ADDENDUM NO. 03 TO

REQUEST FOR PROPOSAL (RFP) FOR CONSTRUCTION MANAGER AS CONSTRUCTOR AT RISK (CMAR), FOR A GUARANTEED MAXIMUM PRICE (GMP)

Thursday, August 7, 2025

ARCHITECT PROJ. NO.: 23008.003

PROJECT:
Nova Classical Academy
Building Improvements and Expansion Project

ARCHITECT:
Bloom Hay Dobbs
2324 University Ave W, Suite 200
Saint Paul, MN 55114

OWNER:
The Friends of Nova Classical Academy

This Addendum is issued to modify, interpret or supplement the Bidding Documents and is hereby made a part of the Request for Proposal (RFP) Documents. Please acknowledge the number of this Addendum in your Proposal. Incorporate the Addendum into the RFP and its exhibits, attachments, and documents even where not directly referenced.

I. GENERAL

Make the following changes to the RFP, Attachments, Exhibits, and Additional Documents. Enclosed documents may not be attached in the order reflected below.

A. CLARIFICATIONS

1. Tectum panels are not currently to be used in ceilings.

2. Include pricing on all items shown in drawings, even if not included in specifications or product information, based on the information provided.

B. BASIS OF DESIGN – PRODUCT INFORMATION FOR GMP PRICING

1. Include the following in the project. Specifications will be developed and refined during the Construction documents phase.
    a. Athletic Equipment Product Information for Basis of Design. (33 pages, attached).
    b. Decorative Fence, Product Information for Screening, Basis of Design: V3 Industrial Ornamental Fencing, V3 Industrial Ornamental Fencing | Fortress Fencing. Match adjacent soccer field fence style. Provide heights indicated in L100. Meet zoning screening requirements.
    c. Exterior signage:
        i. Backlit Aluminum Signs: (Min ¼" Aluminum laser cut channel mount letters, as a BOD.)
            1. For logo and sign facing east towards parking lot on the new building, assume a backlight laser cut aluminum channel sign, with a high quality, baked-on high-gloss enamel for a premium

finish. Sign will be mounted to the facility exterior. Provide a turnkey line-item price. Provide electrical wiring/connection.

2. Provide a building address sign of brushed aluminum letters in the same style as the lettering facing the parking lot (noted above). Location TBD.

ii. For west facing building mounted exterior digital color message board electronic sign, provide an equivalent Daktronics scoreboard mounted on the building exterior. Must be able to be operated from field across the street.

iii. Provide a single monument sign, to include directional sign information, meeting city standards and Nova branding/standards. Provide illumination of sign.

II. ARCHITECTURAL

A. DRAWINGS:

1. The following Drawings have been added or modified. (Attached.) Changes have been clouded and marked with a delta #3.
    a. Illustrative Drawing, Sheet EB-1: Reflects area to receive new flooring at the existing building under Alternate #3.
    b. Drawing Sheet A300: ROOM FINISH SCHEDULE & PARTITION TYPES
    c. Drawing Sheet A310: OPENING SCHEDULE, DOOR, FRAME, WINDOW TYPES
    d. Drawing Sheet A701: WALL SECTIONS - SHELTER
    e. Drawing Sheet A801: INTERIOR ELEVATIONS - SHELTER
    f. Drawing Sheet A802: INTERIOR ELEVATIONS - SHELTER
    g. Drawing Sheet A803: INTERIOR ELEVATIONS
    h. Drawing Sheet A805: INTERIOR ELEVATIONS - 3D VIEW

B. SPECIFICATIONS:

1. The following Specifications have been added or modified. (Attached.)

01 23 00	ALTERNATES
01 33 00	SUBMITTAL PROCEDURES
01 41 00	AIR BARRIER SYSTEM
01 42 00	REFERENCE STANDARDS
01 60 00	PRODUCT REQUIREMENTS
01 78 39	PROJECT RECORD DOCUMENTS
03 41 00	PRECAST STRUCTURAL CONCRETE
03 54 13	GYPSUM CEMENT UNDERLAYMENT
04 20 00	UNIT MASONRY
05 50 00	METAL FABRICATIONS
05 51 10	METAL STAIRS
07 21 13	CONTINUOUS INSULATION NAILBASE
072700	WEATHER BARRIER
07 42 13	METAL WALL PANELS

ARCHITECT: BLOOM COMPANIES, LLC / BLOOM HAY DOBBS

BY: JULIA ROESSLER, PROJECT MANAGER

07 46 46	FIBER CEMENT SIDING
07 53 23	EPDM MEMBRANE ROOFING
08 11 13	HOLLOW METAL DOORS AND FRAMES
08 33 00	TORNADO AND HURRICANE RESISTANT FIRE RATED OVERHEAD COILING DOORS
08 41 13	ALUMINUM FRAMED ENTRANCES AND STOREFRONTS
08 41 23	FIRE RATED STEEL FRAMED ENTRANCES
08 44 13	GLAZED ALUMINUM CURTAIN WALLS
08 83 00	MIRRORS
08 91 00	STORM-RATED METAL BLADE LOUVERS
09 51 00	ACOUSTIC BAFFLES
09 5 000	SUSPENDED WOOD CEILING AND WALL PANEL SYSTEM
09 54 26	ACOUSTIC BAFFLES
09 54 26	LINEAR WOOD CEILINGS
09 65 16	RESILIENT HOMOGENEOUS VINYL SHEET FLOORING
09 65 65	INDOOR RESILIENT ATHLETIC SURFACING
09 65 66	INDOOR MULTI-LAYER RESILIENT ATHLETIC SURFACING
09 83 16	ACOUSTICAL FINISH SYSTEM
09 84 00	ACOUSTICAL WALL PANELS
10 26 00	WALL PROTECTION
10 51 13	METAL LOCKERS
12 49 40	ROLLER SHADES
14 21 23.16	MRL ELECTRIC TRACTION PASSENGER ELEVATORS

III. CIVIL

1. Storm Sewer Manhole in the attached Preliminary Sketch (SK-C01) will move (the final location may be adjusted), as indicated. Provide a turnkey price to for all work, permits, and all costs related to moving the manhole, in the GMP. Provide price as a line item.

END OF ADDENDUM #3

ARCHITECT: BLOOM COMPANIES, LLC / BLOOM HAY DOBBS

BY: JULIA ROESSLER, PROJECT MANAGER

ATHLETIC EQUIPMENT PRODUCT INFORMATION

THE FOLLOWING INFORMATION IS TO PROVIDE A BASIS OF DESIGN AND A BASIS FOR PRICING OF ATHLETIC EQUIPMENT. GMP TO PROVIDE TURN-KEY PRICING TO PROVIDE AND INSTALL ALL ATHLETIC EQUIPMENT. SPECIFICATIONS WILL BE DEVELOPED FURTHER DURING CONSTRUCTION DOCUMENTS.

PRODUCTS INCLUDE:

A. **SCOREBOARDS:** DAKTRONICS MODEL BB-2107, MANUFACTURED BY DAKTRONICS, 201 DAKTRONICS DRIVE, PO BOX 5128, BROOKINGS, SD 57006
PHONE: 1-800-325-8766 OR 605-692-0200 FAX: 605-697-4746
WWW.DAKTRONICS.COM, E-MAIL: SALES@DAKTRONICS.COM

B. **SHELTER ATHLETIC EQUIPMENT: ALL EQUIPMENT TO BE SOURCED BY ONE MANUFACTURER**
   1. BASIS OF DESIGN: PORTER ATHLETIC, PORTER@PORTERATHLETIC.COM, 888-277-7778.
   2. APPROVED EQUAL ONLY WHEN MEETING ALL PERFORMANCE, FINISH, FUNCTION, LAYOUT, AND OTHER REQUIREMENTS:
      a. DRAPER, WWW.DRAPERINC.COM, 411 SOUTH PEARL ST., SPICELAND, INDIANA 47385 USA, 765-987-7999, 800-238-7999
      b. BISON, 603 L STREET LINCOLN, NE 68508, TEL 1-800-247-7668, BISONINC.COM
   3. FINISH/COLOR OPTIONS TO BE SELECTED BY OWNER FROM MANUFACTURERS FULL LINE OF AVAILABLE STANDARD FINISHES.

C. **EQUIPMENT CONTROL SYSTEM:** MODEL NO. 12555 POWR-TOUCH 2.5 SIMULTANEOUS OPERATION GYMNASIUM CONTROL CENTER.

D. **BASKETBALL EQUIPMENT:**
   1. **BASKETBALL BACKSTOPS:** MODEL NO. 90955000 SIDE FOLD OVERHEAD-SUPPORTED BASKETBALL BACKSTOP. BACK BRACED 18'-28' ATTACHMENT HEIGHT
   2. **BASKETBALL BACKBOARDS**: MODEL NO: 208 - RECTANGULAR GLASS BACKBOARD
   3. **BASKETBALL BACKBOARD HEIGHT ADJUSTERS:** MODEL NO. 00900506 MANUAL HEIGHT ADJUSTER – CENTER STRUT
   4. **BASKETBALL WINCHES**: MODEL NO. 713 1 HP ELECTRIC WINCH
   5. **WALL MOUNTED BASKETBALL BACKSTOPS:** MODEL NO. 90220000 WALL MOUNTED, SIDE FOLD UNIT
   6. **BASKETBALL GOALS:** MODEL NO. 236054 ULTRA-FLEX II GOAL
   7. **CEILING SUSPENDED BASKETBALL BACKSTOP ACCESSORIES:** MODEL NO. 797 LOCKING SAFETY STRAP

E. **VOLLEYBALL EQUIPMENT**
   1. **OVERHEAD VOLLEYBALL NETS; OVERHEAD-SUPPORTED VOLLEYBALL SYSTEMS:** MODEL NO. 91920100 OVERHEAD-SUPPORTED VOLLEYBALL SYSTEM WITH JUDGE'S STAND.

F. **DIVIDER CURTAINS:** MODEL NO. 2080 WITH BOTTOM PAD (BOTTOM SUPPORT TUBE SHALL BE ENCASED IN A 2-1/8" O.D., CLOSED CELL SHOCK ABSORBING TYPE PROTECTIVE FOAM RUBBER PADDING) AND TORQUE ARM SAFETY STRAP. QUANTITY: TWO (2) DIVIDER CURTAINS.

G. CRASH PADS: PORTER NO. 570 SUPERSAFE FR WALL PAD W/CUSTOM GRAPHICS: COLOR TO BE SELECTED FROM MFR. FULL STD. RANGE.

SCOREBOARDS

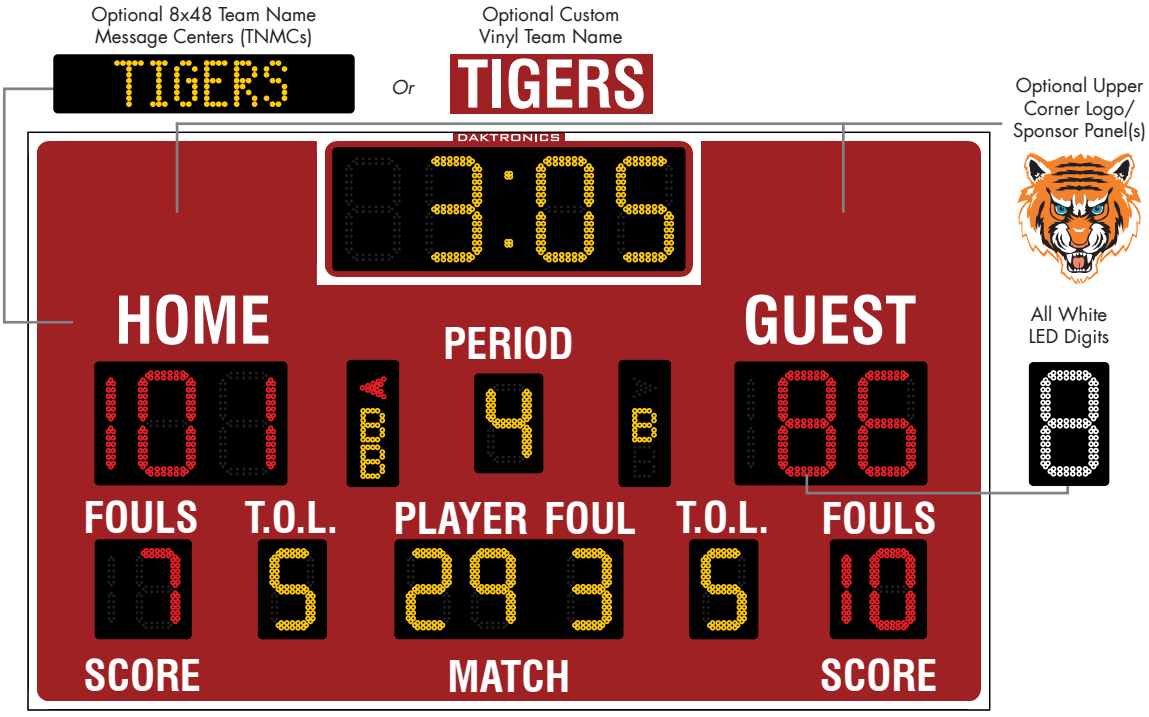
IMAGE OF THE EXISTING SCOREBOARD BELOW. (MOVED UNDER ALTERNATE #5.)

UNDER THE GMP FOR THIS PROJECT THERE WILL BE TWO (2) NEW SCOREBOARDS IN THE NEW BUILDING IN ROOM "SHELTER 100". THE EXACT LOCATION IS YET TO BE DETERMINED BY THE OWNER. PROVIDE EVERYTHING IN THE GMP PRICE TO PROVIDE AND INSTALL THE SCOREBOARDS. INCLUDE ONE - 1 HOUR TRAINING SESSION - FROM DAKTRONICS ON USING THE NEW SCOREBOARDS.

UNDER ALTERNATE #5: THERE WILL BE ONE NEW SCOREBOARD ADDED IN THE EXISTING BUILDING IN THE GYM, HE LOCATION IS YET TO BE DETERMINED BY THE OWNER. ADDITIONALLY, THE SCOREBOARD BELOW WILL BE MOVED TO THE LOCATION IN THE GYM, AS SELECTED BY THE OWNER.

THE PRODUCT INFORMATION FOR THE DAKTRONICS SCOREBOARD TYPE FOR ALL NEW SCOREBOARDS, FOLLOWS ON THE NEXT PAGES.

DAKTRONICS BB-2107 PRODUCT SPECIFICATIONS



This indoor single-sided LED basketball scoreboard displays period time to 99:59, HOME and GUEST scores to 199, PERIOD to nine, PLAYER number to 99, player FOUL to nine, team FOULS to 19, T.O.L. (time outs left) to nine and indicates possession and bonus. Scoreboard can also score volleyball and wrestling. When period time is less than one minute, the scoreboard displays time to 1/10 of a second.

CAPTION OPTIONS	POWER (120 VAC)*	UNCRATED WEIGHT	DIMENSIONS
VINYL ONLY (STANDARD)	220 Watts, 1.9 Amps	260 lb (118 kg)	6'-0" H x 10'-0" W x 6" D (1.83 m x 3.05 m x 152 mm)
VINYL & TNMCS	280 Watts, 2.4 Amps	275 lb (125 kg)	

**Models with 240 VAC power at half the indicated amperage are also offered (International Use Only).*

DIGITS & INDICATORS

- Clock and score digits are 13" (330 mm) high. All other digits are 10" (254 mm) high. Bonus indicators are 4" (102 mm) high and possession arrows are 3" (76 mm) high.
- Scoreboard features PanaView® LED digit technology.
- Scoreboard comes with choice of LED colors:
  - > ***Red/Amber LEDs:*** clock, PERIOD, PLAYER/FOUL, T.O.L. digits, Bonus indicators and optional TNMCs are amber. Scores and FOULS digits and possession indicators are red.
  - > ***White LEDs:*** all digits, indicators and optional TNMCs are white.

CAPTIONS & STRIPING

- HOME and GUEST captions are 6" (152 mm) high. All other captions are 4" (102 mm) high. Optional TNMCs are 6" (152 mm) high.
- Standard captions and border striping are white vinyl. Choose another vinyl color at no additional cost (see DD2101644).

DISPLAY COLOR

Choose a color from the Daktronics standard paint book (see SI-02730).

CONSTRUCTION

Durable, lightweight aluminum Tuff Sport® cabinet withstands high-velocity impact from air-filled sports balls without the need for protective screens.

PRODUCT SAFETY APPROVAL

ETL-listed, tested to CSA standards, and CE-labeled
for indoor use only

OPERATING TEMPERATURES

- Display: -22° to 122° Fahrenheit (-30° to 50° Celsius)
- Console: 32° to 130° Fahrenheit (0° to 54° Celsius)

WWW.DAKTRONICS.COM E-MAIL: SALES@DAKTRONICS.COM

201 Daktronics Drive, PO Box 5128, Brookings, SD 57006
Phone: 1-800-325-8766 or 605-692-0200 Fax: 605-697-4746

DAKTRONICS

DAKTRONICS BB-2107 PRODUCT SPECIFICATIONS

CONTROL CONSOLE	CONTROL OPTIONS
All Sport® 5000 (see SL-03991)	***Wireless:*** 2.4 GHz spread spectrum radio features 64 non-interfering channels and 8 broadcast groups (see SL-04370). This is a popular upgrade.
	Wired: One-pair shielded cable of 22 AWG minimum is required. A cover plate with mounted connector and standard 2" x 4" x 2" (51 mm x 102 mm x 51 mm) outlet box is provided. Connector mates with signal cable from control console.

HORN
A vibrating horn, mounted behind the scoreboard face, sounds automatically when period/timeout clock counts down to zero or manually as controlled by the operator.

SEGMENT TIMER MODE
The segment timer mode is ideal for keeping practices on schedule. The horn at the end of a segment allows coaches and athletes to focus on the practice and to listen for the horn when it is time to change drills (see SL-04004).

TIME OF DAY MODE
This scoreboard features a Time of Day (TOD) mode that allows it to act as a clock when the control console is unplugged or off. Refer to the scoreboard installation manual for instructions on how to enable the Time of Day mode.

GENERAL INFORMATION
Scoreboard provides scoring capabilities for two teams. 100% solid state electronics are housed in an all aluminum cabinet. Scoreboard arrives at the site fully assembled. Mounting hardware not included. Specifications and pricing are subject to change without notice.

FAN FAVORITE OPTIONS
These are the most commonly requested enhancements:
- Custom vinyl team name caption in place of HOME *or* Two Digital Team Name Message Centers (TNMCs) in place of HOME and GUEST captions (see SL-04342)
- 17" tall x 33" wide (432 mm x 838 mm) logo/sponsor panels in upper corners

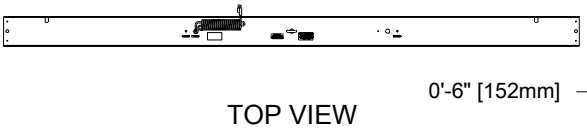
OTHER ACCESSORIES & UPGRADES
The options below are available for additional customization:
- Volleyball and wrestling captions on changeable panels
- Advantage time option for wrestling mode – PLAYER and FOUL digits reversed (see SL-03679)
- Different sounding 12 VDC horn in place of buzzer
- Protective screen (see SL-02551)
- Suspension installation kit *or* corner mounting kit

COMPLETE YOUR SYSTEM
Contact Daktronics about adding any of this equipment to create a unique scoring and display system:
- Backlit advertising/ID panels (see SL-03664)
- Non-backlit advertising/ID panels (see SL-03917)
- Decorative accents
- Statistic displays, shot clocks, and light strips
- Sportsound® Indoor Audio
- Video displays
- Live web streaming of scores and stats

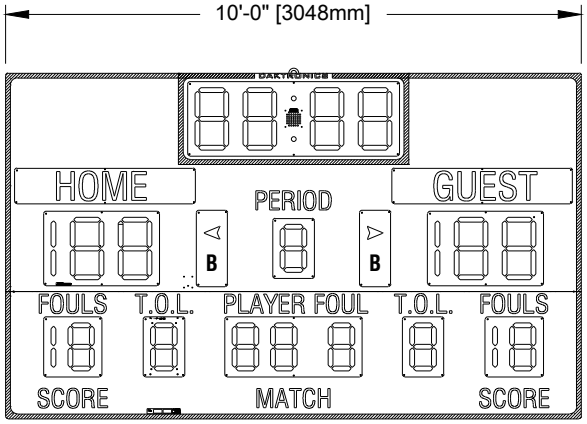
FOR ADDITIONAL INFORMATION
- Mechanical Specifications: DWG-1131234 (attached)
- Component Locations: DWG-1131235 (attached)
- Architectural Specifications: See SL-04791
- Installation Manual: See DD2481645
- Service Manual: See DD2481648

DAKTRONICS

BB-2107/BB-3107

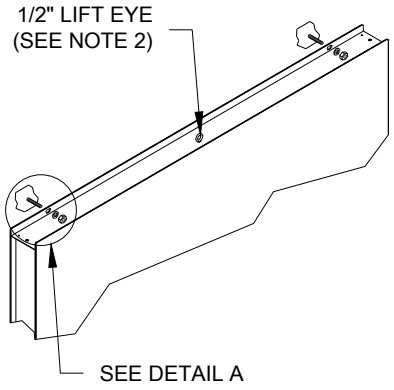


TOP VIEW

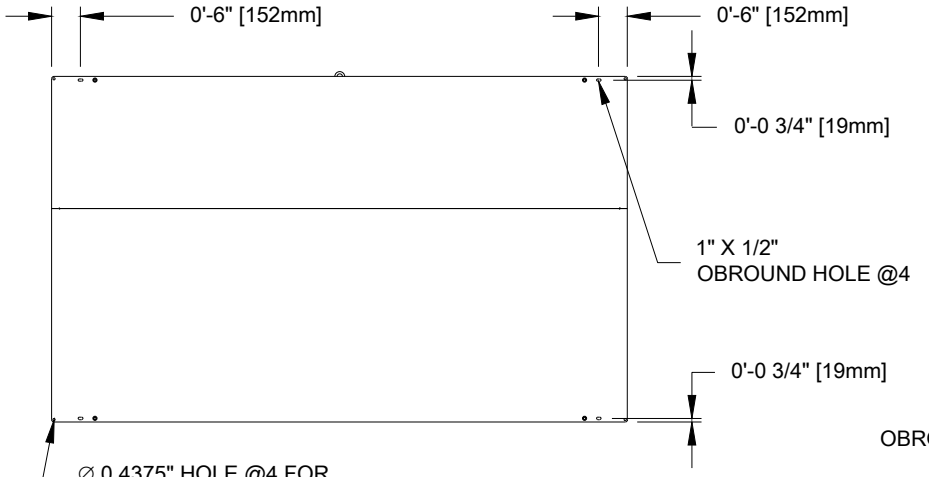


FRONT VIEW

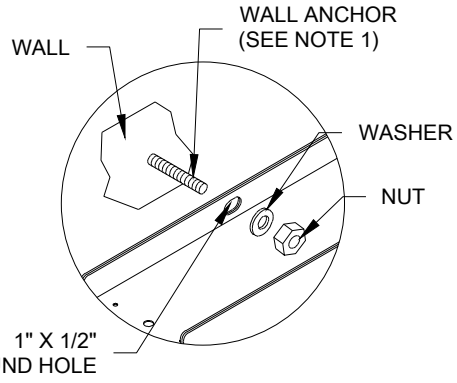
SIDE VIEW



WALL MOUNTING DETAIL



REAR VIEW



DETAIL: A
(SCALE 1=10)

NOTES:

1. USE APPROPRIATE WALL ANCHORS FOR TYPE OF WALL. (NOT PROVIDED BY DAKTRONICS)

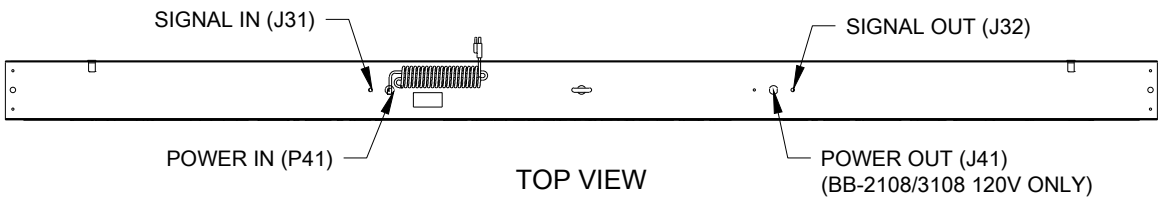
2. LIFT EYE IS FOR TEMPORARY USE WHILE LIFTING SCOREBOARD DURING INSTALLATION. DO NOT USE LIFT EYE FOR PERMANENT SUSPENSION. (REFER TO DWG-1130959)

WEIGHTS	
SHIPPING WEIGHT	MOUNTING WEIGHT
395 LBS (179 KG)	260 LBS (118 KG)

DAKTRONICS, INC.
BROOKINGS, SD 57006
DO NOT SCALE DRAWING

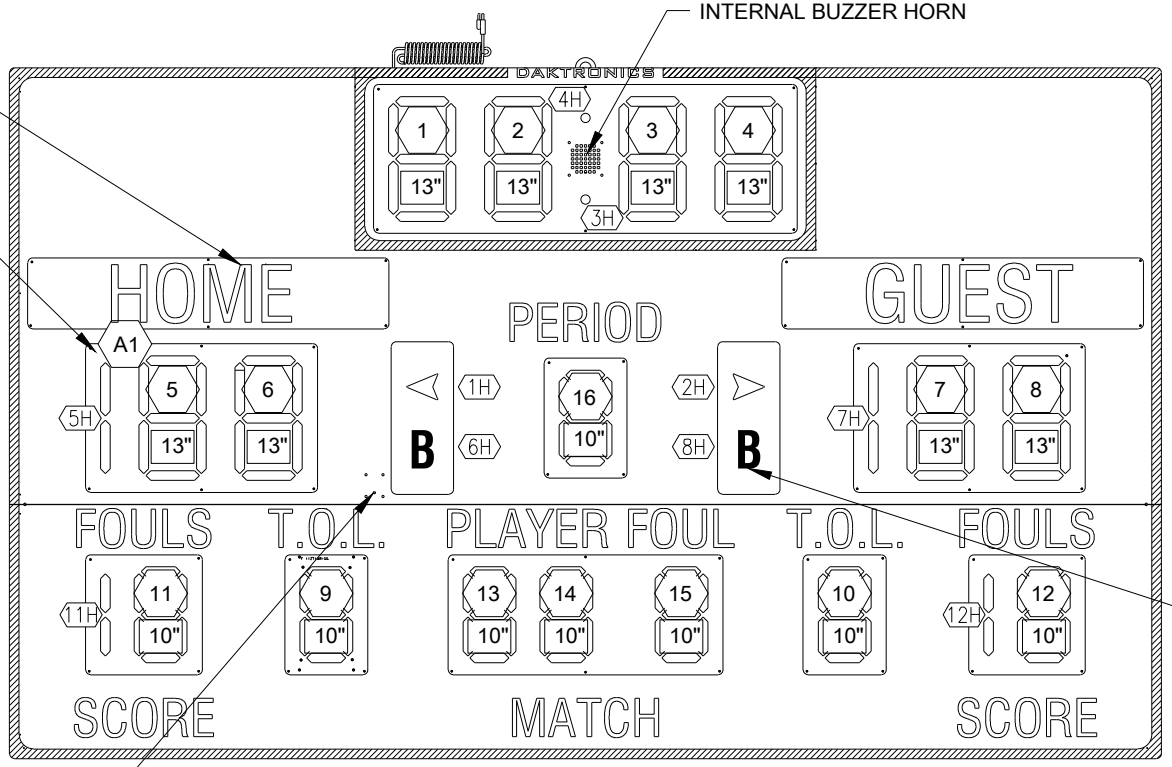
PROJ: INDOOR SCOREBOARDS				
TITLE: MECHANICAL SPEC; BB-2107/BB-3107				
DESIGN: KDRAGT		DRAWN: KDRAGT		DATE: 25 MAR 13
SCALE: 1=40				
SHEET	REV	JOB NO:	FUNC-TYPE-SIZE	1131234
	00	P1749	E - 10 - A	

BB-2107/3107 & BB-2108/3108 FACE



TOP VIEW

SIDE VIEW



FRONT VIEW

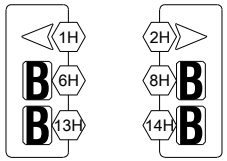
NOTES:

7 = DIGIT DESIGNATION = IN RELATION TO DRIVER

24" = DIGIT SIZE

1H = SEGMENT DESIGNATION

A1 = DRIVER NUMBER



OPTIONAL DOUBLE
BONUS INDICATORS

DETAIL: A

SCALE 1:1

REV	DATE:		BY:	
02	28 MAY 19	PER CN-80249: REPLACED LL-2525 LABELS WITH LL-4172151 LABELS.	AGM	
01	02 FEB 15	PER EC-17119, REMOVED DRIVER DETAILS, ADDED PRIMARY,120V SPECIFICATIONS	KDB	

THIRD ANGLE PROJECTION

PROJECT:	INDOOR SCOREBOARDS			
TITLE:	COMPONENT LOCATION; BB-2107/2108/3107/3108			
DATE: 25 MAR 13	DIM UNITS: INCHES [MILLIMETERS]		SHEET	REV 02
SCALE: 1=20	DO NOT SCALE DRAWING			
DESIGN: KDRAGT	JOB NO.	FUNC - TYPE - SIZE	1131235	
DRAWN: KDRAGT	P1749	E - 10 - A		

2.2 Equipment Control System

Model No. 12555 Powr-Touch 2.5 simultaneous operation gymnasium control center

1. Operation: Push-button control system capable of operating a maximum of 128 basketball backstops or other gymnasium equipment and a maximum of 32 units of auxiliary gymnasium electrical equipment.
2. Operation Safety: For safety of operation, touch pad requires constant pressure on pad button to control gymnasium equipment.
3. Control of Auxiliary Equipment: Single touch of appropriate button.
4. Equipment shall be operated individually or simultaneously by pressing single button. Control systems incapable of simultaneous control operation shall not be considered equal.
5. Each Relay: Programmed to accept 8 memory address assignments for a maximum of 8 different operation combinations for each basketball backstop, height adjuster, or curtain. Operate 1, 2, 3, and up to 8 units individually or simultaneously, curtain simultaneous maximum is 4 units for safety.
6. Desired Operation Mode: Selected at touch pad by entering assigned backstop, height adjuster, or curtain number or combination backstops or height adjusters number.
7. Security Code: Four-digit reprogrammable security code to prevent unauthorized use.
8. Time Delay: Touch pad shall automatically revert back to secure mode if no button is used within 30 seconds.
9. Multiple Locations: Maximum of 7 touch pads may be used when operation from various locations is desirable.
10. Mounting: Flush mounted in standard 2-gang electrical box, 4 inches by 4 inches by 2-1/2 inches, with 12-volt control circuit to relay panels located on walls or roof framing structure.
11. Relay Panels: Minimum of 1 dual-powered relay panel, with a maximum of 16 relay panels per network. Each relay panel shall contain 2 banks of eight 30-amp relays for operating 8 momentary-controlled type (up and down), 120-volt or low-voltage pieces of equipment. Each bank of relays shall be independently powered by 120-volt line power, with 2 dedicated circuit breakers per relay panel. Each relay panel shall include 2 maintained 30-amp relays.
12. Relay Panel Enclosure: 4-3/8 inches by 14 inches by 17 inches.
13. Touch Pad LEDs: Tri-color LED at touch pad for positive user feedback. Illuminates when proper security code is entered (green), when confirming touch pad button is fully depressed (amber), and while operating equipment up or down (red). Additional LEDs at touch pad and relay panel circuit boards to ensure system is receiving power, wired correctly, and relays are functioning properly.
14. Touch Pad Wiring: Fuse protected for additional circuit protection.
15. Legend: Control system shall come with Porter's custom graphical equipment legend to help user identify each piece of equipment.
16. Warranty: 1 year limited warranty.

2.2 BASKETBALL BACKSTOPS

Specifier Notes: Model No. 955 has three separate Attachment Height Ranges listed below (18'-28'/28'-32'/32'-40') and two types of brace (front and back).

Model No. 90955000 Side Fold overhead-supported basketball backstop. Back Braced 18'-28' Attachment Height

1. Frame: Fully welded, vertical front frame assembly consisting of main center Mast of 6-5/8-inch O.D. heavy-wall structural steel tube with diagonal Back sway braces of 2-1/2-inch rectangular steel tube. Bolt-together frames are not acceptable.
2. Structure: Supported from 3-1/2-inch O.D. pipe or tube anchored to overhead framing members with heavy formed-steel support fittings. Fittings must be capable of supporting load exceeding 10,000 pounds with sufficient attachment points and meeting safety factor of 60 to 1. Furnish certified test results with submittals.
3. Goals: Mount directly through backboard and into heavy structural steel weldment Center-Strut, clamped to vertical 6-5/8-inch O.D. center support to eliminate strain on backboard, should player hang on front-mounted goal and to be in compliance with NCAA and NFSHSA requirements.
4. Pipe Ends: Cap when exposed.
5. Finish: Metal Parts, Pipes, and Fittings shall be powder coated, color specified at later time
6. Attachments: Clamping devices used in attaching backboards and other components shall be of u-bolt design providing uniform clamping force around mast, Clamps that provide non-uniform clamping will not be considered equal.
7. Safety Indicator Clamp Required: Mast Attachment Indicator must be capable of supporting backboard and all weight attached to the mast with a minimum safety factor of 4, with visible indication if indicator clamp is supporting weight or if any attachments have moved.
8. Frame Hangers: Tested to 20,000 pounds maximum breaking point to achieve safety factor of 50 to 1. Furnish certified test results with submittals. Minimum of 2-inches of adjustability for precise plumbing of backstop.
9. Frame Hangers: Offset minimum of 1-1/2 inches from center line of main center mast to properly weight lock unit in playing position
10. Brace: Operate with 1-7/8-inch O.D. brace with folding mechanism that locks backboard in playing position with internal torsion spring that must be mechanically disengaged by the hoist cable.
11. Warranty: 25 Year limited warranty on backstop structure.

Model No. 90955000 Side Fold overhead-supported basketball backstop. Back Braced 28'-32' Attachment Height

1. Frame: Fully welded, vertical front frame assembly consisting of main center Mast of 6-5/8-inch O.D. heavy-wall structural steel tube with diagonal Back sway braces of 2-1/2-inch rectangular steel tube. Bolt-together frames are not acceptable.
2. Structure: Supported from 3-1/2-inch O.D. pipe or tube anchored to overhead framing members with heavy formed-steel support fittings. Fittings must be capable of supporting

load exceeding 10,000 pounds with sufficient attachment points and meeting safety factor of 60 to 1. Furnish certified test results with submittals.

3. Goals: Mount directly through backboard and into heavy structural steel weldment Center-Strut, clamped to vertical 6-5/8-inch O.D. center support to eliminate strain on backboard, should player hang on front-mounted goal and to be in compliance with NCAA and NFSHSA requirements.
4. Pipe Ends: Cap when exposed.
5. Finish: Metal Parts, Pipes, and Fittings shall be powder coated, color specified at later time
6. Attachments: Clamping devices used in attaching backboards and other components shall be of saddle clamp design providing uniform clamping force around mast, Clamps that provide non-uniform clamping will not be considered equal.
7. Safety Indicator Clamp Required: Mast Attachment Indicator must be capable of supporting backboard and all weight attached to the mast with a minimum safety factor of 4, with visible indication if indicator clamp is supporting weight or if any attachments have moved.
8. Frame Hangers: Tested to 20,000 pounds maximum breaking point to achieve safety factor of 50 to 1. Furnish certified test results with submittals. Minimum of 2-inches of adjustability for precise plumbing of backstop.
9. Frame Hangers: Offset minimum of 1-1/2 inches from center line of main center mast to properly weight lock unit in playing position
10. Brace: Operate with 2-3/8-inch O.D. brace with folding mechanism that locks backboard in playing position with internal torsion spring that must be mechanically disengaged by the hoist cable.
11. Warranty: 25 Year limited warranty on backstop structure.

Model No. 90955000 Side Fold overhead-supported basketball backstop. Back Braced 32’-40’ Attachment Height

1. Frame: Vertical Front Frame Assembly: Main center Mast of 6-5/8-inch O.D. heavy-wall structural steel tube with diagonal side-sway braces of 2-3/8-inch O.D. structural pipe
2. Structure: Supported from 3-1/2-inch O.D. pipe or tube anchored to overhead framing members with heavy formed-steel support fittings. Fittings must be capable of supporting load exceeding 10,000 pounds with sufficient attachment points and meeting safety factor of 60 to 1. Furnish certified test results with submittals.
3. Goals: Mount directly through backboard and into heavy structural steel weldment Center-Strut, clamped to vertical 6-5/8-inch O.D. center support to eliminate strain on backboard, should player hang on front-mounted goal and to be in compliance with NCAA and NFSHSA requirements.
4. Pipe Ends: Cap when exposed.
5. Finish: Metal Parts, Pipes, and Fittings shall be powder coated, color specified at later time
6. Attachments: Clamping devices used in attaching backboards and other components shall be of saddle clamp design providing uniform clamping force around mast, Clamps that provide non-uniform clamping will not be considered equal.
7. Safety Indicator Clamp Required: Mast Attachment Indicator must be capable of supporting backboard and all weight attached to the mast with a minimum safety factor of 4, with visible indication if indicator clamp is supporting weight or if any attachments have moved.

8. Frame Hangers: Tested to 20,000 pounds maximum breaking point to achieve safety factor of 50 to 1. Furnish certified test results with submittals. Minimum of 2-inches of adjustability for precise plumbing of backstop.
9. Brace: Operate with 2-3/8-inch O.D. brace with folding mechanism that locks backboard in playing position with internal torsion spring that must be mechanically disengaged by the hoist cable.
10. Warranty: 25 Year warranty on backstop structure

Specifier Notes: Models listed below are front braced

Model No. 90955000 Side Fold overhead-supported basketball backstop. Front Braced 18'-28' Attachment Height

1. Frame: Fully welded, vertical front frame assembly consisting of main center Mast of 6-5/8-inch O.D. heavy-wall structural steel tube with diagonal Front sway braces of 2-1/2-inch rectangular steel tube. Bolt-together frames are not acceptable.
2. Structure: Supported from 3-1/2-inch O.D. pipe or tube anchored to overhead framing members with heavy formed-steel support fittings. Fittings must be capable of supporting load exceeding 10,000 pounds with sufficient attachment points and meeting safety factor of 60 to 1. Furnish certified test results with submittals.
3. Goals: Mount directly through backboard and into heavy structural steel weldment Center-Strut, clamped to vertical 6-5/8-inch O.D. center support to eliminate strain on backboard, should player hang on front-mounted goal and to be in compliance with NCAA and NFSHSA requirements.
4. Pipe Ends: Cap when exposed.
5. Finish: Metal Parts, Pipes, and Fittings shall be powder coated, color specified at later time
6. Attachments: Clamping devices used in attaching backboards and other components shall be of saddle clamp design providing uniform clamping force around mast, Clamps that provide non-uniform clamping will not be considered equal.
7. Safety Indicator Clamp Required: Mast Attachment Indicator must be capable of supporting backboard and all weight attached to the mast with a minimum safety factor of 4, with visible indication if indicator clamp is supporting weight or if any attachments have moved.
8. Frame Hangers: Tested to 20,000 pounds maximum breaking point to achieve safety factor of 50 to 1. Furnish certified test results with submittals. Minimum of 2-inches of adjustability for precise plumbing of backstop.
9. Frame Hangers: Offset minimum of 1-1/2 inches from center line of main center mast to properly weight lock unit in playing position
10. Brace: Operate with 1-7/8-inch O.D. brace with folding mechanism that locks backboard in playing position with internal torsion spring that must be mechanically disengaged by the hoist cable.
11. Warranty: 25 Year warranty on backstop structure

Model No. 90955000 Side Fold overhead-supported basketball backstop. Front Braced 28'-32' Attachment Height

1. Frame: Fully welded, vertical front frame assembly consisting of main center Mast of 6-5/8-inch O.D. heavy-wall structural steel tube with diagonal Front sway braces of 2-1/2-inch rectangular steel tube. Bolt-together frames are not acceptable.
2. Structure: Supported from 3-1/2-inch O.D. pipe or tube anchored to overhead framing members with heavy formed-steel support fittings. Fittings must be capable of supporting load exceeding 10,000 pounds with sufficient attachment points and meeting safety factor of 60 to 1. Furnish certified test results with submittals.
3. Goals: Mount directly through backboard and into heavy structural steel weldment Center-Strut, clamped to vertical 6-5/8-inch O.D. center support to eliminate strain on backboard, should player hang on front-mounted goal and to be in compliance with NCAA and NFSHSA requirements.
4. Pipe Ends: Cap when exposed.
5. Finish: Metal Parts, Pipes, and Fittings shall be powder coated, color specified at later time
6. Attachments: Clamping devices used in attaching backboards and other components shall be of saddle clamp design providing uniform clamping force around mast, Clamps that provide non-uniform clamping will not be considered equal.
7. Safety Indicator Clamp Required: Mast Attachment Indicator must be capable of supporting backboard and all weight attached to the mast with a minimum safety factor of 4, with visible indication if indicator clamp is supporting weight or if any attachments have moved.
8. Frame Hangers: Tested to 20,000 pounds maximum breaking point to achieve safety factor of 50 to 1. Furnish certified test results with submittals. Minimum of 2-inches of adjustability for precise plumbing of backstop.
9. Frame Hangers: Offset minimum of 1-1/2 inches from center line of main center mast to properly weight lock unit in playing position
10. Brace: Operate with 2-3/8-inch O.D. brace with folding mechanism that locks backboard in playing position with internal torsion spring that must be mechanically disengaged by the hoist cable.
11. Warranty: 25 Year warranty on backstop structure

Model No. 90955000 Side Fold overhead-supported basketball backstop. Front Braced 32’-40’ Attachment Height

1. Frame: Vertical Front Frame Assembly: Main center Mast of 6-5/8-inch O.D. heavy-wall structural steel tube with diagonal side-sway braces of 2-3/8-inch O.D. structural pipe
2. Structure: Supported from 3-1/2-inch O.D. pipe or tube anchored to overhead framing members with heavy formed-steel support fittings. Fittings must be capable of supporting load exceeding 10,000 pounds with sufficient attachment points and meeting safety factor of 60 to 1. Furnish certified test results with submittals.
3. Goals: Mount directly through backboard and into heavy structural steel weldment Center-Strut, clamped to vertical 6-5/8-inch O.D. center support to eliminate strain on backboard, should player hang on front-mounted goal and to be in compliance with NCAA and NFSHSA requirements.
4. Pipe Ends: Cap when exposed.
5. Finish: Metal Parts, Pipes, and Fittings shall be powder coated, color specified at later time
6. Attachments: Clamping devices used in attaching backboards and other components shall be of saddle clamp design providing uniform clamping force around mast, Clamps that provide non-uniform clamping will not be considered equal.

7. Safety Indicator Clamp Required: Mast Attachment Indicator must be capable of supporting backboard and all weight attached to the mast with a minimum safety factor of 4, with visible indication if indicator clamp is supporting weight or if any attachments have moved.
8. Frame Hangers: Tested to 20,000 pounds maximum breaking point to achieve safety factor of 50 to 1. Furnish certified test results with submittals. Minimum of 2-inches of adjustability for precise plumbing of backstop.
9. Brace: Operate with 2-3/8-inch O.D. brace with folding mechanism that locks backboard in playing position with internal torsion spring that must be mechanically disengaged by the hoist cable.
10. Warranty: 25 Year warranty on backstop structure

2.2 BASKETBALL BACKBOARDS

Model No: 208 - Rectangular Glass Backboard

1. Backboards: 2-5/16-inch thick frame, 72 inches by 42 inches, 1/2-inch tempered plate glass cushioned in fully welded, unitized steel-tubing frame.
2. Perimeter: Glare-free aluminum.
3. Goal Mount Structure: Provided with two mounting holes and hardware to independently secure backboard to a direct mount goal feature which relieves all stress and shock on the backboard frame.
4. Rear Backboard Frame: Finished in a durable neutral gray powder coated finish.
5. Front Perimeter Frame: Secured to unitized rear frame with structural truss head rivets.
6. Glass Section: Fitted with shock absorbing neoprene material to cushion and project the glass section.
7. Goal Mounting Holes: (4) to be on standard 5” (horizontal) x4-1/2” (vertical) mounting centers.
8. Standard White Borders and Target Area: Fired into glass permanently.
9. Warranty: Limited lifetime warranty against breakage when installed on Porter Center-Strut support systems

2.2 BASKETBALL BACKBOARD HEIGHT ADJUSTERS

Specifier Notes: Model No. 00900506 can be combined with optional Portable Operator Kit for Manual Height Adjusters

Model No. 00900506 Manual Height Adjuster – Center Strut

1. Operation: Height adjustment unit shall be designed for use with No. 900 Center-Strut R series ceiling suspended basketball backstop support systems to provide an adjustable, direct-mount (Center-Strut R) goal attachment system to eliminate any strain on the backboard should a player hang on the front mounted goal (conforms to the latest NCAA recommendation). Height adjustment units without the prescribed direct-mount goal feature will not be approved as equal. Height adjustment feature will allow goal height settings from 8'-0" to the official 10'-0" for use by all age groups. For use on No. 208 rectangular glass.
2. Materials: Center unitized support frame shall be fabricated by dual, 2-3/16" square heavy-wall zinc plated guide tubes located on 11-3/16" centers. Ends of guide tubes shall be welded to heavy formed mounting brackets. Heavy formed, die cut steel clamp assemblies (2) shall be provided for securing height adjustment assembly directly to a 6-5/8" O.D. center support structure (No. 900 Center-Strut R series basketball backstops). Outer dual slide tubes shall support heavy structural steel angle sections which extend downward to accept a direct-mount (Center-Strut R) goal mounting system. Slide tube assembly shall be provided with a heavy formed steel section to attach a special upper backboard support assembly to secure the unit to the upper two corners of the rectangular backboard on standard (5'-6") mounting centers.
3. Adjustment Mechanism: Height adjustment unit shall incorporate a centrally located 3/4" diameter acme threaded rod equipped with precision, hardened steel roller thrust bearings for ease of operation from the playing floor by means of an awning crank type mechanism. Height adjustment system shall incorporate an internal, spring-loaded height locking mechanism to automatically lock and hold unit at any desired goal height during play. Lock mechanism automatically releases when height setting changes are made with adjustment crank assembly. Adjustment crank assembly shall be provided with each pair of height adjustment units. A height setting scale shall be located on the side of the unit to visually determine height settings from 8'-0" to 10'-0" in 3" increments.
4. Coating: Height adjustment frame shall be finished with one coat of flat black enamel.
5. Mounting: Hardware shall be furnished for mounting unit to a 6-5/8” O.D. vertical support tube.
6. Warranty: Height Adjusters furnished with a 1-year limited warranty.

2.2 BASKETBALL WINCHES

Model No. 713 1 HP Electric Winch

1. Hoist Cable: Of sufficient length to each backstop. 1/4-inch diameter galvanized aircraft-type cable, minimum of 7,000 pounds ultimate.
2. Drum: Will hold 41ft of cable on a single layer. The top speed of the cable is 14.3 ft. /min.
3. Swivel Pulleys: 4-inch diameter cast iron pulley sheave with maintenance-free, oil-impregnated bearing for proper hoist cable routing to winch.
4. Pulley Assembly and Attachment to 3-1/2-Inch O.D. Support Structure: Rated at minimum 9,000-pound load rating. Furnish certified test results with submittals.
5. Hold units at any position when raising or lowering.
6. Saf Strap: Provide speed sensitive automatic lock designed to engage in the event of an over-speed occurrence. Must be able to withstand test using 1750 lb. fall weight. Must be able to provide independent lab test results. Capable of being automatically reset without the use of poles, ropes, levers, or buttons.
7. Warranty: 5 year limited warranty.

2.2 WALL MOUNTED BASKETBALL BACKSTOPS

Model No. 90220000 Wall mounted, side fold unit 4’ to 10’ face of backboard to wall

1. Backstop: Shall be wall-mounted side-fold type with face of backboard extended 4’-0” to 10’-0” from supporting wall. Backstop provided with specified backboard and goal.
2. Extension Frames: Shall be fabricated of four (4) 1-7/8" O.D. tubes with a telescoping end section for ease of installation, and precise plumbing and alignment of backboard with official court markings, even when supported on uneven wall conditions. Ends of telescoping extension frame assemblies shall be drilled and bolted to hinge plate assemblies (short and long) for attachment to the backside of the backboard and to the wall pads. The hinge plate assemblies shall be offset-type, to allow backstop to be folded to a position nearly flat against the wall. The direction of fold is determined at the time of installation by placement of the hinge plate assemblies.
3. Bracing: Shall be vertically braced with two (2) 3/16" x 1-1/4" steel tension flats attached at both ends with precision die-formed clamps. Two (2) chain supports (3/16" proof coil chain) shall extend diagonally from the wall to the upper extension tubes, terminating in clamp-type fittings.
4. Telescoping Brace: Backstop shall be locked into the playing and storage positions by means of a 1-7/8" O.D. telescoping tube assembly, running diagonally across the lower extension tubes. An extension crank shall be provided (one for every two backstops) to operate telescoping brace from the floor. Crank engages eyebolt on telescoping brace to lock it in position. Crank is also used to pull backstop to playing or storage positions.
5. Wood Pads: Southern yellow pine wall pads shall be provided at all wall attachment points. All edges shall be chamfered and pads shall be finished with two finish coats of natural gloss lacquer. Wood pads help distribute loads to walls. Some walls may not require wood pads.
6. Coating: All metal parts shall be powder coated.
7. Warranty: 10 year limited warranty.

2.2 BASKETBALL GOALS

Model No. 236054 Ultra-Flex II goal

1. Goal: Positive-lock, pressure-release mechanism which is preset to provide rebound characteristics identical to those of a non-movable ring. Spring-loaded to automatically and instantaneously return to playing position.
2. Pressure Release Mechanism: Factory preset with capability for field adjustment to comply with NCAA recommendation to test goals for rebound elasticity.
3. Breakaway goals with plastic-pivot bearings are not acceptable.
4. Rim: 18 inch diameter, made with 5/8 inch diameter cold drawn, alloy steel, rigidly braced by 3/16-inch thick steel formed and die-cut steel brace welded in position on underside of rim for maximum support. Inside diameter of ring shall be positioned 6” from face of backboard by a heavy formed steel, hinged type housing with a removable cover to conceal mounting bolts and spring mechanisms of goal, and also protect against finger entrapment.
5. Goal Mounting Plate: Shall be provided with hardware and a 5” x 4” mounting hole pattern for front mounting on standard glass, wood and fiberglass backboards and is also compatible for use with all Center-Strut direct mount type support frames.
6. Net Attachment: Tube-tie net attachment system on rim to eliminate conventional wire-formed net locks.
7. Net: Anti-whip, white net.
8. Finish: Official orange powder coated.
9. Warranty: 5 year limited warranty when installed on Porter Center-Strut support systems.

2.2 CEILING SUSPENDED BASKETBALL BACKSTOP ACCESSORIES

Model No. 797 Locking Safety Strap

1. Function: The safety strap shall be directly speed sensitive to automatically lock a basketball backstop, divider curtain, or other piece of ceiling-suspended equipment in position at any time. The device will lock, whether in storage or during the raising/lowering cycle, in the event of an over-speed occurrence due to a malfunction of the hoisting apparatus, such as winch, cable, pulleys, support fittings, etc. Any increase in cycle speed or tension, whether sudden or gradual, immediately activates the locking device.
2. Unit Strength: The device shall incorporate a 2” wide polyester belt with a breaking strength of 6000 lbs. The entire unit must be capable of withstanding a test using a 1750 lb. falling weight, without strap failure or structural damage.
3. Locking Mechanism: The locking mechanism must be fail-safe, meaning that any sticking, jamming or breakage of any of the components of the arresting mechanism results in immediate, positive locking of the reel. The locking mechanism shall fully engage within 3" of belt travel should a failure occur. The locking mechanism must react to the actual speed of the reel and prevent it from exceeding normal operating parameters regardless of whether the load suddenly drops by breakage of a component in the hoisting apparatus or whether it accelerates more slowly, as caused by a back-driving winch or the yielding of a structural component. The locking mechanism must always remain in ready position regardless of whether the belt is retracting or extending.
4. Strap: Shall incorporate the use of a brightly colored warning strip that indicates when maximum safe extension of the belt has been reached. The standard strap length shall be 36'. Lengths up to 46' shall be accommodated as an option. The strap shall incorporate a breakaway loop stitched into its lower end to indicate if the unit has been subjected to a heavy load. A bright colored warning label must be exposed if the loop stitching has been broken.
5. Re-use: The unit shall permanently lock when a load of more than 1000lbs is captured. To prevent possible re-use and failure of critical components that are stressed when the unit engages a load, the unit shall not be functional after it has caught a significant load.
6. Anchoring System: The strap anchoring system must bear on the full width of the strap and be capable of taking the full breaking strength of the strap. The locking mechanism shall evenly load the drum and housing when engaged. The unit shall be self-aligning so that the force of a fall positions the unit in the ideal plane to prevent damage to the equipment and supporting structure.
7. Reel: Must be supported in bearings on both sides to assure that there is no deflection under heavy load, which would cause the strap to be misaligned and suffer damage.
8. Mounting System: The unit shall incorporate a universal mounting system to allow mounting either parallel or perpendicular to the strap and to allow mounting on either a 4” O.D. or a 3 ½” O.D. round tube.
9. Warranty: 5 year limited warranty.

2.2 OVERHEAD VOLLEYBALL NETS

2.3 OVERHEAD-SUPPORTED VOLLEYBALL SYSTEMS

1 ~~Model No. 91920100 Overhead-supported volleyball system with Judge's Stand~~
See note on next page regarding last minute change.

A. System shall consist of vertical drop-frame units with folding side brace assemblies to automatically fold entire unit (including judge's stand, net, antennas, padding, etc.) to the ceiling with a single electrically operated Winch, without releasing tension on the net. The system shall automatically release the tension on the net as the masts are raised into the storage position by means of shortening the distance between the masts, at the net attachment point, as the masts are folded up.

B. System must be able to be set up from the control system in a one step process. Manual and secondary process requiring unit to attach or to be detached to the ground prior to operating are not permitted.

C. Vertical drop frame assemblies shall be fitted with a net-tensioning, incorporating a heavy-duty, self-locking ratchet mechanism with a compression, disc-brake type release mechanism to eliminate sudden release of the cable tension when removing the net.

D. Each vertical frame shall be laterally braced and locked in playing position with a special diagonal brace assembly (minimum 1-7/8" (4.8cm) O.D.), incorporating a folding knee-joint type mechanism. Knee joints lock braces in playing position for maximum stability by means of a torsion spring system, which is easily disengaged by upward force of the hoist cables.

E. System shall be folded to the overhead storage position by means of a 1 H.P. electric winch with integral up-and-down limit switches. Hoist cable system shall be 1/4" diameter galvanized cable with a 7,000-lb. ultimate breaking strength operating through 4" diameter swivel pulley assemblies rated at a minimum 9,000-lb. load rating.

F. Wiring of all electrical components shall be in accordance with local codes and in accordance with manufacturer's instructions. All conduit, wiring, junction boxes, and components not specified herein shall be furnished and installed by the electrical contractor.

G. Each folding support frame shall be furnished with an inertia-sensitive type safety lock (No.10797-100 Saf-Strap) to automatically lock system in position at any time in storage or during the raising or lowering cycle, should there be a possible malfunction of the hoisting system.

H. Lower ends of folding support frames, including the judge's stand, net tension and height adjustment mechanisms shall be fully padded to a height of 6'-0" (1.83m) above the playing floor to comply with all competition requirements.

I. Padding color shall be per manufacturer's standard selection.

J. System shall be furnished complete with No. 02295-390 Powr-Line volleyball net and No. 2296 net antennas.

Net Height Adjustment:

Electric

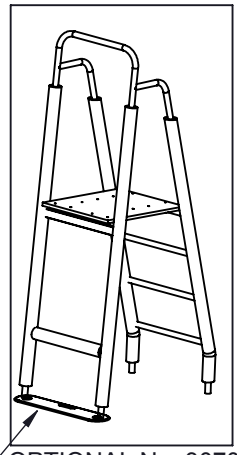
A. Net Height Adjustment: Vertical drop frame assemblies shall be fitted with an integrated electric net height adjustment system, allowing the ability to raise and lower the net automatically to men's 7' 11-5/8" (2.43m) or women's 7' 4-1/8" (2.24m) official net heights for competition without loosening the net tension. Height setting indicators shall be visible from the side of each frame.
B. Materials: Center unitized support frame shall be fabricated by dual, 2-3/16" square heavy-wall zinc plated guide tubes located on 11-3/16" centers.
C. Wiring and control: Height adjustment unit shall incorporate a compact 115-volt, gear motor type linear actuator with 600 pound thrust capacity to raise and lower the height electrically. Motor shall draw 1.4 amps under full load. Integral limit switches shall provide automatic shut off at lower and upper extensions. The motor shall be controlled by a special dual keyed, flush wall-mounted momentary key switch. Switch assembly shall be furnished with a 4-1/2" square stainless steel cover plate for mounting in a masonry wall box by the electrical contractor.

Note: There is a last minute change to this product - no ceiling mounted judges stand will be required; rather the volleyball net/standards will be ceiling mounted/electric fold down. For the purposes of the GMP pricing, the following system is included, in lieu of the model with the judges stand:
1900 SERIES POWR-NET Overhead Volleyball System, Porter Athletic, https://www.gillporter.com/porter/powr-net-overhead-supported-fold-up-volleyball-system-w-o-judge-s-stand.html

The judges stand (2 thus) will be the product that follows on the next two (2) pages.

669100 - FOLDING JUDGES STAND

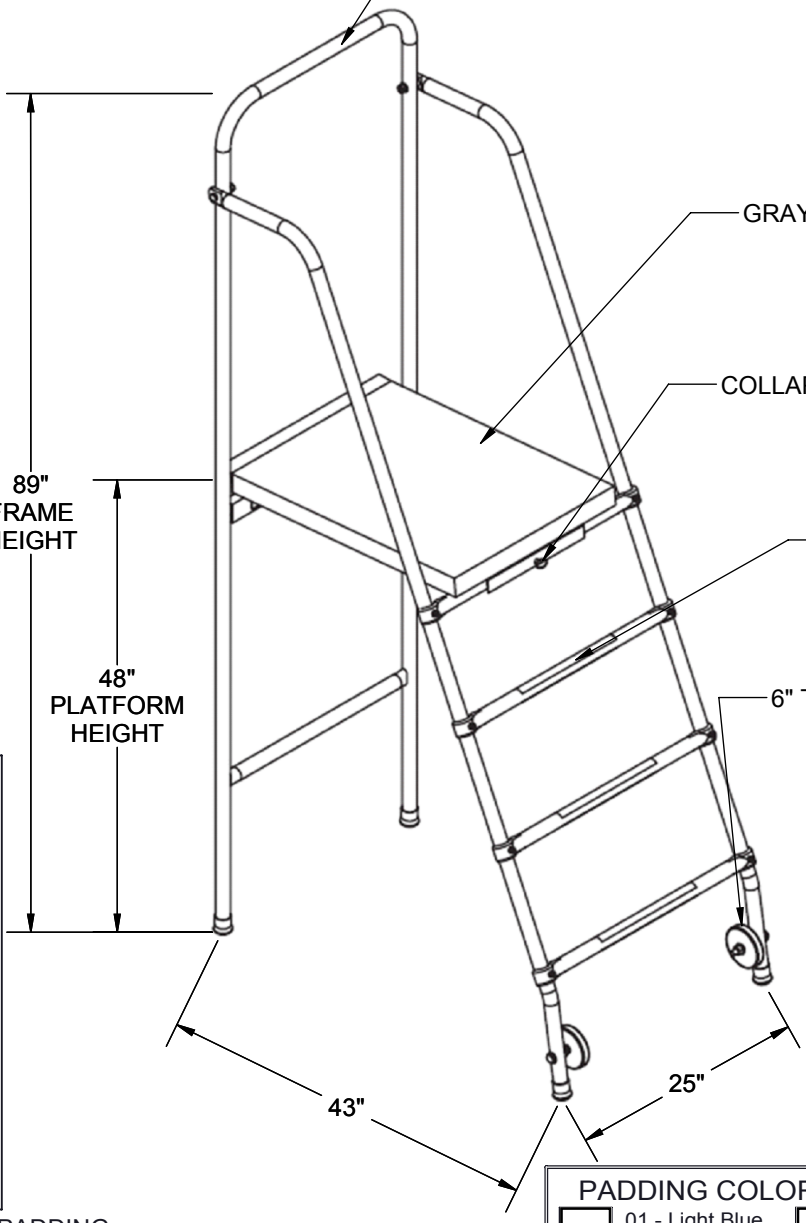
FOR COMPETITION VOLLEYBALL

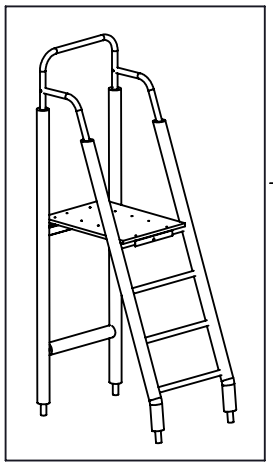


OPTIONAL No. 3070
JUDGES STAND

INCLUDES STAND AND
FRONT SUPPORT DISK

FOR USE ON SAND VOLLEYBALL





OPTIONAL No. 6693XX TUBE PADDING
3/4" THICK PE FOAM W/ VINYL COVER

PADDING COLOR SELECTION

01 - Light Blue	09 - Gray
02 - Royal Blue	10 - Maroon
03 - Red	11 - Purple
04 - White	12 - Black
05 - Orange	13 - Navy Blue
06 - Yellow Gold	14 - Kelly Green
08 - Tan	15 - Dark Green

_____ - 669100 FOLDING JUDGE'S STAND

_____ - 6693XX PROTECTIVE PADDING FOR JUDGE'S STAND

_____ - 3070 FOLDING JUDGE'S STAND W/ SUPPORT DISK (FOR USE ON SAND VB)

PROJECT NUMBER

PROJECT NAME

888-277-7778 PORTER@PORTERATHLETIC.COM

WWW.PORTERATHLETIC.COM/FACILITY

VOLLEYBALL SPECIFICATION SHEET

V-669100

3/14/2016

669100 - FOLDING JUDGES STAND

FOR COMPETITION VOLLEYBALL

SPECIFICATIONS

PORTER No. 669100 FOLDING TYPE JUDGE'S STAND

Judge's stand shall be designed to elevate a referee's head two to three feet (61cm to 91cm) above the top of the net for competition volleyball requirements. Elevated platform shall be finished in a padded surface. Platform shall be supported by a front upright with handrail located approximately 89" off the floor and a diagonal ladder weldment with three (3) steps to provide ease of access to platform. Front upright and ladder support shall be fitted with non-marking, rubber floor pads.

Platform and ladder assembly shall fold compactly against front upright for ease of transport and storage. Ladder assembly shall be equipped with two (2) 6" diameter wheels to provide ease of transport to and from storage areas.

Unit finished in durable black powder-coat finish.

PORTER No. 3070 FOLDING TYPE SAND JUDGE'S STAND

Same specification as above, except with an additional support disk. Support disk shall keep stand upright and prevent sinking when used on a sand volleyball court.

WARRANTY

Volleyball system furnished with the following warranty:

1 year limited warranty

OPTIONAL ITEMS TO SPECIFY

Porter No. 6693XX set of protective padding

2.2 DIVIDER CURTAINS

Specifier Notes: Model No. 2080 can be paired with the following options. Bottom Pad (Bottom support tube shall be encased in a 2-1/8" O.D., closed cell shock absorbing type protective foam rubber padding) and Torque Arm Safety Strap.

Specifier Notes: Model No. 2082/2085 use the Torque Arm system and Model No. 2081/2084 use the Wall Guided system.

Specifier Notes: Models below refer to both single and double motor systems. Systems over 60'-0" Length or 1500 SQ. FT. shall use the double motor system.

Model No. 2082/2085 Center-Roll Torque Arm Single/Double Motor Gymnasium Divider Curtain

1. Curtain: Gym divider curtain shall be center roll-up type compactly storing to a height not to exceed 14" (35.56cm) below structural attachment support without the use of hoist cables or belts. Minimum curtain height shall be 18'-0" (5.48m).
2. Material: Lower one-half of curtain shall be of Flexivide R solid vinyl, polyester reinforced 19 oz. vinyl coated fabric (per square yard, containing antibacterial, fungi-resistant and flame-retardant chemicals, meets NFPA-701 large scale, ULC S-109 large and small scale, and State of California test requirements).Upper one-half of curtain shall be of Fleximesh R, designed for air breathing areas in gym dividers, tennis screens or other custom air transfer applications. Fleximesh R material shall be an open polyester type interlocking grid weave coated with polyvinyl chloride with an approximate 45 to 50% open area. Weight of material – 8 oz. per square yard. Flame resistant (meets California Health and Safety Code Section 13115 Large and Small Scale Test, Fed. Std. 191A, CPAI-84, NFPA 701, BIFMA F-1-78, MSHA-155).
3. Support: Top and bottom of curtain shall be fabricated with a pocket to conceal continuous, 1-5/16" (33.3mm) O.D. tubes extending the full length of the fabric to ensure proper support. Top tube shall be supported from the overhead support structure with threaded rod-type support fitting to provide proper horizontal alignment with floor.
4. Hem: The bottom edge of the upper section and the top edge of the lower section shall be hemmed and contain a 3/16" (4.75mm) diameter cable to fit and hold the curtain sections in a 3" OD (76mm) grooved center drive anodized aluminum batten tube.

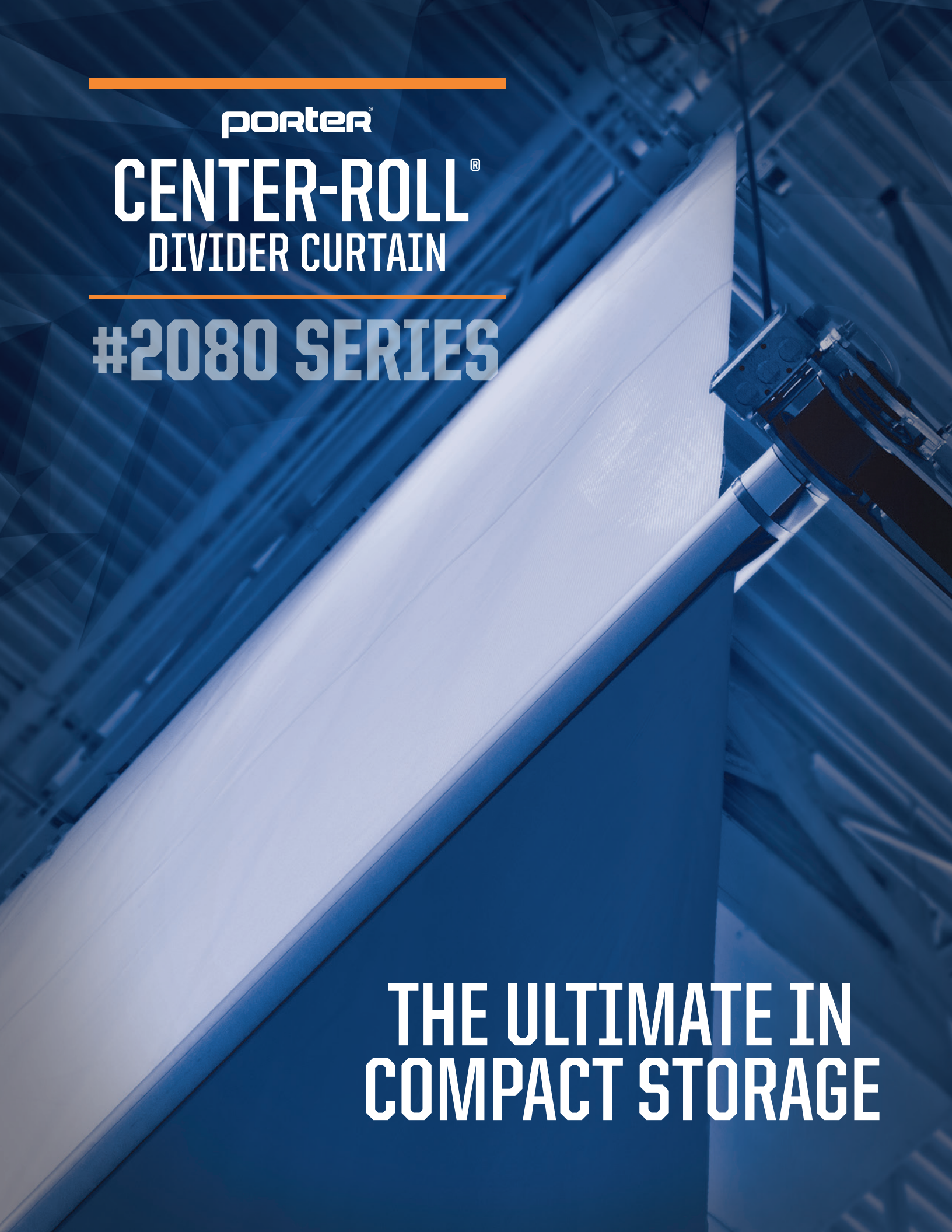
5. Motor: Upper and lower curtain sections shall roll flat and compact to the overhead storage position by means of a tubular-type motor (115 volt, 3.8 amp, single-phase), gear reducer, brake mechanism concealed inside the horizontal batten tube. Motor shall be equipped with up and down, push-button type limit switches and an automatic reset, thermal overload protection. Electrical power to motor shall be accomplished by means of a self-retracting cable reel system. The torque reaction of the motor shall be contained in a special, cantilevered-type tension strap mechanism that automatically retracts as the curtain is raised to the storage position. (The use of a torque strap-type operation is necessary when at least one end of the center batten tube does not extend to a wall or column.)
6. Speed: Curtain raises or lowers at a rate of approximately 26' / minute.
7. Warranty: 5 year limited warranty.

Model No. 2081/2084 Center-Roll Wall Guided Single/Double Motor Gymnasium Divider Curtain

1. Curtain: Gym divider curtain shall be center roll-up type compactly storing to a height not to exceed 14" (35.56cm) below structural attachment support without the use of hoist cables or belts.
2. Material: Lower one-half of curtain shall be of Flexivide R solid vinyl, polyester reinforced 19 oz. vinyl coated fabric (per square yard, containing antibacterial, fungi-resistant and flame-retardant chemicals, meets NFPA-701 large scale, ULC S-109 large and small scale, and State of California test requirements). Upper one-half of curtain shall be of Fleximesh R , designed for air breathing areas in gym dividers, tennis screens or other custom air transfer applications. Fleximesh R material shall be an open polyester type interlocking grid weave coated with polyvinyl chloride with an approximate 45 to 50% open area. Weight of material – 8 oz. per square yard. Flame resistant (meets California Health and Safety Code Section 13115 Large and Small Scale Test, Fed. Std. 191A, CPAI-84, NFPA 701, BIFMA F-1-78, MSHA-155).
3. Support: Top and bottom of curtain shall be fabricated with a pocket to conceal continuous, 1-5/16" (33.3mm) O.D. tubes extending the full length of the fabric to ensure proper support. Top tube shall be supported from the overhead support structure with threaded rod-type support fitting to provide proper horizontal alignment with floor.
4. Hem: The bottom edge of the upper section and the top edge of the lower section shall be hemmed and contain a 3/16" (4.75mm) diameter cable to fit and hold the curtain sections in a 3" OD (76mm) grooved center drive anodized aluminum batten tube.
5. Motor: Upper and lower curtain sections shall roll flat and compact to the overhead storage position by means of a tubular-type motor (115 volt, 3.8 amp, single-phase), gear reducer, brake mechanism concealed inside the horizontal batten tube. Motor shall be equipped with up and down, push-button type limit switches and an automatic reset, thermal overload protection. Electrical power to motor shall be accomplished by means of a self-retracting cable reel system. The torque reaction of the motor is contained by an enclosed, wall-mounted, extruded and anodized aluminum guide with a dual Delrin roller

cam follower mechanism. Wall guide shall extend from the attachment height of the curtain down to the center batten tube.

6. Speed: Curtain raises or lowers at a rate of approximately 26' / minute.
7. Warranty: 5 year limited warranty.



porter®

CENTER-ROLL®
DIVIDER CURTAIN

#2080 SERIES

THE ULTIMATE IN
COMPACT STORAGE

ELECTRIC DIVIDER CURTAIN STYLES

	PORTER ATHLETIC	GARED / PERFORMANCE SPORTS SYSTEMS	DRAPER	AALCO
CENTER-ROLL	✓	✓	X	X

- Top of the line curtain model. Offers cleanest aesthetics because the fabric is uniformly supported.
- Fastest curtain operating speed available on the market.
- Rolls within 14" of the ceiling or overhead support structure when retracted.
- No straps or cables required to hoist the fabric, which provides improved safety.
- Porter's Center-Roll® curtain offers an industry-leading 5 year warranty.

BOTTOM ROLL / ROLL UP	✓	✓	✓	X

- Offers cleaner aesthetics than roll fold or top roll styles. Fabric is rolled around a large bottom batten tube.
- Bottom rolling action is accomplished by means of multiple hoist belts.
- Rolls within approximately 2' - 0" of the overhead support structure when retracted.

ROLL FOLD / FOLD UP	✓	✓	✓	✓

- The industry's "work horse" divider curtain style. The design is functional, economical, and allows the most design customization.
- Cable driven operation folds the fabric over itself in an accordion style arrangement.
- Rolls within approximately 3 - 0" of the overhead support structure when retracted.

TOP ROLL	X	✓	✓	✓

- Fabric rolls around a top rolling tube. Evenly spaced rollers support the top tube.
- Roller-supports place concentrated frictional force on areas of the curtain fabric, which can cause the fabric to wear prematurely.
- Design offers low storage profile. Results vary by manufacturer and project situation.

porter®

CENTER-ROLL® ADVANTAGES AND BENEFITS

Porter's Center-Roll® divider curtain offers benefits that other divider curtain designs can't provide. Benefits and advantages include:

- Center-Roll® is the **ultimate in compact storage**, raising to within **14 inches** of the ceiling or overhead support structure for maximum clearance. Traditional curtains hang twice as low.
- The fabric raises without straps or cables. This makes the design of the Center-Roll® **safer** than traditional curtains, where straps or cables can cause injury to unknowing children.
- No curtain design features **smoother fabric** than the Center-Roll® style. There are no high-stress points on the fabric, unlike traditional top-rolling curtains that rely on rollers to operate.
- Center-Roll® curtains raise **twice as fast** as traditional curtains. The top and bottom sections of the curtain roll neatly and evenly around a center batten tube.
- 880 inch-pounds of motor torque and a 3 inch diameter batten tube provide nearly **25% more lifting torque** than the closest competing product from our competitor.
- Center-Roll® comes with an **industry-best** 5 year warranty.

HEAD-TO-HEAD COMPARISON: CENTER-ROLL® VS. CENTER DRIVE

	2080 Series Center-Roll® PORTER ATHLETIC	4050 Center-Drive PERFORMANCE SPORTS SYSTEMS

DIMENSIONS & WARRANTY:

ROLL-UP DIMENSION BELOW SUPPORT STRUCTURE	TORQUE ARM MECHANISM: 8” BOTTOM OF CURTAIN FABRIC: 14”	COUNTERWEIGHT MECHANISM: 29” BOTTOM OF CURTAIN FABRIC: 14”

⊕ Overhead clearance space is extremely important in competition gymnasium spaces. Rule-governing bodies for interscholastic competition at the high school and collegiate levels set forth competition rules regarding overhead clearance requirements.

MAXIMUM FABRIC DIMENSIONS	120’ - 0” LENGTH 42’ - 0” HEIGHT MAX SQUARE FOOTAGE: 3,000 FT²	98’ - 0” LENGTH 34’ - 0” HEIGHT MAX SQUARE FOOTAGE: UNSPECIFIED

⊕ Go **bigger** and **stronger** with Center-Roll®. Our motor torque specifications and other design features help Center-Roll® meet facility design requirements that the competition can’t compete against.

CENTER BATTEN TUBE DIAMETER	3” DIAMETER	4” DIAMETER

⊕ A smaller center batten tube increases the torque performance of our Center-Roll® curtain, which means you receive a curtain that **performs**. The competition sacrifices performance by using a 4 inch tube, in an attempt to increase their operating speed.

WARRANTY	ENTIRE CURTAIN ASSEMBLY: *5 YEAR LIMITED WARRANTY*	MOTOR & FABRIC: *1 YEAR LIMITED WARRANTY* STRUCTURE: *5 YEAR LIMITED WARRANTY*

⊕ Not only does Center-Roll® provide a superior design- it also provides a **superior warranty!**

MOTOR SPECIFICATIONS:

MOTOR TORQUE	880 INCH-POUNDS PER MOTOR	700 INCH-POUNDS PER MOTOR

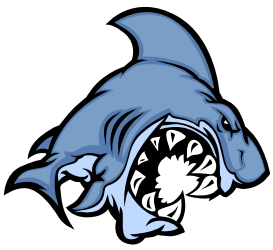
⊕ 880 inch-pounds of motor torque and a 3 inch diameter batten tube provide nearly **25% more lifting torque** than the competition. Weaker motors must work harder to achieve the same level of performance, which increases the chance of overheating issues.

SINGLE MOTOR OPTION	AVAILABLE UP TO 60’ LENGTH	AVAILABLE UP TO 40’ LENGTH

⊕ The reason for this difference is simple- Porter’s motor generates more torque than that of the competition!

WIRING BETWEEN SYNCHRONIZER AND DUAL MOTORS	INCLUDED	NOT INCLUDED

⊕ Electrical power for dual-motor curtains must be synchronized. When purchasing, specifying, or installing a divider curtain, rest assured that you’ll receive everything you need from Porter to complete the job.



porter®

GRAPHIC CURTAINS

The original gymnasium equipment company since 1868, Porter is the industry leader in innovation and design of gymnasium divider curtains. In addition to getting the best quality curtain on the market, you can now add brilliant custom graphics. Choose from our library of compelling graphics or provide your own...even photos can be printed with out state-of-the-art printing system. These 59" tall graphics are available on all Porter curtain styles and can be printed edge to edge. To get more information, visit our website at www.porterathletic.com.

- Great for Logos, Mascots, & Slogans
- Advertise Sponsors
- Full Color Printing Including White
- High Resolution Printing
- UV Stabilized for Indoor & Outdoor Use

porter®

GRAPHIC PADS

Porter offers custom graphic printing on a wide variety padding including wall pads, portable backstop padding, football goal post padding, and volleyball padding. Take advantage of an opportunity increase tickets sales and pump up school spirit with your striking mascot display, sell advertisement space to sponsors, or create a design for a special event.

The state of the art printing process can print all colors- even the whitest of whites! Gradients, photos, vector art and more are printed to form a one-of-a-kind art display. Don't have art files? Choose from our huge library of mascots, characters, and fonts. Have our professional designer create one! Graphics are UV stabilized for indoor and outdoor use and look great for years!

12 Pad Graphic Display

www.porterathletic.com

SMPL00048031

No. 570 - SuperSafe FR Wall Pad

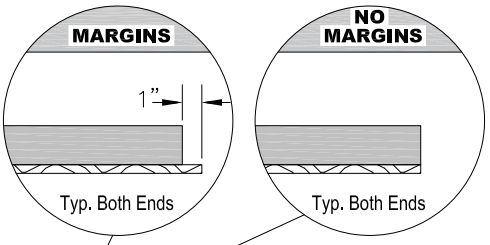
FIRE RATED WALL PAD

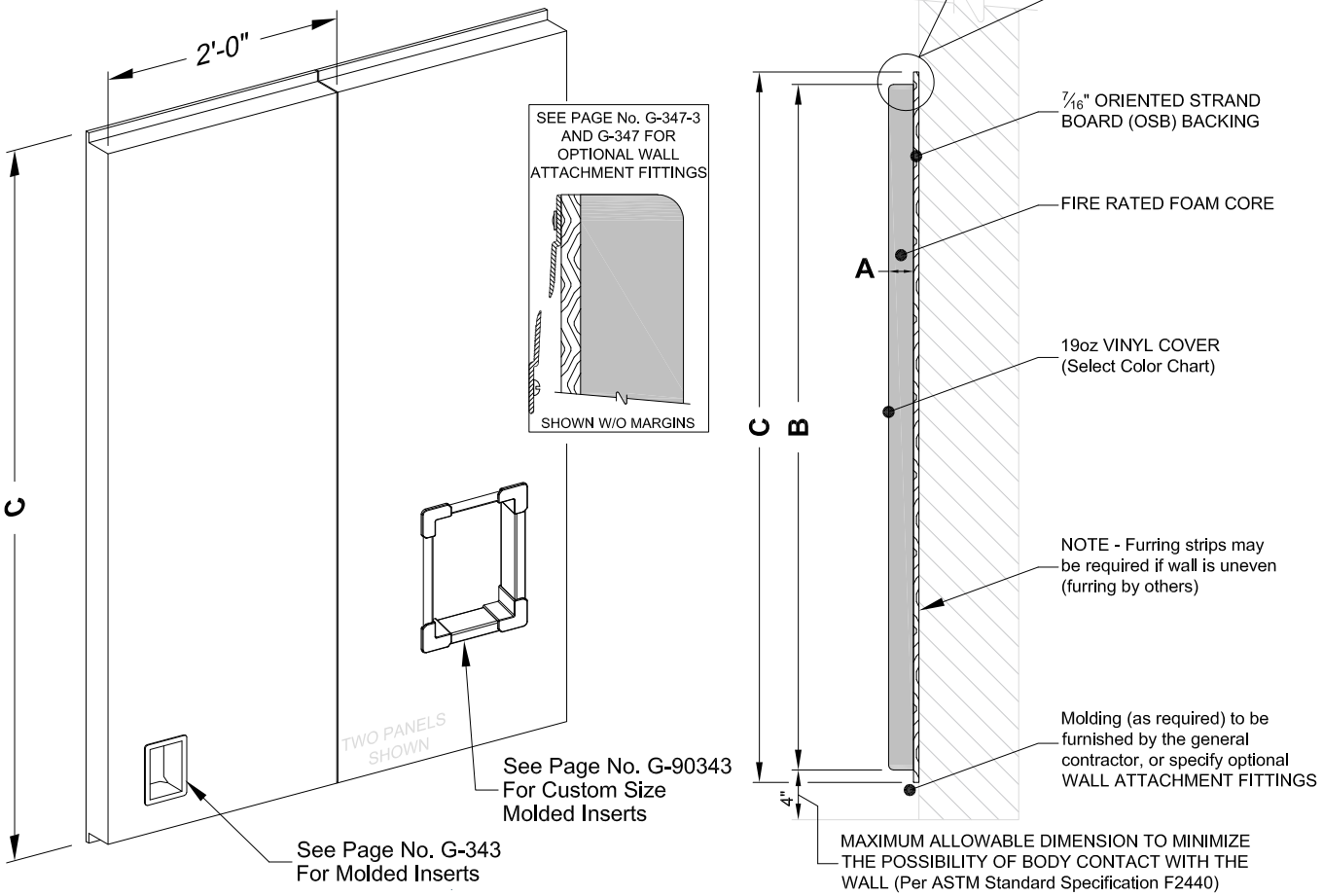
WARNING

This wall pad meets the level of protection per ASTM Standard Specification F2440. This pad is provided to reduce the possibility of minor injuries. However, any activity involving motion and severe impacts may result in serious injuries, including but not limited to paralysis or death. No wall pad can guarantee the prevention of serious head or neck injuries that are due to a violent impact while participating in various sports activities.

xx - COLOR SELECTION

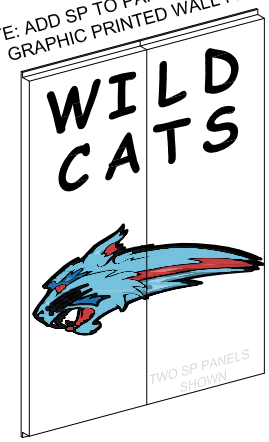
01 - Light Blue	09 - Gray
02 - Royal Blue	10 - Maroon
03 - Red	11 - Purple
04 - White	12 - Black
05 - Orange	13 - Navy Blue
06 - Yellow Gold	14 - Kelly Green
08 - Tan	15 - Dark Green





QTY	PART NUMBER	A FOAM THICKNESS	B FOAM HEIGHT	C OSB HEIGHT	NAILING MARGINS	CUSTOM GRAPHICS
	5700xx	2"	70"	72"	YES	NO
	5700xxSP	2"	70"	72"	YES	YES
	5701xx	2"	70"	70"	NO	NO
	5701xxSP	2"	70"	70"	NO	YES
	5720xx	3"	70"	72"	YES	NO
	5720xxSP	3"	70"	72"	YES	YES
	5721xx	3"	70"	70"	NO	NO
	5721xxSP	3"	70"	70"	NO	YES
	570280xx	2"	94"	96"	YES	NO
	570280xxSP	2"	94"	96"	YES	YES
	570281xx	2"	96"	96"	NO	NO
	570281xxSP	2"	96"	96"	NO	YES

NOTE: ADD SP TO PART NUMBER FOR GRAPHIC PRINTED WALL PAD



888-277-7778 PORTER@PORTERATHLETIC.COM

PROJECT NUMBER

PROJECT NAME

5/5/2020

No. 570 - SuperSafe FR Wall Pad

FIRE RATED WALL PAD

SPECIFICATIONS

PORTER No. 5700xx SUPERSAFE GYMNASIUM WALL PADDING
PANEL SIZE: 2'-0" X 6'-0" X 2" WITH NAILING MARGINS

Panel shall meet the min. ASTM F2440 Standard Specification for impact performance requirements. The maximum gmax values for the padding shall not exceed 200 and the HIC shall not exceed 1000 when tested at a 4'-0" drop height. Panels that have not been tested to this minimum standard shall not be considered as equal.

Entire pad assembly has been tested and meets the requirements of NFPA 101 Life Safety Code when tested in accordance with NFPA 286. Entire pad assembly has been tested and meets the criteria set forth in the International Building Code (2003 IBC section 803.2.1) when tested in accordance with NFPA 286. ASTM E-84 test is not considered an equal test to NFPA 286.

Wall pad shall be 2'-0" wide x 6'-0" high, with a 1" nailing margin top and bottom for securing panels to the wall. Panels shall be constructed with a 2" thick flame retardant foam. Interior foam shall be bonded to a 7/16" oriented strand wood board to minimize warping.

Entire face of panel, including the 1" nailing margins, shall be upholstered in a heavy (19-oz.) fire-retardant, high tensile, vinyl-coated polyester fabric material. Wall pads using less than 19oz vinyl shall not be considered equal. Cover material shall be designated as flame resistant in accordance with NFPA 701, and State of California. The cover material shall have a tear strength of 100 P.S.I. and shall be mildew and rot resistant and fortified with an infection combating fungicide. Vinyl covering shall be folded and stapled securely to backside of oriented strand board. Vinyl covering is available in 14 colors - see color chart for options.

The installing contractor shall be responsible for proper inspection and installation of all panels. Installation shall be made in accordance with current factory procedures, and ASTM Standard Specification F2440. Also, the *NCAA MEN'S AND WOMEN'S BASKETBALL RULES AND INTERPRETATIONS* book states: "It is recommended that padding that meets current ASTM standards be used on walls and other facility features in or around the playing area that a student-athlete might contact during play. Padding should be installed no more than 4 inches from the floor up to 6 feet".

Custom wall pad sizes are available. Custom wall pad worksheets can be found online at www.porterathletic.com

PORTER No. 5701xx SUPERSAFE GYMNASIUM WALL PADDING
PANEL SIZE: 2'-0" X 5'-10" X 2" WITHOUT NAILING MARGINS

Same specification as No. 5700xx above, except without nailing margins

PORTER No. 5720xx SUPERSAFE GYMNASIUM WALL PADDING
PANEL SIZE: 2'-0" X 6'-0" X 3" WITH NAILING MARGINS

Same specification as No. 5700xx above, except with 3" thick foam

PORTER No. 5721xx SUPERSAFE GYMNASIUM WALL PADDING
PANEL SIZE: 2'-0" X 5'-10" X 3" WITHOUT NAILING MARGINS

Same specification as No. 5700xx above, except with 3" thick foam and no nailing margins

PORTER No. 570280xx SUPERSAFE GYMNASIUM WALL PADDING
PANEL SIZE: 2'-0" X 8'-0" X 2" WITH NAILING MARGINS

Same specification as No. 5700xx above, except 8'-0" high

PORTER No. 570281xx SUPERSAFE GYMNASIUM WALL PADDING
PANEL SIZE: 2'-0" X 8'-0" X 2" WITHOUT NAILING MARGINS

Same specification as No. 5700xx above, except 8'-0" high and no nailing margins

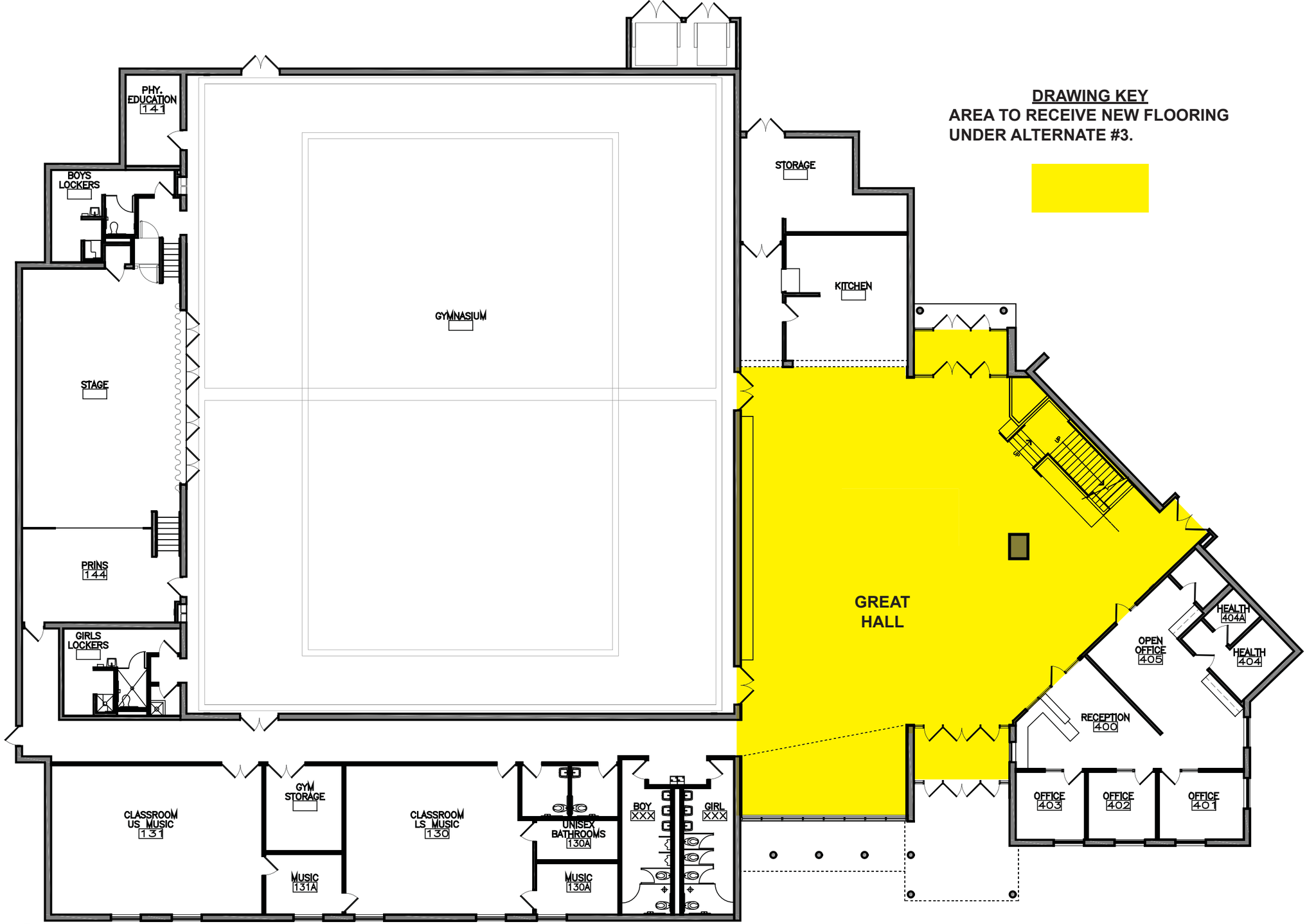
NOTE: CONFORM TO ANSI SAFETY STANDARD; PROVIDE FORMED INSERTS AND MOLDING. ATTACH PER MANUFACTURER'S INSTRUCTIONS.

ISSUED AUGUST 11, 2017, SUBJECT TO CURRENT MANUFACTURING PROCEDURES AND CHANGES

PORTER@PORTERATHLETIC.COM

DRAWING KEY

AREA TO RECEIVE NEW FLOORING UNDER ALTERNATE #3.



Existing Partial First Floor Plan - Reference for Alternate #5

Not to Scale

Date: 08/04/2025
PROJECT NO.: 23008.003

Nova Classical Academy

Saint Paul, Minnesota

BLOOM HAY DOBBS

BLOOM HAY DOBBS

ROOM FINISH LEGEND

ACB	ACOUSTICAL CEILING BAFFLES
ACS	ACOUSTIC CEILING SPRAY
ACT	ACOUSTICAL CEILING TILE
AWP	ACOUSTICAL WALL PANEL
CG	CORNER GUARD
CONC.	CONCRETE
CPT	CARPET
CT	CERAMIC WALL TILE
CTB	CERAMIC TILE BASE
EP PT	EPOXY PAINT
EXP	EXPOSED STRUCTURE
GL	GLASS
GT	GROUT
GYP BD	GYPSUM BOARD
HDFC	HIGH DENSITY FIBER CEMENT PANEL
LIN	LINOLEUM FLOORING
LOK	LOCKER
MIR	MIRROR
MP	METAL PANEL
MTA	METAL TRANSITION ACCESSORIES
NA	NOT APPLICABLE
PCT	PORCELAIN TILE
PCW	PRECAST CONC. WALL
PLAM	PLASTIC LAMINATE
PT	PAINT
PTD	PAPER TOWEL DISPENSER
QTZ	QUARTZ
RB	RESILIENT BASE
REC	RECREATIONAL FLOORING
RF	RUBBER FLOORING
RMA	RESILIENT MOLDING ACCESSORY
RST	RESILIENT STAIR TREADS
RT	RESILIENT TILE
SC	SHOWER CURTAIN
SD	SOAP DISPENSER
SLD	SEALED CONCRETE
SND	SENITORY NAPKIN DISPENSER
SS	SOLID SURFACE MATERIAL
SST	STAINLESS STEEL
SVT	SOLID VINYL TILE
TB	TACKBOARD
TPD	TOILET PAPER DISPENSER
TPTD	TRASH-PAPER TOWEL DISPENSER
TPTN	TOILET PARTITION
TR	TRASH RECEPTACLE
TSC	TOILET SEAT COVER
VB	VINYL BASE
WB	WHITEBOARD
WD	WOOD
WG	WOOD GRILLE CEILING/ WALL
WS	WINDOW SHADES

ROOM FINISH SCHEDULE

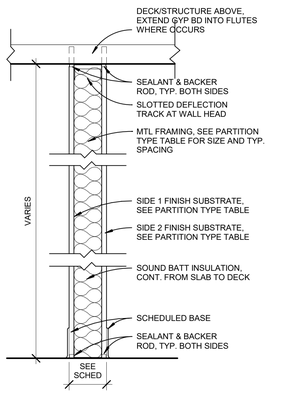
Level	ROOM NUMBER	ROOM NAME	FLOOR FINISH	BASE FINISH	NORTH WALL FINISH	NORTH WALL SUBSTRATE	EAST WALL FINISH	EAST WALL SUBSTRATE	SOUTH WALL FINISH	SOUTH WALL SUBSTRATE	WEST WALL FINISH	WEST WALL SUBSTRATE	CEILING MATERIAL	CEILING FINISH	CEILING HEIGHT	REMARKS
LEVEL 1	101	SHELTER	REC-1	VINYL	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	EXP	ACS-1	--	6,7,10
LEVEL 1	102	CORRIDOR	RT-1	VINYL	PT-1	CONC.	PT-1	GYP BD	PT-1	CONC.	PT-7	CONC.	EXP	PT-1	--	
LEVEL 1	103	STORAGE	SLD CONC.	VINYL	PT-1	CONC.	PT-1	GYP BD	PT-1	CONC.	PT-1	GYP BD	EXP	NA	--	
LEVEL 1	104	WOMEN'S SHWR	PCT-3	CT-1/ CT-2	CT-3	GYP BD / MOIST. RES.	CT-3	GYP BD / MOIST. RES.	CT-3	GYP BD / MOIST. RES.	CT-3	GYP BD / MOIST. RES.	GYP BD	PT-1	9'-0"	1,2,3,8
LEVEL 1	105	WOMEN'S TOILET	PCT-1, PCT-2	CT-1/ CT-2	CT-1	GYP BD / MOIST. RES.	CT-1/ CT-2	GYP BD / MOIST. RES.	CT-1/ CT-2	GYP BD / MOIST. RES.	CT-1	GYP BD / MOIST. RES.	GYP BD	PT-1	9'-0"/8'-8"	2
LEVEL 1	106	CORRIDOR	RT-1	VINYL	NA	NA	PT-1	GYP BD	PT-1	CONC.	PT-1	GYP BD	EXP	PT-2	--	
LEVEL 1	107	MEN'S TOILET	PCT-1, PCT-2	CT-1/ CT-2	CT-1	GYP BD / MOIST. RES.	CT-1	GYP BD / MOIST. RES.	CT-1/ CT-2	CONC.	CT-1/ CT-2	GYP BD / MOIST. RES.	GYP BD	PT-1/ PT-2	9'-0"/ 8'-8"	2
LEVEL 1	108	MEN'S SHWR	PCT-3	CT-3	CT-3	GYP BD / MOIST. RES.	CT-3	GYP BD / MOIST. RES.	CT-3	GYP BD / MOIST. RES.	CT-3	GYP BD / MOIST. RES.	GYP BD	PT-1	9'-0"	1,2,3,8
LEVEL 1	109	MECH.	SLD CONC.	NA	NA	CONC.	NA	CONC.	NA	CONC.	NA	GYP BD	EXP	NA	--	
LEVEL 1	110	STAIR B	RST	RB	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	EXP	NA	--	
LEVEL 1	111	WOMEN'S LOCKERS	RT-2	VINYL	EPOXY PT-1	GYP BD	EPOXY PT-1	GYP BD	EPOXY PT-1	GYP BD	EPOXY PT-1	GYP BD	GYP BD	PT-1	10'-0"	
LEVEL 1	112	MEN'S LOCKERS	RT-2	VINYL	EPOXY PT-1	GYP BD	EPOXY PT-1	GYP BD	EPOXY PT-1	GYP BD	EPOXY PT-1	GYP BD	GYP BD	PT-1	10'-0"	
LEVEL 1	113	VEST.	CPT-2	VINYL	EXP	CONC.	EXP	CONC.	HDFC-2	GL-1	HDFC-2	GL-1	MP	MP	10'-6"	9
LEVEL 1	114	CORRIDOR	RT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	CONC.	ACT-2	ACT-2	10'-0"/9'-0"	4,5
LEVEL 1	115	VEST.	CPT-2	VINYL	PT-1	GYP BD	PT-1	CONC.	PT-1	GYP BD	PT-1	GYP BD	WOOD	NA	10'-0"	4
LEVEL 1	116	FACILITIES	SLD CONC.	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	CONC.	PT-1	CONC.	EXP	NA	--	3
LEVEL 1	117	OPEN OFFICE/ WORKSTATIONS	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	ACT-1	9'-0"	
LEVEL 1	118	MEETING	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	ACT-1	9'-0"	
LEVEL 1	119	FILES	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	ACT-1	9'-0"	
LEVEL 1	120	BUSINESS OFFICE	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	ACT-1	9'-0"	
LEVEL 1	121	STAIR A	RST	RB	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	EXP	NA	--	
LEVEL 1	E101	HALLWAY														
LEVEL 1	E102	OFFICE														
LEVEL 2	202	MEZZANINE	RF-1	RB	NA	NA	PT-1	GYP BD	PT-1	CONC.	PT-1	CONC.	EXP	NA		
LEVEL 2	203	OFFICE	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	ACT-1	9'-0"	
LEVEL 2	204	MECH.	SLD CONC.	VINYL	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	PT-1	GYP BD	EXP	NA	--	
LEVEL 2	205	STAIR B	RST	RB	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	EXP	PT-2	--	
LEVEL 2	206	TOILET	PCT-2	CT-1	CT-1	GYP BD / MOIST. RES.	TILE	GYP BD / MOIST. RES.	TILE	GYP BD / MOIST. RES.	TILE	GYP BD / MOIST. RES.	GYP BD	PT-1	9'-0"	
LEVEL 2	207	TOILET	PCT-2	CT-1	CT-1	GYP BD / MOIST. RES.	TILE	GYP BD / MOIST. RES.	TILE	GYP BD / MOIST. RES.	TILE	GYP BD / MOIST. RES.	GYP BD	PT-1	9'-0"	
LEVEL 2	208	CORRIDOR	RT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-2	ACT-2	10'-0"/ 9'-0"	4,6
LEVEL 2	209	STORAGE/ MECH	SLD CONC.	VINYL	PT-1	CONC.	PT-1	GYP BD	PT-1	CONC.	PT-1	CONC.	EXP	NA	--	
LEVEL 2	210	MEETING	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-2	ACT-2	10'-0"	
LEVEL 2	211	MTSS OFFICE	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	ACT-1	9'-0"	
LEVEL 2	212	OPEN OFFICE	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	ACT-1	9'-0"	
LEVEL 2	213	MEETING	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	ACT-1	9'-0"	
LEVEL 2	214	ACD OFFICE	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	ACT-1	9'-0"	
LEVEL 2	215	HR OFFICE	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	ACT-1	9'-0"	
LEVEL 2	216	ED OFFICE	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	ACT-1	9'-0"	
LEVEL 2	217	STAIR A	RST	RB	PT-1	GYP BD	PT-1	CONC.	PT-1	CONC.	PT-1	CONC.	EXP	PT-2	--	
LEVEL 2	218	SKYWAY LOBBY	RT-1	VINYL	PT-1	CONC.	NA	CONC.	PT-1	GYP BD	PT-1	GYP BD	EXP	PT-2	--	
LEVEL 2	219	SKYWAY	RT-1	VINYL	PT-1	NA	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	EXP	PT-1	--	
LEVEL 2	E101M	MEZZ	RF-2	VINYL	PT-1		PT-1		PT-1		PT-1					
LEVEL 2	E201	OT	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	ACT-1	9'-0"	
LEVEL 2	E202	TUTOR	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	ACT-1	9'-0"	
LEVEL 2	E203	HALLWAY	RT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-3	ACT-3	10'-0"	
LEVEL 2	E204	SENSORY	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	ACT-1	9'-0"	
LEVEL 2	E205	TUTOR	CPT-1	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	ACT-1	ACT-1	9'-0"	
LEVEL 2	E206	RAMP	RT	VINYL	PT-1	GYP BD	PT-1	GYP BD	PT-1	NA	PT-1	GYP BD	ACT-3	ACT-3	10'-0"	
LEVEL 2	E207	HALLWAY	RT-1	VINYL	PT-1	EXIST	PT-1	GYP BD	NA	EXIST	NA	EXIST	NA	NA		PAINT ON NEW WALL
LEVEL 3	E325	MEETING / CLASS	CPT-1	VINYL	PT-1	EXIST	PT-1	EXIST	PT-1	EXIST	PT-1	GYP BD	ACT-3	ACT-3	9'-0"	
LEVEL 3	E326	LOCKERS	SVT	VINYL	PT-1	EXIST	PT-1	GYP BD	PT-1	EXIST	PT-1	EXIST	ACT-3	ACT-3	9'-0"	

GENERAL FINISH SCHEDULE NOTES

1. REVIEW INTERIOR ELEVATIONS FOR ADDITIONAL INFORMATION REGARDING ACCENT COLORS AND LOCATIONS OF PAINT COLOR TRANSITIONS. SEE FINISH PLAN FOR EXTENT OF ACCENT COLORS.
2. REFER TO REFLECTED CEILING PLAN FOR ADDITIONAL CEILING HEIGHT CHANGES.
3. SEE SPECIFICATIONS FOR SPECIFIC COLORS AND BLENDS FOR FINISH MATERIALS NOTED IN ROOM FINISH SCHEDULE
4. SEE DOOR SCHEDULE FOR HM DOOR AND FRAME PAINT COLORS
5. ALL STRUCTURAL STEEL EXPOSED TO VIEW FROM BELOW TO BE PAINTED, SEE ELEVATIONS / SECTIONS FOR ADD'L INFO.
6. WINDOW STOOLS (SILLS) SHALL BE SOLID SURFACE MATERIAL.
7. FLOOR TRANSITIONS BETWEEN ROOMS ARE AT THE CENTERLINE OF DOOR, UNLESS NOTED OTHERWISE.
8. PAINT UNDERSIDE OF STAIRS, STRINGERS, BALUSTERS AND RAILS PT-1.
9. PAINT HOLLOW METAL DOOR FRAMES AS NOTED IN DOOR SCHEDULE.
10. PROVIDE 1'-4"H BURNISHED CMU LOCKER BASE AT ROOM # 111 & 112

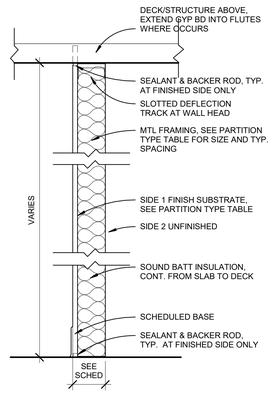
INTERIOR REMARKS FINISHES

Key Name	ROOM FINISH REMARKS
1	SOLID SURFACE AT TOP OF WALL, SEE INTERIOR ELEVATION
2	FOR CERAMIC TILE TYPES,SEE INTERIOR ELEVATION
3	CERAMIC TILE ABOVE SHOWER BOOTH, SEE INTERIOR ELEVATION
4	PT-6 ON VISIBLE WALL AND CEILING SURFACES THROUGH WOOD SLATS.
5	SEE ELEVATOR SPECIFICATIONS FOR STAINLESS STEEL FINISHES.
6	FOR ACCOUSTICAL WALL PANEL, SEE INTERIOR ELEVATION
7	FOR ADDITIONAL WALL PAINT TYPE,SEE INTERIOR ELEVATION
8	SOLID SHOWER SYSTEM
9	SEE INTERIOR 3D VIEW FOR ADDITIONAL MATERIALS AND COLOR FINISH
10	SEE SPECIFICATION SECTION 012300 - ALTERNATES APPLICABLE TO THIS AREA



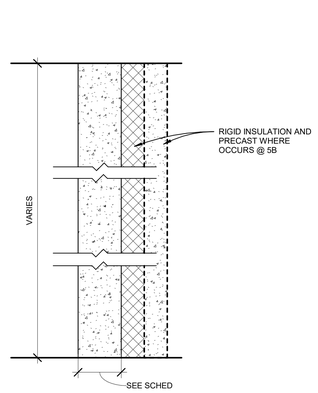
1 PARTITION TYPE 1 - TYP MTL STUD
1 1/2" = 1'-0"

PARTITION TYPE 1							
TYPE	TOTAL WIDTH	FRAMING	SIDE 1 SUBSTRATE	SIDE 2 SUBSTRATE	SOUND BATT	FIRE RATING	UL DESIGN NO.
1A	4 7/8"	3 5/8"	5/8" TYPE-X GYP BD	5/8" TYPE-X GYP BD	YES		
1B	7 1/4"	6"	5/8" TYPE-X GYP BD	5/8" TYPE-X GYP BD	YES		
1C	7 1/4"	6"	5/8" TYPE-X GYP BD	5/8"CEMENT BACKER BOARD	YES		
1D	7 3/4"	6"	5/8" TYPE-X GYP BD	5/8" MOIST. RES. GYP BD W/CT	YES		
1E	8 1/4"	6"	5/8" MOIST. RES. GYP BD W/CT	5/8" MOIST. RES. GYP BD W/CT	YES		
1F	7 3/4"	6"	5/8" MOIST. RES. GYP BD W/ CT	1/2" CEMENT BACKER BOARD W/ S.S.	YES		
1F1	7 1/4"	6"	5/8" TYPE-X GYP BD	5/8" TYPE-X GYP BD	YES		UL DES. U 465
1G	4 7/8"	3 5/8"	5/8" CEMENT BACKER BD W/ S.S.	5/8" CEMENT BACKER BD W/ S.S.	YES		
1H	4 7/8"	3 5/8"	5/8" CEMENT BACKER BD W/ S.S.	5/8" TYPE-X GYP BD	YES		
1T	5 3/8"	3 5/8"	5/8" MOIST. RES. GYP BD W/ CT	5/8" TYPE-X GYP BD	YES		



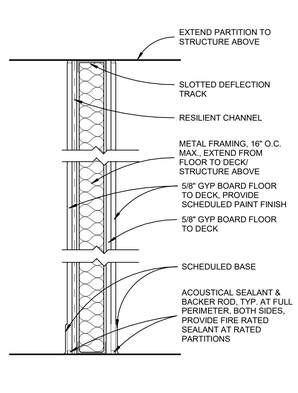
2 PARTITION TYPE 2 - MTL STUD FURRING/SHAFT
1 1/2" = 1'-0"

PARTITION TYPE 2							
TYPE	TOTAL WIDTH	FRAMING	SIDE 1 SUBSTRATE	SIDE 2 SUBSTRATE	SOUND BATT	FIRE RATING	UL DESIGN NO.
2A	2 1/4"	1 5/8"	5/8" TYPE-X GYP BD	NONE			
2B	4 1/4"	3 5/8"	5/8" TYPE-X GYP BD	NONE	YES		
2D	3 1/8"	2 1/2"	5/8" TYPE-X GYP BD	NONE	YES		
2E	2 5/8"	1 5/8"	1/2" CEMENT BACKER BOARD W/CT	NONE			
2F	3 1/8"	2 1/2"	5/8" TYPE-X GYP BD	NONE	YES		
2T	4 3/4"	3 5/8"	5/8" MOIST. RES. GYP BD W/ CT	NONE	YES		
2U	7 1/8"	3 5/8"	5/8" MOIST. RES. GYP BD W/ S.S.	NONE	YES		



5 PARTITION TYPE 5 - INTERIOR PRECAST
1 1/2" = 1'-0"

PARTITION TYPE 5							
TYPE	TOTAL WIDTH	FRAMING	SIDE 1 SUBSTRATE	SIDE 2 SUBSTRATE	SOUND BATT	FIRE RATING	UL DESIGN NO.
5A	6"						
5B	1' - 2"					2HR	
5C	8"					2HR	



8 PARTITION TYPE 9 - MTL STUD W/ STC 59
1 1/2" = 1'-0"

PARTITION TYPE 9							
TYPE	TOTAL WIDTH	FRAMING	SIDE 1 SUBSTRATE	SIDE 2 SUBSTRATE	SOUND BATT	FIRE RATING	UL DESIGN NO.
9A	5 3/4"	3 5/8"	5/8" TYPE-X GYP BD	5/8" TYPE-X GYP BD	YES	NONE	N/A

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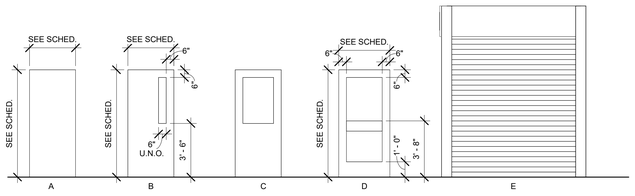
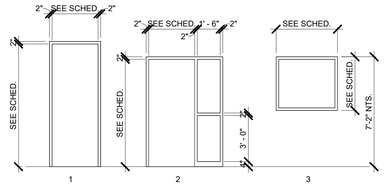
SHEET TITLE:
ROOM FINISH SCHEDULE & PARTITION TYPES

SHEET NUMBER:

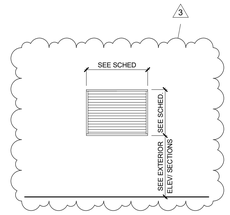
A300



DOOR TYPES
1/4" = 1'-0"



FRAME TYPES
1/4" = 1'-0"



LOUVER TYPE
NOT TO SCALE

OPENING SCHEDULE KEYNOTES:

1. PAIR OF DOORS. TWO EQUAL, TOTALLING TO DIMENSION INDICATED IN SCHEDULE, UNLESS NOTED OTHERWISE
2. PROVIDE ELECTRONIC ACCESS CONTROL AND CARD READERS, SEE ELEC.
3. DOOR SHALL MEET REQUIREMENTS OF ICC 500 & FEMA 320/361, SEE SPEC FOR FEMA PACKAGE DOORS AND FRAMES FOR TORNADO SHELTERS
4. PROVIDE FIRE RATED GLAZING.
5. DOOR TO BE INSTALLED IN EXISTING MASONRY OPENING, FIELD VERIFY EXISTING OPENING SIZE
6. PROVIDE 4" FRAME HEAD

OPENING SCHEDULE GENERAL NOTES:

A. SEE PLAN FOR ALL DOOR LOCATIONS.

B. FOR WINDOW OPENING HEIGHTS, SEE HOLLOW METAL FRAME TYPES, UNLESS NOTED OTHERWISE ON DRAWINGS.

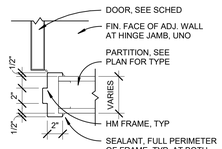
OPENING SCHEDULE

Level	OPENING NUMBER	OPENING SIZE		DOOR				FRAME			RATING	HARDWARE GROUPS	DETAILS			NOTES
		WIDTH	HEIGHT	THICKNESS	TYPE	MATERIAL	FINISH	TYPE	MATERIAL	FINISH			HEAD	JAMB	SIL/THRESHOLD	
LEVEL 1	101-1	3' - 0"	8' - 0"	1 3/4"	A	HM	POLY	1	HM	PT	X					
LEVEL 1	101-2	3' - 0"	8' - 0"	1 3/4"	A	HM	POLY	1	HM	PT	X					
LEVEL 1	101-3	3' - 0"	8' - 0"	1 3/4"	A	HM	POLY	1	HM	PT	X					
LEVEL 1	104	6' - 0"	11' - 2"	0"	E/3											
LEVEL 1	105-3	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 1	107-1	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 1	107-3	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 1	108	6' - 0"	11' - 2"	0"	E											
LEVEL 1	111	3' - 0"	7' - 0"	1 3/4"	A/3	WD	POLY	1	HM	PT	X					
LEVEL 1	112	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 1	113-1	6' - 0"	8' - 0"	1 3/4"	D	ALUM		SEE ELEV	ALUM			TBD				
LEVEL 1	113-2	6' - 0"	8' - 0"	1 3/4"	D	WD		SEE ELEV	HM			TBD				
LEVEL 1	113-3	3' - 0"	8' - 0"	1 3/4"	B	HM	PT	1	HM	PT	X					
LEVEL 1	114	3' - 0"	8' - 0"	1 3/4"	B	HM	PT	1	HM	PT	X					
LEVEL 1	115-1	6' - 0"	8' - 0"	1 3/4"	D	WD		SEE ELEV	HM			TBD				
LEVEL 1	115-2	6' - 0"	8' - 0"	1 3/4"	D	WD		SEE ELEV	HM			TBD				
LEVEL 1	115-3	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	2	HM	PT	X					
LEVEL 1	116	3' - 0"	8' - 0"	1 3/4"	A	HM	PT	1	HM	PT	X					
LEVEL 1	117	6' - 0"	8' - 0"	1 3/4"	D	WD		SEE ELEV	HM			TBD				
LEVEL 1	119	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 1	120	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	2	HM	PT	X					
LEVEL 1	129	3' - 0"	8' - 0"	1 3/4"	A	WD		SEE ELEV	HM			TBD				
LEVEL 1	179	3' - 0"	7' - 0"	1 3/4"	B	WD	POLY	1	HM	PT	X					
LEVEL 1	180	3' - 0"	7' - 0"	1 3/4"	B	WD	POLY	1	HM	PT	X					
LEVEL 1	205-2	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 1	210-4	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 1	210-7	3' - 0"	7' - 0"	1 3/4"	A	HM	PT	1	HM	PT	X					
EX - LEVEL 1	E101-1	4' - 0"	7' - 0"	1 3/4"	C	WD	POLY	1	HM	HM	X					
EX - LEVEL 1	E101-2	4' - 0"	7' - 0"	1 3/4"	C	WD	POLY	1	HM	HM	X					
EX - LEVEL 1	E102	3' - 0"	7' - 0"	1 3/4"	C	WD	POLY	1	HM	PT	X					
EX - LEVEL 2	E201	3' - 0"	7' - 0"	1 3/4"	B	WD	POLY	1	HM	PT	X					
EX - LEVEL 2	E202	3' - 0"	7' - 0"	1 3/4"	B	WD	POLY	1	HM	PT	X					
EX - LEVEL 2	E204	3' - 0"	7' - 0"	1 3/4"	B	WD	POLY	1	HM	PT	X					
EX - LEVEL 2	E205	3' - 0"	7' - 0"	1 3/4"	B	WD	POLY	1	HM	PT	X					
EX - LEVEL 2	E207-1	4' - 0"	7' - 0"	1 3/4"	C	WD	POLY	1	HM	HM	X					
EX - LEVEL 2	E207-2	4' - 0"	7' - 0"	1 3/4"	C	WD	POLY	1	HM	HM	X					
LEVEL 2	133	3' - 0"	7' - 0"	1 3/4"	A	HM	PT	1	HM	PT	X					
LEVEL 2	203	3' - 0"	7' - 0"	1 3/4"	B	HM	POLY	1	HM	PT	X					
LEVEL 2	203-1	4' - 6"	3' - 6"					3	HM							
LEVEL 2	204	3' - 0"	7' - 0"	1 3/4"	A	HM	PT	1	HM	PT	X					
LEVEL 2	205	8' - 0"	11' - 2"	0"	E/3											
LEVEL 2	205-1	3' - 6"	7' - 0"	1 3/4"	A	HM	POLY	2	HM	PT	X					
LEVEL 2	206	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 2	207	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	1	HM	PT	X					
LEVEL 2	208	3' - 0"	7' - 0"	1 3/4"	B	HM	PT	1	HM	PT	X					
LEVEL 2	210-1	3' - 0"	8' - 0"	1 3/4"	D	WD		SEE ELEV	HM			TBD				
LEVEL 2	210-2	3' - 0"	8' - 0"	1 3/4"	D	WD		SEE ELEV	HM			TBD				
LEVEL 2	211	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	2	HM	PT	X					
LEVEL 2	212	3' - 0"	8' - 0"	1 3/4"	A	WD		SEE ELEV	HM			TBD				
LEVEL 2	213	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	2	HM	PT	X					
LEVEL 2	214	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	2	HM	PT	X					
LEVEL 2	215	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	2	HM	PT	X					
LEVEL 2	216	3' - 0"	7' - 0"	1 3/4"	A	WD	POLY	2	HM	PT	X					
LEVEL 2	218-1	3' - 0"	7' - 0"	1 3/4"	C	WD	POLY	1	HM	PT	X					
LEVEL 2	218-2	3' - 0"	7' - 0"	1 3/4"	C	HM		1	HM		X	12				
LEVEL 2	219-1	3' - 0"	7' - 0"	1 3/4"	C	WD	POLY	1	HM	PT	X					
LEVEL 2	219-2	3' - 0"	7' - 0"	1 3/4"	C	HM		1	HM		X	12				

3

LOUVER SCHEDULE

OPENING NUMBER	OPENING SIZE		DETAILS			NOTES
	WIDTH	HEIGHT	HEAD	JAMB	SILL	
L01	4' - 0"	6' - 4"				
L02	4' - 0"	6' - 4"				
L03	4' - 0"	6' - 4"				
L04	4' - 0"	6' - 4"				
L05	5' - 0"	8' - 0"				
L06	5' - 0"	8' - 0"				
L07	5' - 0"	8' - 0"				
L08	5' - 0"	8' - 0"				



SEE DOOR SCHED. FOR REQ. RATED OPENING PROTECTIONS

1 TYPICAL HM DOOR JAMB (HEAD SIM.)
1 1/2" = 1'-0"

BLOOM HAY DOBBS

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CONSULTANT

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Date: 05/07/2025

Rev. 3
Date: 2025 08 07
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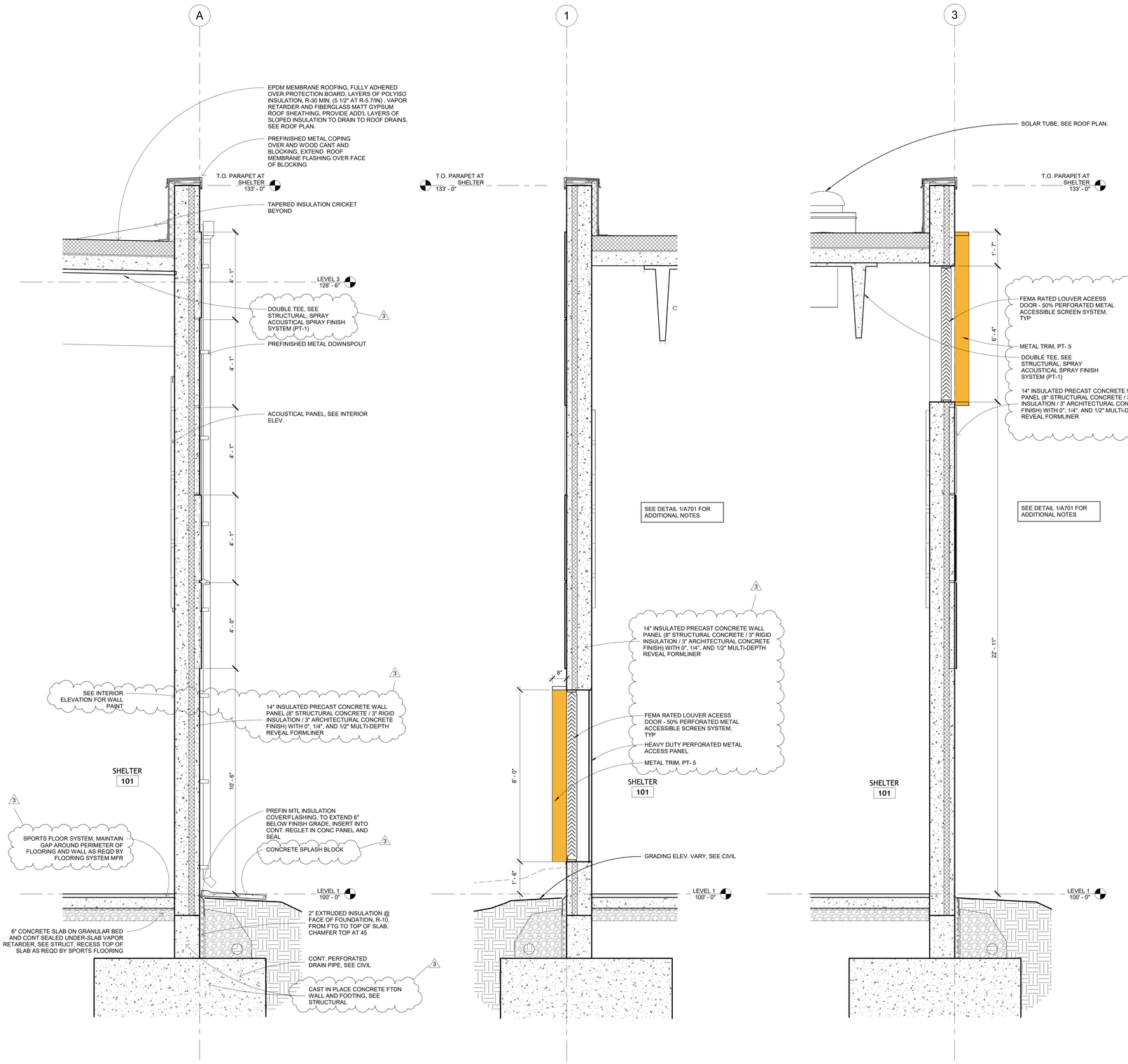
SHEET TITLE:
OPENING SCHEDULE, DOOR, FRAME, WINDOW TYPES

SHEET NUMBER:

A310



1 WALL SECTION - SHELTER TYPICAL
1/2" = 1'-0"

2 WALL SECTION - SHELTER WEST WALL
1/2" = 1'-0"

3 WALL SECTION - SHELTER EAST WALL
1/2" = 1'-0"

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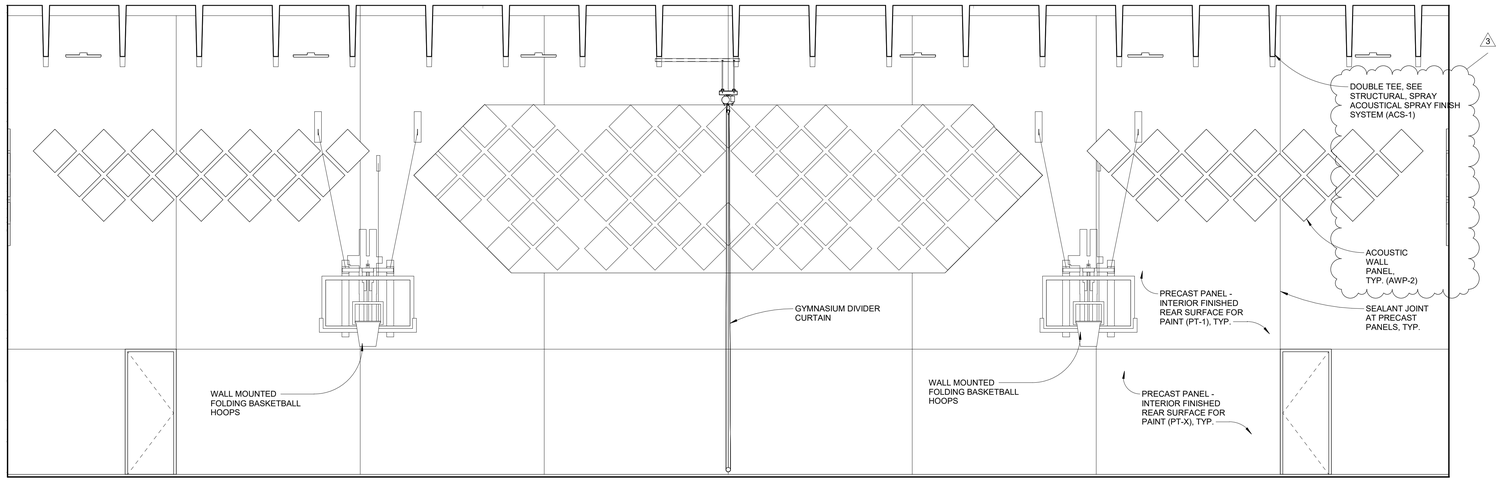
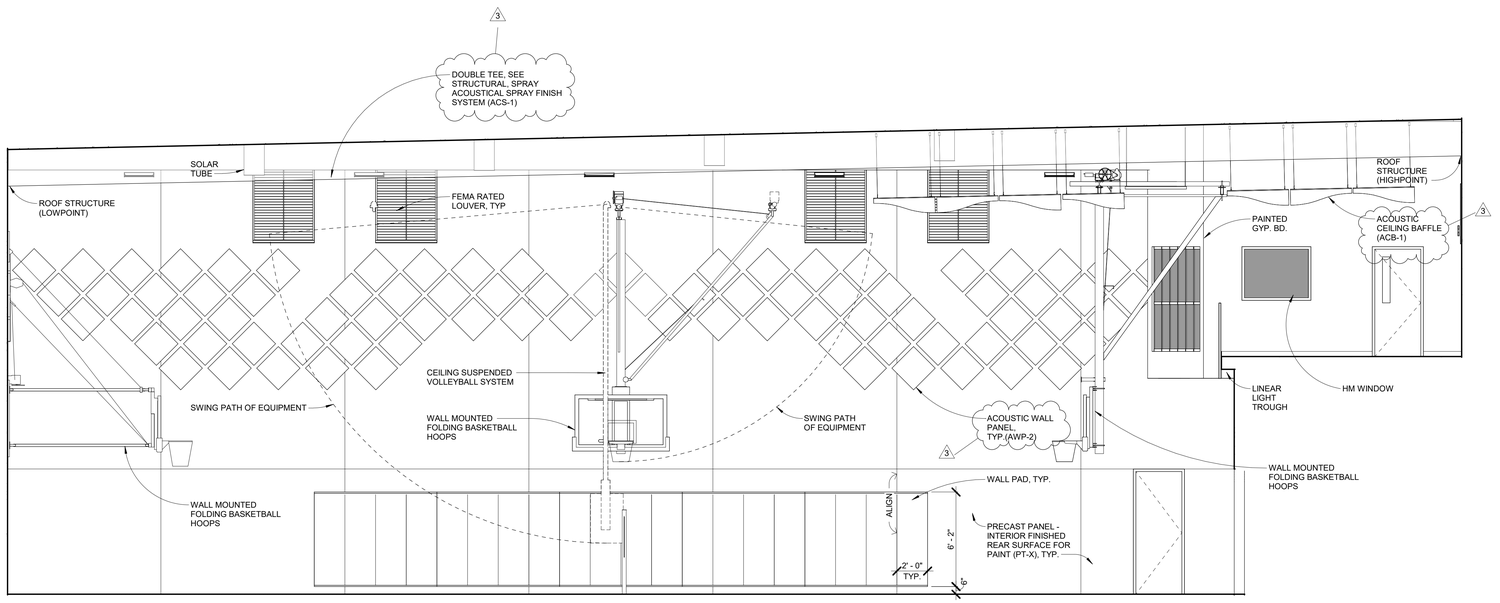
SHEET TITLE:
WALL SECTIONS - SHELTER

SHEET NUMBER:

A701



1 INTERIOR ELEVATION - SHELTER LOOKING NORTH
1/4" = 1'-0"



2 INTERIOR ELEVATION - SHELTER LOOKING EAST
1/4" = 1'-0"

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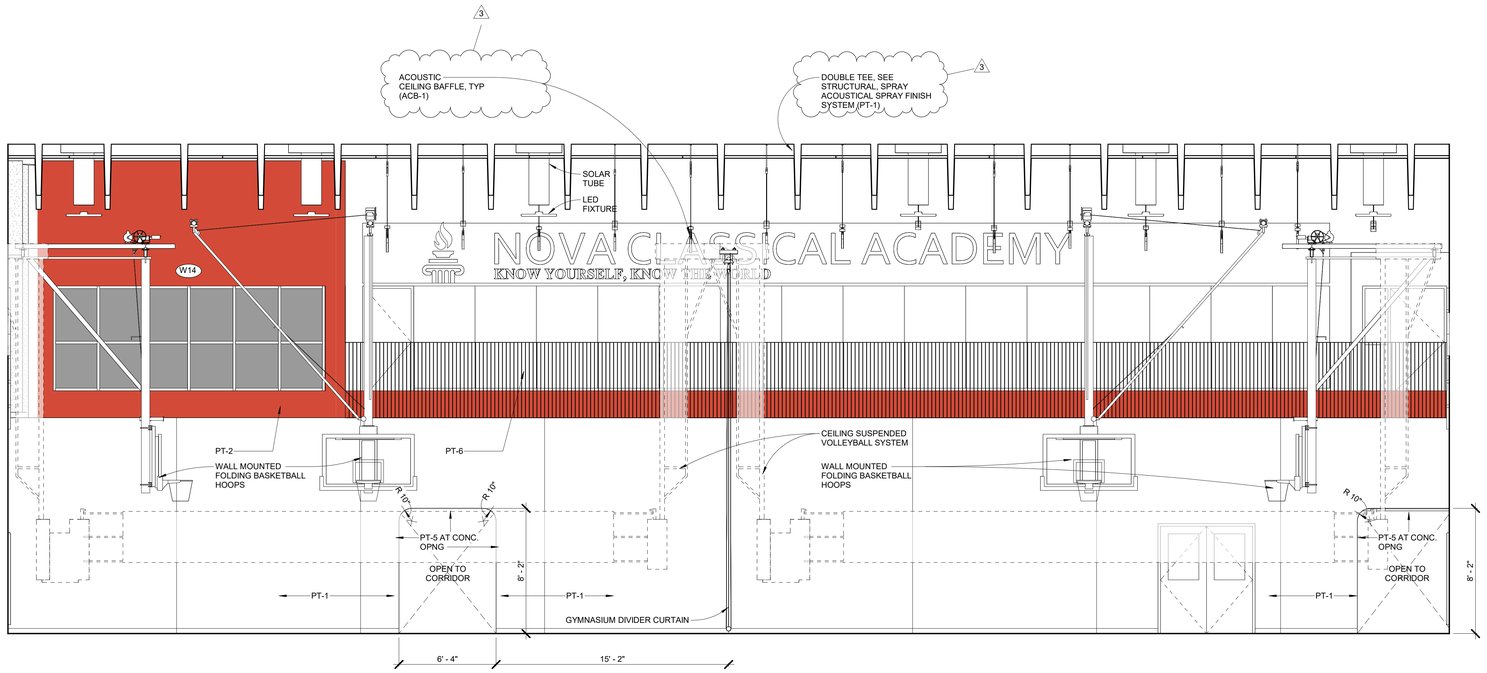
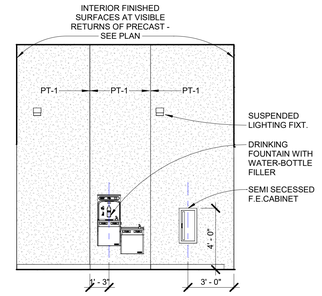
SHEET TITLE:
INTERIOR ELEVATIONS - SHELTER

SHEET NUMBER:

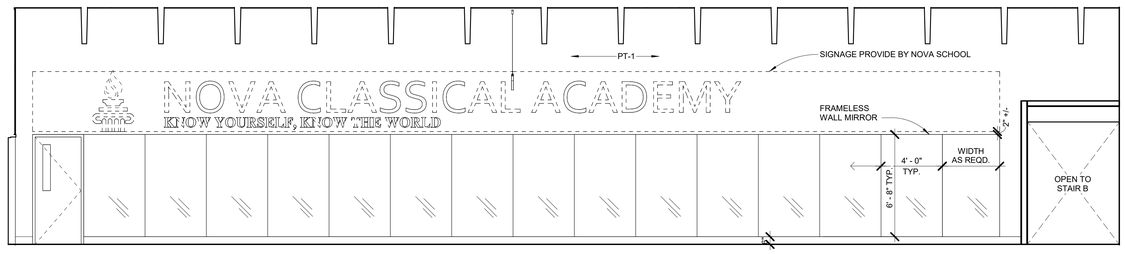
A801



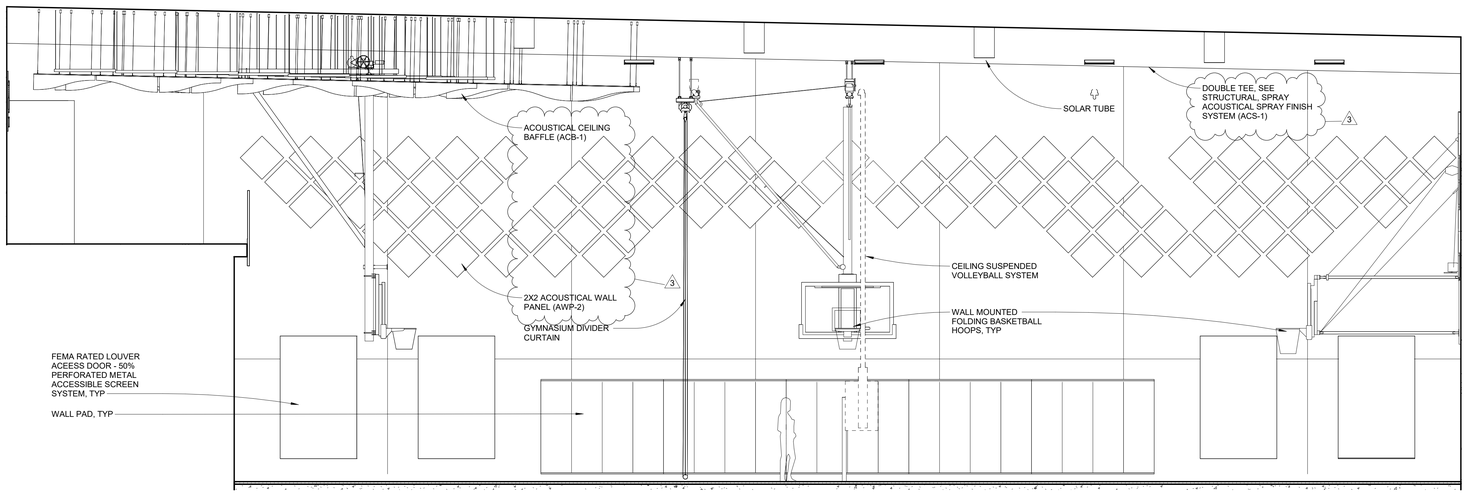
1 INTERIOR ELEVATION - SHELTER LOOKING SOUTH
1/4" = 1'-0"



2 INTERIOR ELEVATION - CORRIDOR 102
1/4" = 1'-0"



3 INTERIOR ELEVATION - MEZZANINE LOOKING SOUTH
1/4" = 1'-0"



4 INTERIOR ELEVATION - SHELTER LOOKING WEST
1/4" = 1'-0"

BLOOM HAY DOBBS

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CONSULTANT

Project Name: NOVA CLASSICAL ACADEMY IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

Rev. 3
Date: 2025 08 07
Desc.ADDENDUM 3

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME

SIGNATURE

LICENSE NO.

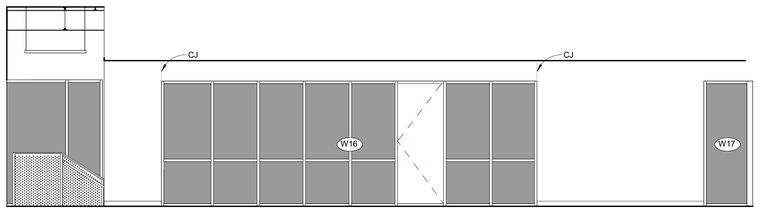
05/07/2025
DATE

DD DOCUMENT Not For Construction

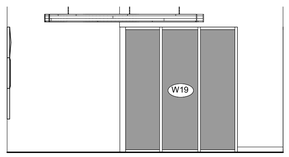
SHEET TITLE:
INTERIOR ELEVATIONS - SHELTER

SHEET NUMBER:

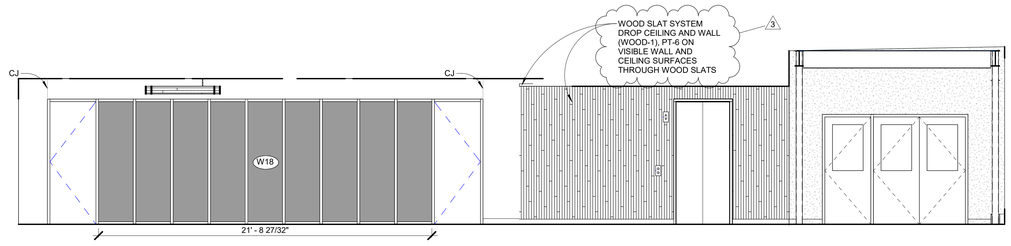
A802



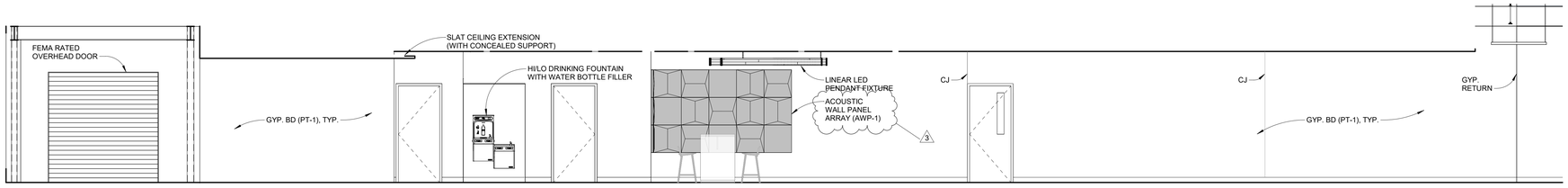
1 INTERIOR ELEVATION - LEVEL 2 - HALLWAY SOUTH
1/4" = 1'-0"



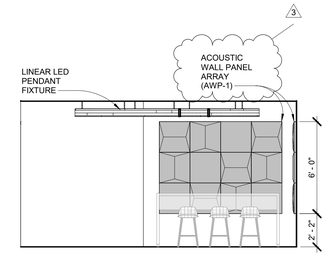
2 INTERIOR ELEVATION - LEVEL 2 - MTSS OFFICE
1/4" = 1'-0"



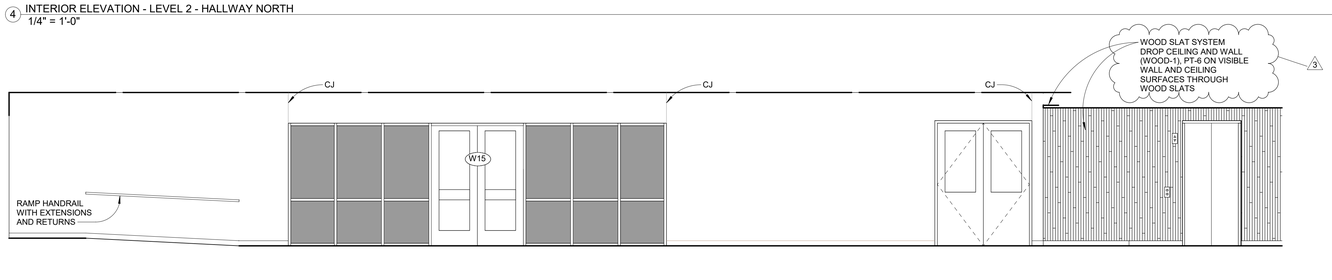
3 INTERIOR ELEVATION - LEVEL 2 - HALLWAY SOUTH - MEETING ROOM AND ELEVATOR LOBBY
1/4" = 1'-0"



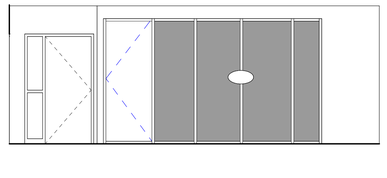
4 INTERIOR ELEVATION - LEVEL 2 - HALLWAY NORTH
1/4" = 1'-0"



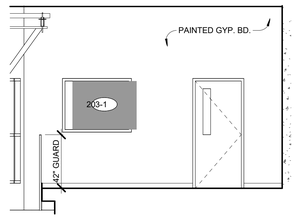
5 LEVEL 2 - MEETING LOBBY / CORRIDOR BREAK
1/4" = 1'-0"



6 INTERIOR ELEVATION - LEVEL 1 - HALLWAY SOUTH
1/4" = 1'-0"



7 INTERIOR ELEVATION - MEETING ROOM
1/4" = 1'-0"



8 INTERIOR ELEVATION - MEZZANINE EAST
1/4" = 1'-0"

BLOOM
HAY DOBBS

Midtown Commons
2324 University Ave. W,
Suite 200
St. Paul, MN 55114
Tel. 612.338.4990

NOVA CLASSICAL ACADEMY
1445 MERCER WAY
ST. PAUL, MN 55102
Phone: 651.209.6320

CONSULTANT

Project Name: NOVA CLASSICAL ACADEMY
IMPROVEMENTS & EXPANSION
Project Number: 23008.003
Date: 05/07/2025

Rev. 3
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Desc.ADDENDUM 3

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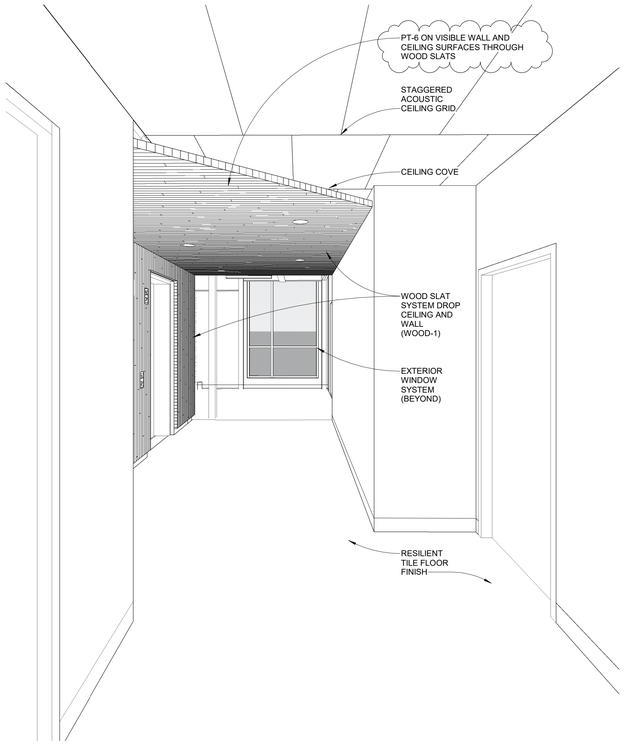
05/07/2025
DATE

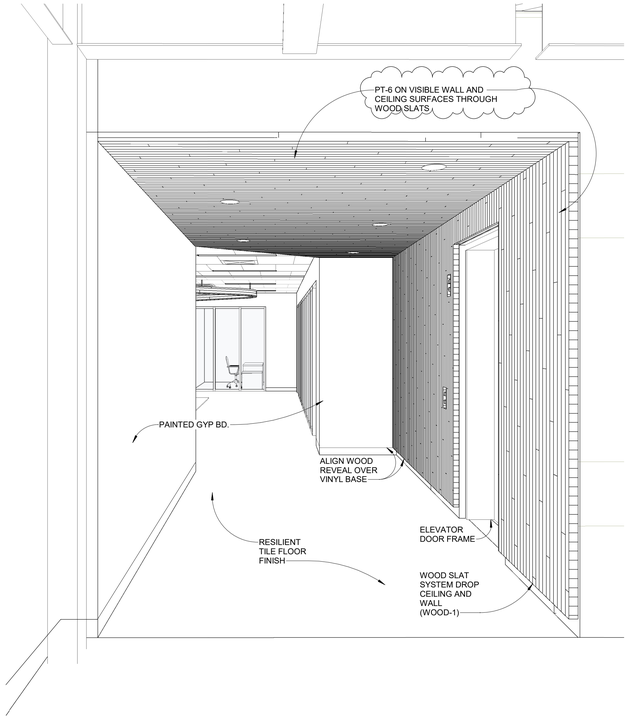
DD DOCUMENT Not For Construction

SHEET TITLE:
INTERIOR ELEVATIONS

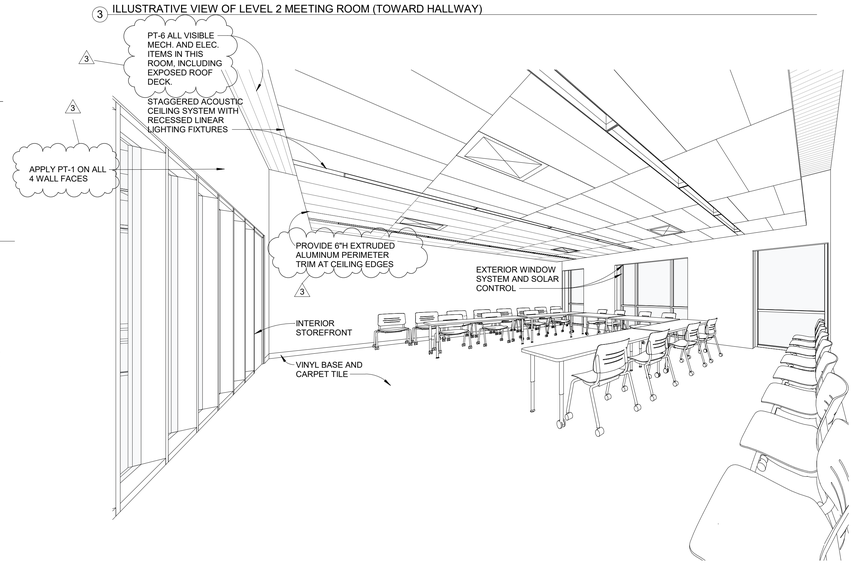
SHEET NUMBER:

A803

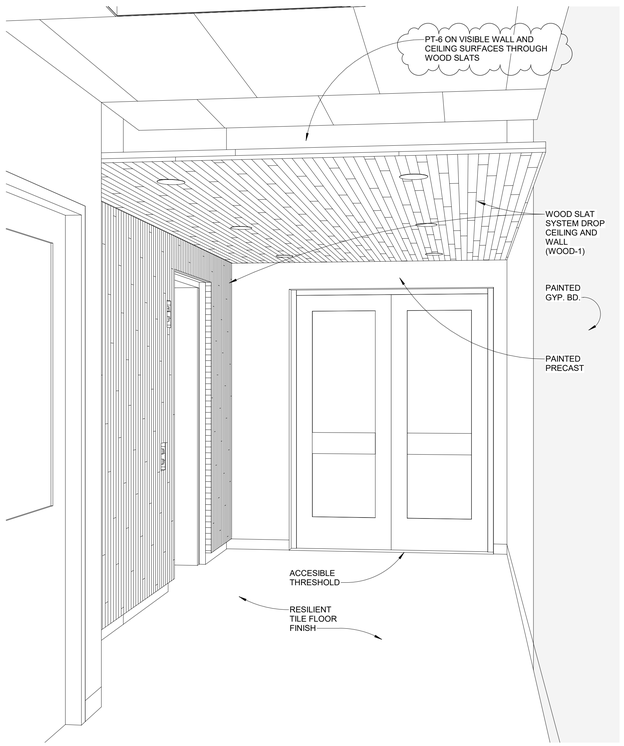




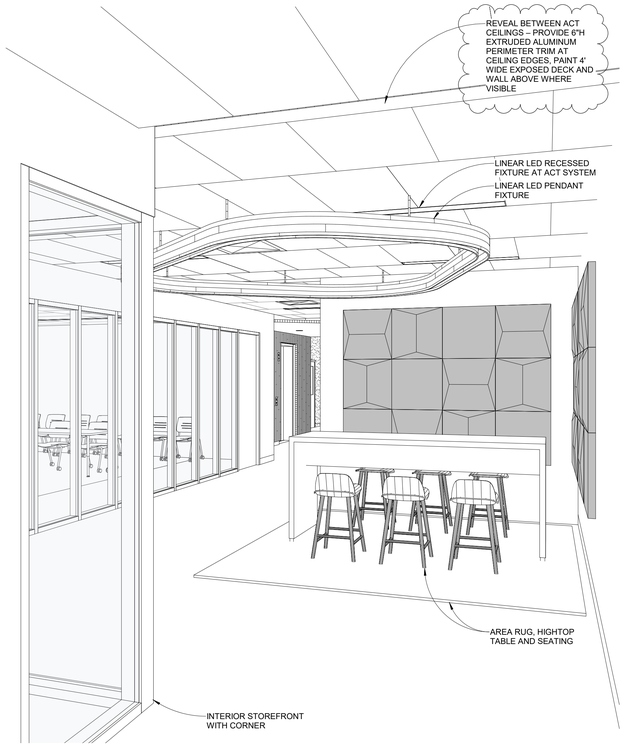
3 ILLUSTRATIVE VIEW OF LEVEL 2 MEETING ROOM (TOWARD HALLWAY)



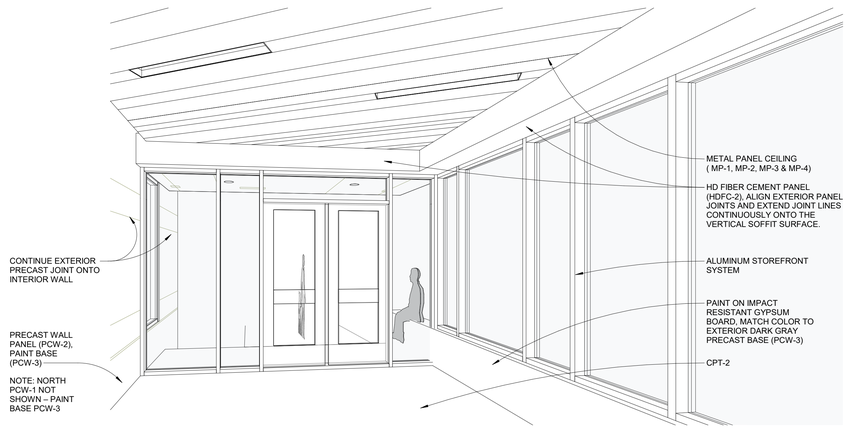
1 ILLUSTRATIVE VIEW OF LEVEL 2 - ELEVATOR LOBBY (TOWARD WEST)



2 ILLUSTRATIVE VIEW OF LEVEL 2 - ELEVATOR LOBBY (LOOKING EAST)



6 ILLUSTRATIVE VIEW OF LEVEL 2 MEETING ROOM (TOWARD SOUTH WALL)



4 ILLUSTRATIVE VIEW OF LEVEL 1 - ELEVATOR LOBBY (LOOKING EAST)

5 ILLUSTRATIVE VIEW OF LEVEL 2 CORRIDOR BREAK AREA

7 ILLUSTRATIVE VIEW OF LEVEL 1 VESTIBULE 113

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DATE

DD DOCUMENT Not For Construction

SHEET TITLE:
INTERIOR ELEVATIONS - 3D VIEW

SHEET NUMBER:

A805

SECTION 012300 - ALTERNATES

PART 1 – GENERAL

1.01 SUMMARY

A. This Section identifies Alternates to the Base GMP by number and describes the basic changes to be incorporated into the Work, only when the Alternate is made a part of the Work by specific provisions in the Contract.

1. Alternates described in this Section are part of the Work only if accepted by the Owner and enumerated in the Agreement, or if later incorporated into the Agreement through the procedure for amending the Agreement, as described in the documents.

2. The price or credit for each alternate is the net addition to, or deduction from, the GMP to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.02 DEFINITIONS

A. Base GMP: The Guaranteed Maximum Price of the Work as described in the Documents, except for work specifically described as an Alternate, without adding the or subtracting the Alternate to the GMP. The Guaranteed Maximum Price is defined in Article 6 of AIA Document A133 – 2019 and Article A.1 of AIA Document A133 – 2019 Exhibit A.

B. Total GMP: The Base GMP as described in the Documents adding the or subtracting Alternates accepted by the Owner and is the agreed upon GMP indicated ed in the Agreement.

1.03 SUMMARY

C. This Section identifies each Alternate by number and describes the basic changes to be incorporated into the Work, only when the Alternate is made a part of the Work by specific provisions in the Contract. The scope of work for Alternates shall be in accordance with applicable Drawings and Specifications.

D. Applicable Sections of the Specifications, Drawings, and other RFP documents stipulate pertinent requirements for products and methods to achieve the Work stipulated under each Alternate.

1.04 PROCEDURES

A. The Total GMP (Base GMP plus Alternates) will be accepted at the option of the Owner, and as indicated in the Agreement.

B. The Owner shall have the right to accept Alternates in any order or combination thereof based on the sum of the Base GMP and the selected Alternates.

C. Award of any, all, or none of the Alternates shall not affect the required date of Project Delivery for Substantial Completion unless indicated in writing by the CMAR and accepted by the Owner.

D. Each Alternate price shall be submitted as an individual price in Exhibit E - Proposal Form and the Schedule of Values (not cumulative). Each numbered Alternate as a whole, will be deductive or additive, resulting in a reduction or an increase of the Total GMP. The Contractor shall state on their Proposal Form the amount of money to be deducted or increased from the Base GMP for each Alternate described in the Schedule of Alternates.

E. Failure to quote an amount, or insertion of the words "no price," "none" or words of similar meaning, may be considered as not completing the proposal and may constitute disqualification of entire Proposal, at the Owner's discretion. When there is no change in the Base GMP due to

using the Alternate, use the words "No Change". The words "No Change" will be interpreted to mean that work described in the Alternate shall be completed at no adjustment or change in cost of Base GMP.

F. Coordinate pertinent related Work and modify surrounding Work as required to properly integrate the Work under each Alternate and to provide the complete construction when Alternate acceptance is designated in the Contract and incorporate into the Alternate price or credit.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required to provide a complete installation whether or not they are indicated as part of Alternate.

G. Accepted Alternates are under the same conditions as other work of the Contract.

H. Schedules: A “Schedule of Alternates” is included at the end of this Section. Include as part of each Alternate, miscellaneous devices, appurtenances, and similar Work items incidental to or required for a complete installation whether or not specifically mentioned as part of the Alternate.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.01 SCHEDULE OF ALTERNATES

ALTERNATE NO. 1 (Deduct Alternate) – Extension to the Date of Substantial Completion.
Provide a Deduct Alternate Credit (to be subtracted from the GMP) for Extension to the Delivery Dates, if available from CMAR to the Owner. Indicate proposed Delivery Dates for this Alternate. Also indicate the date by which all permits will be pulled under this Alternate.

ALTERNATE NO. 2 (Add Alternate) – Shelter Wood Floor
Provide an Add Alternate Turnkey Price (to be added to the GMP) for providing a wood floor within Room - Shelter 101, including a recessed slab, to accommodate the new flooring system to have a finish floor flush with the adjacent floor areas and to achieve the designated FFE. Alternate includes turnkey price to modify the concrete slab, foundation, and precast wall, as required, to lower the slab FFE by approximately 2 inches (recess the slab the height of the wood flooring system for a flush install with adjacent flooring). Include all accessories and incidentals.

ALTERNATE NO. 3 (Add Alternate) – Great Room Flooring:
Provide an Add Alternate Turnkey Price (to be added to the GMP) for removal of the existing Great Room flooring at the Existing School Building and replace it with new Tarkett IQ Granit Resilient Homogenous Vinyl Sheet Flooring (https://commercial.tarkett.com/products/resilient/homogeneous-sheet-tile/iq-granit), or approved equal, and new wall base. Install transition strips and new thresholds. Install according to manufacturer’s written instructions. Patch and match existing finishes, if damaged due to the work. (See Drawing EB-1 in Addendum #2)

ALTERNATE NO. 4 (Add Alternate) – Add Heat in Existing School Building South Stairs:
Provide an Add Alternate Price (to be added to the GMP) for a turnkey installation to adding electric fin tube heat, with a remotely adjustable thermostat, in the existing school building

south stairwell, adequate to maintain typical temperature setpoints of 73 deg. Fahrenheit when in use.

ALTERNATE NO. 5 (Add Alternate) – Scoreboards at Existing Building:
Provide an Add Alternate Price (to be added to the GMP) for relocating the existing scoreboard in the stage area to the gym and for providing and adding a new 2nd scoreboard to the existing gymnasium in the locations to be selected by the Owner. Include removal and relocation of an existing scoreboard, and all required electrical work and wiring to meet existing building standards, permits, and all other requirements for a turn-key installation. Include patching and finishing all surfaces to match existing.

OTHER ALTERNATES:
Proposer to provide a list of other proposed Alternates to be deducted or added to the GMP, the alternate price to be added or subtracted, and any potential impact on the design, the required Delivery Dates, or other parts of the Project.

END OF SECTION

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. All required submittals listed in this Section are required to be submitted in electronic format to the Architect.

The following represents requirements for certain Submittals Required During Construction Period: Submit the following as required by the Work and as specified:

1. Updated CPM Construction Schedules.
2. Shop Drawings, Engineered Documents, Product Data, Samples, and other Submittals as indicated below.
3. Construction submittal log.

B. **Submittals Required at the Time of Project Closeout**: Refer to Sections 017700, 017823, 017836, and 017839 for submittals required.

1.02 CONSTRUCTION SCHEDULE AND SEQUENCE PLAN

A. General: Within ten (10) calendar days after the date of written Contract Notice to Proceed, submit to the Architect and the Owner to review, a Construction Schedule for the Work, with sub-schedules of related activities which are essential to Project progress. The Construction Schedule shall provide for the expeditious and practical execution of the Work. The Construction Schedule shall both incorporate and maintain the dates provided in the Milestone Schedule as described in Specifications Section 011216.

B. Form of Construction Schedule:

1. The Construction Manager/Contractor shall prepare a computerized CPM Construction Schedule for the Work using the Critical Path Method (CPM). The CPM Construction Schedule shall include the sequences, phases and interdependencies of activities required for the complete performance of the Work as defined by the Contract Documents.
2. The CPM Construction Schedule configuration shall show the activities and durations of the Work in sufficient detail to demonstrate the Work sequence, including lead Work activities prerequisite to other Work, and the order and interdependence of activities in the Work sequence. The Work sequence shall include, but not be limited to: Work activities, submittals, fabrication and delivery of key materials, Pre-installation meetings, testing and Architect's inspections.
3. The CPM Construction Look-Ahead Schedules shall be prepared consisting of portions of the activities from the full CPM Construction Schedule that are planned or anticipated in the next short-term period, usually two to three weeks in advance of the reporting date. The Construction Manager/Contractor shall provide Look-ahead Schedules to be reviewed at each Construction Meeting.

C. Initial CPM Construction Schedule Acceptance:

1. The Architect and Owner will review the initial CPM Construction Schedule for the Work. The CPM Construction Schedule will be acceptable to the Architect and Owner if it provides an orderly progression of the Work to completion within any specified Milestone Dates and the Contract Times and includes all required contents. Such acceptance will not impose on the Architect or Owner responsibility for the CPM Construction Schedule, for scheduling, Work coordination, means and methods of progress of the Work nor interfere with or relieve the Construction Manager/Contractor from their full responsibilities, therefore.

2. The Construction Manager/Contractor shall revise the initial CPM Construction Schedule until it is acceptable to the Architect and the Owner. No Application for Payment will be accepted from the Construction Manager/Contractor until an acceptable CPM Construction Schedule is submitted to and accepted by the Architect and the Owner.

D. Revised CPM Construction Schedule Monthly Update Submissions:

1. Submission of Revised Schedules: As a minimum, submit an updated and revised CPM Construction Schedule once per month with the Construction Manager/Contractor's Application for Payment. Updates shall show actual start and completion dates for each activity as of the revision date.

2. Submit an electronic copy of the Revised Schedule with the Pay Application. Provide an electronic copy of each schedule revision to the Architect, Owner and Owner's Consultants as required. Also, distribute revised schedule to all subConstruction Manager/Contractors and suppliers.

1.03 SCHEDULE OF VALUES

A. General: Submit to the Architect for review, a draft Schedule of Values, allocated to the various portions of the Work. Submit one Schedule of Values for the total Contract Sum. Submit on AIA Document G703 Continuation Sheets.

B. Supporting Data: Support the values with back-up data which will substantiate their accuracy, if requested.

C. Use of Schedule: The Schedule of Values, unless objected to by the Architect, shall divide the Work into a sufficient number of individual cost elements and shall, together with the site observations by the Architect and other considerations as required by the Owner, be used as the basis for reviewing the Construction Manager/Contractor's Applications for Payment.

D. Form and Content of Schedule of Values:

1. General Information to be Included:

   a. Project Name and Location

   b. Architects Name and Address

   c. Construction Manager/Contractor's Name and Address

2. Date of Submission

3. Format and Ordering of Listing: Follow the Project Manual Table of Contents as the format for listing component items at a minimum. Identify each line item with the number and title of the respective major Specification Section.

4. Total Sum of Values: The sum of all values listed in the Schedule shall equal the total Contract Sum.

5. Values Detail: If the Schedule of Values initially submitted does not divide the Work as completely as described by the Architect or the Owner, the Architect will recommend additional elements and the Construction Manager/Contractor shall revise and resubmit the Schedule of Values within seven (7) calendar days.

6. No Application for Payment will be accepted from the Construction Manager/Contractor until an acceptable Schedule of Values is submitted to the Architect.

E. Revision for Change Orders: Revise Schedule of Values to list each Change Order and its detail, at the end of the schedule, only after each Change Order has been fully executed, for each subsequent Application for Payment.

1.04 CONSTRUCTION SUBMITTALS LOG

A. General: This Section includes the Construction Submittals Log Form to identify all submittals required from the Construction Manager/Contractor. Failure to include an item on such Log

does not alter the responsibility of the Construction Manager/Contractor to furnish all required submittals and to complete all Work in accordance with the Contract Documents. Construction Manager/Contractor shall provide submittal log form within 10 days of written Notice to Proceed.

1.05 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. General Requirements: Construction Manager/Contractor shall submit all technical submittals including Shop Drawings, Product Data, and Samples required by the Contract Documents. Refer to General Conditions, Section 007200, for basic requirements. Refer to other pertinent Sections of these Specifications for individual submittal requirements.

B. Definitions:

1. Shop Drawings are technical drawings, diagrams, schedules, design mixes, engineering computations and other data specially prepared for this Project to illustrate some portion of the Work, including, but not limited to the following items:

   Field Coordination Drawings

   Fabrication and Installation Drawings

   Shopwork Manufacturing Drawings

   Setting Diagrams

   Templates

   Patterns

   Schedules

   Design Mix Formulas

   Construction Manager/Contractor's Engineering Computations

   Field Measurement Data

   Standard information prepared without specific reference to the Project is not considered to be Shop Drawings.

2. Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished to illustrate materials or equipment for some portion of the Work, including standard printed information on manufactured products that has not been specially prepared for this Project, including, but not limited to the following items.

   Manufacturer's Product Literature, Specifications, and Installation Instructions

   Manufacturer's Instructions and Certificates

   Product Catalog Cuts

   Standard Color Charts

   Test and Certification Reports

   Rough-in diagrams and templates

   Standard Wiring Diagrams

   Printed Performance Curves, charts, and data

   Products Installation, Operating and Maintenance Manuals and data

3. Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged, including, but not limited to the following items.

   Partial sections of manufactured or fabricated work

   Small cuts or containers of materials

   Complete units of repetitively used materials

   Color charts or swatches showing colors, textures, or patterns

Color range sets

Units or materials of work to be used for inspection and testing

4. Miscellaneous Submittals are work related, non-administrative submittals that do not fit in the three previous categories, including, but not limited to the following:

   Specially prepared or standard printed Warranties

   Maintenance Agreements

   Workmanship bonds

   Project photographs

   Record Drawings

   Keys and other security control/protection devices

   Maintenance tools and spare parts

   Extra Materials

C. Procedures:

1. Shop Drawings and Product Data shall be submitted in electronic format to the Architect.
2. Physical product samples shall be sent directly to the Architect for review. Submit physical samples or physical copies of the manufacturer's printed color selection charts directly to the Architect for any product requiring review of its finish or colors.
3. Submittals intended to be used for finish and color selection shall not be provided in a digital format. Acceptable submittals for color and finish selection shall either be physical samples of the product to be provided, or color reproductions prepared by the manufacturer that accurately represents the colors, finishes and textures of the products to be provided. Electronic versions, or physical copies that are reproduced by the Construction Manager/Contractor, supplier or Sub-Contractors from electronic versions are not acceptable and will be rejected without review.

D. Responsibility: **Submittals shall be made by the Prime Construction Manager/Contractor ONLY**. Sub-Contractors and suppliers shall forward all their submittals to the Prime Construction Manager/Contractor to be submitted to the EPMS. Submittals that are transmitted to the Architect without review by the Prime Construction Manager/Contractor will be rejected without review.

E. In submitting Shop Drawings, Product Data, and Samples, the Construction Manager/Contractor represents that they have determined and verified all field measurements, checked catalog numbers and similar data and that they have checked and coordinated the information contained within such submittals with the requirements of the Work and the Contract Documents and shall stamp all submittals indicating such review.

F. The Construction Manager/Contractor remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selection of fabrication process, for techniques of assembly, errors or omissions in the submittals and for performing their Work in a safe manner.

G. No portion of the Work requiring submission of Shop Drawings, Product Data or Samples shall be commenced until the submittal has been received and reviewed by the Architect.

H. The Construction Manager/Contractor shall not be relieved of responsibility for any deviation from the Contract Documents, or any errors and omissions in Shop Drawings, Product Data or Samples by the Architect's approval thereof.

I. Materials:

1. Format: All submittals shall be in an electronic PDF format, in color, to facilitate electronic transfer. Submittals not created digitally shall be scanned as necessary by the Construction Manager/Contractor to create pdf files. Sample submittals shall be handled

physically with electronic transmittal letter copies also used to record and track submittals, reviews and approvals of sample materials.

2. Submittals in the form of Shop Drawings shall be prepared on clear, clean, scannable, print copies of each sheet. Submit Shop Drawings to the Architect.

3. Submittals in the form of Product Data shall be provided as an electronic PDF format, typically sized 8-1/2" x 11". If clarity of information is not adequate, a resubmittal will be required. Where pages of manufacturer's literature or brochures are used, provide all pages complete, do not select isolated pages. Submit data together with a title and index sheet listing all identification information for the Project and the specific items being submitted. The title and index sheet shall have a clear space of 4" x 4" for review stamps and notes. Submit all Product Data to the Architect.

   a. Manufacturer's color or finish charts intended for initial color, pattern, or finish selection shall be hard copies printed by the manufacturer for the purpose of illustrating the manufacturer's standard range of options. Electronic files, hard copies printed from electronic files, or other types of reproductions will be rejected.

4. Submittals in the form of Samples shall be physical exhibits of the precise article proposed to be furnished. Unless the precise color, pattern, texture, etc. is specifically described in the Contract Documents, and whenever a choice of color, pattern, texture, etc. is available in a specified product, submit accurate full range of color and pattern samples for review and selection. Where submission of full range is impractical, verify with Architect the preferred article prior to submission. Attach to each sample a label which includes the Project title, Construction Manager/Contractor, S Sub-Contractors or Supplier name, Specification Section and paragraph, product name, features, finish, etc. Submit three (3) Samples in boxes, containers, or enclosures, unless noted otherwise elsewhere. Submit Samples to the Architect. Also submit electronic transmittal letter copies to record and track submissions, reviews and approvals of sample materials.

5. Submittals in the form of Field Coordination Drawings shall be prepared the same as for Shop Drawings. Provide Field Coordination Drawings where required for the integration of the Work. Show sequencing and relationship of separate units of Work which must interface in a restricted manner to fit in the space provided, or function as indicated. Field Coordination Drawings are considered Shop Drawings and shall be definitive in nature.

J. Submittal preparation and initiation:

1. The Construction Manager/Contractor shall prepare, review, stamp with their approval using a color other than black and transmit all submittals required by the Contract Documents or subsequently by the Architect as covered by Modifications with reasonable promptness and in orderly sequence so as to cause no delays in the Work or in the Work of any other Construction Manager/Contractor. Submittals without the Construction Manager/Contractor's Stamp will be rejected.

2. Submittals for all materials and/or equipment in each system shall all be submitted at one time, each complete set in a separate brochure.

3. At the time of submission, the Construction Manager/Contractor shall inform the Architect in writing of any deviation in the submittal from the requirements of the Contract Documents.

4. The Construction Manager/Contractor shall deliver the submittals to the Architect complete with transmittal forms and identification information including the Specifications Section and paragraph.

K. Submittal Review:

1. The Architect will review submittals with reasonable promptness (generally allow 14 calendar days for a review and response) and will return them with a stamp indicating the Action of the Architect's or Engineer's Review noted thereon. These stamp (s) and all

accompanying notations and remarks shall be red in color. Each submittal will be noted with the appropriate action as follows:

a. "NO EXCEPTIONS TAKEN" means that fabrication, manufacture, or construction may proceed providing the submittal complies with the Contract Documents.

b. "CORRECT AS NOTED" means fabrication, manufacture or construction may proceed providing submittal complies with the Architect's notations and the Contract Documents. If, for any reason, Construction Manager/Contractor cannot comply with the notations, Construction Manager/Contractor shall resubmit as described for submittals stamped, "REVISE AND RESUBMIT".

c. "REJECTED/REVISE AND RESUBMIT" means that submittal does not comply with the Contract Documents and that the fabrication or manufacture shall not proceed. Construction Manager/Contractor shall make revisions and resubmit.

2. The Architect's review shall not be construed as an indication that submittal is correct or suitable nor that Work represented by submittal complies with the Contract Documents, except as to matters left to the Architect's decision by the Contract Documents.

3. If more than one revision is required to be reviewed by Architect/Engineer for any Submittal, A/E's fee for the additional reviews will be subtracted from the CMAR's contract value (GMP).

4. The Architect may hold submittals in cases where partial submission cannot be reviewed until the complete submission has been received or where correlated items have not yet been received. When the Architect holds such submittals, they will advise the Construction Manager/Contractor that the items submitted will not be reviewed until all related information has been received.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

SECTION 01 41 00 - AIR BARRIER SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes administrative and procedural requirements for accomplishing an airtight building enclosure that controls infiltration or exfiltration of air.

1. The airtight components of the building enclosure and the joints, junctures and transitions between materials, products, and assemblies forming the air-tightness of the building enclosure are called “the air barrier system”. Services include coordination between the trades, the proper scheduling and sequencing of the work, preconstruction meetings, inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Architect.

2. The Contractor shall ensure that the intent of constructing the building enclosure with a continuous air barrier system to control air leakage into, or out of the conditioned space is achieved. The air barrier system shall have the following characteristics:
   a. It must be continuous, with all joints sealed.
   b. It must be structurally supported to withstand positive and negative air pressures applied to the building enclosure.
   c. Connection shall be made between:
      1) Foundation and walls.
      2) Walls and windows or doors.
      3) Different wall systems.
      4) Wall and roof.
      5) Wall and roof over unconditioned space.
      6) Walls, floor and roof across construction, control and expansion joints.
      7) Walls, floors and roof to utility, pipe and duct penetrations.

3. Air Barrier Penetrations: All penetrations of the air barrier and paths of air infiltration / exfiltration shall be sealed with products and methods approved by the air barrier manufacturer.

B. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.

C. Requirements of this section relate to the coordination between subcontractors required to provide an airtight building enclosure, customized fabrication and installation procedures, not production of standard products.

1. Continuity of the air barrier materials and products with joints to provide assemblies. Continuity of all the enclosure assemblies with joints and transition materials to provide a whole building air barrier system.

2. Specific quality-control requirements for individual construction activities are specified in the sections of the specifications. Requirements in those sections may also cover production of standard products. It is the Contractor's responsibility to ensure that each subcontractor is adequately and satisfactorily performing the quality assurance documentation, tests and procedures required by each section.

3. Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.

4. Requirements for Contractor to provide an airtight building enclosure is not limited by quality-control services required by Architect, Owner, or authorities having jurisdiction and are not limited by provisions of this section.

1.2 RELATED SECTIONS

A. Section 014500 Quality Control
B. Section 011216 Work Sequence and Milestone Schedule
C. Section 013119 Project Meetings
D. Section 017329 Cutting and Patching
E. Section 033000 Cast in Place Concrete
F. Section 034100 Precast Concrete
G. Section 054000 Cold Formed Metal Framing
H. Section 061000 Rough Carpentry
I. Section 061005 Roof Related Rough Carpentry
J. Section 075100 Build Up Roofing
K. Section 075323 EPDM Membrane Roofing
L. Section 075400 TPO Roofing
M. Section 079200 Joint Sealants
N. Section 081113 Hollow Metal Doors
O. Section 083323 Overhead Coiling Doors
P. Section 084113 Aluminum Entrances
Q. Section 084523 Insulated Translucent Fiberglass Sandwich Unit System
R. Section 085113 Aluminum Windows
S. Section 085213 Aluminum Clad Wood Windows
T. Section 085313 Vinyl Windows
U. Section 086223 Tubular Daylighting Devices

1.3 RESPONSIBILITIES

A. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, Construction Manager shall provide coordination of the trades, and the sequence of construction to ensure continuity of the air barrier system joints, junctures and transitions between materials and assemblies of materials and products, from substructure to walls to roof. Provide quality assurance procedures, testing and verification as specified herein. Facilitate inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction or by the Owner. Costs for these services are included in the Contract Sum.

1. Organize preconstruction meetings between the trades involved in the whole building's air barrier system to discuss where each trade begins and ends and the responsibility and sequence of installation of all the air-tight joints, junctures, and transitions between materials, products and assemblies of products specified in the different sections, to be installed by the different trades.

2. Build a mock-up before proceeding with the work, satisfactory to the Architect, of each air-tight joint type, juncture, and transition between products, materials and assemblies.

B. Associated Services: Coordinate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:

1. Provide access to the Work.

2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.

3. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.

4. Deliver samples to testing laboratories.

5. Provide security and protection of samples and test equipment at the Project Site.

C. Duties of the Testing and Inspection Agency: Construction Manager's independent agency engaged to perform inspections, sampling, and testing of air barrier materials, components and assemblies specified in individual Sections shall cooperate with the Architect and the Contractor in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.

1. The agency shall notify the Architect and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.

2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.

3. The agency shall not perform any duties of the Contractor.

D. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.4 PERFORMANCE REQUIREMENTS

A. Compliance Alternatives:
a. Materials: materials used for the air barrier system in the opaque envelope shall have an air permeance not to exceed 0.004 cfm/ft^2 under a pressure

differential of 0.3 in. water (1.57psf) (0.02 L/s.m^2 @ 75 Pa) when tested in accordance with ASTM E 2178. Or,

b. Assemblies of materials and components: shall have an air permeance not to exceed 0.04 cfm/ft^2 under a pressure differential of 0.3 in. water (1.57psf) (0.2 L/s.m^2 @ 75 Pa) when tested in accordance with ASTM E 2357. Or:
c. The entire building: The air leakage of the entire building shall not exceed 0.4 cfm/ft^2 under a pressure differential of 0.3 in. water (1.57psf) (2.0 L/s.m^2 @ 75 Pa) when tested according to ASTM E 779.

1.5 SUBMITTALS

A. Construction Manager's independent testing agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Architect. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.

1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.

2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
   a. Date of issue.
   b. Project title and number.
   c. Name, address, and telephone number of testing agency.
   d. Dates and locations of samples and tests or inspections.
   e. Names of individuals making the inspection or test.
   f. Designation of the Work and test method.
   g. Identification of product and Specification Section.
   h. Complete inspection or test data.
   i. Test results and an interpretation of test results.
   j. Ambient conditions at the time of sample taking and testing.
   k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
   l. Name and signature of laboratory inspector.
   m. Recommendations on retesting.

1.6 QUALITY ASSURANCE

A. Qualifications for Air Barrier Testing and Inspection Agencies: Engage air Barrier inspection and testing service agencies, including independent testing laboratories, that are prequalified and that specialize in the types of air barrier system inspections and tests to be performed.
   1. Air Barrier Testing and Inspection Agency will be hired by Owner.

PART 2 - PRODUCTS

(not used)

PART 3 - EXECUTION

3.1 GENERAL

A. Construction Manager is responsible for all execution procedures AND FOR 3RD PARTY INSPECTIONS.

3.2 REPAIR AND PROTECTION

A. Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 1 Section "Cutting and Patching."

B. Protect construction exposed by or for quality-control service activities and protect repaired construction.

C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

3.3 TESTING AND INSPECTION

A. The Construction Manager will hire a testing and inspection agency to provide [Continuous] [Occasional] observation and inspection during installation of the air barrier system. The testing and inspection agency will provide the following listed services:
   1. Qualitative Testing and Inspection:
      a. Daily reports of observations, with copies to the Owner, Contractor and Architect.
      b. Continuity of the air barrier system throughout the building enclosure with no gaps, holes.
      c. Structural support of the air barrier system to withstand design air pressures.
      d. Masonry and concrete surfaces are smooth, clean and free of cavities, protrusions and mortar droppings.
      e. Site conditions for application temperature and dryness of substrates.
      f. Maximum length of exposure time of materials to ultra-violet deterioration.
      g. Surfaces are properly primed.
      h. Laps in material are 2”minimum, shingled in the correct direction (or mastic applied on exposed edges), with no fish-mouths.
      i. Mastic applied on cut edges.
      j. Roller has been used to enhance adhesion.
      k. Measure application thickness of liquid-applied materials to manufacturer’s specifications for the specific substrate.
      l. Materials used for compatibility.
      m. Transitions at changes in direction, and structural support at gaps.
      n. Connections between assemblies (membrane and sealants) for cleaning, preparation and priming of surfaces, structural support, integrity and continuity of seal.
      o. All penetrations sealed.
      p. ASTM E 1186 “Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Retarder Systems.”
         1) Infrared scanning with pressurization/depressurization.
         2) Smoke pencil with pressurization/depressurization.
         3) Pressurization/depressurization with use of anemometer

4) Generated sound with sound detection
5) Tracer gas measurement of decay rate
6) Chamber pressurization/depressurization in conjunction with smoke tracers
7) Chamber depressurization using detection liquids

2. The Contractor shall be present on site during all tests performed by the testing and inspection agency. The Contractor shall provide support to facilitate successfully testing of the air barrier system, including by not limited to, adjustment of doors and window systems, patching of incomplete air barrier system, installation of door seals, etc.

3. Quantitative tests:
   a. Provide written test reports of all tests performed, with copies to the Owner, Contractor and Architect.
   b. Material compliance for maximum air permeance, ASTM E 2178.
   c. ASTM E 283, Determining rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences Across the Specimen.
   d. Assemblies, ASTM E 2357, test pressure and allowable air leakage rate to be determined by design professional for interior design conditions and location of project.
   e. CAN/CGSB 1986 Standard 149.10, Determination of the Airtightness of Building Envelopes by the Fan Depressurization Method.
   f. CAN/CGSB 1996 Standard 149.15 Determination of the Overall Envelope Airtightness of Office Buildings by the Fan Depressurization Method Using the Building's Air Handling System.
   g. Whole building, floors, or suites, ASTM E779, Determining Airtightness of Buildings Air Leakage Rate by Single Zone Air Pressurization.
   h. Windows and connections to adjacent opaque assemblies, ASTM E783 method B
   i. Tracer gas testing, ASTM E741
   j. Pressure test, ASTM E330
   k. Bond to substrate, ASTM D4541

END OF SECTION

SECTION 014219 - REFERENCE STANDARDS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work Included:

1. Throughout the Contract Documents, reference is made to codes and standards which establish qualities and type of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics.
2. The edition of all referenced codes, standards, tests, and methods shall be those most current at the date of the Contract Documents or as otherwise specified.
3. Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is the Contractor's responsibility to provide materials and workmanship, which meet or exceed the specifically named code or standard. In all cases the expectation of the Construction Manager, Multi-Prime Contractors, and Subcontractors and trades is all materials, products and labor shall be performed and installed in a high-quality workmanship like manner.
4. It is also the Contractor's responsibility, when so required by the Contract Documents or by written request from the Architect or Owner, to deliver to the Architect or Owner all required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard. Such proof shall be in the form requested in writing by the Architect or Owner and generally will be required to be copies of a certified report of tests conducted by an approved independent testing laboratory.

B. Related Work Described Elsewhere:

1. Specific naming of codes or standards occurs on the Drawings and in other Sections of these Specifications.

1.02 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "Authorized," "selected," "required," and "permitted" have the same meaning as directed.

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as indicated.

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction (AHJ), and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Installer": Construction Manager or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name

J. "Experienced": When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

K. “Project Site”: Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.03 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.04 QUALITY ASSURANCE

A. Familiarity with Pertinent Codes and Standards.

1. In procuring all items in this Work, it is the Contractor’s responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in this Work meet or exceed the specified requirements.

B. Overlapping or Conflicting Requirements:

1. Where compliance with two or more industry standards or sets of requirements are specified, and the overlapping of those standards or requirements establishes different or conflicting minimums or levels of quality, the most stringent requirement (which is generally recognized to also be the costliest) is intended and will be enforced, unless more detailed language written directly into the Contract Documents clearly indicates that a less stringent requirement is acceptable.

2. Refer all uncertainties to the Architect for clarification before proceeding.

C. Rejection of Non-Complying Items:

1. The Owner reserves the right to reject items incorporated into the Work which fail to meet the specified minimum requirements.

2. The Owner further reserves the right, and without prejudice to other recourse the Owner may take, to accept non-complying items subject to an adjustment in the Contract Sum as approved by the Owner.

D. Applicable standards listed in these Specifications include, but and not necessarily limited to, standards promulgated by the following agencies and organizations:

AA	=	Aluminum Association 818 Connecticut Ave. NW Washington, DC 20006 www.aluminum.org
AAMA	=	Architectural Aluminum Manufacturer's Association See FGIA www.fgiaonline.org/pages/aluminum
AATCC	=	American Association of Textile Chemists and Colorists PO Box 12215 Research Triangle Park, NC 27709-2215 www.aatcc.org
ABAA	=	Air Barrier Association of America 1600 Boston-Providence Hwy Walpole, MA 02081 www.airbarrier.org
ACI	=	American Concrete Institute 38800 Country Club Drive Farmington Hills, MI. 48331-3439 www.concrete.org
ADAAG	=	Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities Available from Access Board www.access-board.gov
AFPA	=	American Forest and Paper Association 1101 K St NW Ste 700 Washington, DC 20005 www.afandpa.org
AHA	=	American Hardboard Association 1210 West Northwest Highway Palatine, IL 60067 www.domensino.com/AHA
AIA	=	American Institute of Architects 1735 New York Avenue N.W. Washington, DC 20036 www.aia.org
AISC	=	American Institute of Steel Construction 130 East Randolph, Suite 2000 Chicago, IL, 60601 www.aisc.org
AISI	=	American Iron and Steel Institute 1000 – 16th Street NW Washington, DC 20036 www.steel.org

ALSC	=	American Lumber Standard Committee 7470 New Technology Way, Suite F Frederick, MD 21703 www.alsc.org
ANSI	=	American National Standards Institute 1430 Broadway New York, NY 10018 www.ansi.org
APA	=	The Engineered Wood Association Box 11700 Tacoma, WA 98411 www.apawood.org/plywood
ARI	=	Air-Conditioning and Refrigeration Institute 1815 N. Fort Myer Drive Arlington, VA 22209
ASHRAE	=	American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc. 180 Technology Parkway Peachtree Corners, Ga 30092 www.ashrae.org
ASCE	=	American Society of Civil Engineers 801 Alexander Bell Drive Reston VA 20191 www.asce.org
ASME	=	American Society of Mechanical Engineers Two Park Avenue New York, NY 10016-5990 www.asme.org
ASNT	=	American Society for Non-Destructive Testing 1711 Arlingate Ln Columbus, OH 43228 www.asnt.org
ASTM	=	American Society for Testing and Materials 100 Barr Harbor Drive, P.O. Box C700 West Conshohocken, PA 19428-2959 www.astm.org
AWI	=	Architectural Woodwork Institute 46179 Westlake Dr Ste 120 Potomac Falls, VA 20165 www.awinet.org
AWPA	=	American Wood Protection Association PO Box 151387 Alexandria VA, 22315 www.awpa.com

AWS	=	American Welding Society, Inc. 8669 NW 36 Street, # 130 Miami, FL 33166-6672 www.aws.org
BHMA	=	Builder's Hardware Manufacturer's Association 355 Lexington Avenue, 15th Floor New York, NY 10017 www.buildershardware.com
CCRL	=	Cement and Concrete Reference Laboratory (ASTM) 100 Barr Harbor Drive, P.O. Box C700 West Conshohocken, PA 19428-2959 www.ccrl.us
CFR	=	Code of Federal Regulations www.archives.gov/federal-register/cfr
CISCA	=	Ceilings and Interior Systems Construction Association 1010 Jorie Blvd Ste 30 Oak Brook, IL 60523 www.cisca.org
CPSC	=	Consumer Product Safety Commission 4330 E West Hwy Bethesda, MD 20814 www.cpsc.gov
CRI	=	Carpet and Rug Institute 100 S Hamilton St Dalton, GA 30720 www.carpet-rug.org
CRSI	=	Concrete Reinforcing Steel Institute 933 N. Plum Grove Road Schaumburg, IL 60173-4758 www.crsi.org
CS	=	Commercial Standard of NBS U.S. Department of Commerce Government Printing Office Washington, DC 20234 www.nist.gov/pml/weights-and-measures
CSI	=	Construction Specifications Institute 23 North Pitt St, Ste 450, Alexandria, VA 22314 www.csinet.org
DASMA	=	Door and Access Systems Manufacturers Association 1300 Summer Avenue Cleveland, OH 44115-2851 www.dasma.com

DHI	=	Door Security + Safety Professionals (formerly the Door and Hardware Institute) 2110 K Street NW, 3rd Floor Washington DC 20006 www.dhi.org
EJMA	=	Expansion Joint Manufacturer's Association 707 Westchester Avenue White Plains, NY 10604 www.ejma.org
EPA	=	U.S. Environmental Protection Agency USEPA William Jefferson Clinton Building North 1200 Pennsylvania Avenue N.W. Washington, DC 20004 www.epa.gov
FDA	=	U.S. Food and Drug Administration www.fda.gov
FEMA	=	Federal Emergency Management Agency 500 C Street SW Washington, DC 20472 www.fema.gov
FGIA	=	Fenestration and Glazing Industry Alliance 1900 E. Golf Rd., Ste 1250 Schaumburg, IL 60173 www.fgiaonline.org
FM	=	Factory Mutual System 505 Highway 169 North Waterford Park, Suite 375, Plymouth, MN 55441 www.fmglobal.com
GA	=	Gypsum Association 962 Wayne Ave., Suite 620 Silver Spring, MD 20910 www.gypsum.org
GANA	=	Glazing Association of North America, See NGA
IAPMO	=	International Association of Plumbing and Mechanical Officials 4755 E Philadelphia St. Ontario, CA 91761 www.iapmo.org
ICC	=	International Code Council 500 New Jersey Avenue, NW 6th Floor, Washington, DC 2000 www.iccsafe.org
ICRI	=	International Concrete Repair Institute 1000 Westgate Dr Ste 252 Saint Paul, MN 55114 www.icri.org

IES	=	Illuminating Engineering Society 120 Wall St. Fl 17 New York, NY 10005-4026 www.ies.org
IGCC	=	Insulating Glass Certification Council PO Box 730 Sackets Harbor, NY 13685 www.igcc.org
IGMA	=	Insulating Glass Manufacturers Alliance, See NGA
IMI	=	International Masonry Institute BAC/IMI National Training Center 17101 Science Drive Bowie, MD 20715 www.imiweb.org
MBMA	=	Metal Building Manufacturers Association 1300 Sumner Avenue Cleveland, OH 44115-2851
MPI	=	Master Painters Institute 15835 Park Ten Pl. Houston, TX 77084 www.mpi.net
NAAMM	=	National Association of Architectural Metal Manufacturers 800 Roosevelt Rd. Bldg. C Suite 312 Glen Ellyn, IL 60137 www.naamm.org
NAFS	=	North American Fenestration Standard, See FGIA www.fgiaonline.org/pages/nafs-overview
NBS	=	National Bureau of Standards U.S. Department of Commerce Standards Development Service Section Washington, DC 20234
NCCA	=	National Coil Coating Association 1300 Sumner Ave. Cleveland, OH 44115 www.coilcoating.org
NCMA	=	National Concrete Masonry Association Box 781 Herndon, VA 22070 www.ncma.org
NELMA	=	Northeastern Lumber Manufacturers Association 272 Tuttle Rd. Cumberland Center, ME 04021 www.nelma.org

NEMA	=	National Electrical Manufacturers Association 1300 17th St N #900 Arlington, VA 22209, USA www.nema.org
NFPA	=	National Fire Protection Association 1 Batterymarch Park Quincy, Massachusetts 02169-7471 www.nfpa.org
NFRC	=	National Fenestration Rating Council 6305 Ivy Ln Ste 140 Greenbelt, MD 20770 www.nfrc.org
NGA	=	National Glass Association with GANA 1945 Old Gallows Road, Suite 750 Vienna, VA 22182 www.glass.org
NIOSH	=	National Institute for Occupational Safety and Health 395 E St., SW. Suite 9200. Washington, DC 20201 www.cdc.gov/niosh
NLGA	=	National Lumber Grades Authority 409 Granville St, Suite 303 Vancouver, BC, Canada V6C 1T2 www.nlga.org
NRCA	=	National Roofing Contractors Association 10255 W. Higgins Road, Suite 600 Rosemont, IL 60018-5607 www.nrca.net
OSHA	=	Occupational Safety and Health Administration (U.S. Dept of Labor) 200 Constitution Ave NW Washington, DC 20210 www.osha.gov
PCA	=	Portland Cement Association 5420 Old Orchard Road Skokie, IL 60077 www.cement.org
SDI	=	Steel Deck Institute P.O. Box 426 Glenshaw, PA 15116 www.sdi.org
SDI	=	Steel Door Institute 30200 Detroit Road Westlake, OH 44145 www.steeldoor.org

SEI	=	Structural Engineering Institute 801 Alexander Bell Drive Reston VA 20191 www.asce.org/structural-engineering/structural-engineering-institute\
SJI	=	Steel Joist Institute 140 W Evans St Ste 203 Florence, SC 29501 www.steeljoist.org
SMACNA	=	Sheet Metal and Air Conditioning Contractors' National Association 4201 Lafayette Center Drive Chantilly, Virginia 20151-1219 www.smacna.org
SPIB	=	Southern Pine Inspection Bureau P.O. Box 10915 Pensacola, FL 32524-0915 www.spib.org
SPRI	=	Single Ply Roofing Industry 465 Waverly Oaks Road, Suite 421 Waltham, MA 02452 www.spri.org
SSPC	=	The Society for Protective Coatings 800 Trumbull Dr. Pittsburg, PA 15205 www.sspc.org
TCNA	=	Tile Council of North America, Inc. 100 Clemson Research Blvd Anderson, SC 29625 www.tcnatile.com
TMS	=	The Masonry Society 105 South Sunset Street, Suite Q Longmont, CO USA 80501-6172 www.masonrysociety.org
UFC	=	Uniform Fire Code International Conference of Building Officials 5360 South Workman Mill Road Whittier, CA 90601
UL	=	Underwriters Laboratories, Inc. 333 Pfingsten Road Northbrook, IL 60062 www.ul.org
WCLIB	=	West Coast Lumber Inspection Bureau 6980 SW Varns Street Tigard, OR 97223 www.wclib.org

WDMA	=	Window and Door Manufacturers Association 330 N Wabash Avenue, Suite 2000 Chicago, IL 60611 www.wdma.com
WI	=	Woodwork Institute 1455 Response Road, Suite 110 Sacramento, CA 95815 www.woodworkinstitute.com
WWPA	=	Western Wood Products Association 1500 SW First Ave., Ste. 870 Portland, OR 97201 www.wwpa.org

END OF SECTION

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. Products
B. Reuse of Existing Materials and Equipment
C. Manufacturers' Instructions
D. Transportation and Handling
E. Storage and Protection
F. Extra Materials

1.02 RELATED REQUIREMENTS

A. Section 013300 – Submittals
B. Section 017700 – Closeout Procedures
C. Section 017823 – Operation and Maintenance Data
D. Section 017836 – Warranties

1.03 PRODUCTS

A. Products include material, equipment, and systems.

B. Comply with Specifications and Reference Standards as minimum requirements.

C. Components required shall be supplied in quantities required by the Drawings and the technical Specification Sections and shall be interchangeable, as necessary.

1.04 REUSE OF EXISTING MATERIAL AND EQUIPMENT

A. Except as specifically indicated or specified, materials and equipment removed from the existing facilities or site shall not be used in the Project Work.

B. For material and equipment specifically indicated or specified to be reused in the Work:

   a. Use special care in removal, handling, protection, storage, and reinstallation, to assure proper function in the completed Work.
   b. Arrange for transportation, storage, and handling of products, which require off-site storage, restoration, and renovation. Pay all costs for such Work.

1.05 MANUFACTURERS' INSTRUCTIONS

A. When the Contract Documents require that installation comply with printed Manufacturers' Instructions, obtain and distribute copies of such instructions to parties involved in the installation. When specified, submit copies of Manufacturers' Instructions for approval by the Architect in accordance with **Section 013300**.

B. Maintain one (1) complete set of Manufacturers' Instructions at the site field office during installation, until Project completion.

C. Handle, install, connect, clean, condition and adjust products in strict accordance with Manufacturers' Instructions and in conformance with specified requirements.

   a. Should job conditions or specified requirements conflict with Manufacturers' Instructions, consult with the Architect for further clarifications.
   b. Do not proceed with such Work without clear direction.

D. Perform Work in accordance with Manufacturers' Instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by the Contract Documents or the Architect.

1.06 TRANSPORTATION AND HANDLING

A. Arrange deliveries of products in accordance with Construction Schedules; coordinate to avoid conflict with Work and conditions at the site.

B. Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturers' original containers or packaging, dry, with identifying labels intact and legible.

C. Upon delivery, promptly inspect shipments to assure that products comply with Contract Document requirements, quantities are correct, and products are undamaged.

D. Provide equipment and personnel to receive and handle products by methods to prevent soiling or damage.

1.07 STORAGE AND PROTECTION

A. Store products in accordance with Manufacturers' Instructions, with seals and labels intact and legible. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by Manufacturers' Instructions.

B. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.

C. Store loose granular materials on solid surface in a well-drained area; prevent mixing with foreign matter.

D. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged and are maintained under required conditions.

E. Protection after Installation:

   a. Provide substantial coverings as necessary to protect installed products from damage from traffic, subsequent construction operations, and the elements. Remove when no longer needed.

1.08 EXTRA MATERIALS

A. The Contractor shall furnish all "extra materials" to the Owner at the end of the Project as may be described in various Sections of the Specifications. Extra materials generally are building components that may need repair or replacement, or unique materials that may be difficult to match in the future.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. The Construction Manager's Superintendent shall maintain at the Project site a complete set of Contract Documents, including the following:

1. Drawings
2. Specifications
3. Addenda
4. Change Orders and Other Modifications to the Contract
5. Architect's Written Instructions
6. Approved Shop Drawings, Product Data, and Samples
7. Field Test Records

1.02 WORK INCLUDED

A. Throughout the progress of the Work of the Contract, the Construction Manager shall maintain an accurate record of all changes in the Contract Documents, as described herein.

B. Prior to completion of the Work of this Contract, the Construction Manager shall transfer all recorded changes to a set of Final Record Documents, as describe herein.

1.03 QUALITY ASSURANCE

A. General: Delegate the responsibility for maintenance of Report Documents to one person on the Contractor's staff.

B. Accuracy of Records: Thoroughly coordinate all changes within the Project Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry is required to properly show the change. Accuracy of records shall be such that future search for items shown in the Contract Documents may reasonably rely on information obtained from the approved Final Record Documents.

C. Timing of Entries: Make all entries within twenty-four (24) hours after receipt of information.

1.04 SUBMITTALS

A. Prior to submitting each Application for Payment, each Subcontractor shall review the current status of Record Documents maintenance with the Construction Manager and secure Construction Manager's approval of the Record Document as currently maintained.

B. Failure to maintain Record Documents in compliance with these Specifications may reduce Progress Payments.

C. At Contract Closeout, the Construction Manager shall deliver Record Documents, as indicated below the Architect for delivery to the Owner.

D. The Construction Manager shall accompany the Record Documents submittal with a transmittal letter containing:

1. Date
2. Project Title
3. Contractor's Name and Address
4. Title and Number of Each Record Document
5. Signature of Contractor Authorized Representative

E. As a condition of and prior to final payment, the Construction Manager shall provide all required Project Record Documents and obtain the approval of their submittal from the Architect and the Owner.

1.05 RECORD DOCUMENTS HANDLING

A. Use all means necessary to maintain the Job Set of Record Documents completely protected from deterioration, loss and damage until completion of the Work and transfer of the recorded data to the Final Record Documents. In the event of loss of recorded data, use all means necessary to secure the data for the Architect's approval; such means shall include, if necessary, removal and replacement of concealing materials, and in such case, all replacements shall be to the standards originally specified in the Contract Documents.

PART 2 – PRODUCTS

2.01 RECORD DOCUMENTS

A. Job Set: Promptly following Contract Award, provide from the Architect's electronic files, at least one (1) complete, printed, hard copy set of all Contract Documents.

B. Final Record Documents: See Paragraph 3.02 below.

PART 3 – EXECUTION

3.01 MAINTENANCE OF JOB SET

A. Identification: Immediately upon receipt of the Job Set described in Paragraph 2.01A above, mark each of the Documents with the title "RECORD DOCUMENTS – JOB SET".

B. Preservation:

1. Do not use the Job Set for construction or any purposes except entry of new data and for review by the Architect and Owner.
2. Maintain the Job Set at the Project site.

C. Making Entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by note and by graphic line, as required. Date all entries. Call attention to the entry by a "cloud" around the areas affected. In the event of overlapping changed, different colors may be used for each of the changes or more than one copy of each sheet may be used.
2. Show all significant changes in schedules, plans, sections, dimensions, elevations and details, such as shifts in location of walls, doors, windows, stairs and the like made during construction. Include changes made by clarifications and Change Orders.
3. Show all significant changes in footings, elevations, foundations, columns, beams, connections, details, openings, concrete reinforcing, lintels, and concealed anchorages made during construction.
4. Note all details and locations of concealed construction immediately during the course of the Work. Measure and record horizontal location tie measurements to permanent structures and particularly verify and note all elevations of underground construction prior to backfilling.
5. Show final horizontal and vertical locations and arrangement of all new and/or rerouting of existing site utilities, including, but not limited to: sanitary, storm, water, natural gas, electrical and telephone referenced to permanent surface structures.
6. Show final locations, arrangement and elevations of all existing and new plumbing systems, including, but not limited to: storm sewer, sanitary sewer, water, gas, air, valves, floor drains, cleanouts, risers, fixtures and appurtenances. Note all locations and details of

concealed construction immediately during the course of the Work and particularly verify and note all elevations of existing new underground or concealed construction prior to backfilling or covering.

7. Show final locations and arrangement of all mechanical equipment and major concealed mechanical work items, including, but not limited to: ductwork supply, return, exhaust, ventilation and circulating systems, diverters, access doors, variable air volume boxes, diffusers, grilles, registers, heating and cooling piping, control and shut-off valves, pumps, piping specialties, temperature control system components, thermostats, equipment schedules and details.
8. Show final locations of all fire protection piping, riser diagrams and heads.
9. Show final locations of all electrical panelboards, final configurations, locations and circuiting, of all circuits, lights, switches, receptacles, computer cabling, motors, controls, fire alarm systems, equipment schedules and riser diagrams.
10. Conversion of Schematic Layouts: In most cases on the Drawings, arrangement of conduits and circuits, piping, ducts, and other similar items, is shown schematically and is not intended to portray precise physical layout. Final physical arrangement is as determined by the Contractor. For maintenance purposes or design of future modifications of the facility, the Owner requires accurate information as to the final physical arrangement of items that are shown only schematically on the Drawings. The Contractor shall provide the necessary information graphically and by dimension as part of the Project Final Record Documents.

3.02 FINAL RECORD DOCUMENTS

A. The purpose of the Final Record Documents is to provide factual information regarding all aspects of the Work, both concealed and visible, to enable future maintenance, service and modifications of design to proceed without lengthy and expensive site measurements, investigations and examination.

B. Approval of Recorded Data Prior to Transfer: Following completion of the Work and prior to start of transfer of recorded data thereto, secure a review by the Architect and the Owner of all “Job Set” recorded data. Make all required revisions.

C. Transfer of Data to Final Record Drawings: Using an erasable colored pencil, carefully transfer all change data shown on the Job Set of Record Drawings to the corresponding Final Record Documents, coordinating the changes as required, and clearly indicating at each affected Detail and other Drawing the full description of all changes made during construction and the actual location of items described in Paragraph 3.01 above. Call attention to each entry by drawing a “cloud” around the area or areas affected. In the event of overlapping changes, different colors may be used for each of the changes or more than one copy of each sheet may be used.

D. Transfer of Data to Other Documents: If the Documents other than Drawings have been kept clean successfully during progress of the Work, and if entries have been sufficiently orderly thereon to the approval of the Architect and the Owner, the Job Set of those Documents (other than Drawings) will be accepted as Final Record Documents for those Documents. If any such Document is not so approved by the Architect and Owner, secure a new copy of that Document and carefully transfer the change data to the new copy.

E. Review and Approval: Submit the completed total set of Final Record Documents to the Architect as described in Paragraphs 1.04C. and D. above. Participate in review meetings as required by the Architect and the Owner, make all required changes in the Final Record Documents, and promptly deliver the Final Record Documents to the Architect for delivery to the Owner.

END OF SECTION

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SECTION 03 41 00 - PRECAST STRUCTURAL CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Technical Specifications Sections may apply to this Section even when not specifically referenced.

1.2 SECTION INCLUDES

A. Wall panels with integral insulation.

B. Wall panels.

C. Roof double tees.

D. Grout packing.

1.3 RELATED SECTIONS

A. Section 01 45 33 - Structural Testing and Special Inspection

B. Section 03 20 00 - Concrete Reinforcing

C. Section 03 15 10 - Post-Installed Anchors

D. Section 03 41 13 - Precast Concrete Planks

1.4 REFERENCE STANDARDS

A. AASHTO - Standard Specifications for Highway Bridges, Sixteenth Edition, 1996, including 1997-2000 revisions.

B. ACI 301 - Specifications for Structural Concrete; American Concrete Institute International; 2010 (Errata 2012).

C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).

D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

E. ASTM A307 - Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength; 2002

F. ASTM A416/A416M - Standard Specification for Low-Relaxation, Seven-Wire Steel Strand for Prestressed Concrete; 2018.

G. ASTM A496 - Steel Welded Wire Reinforcement, Deformed, for Concrete; 2002

H. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.

I. ASTM 706/A706M - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement; 2014

J. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.

K. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.

L. ASTM B766 - Electrodeposited Coatings of Cadmium; 2003.

M. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.

N. ASTM C595/C595M - Standard Specification for Blended Hydraulic Cements; 2021.

O. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2023, with Editorial Revision.

P. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2020a.

Q. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

R. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021.

S. ASTM C881 - Epoxy-Resin-Base Bonding Systems for Concrete; 2002

T. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023a.

U. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).

V. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).

W. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2020.

X. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).

Y. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars; 2018, with Amendment (2020).

Z. ICC 500 - ICC/NSSA Standard for the Design and Construction of Storm Shelters; 2020.

AA. PCI MNL-116 - Manual for Quality Control for Plants and Production of Structural Precast Concrete Products; 2021.

BB. PCI MNL-120 - PCI Design Handbook; 2017, with Errata (2021).

CC. PCI MNL-123 - Connections Manual: Design and Typical Details of Connections for Precast and Prestressed Concrete; 1988.

DD. PCI MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction; 2000.

EE. Minnesota State Building Code (MSBC) - 2020

FF. International Building Code (IBC) - 2018

1.5 DESIGN REQUIREMENTS

A. Conform to ACI 318 and MSBC for design load and construction requirements applicable to work of this section.

B. Design components to withstand dead loads and design loads in the configuration indicated on the drawings and as follows:

1. Maximum Allowable Deflection of Roof Assemblies:
    a. Live Load Deflection: 1/240 span.
    b. Total Load Deflection: 1/180 span.
2. Calculate structural properties of framing members in accordance with ACI 318.

C. Design system to accommodate construction tolerances, deflection of other building structural members and clearances of intended openings.

1.6 SUBMITTALS

A. See Division 1 for submittal procedures.

B. Shop Drawings.

1. Erection drawings: Include member piece marks with size and shape of each member; plans/elevations showing all products furnished by supplier; sections/details showing connections and cast in items; joints and openings between members and structure; description of all loose cast-in field hardware; locations of field installed anchors, fire ratings of all members; and all dead, live and other applicable design loads.

2. Include anticipated camber and deflection of precast members where camber or deflection exceeds L/360 or 1/2", and where camber and deflection vary more than 1/4" between adjacent units.

3. Production drawings on request. Include elevation view of each member, sections/details to show quantity and position of reinforcing, anchors, and inserts, handling devices, dimensions and finished, strand prestress, concrete strength, and estimated camber.

4. If shop drawings are resubmitted after the original review, identify all changes made to the shop drawings after the original submittal with clouds or similar markings.

C. Design Data: Submit design data reports indicating calculations for loadings and stresses of fabricated, designed framing.

D. Integrally Insulated Panel System Manufacturer's Installation Instructions: Submit manufacturer's current installation instructions for system specified. Certify that copies are available at fabrication site prior to the start of precast fabrication.

E. Welders' Qualification Statement: Submit to Special Inspector welders' qualifications in accordance with AWS B2.1/B2.1M.

F. Calculations

1. Submit calculations for headers and connections.

2. Submit calculations for storm shelter.

3. Review of calculations shall be for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Contractor remains responsible for correctness and completeness of submitted calculations.

4. Calculations to be certified by a professional engineer licensed in the State in which the Project is located.

G. Samples

1. Provide minimum 1' x 1' sample of wall panel in each finish specified. Provide two samples per color for review. Continue submittals until accepted by the Architect.

2. Provide samples for each brick unit required, shoring the full range of color and texture expected. Supply sketch of each corner or special shape with dimensions. Supply sample showing color and texture of joint treatment.

H. Certification: Precast plant certification on request.

1.7 QUALITY ASSURANCE

A. Designer Qualifications: Design precast concrete members under direct supervision of a Professional Structural Engineer experienced in design of precast concrete and licensed in the State in which the Project is located.

B. The precast concrete manufacturing plant shall be certified by the Precast/Prestressed Concrete Institute, Plant Certification Program, in categories C3A and C4A, at the time of bidding.

C. Perform work of this section in accordance with requirements of PCI MNL-116, PCI MNL-120, PCI MNL-123, and PCI MNL-135.

D. Fabricator Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of experience.

E. Erector Qualifications: Company specializing in erecting products of this section with not less than 5 years' experience.

F. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.4/D1.4M.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Handle precast members in a position consistent with their shape and design. Lift and support only from support points.

B. Lifting or Handling Devices: Capable of supporting member in positions anticipated during manufacture, storage, transportation, and erection.

C. Protect members to prevent staining, chipping, or spalling of concrete.

D. Mark each member with the date of production and final position in structure.

E. Storage:

1. Store all units off ground. Place stored units so the identification marks are discernible.
2. Separate stacked members by battens across full width of each bearing points.
3. Stack so that lifting devices are accessible and undamaged. Do not use upper member of stacked tier as storage area for shorter member or heavy equipment.

1.9 PROJECT CONDITIONS

A. Coordinate the work of framing components not pre-tensioned but associated with the work of this section.

PART 2 – PRODUCTS

2.1 PRECAST UNITS

A. Precast Structural Concrete Units: Comply with PCI MNL-116, PCI MNL-120, PCI MNL-123, PCI MNL-135, ACI 318 and applicable codes.

1. Precast walls used for storm shelter walls shall have a maximum gap between panels of 3/8" or less. Joints shall be sealed with joint material complying with ASTM C920. The precast supplier may provide joints greater than 3/8" if protection of joints is provided with products/installation techniques complying with Section 305 of ICC 500. Testing and documentation shall be submitted to the architect, EOR, 3rd party inspector(s), and code official at the expense of the precast supplier.
2. Precast supplier shall coordinate design, location, and detailing of embeds in wall panels to facilitate doors, windows, MEP openings, and associated protection/baffling of openings at storm shelters.

2.2 MATERIALS

B. Cement: Gray, Portland type complying with ASTM C150/C150M, Type I, or Blended Hydraulic type complying with ASTM C595/C595M, Type IL.

C. Aggregate, Sand, Water, Admixtures: Determined by precast fabricator as appropriate to design requirements and PCI MNL-116.

D. Fly ash: ASTM C618, type C or F. Use only on precast members not exposed to view with Architect/Engineer's approval.

2.3 REINFORCEMENT

A. Tensioning Steel Tendons: ASTM A416/A416M, Grade 250 (1725); seven-wire stranded steel cable; low-relaxation type; full length without splices; uncoated.

B. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).

1. Deformed billet-steel bars.

C. Steel Welded Wire Reinforcement: ASTM A1064/A1064M plain type or deformed type; in flat sheets; unfinished.

2.4 INTEGRALLY INSULATED PANEL SYSTEM (PIN CONNECTORS)

A. Integrally Insulated Panel System: Precast concrete panel formed from two layers of concrete with continuous rigid insulation and non-conducting pin connectors between layers.

B. Connectors: System manufacturer's standard; corrosion- and alkali-resistant, glass fiber reinforced, vinyl-ester composite pultrusions with serrated profile, and thermoplastic depth-limiting and sealing collar.

2.5 INSULATION

A. Integral Insulation: As recommended by manufacturer to have a continuous insulation R-Value of 5.4/inch, or greater, in 3" thickness.

2.6 FABRICATION

A. Comply with fabrication procedures specified in PCI MNL-116.

B. Maintain plant records and quality control program during production of precast members. Make records available upon request.

C. Ensure reinforcing steel, strands, anchors, inserts, plates, angles, and other cast-in items are embedded and located as indicated on Drawings. Keep strands or wires clean of substances harmful to bonding of strand to concrete.

D. Tension reinforcement tendons as required to achieve design load criteria.

E. Provide required openings with a dimension larger than 8 inches and embed accessories provided under other sections of the specifications, at indicated locations.

F. Exposed Ends at Stressing Tendons: Fill recess with non-shrink grout, trowel flush.

G. Integrally Insulated Panel System: Comply with manufacturer's written installation instructions.

H. Provide AWS certified welders for all shop welding.

I. Wall Panels:

1. Exterior: Provide reveal recesses and joints as shown on the Drawings. See Drawings for color and texture.

2. When openings in precast panels are shown on drawings, provide color and finish throughout depth of panel at all sides of opening as indicated.
3. It is required that the wall panel manufacturer coordinate electrical device location rough-in with Electrical Contractor to be recessed in the wall panel.
4. Review all architectural, mechanical and electrical plans for required penetrations of the wall panels. Coordinate with the electrical and mechanical contractor as required.

J. Panel Identification:

1. Mark each precast panel to correspond to identification mark on shop drawings for panel location.
2. Mark each precast panel with date cast.

2.7 FABRICATION TOLERANCES

A. Comply with fabrication tolerances specified in PCI MNL-135.

2.8 FINISHES

B. Ensure exposed-to-view finish surfaces of precast concrete members are uniform in color and appearance.

C. Cure members under identical conditions to develop required concrete quality, and minimize appearance blemishes such as non-uniformity, staining, or surface cracking.

D. Finish members to PCI MNL-116 Standard grade.

1. On the exterior face, provide acid etched, sandblast, or thin brick finishes as noted and detailed on Architectural Drawings. Provide reveals in locations and sizes as shown.

E. Wall Panel Finish Color Mix:

1. Light Sandblasted Precast
   a. Texture: Sandblasted
      1) Exposure: Medium/Heavy
   b. Color: White
      1) White cement
      2) Fort Dodge aggregate
      3) Fort Dodge sand
      4) DCS #2 0.5%
   c. Location: As indicated on drawings
2. Light Acid Etch Precast
   a. Texture: Acid Etch
      1) Exposure: Light
   b. Color: White
      1) White cement
      2) Fort Dodge aggregate
      3) Fort Dodge sand
      4) DCS #2 0.5%
   c. Location: As indicated on drawings
3. Dark Sandblasted Precast
   a. Texture: Sandblasted
      1) Exposure: Medium/Heavy
   b. Color: Black/Charcoal
      1) Gray Cement
      2) UC Black aggregate

3) Dresser Trap aggregate
4) Starlight sand
5) UC Black sand
6) DCS #620 5.0%

c. Location: As indicated on drawings

4. Light Acid Etch Precast
   a. Texture: Acid Etch
      1) Exposure: Light
   b. Color: Black/Charcoal
      1) Gray Cement
      2) UC Black aggregate
      3) Dresser Trap aggregate
      4) Starlight sand
      5) UC Black sand
      6) DCS #620 5.0%
   c. Location: As indicated on drawings

5. Form Liner panels
   a. Location: As indicated on drawings
   b. Manufacturer: AP Thermoforming
   c. Item: #313 Salem
   d. Direction: Vertical
   e. Size: 4’ x 12’
   f. Backing: Provided by Precast supplier during panel fabrication as required.

2.9 ACCESSORIES

F. Connecting and Supporting Devices; Anchors and Inserts: Plates, angles, items cast into concrete, and inserts complying with PCI MNL-123 and as follows:

1. Material: Carbon steel complying with ASTM A36/A36M.
2. Finish: Prime painted, except where device surfaces will be in contact with concrete or will require field welding.
3. Anchor Bolts: ASTM F1554
4. Welded headed studs: AWS D1.1/D1.1M - Type B
5. Deformed bar anchors: ASTM A496
6. Welding electrodes: E70XX

G. Grout:

1. Non-shrink, non-metallic, minimum compressive strength of 5,000 psi at 28 days.
2. Epoxy-Resin Grout: Two components mineral-filled epoxy-resin: ASTM C881/C881M.

H. Bearing Pads

1. Random-Oriented, Fiber-Reinforced Elastomeric Pads: Preformed, randomly oriented synthetic fibers set in elastomer. Surface hardness of 70 to 90 Shore A durometer. Capable of supporting a compressive stress of 3000 psi (20.7 MPa) with no cracking, splitting or delaminating in the internal portions of the pad. Masticord: JVI (www.jvi-inc.com) or approved equal.
2. Elastomeric Pads: AASHTO M 251, plain, vulcanized, 100 percent polychloroprene (neoprene) elastomer, 50 to 70 Shore A durometer per ASTM D2240, minimum tensile strength 2250 psi per ASTM D412.

I. Bolts, Nuts and Washers: High strength steel type recommended for structural steel joints.

J. Post-installed anchors and reinforcing: See Section 03 15 10 - Post-Installed Anchors.

K. Prime Paint: Zinc rich alkyd type.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that site conditions are ready to receive work and field measurements are as indicated on shop drawings.

B. Verify that supporting structure is ready to receive work, including all bearing surfaces, location and alignment of inserts and anchorage items cast in the structure.

C. Notify the General Contractor in writing of required corrections, if unsatisfactory conditions or deficiencies are observed. Do not begin work until corrections are made

3.2 ERECTION

A. Erect members without damage to structural capacity, shape, or finish. Replace or repair damaged members.

B. Align and maintain uniform horizontal and vertical joints, as erection progresses.

C. Maintain temporary bracing in place until final support is provided. Protect members from staining.

D. Provide temporary lateral support to prevent bowing, twisting, or warping of members.

E. Adjust differential camber between precast members to tolerance before final attachment.

F. Install bearing pads.

G. Level differential elevation of adjoining horizontal members with grout to maximum slope of 1:12.

H. Set vertical units dry, without grout, attaining joint dimension with lead or plastic spacers.

I. Grout underside of column bearing plates.

J. Secure units in place. Perform welding in accordance with AWS D1.1/D1.1M and AWS D1.4/D1.4M.

K. Cooperate with other trades in permitting insertion of anchors, hangers, electrical outlets, etc.

L. Remove erection devices or cut off flush with the surface of the member.

3.3 TOLERANCES

A. Erect members level and plumb within allowable tolerances.

B. Comply with PCI MNL-135 for erection tolerances.

C. When members cannot be adjusted to comply with design or tolerance criteria, cease work and advise Architect. Execute modifications as directed.

3.4 FIELD OPENINGS AND ANCHORS BY OTHER TRADES

A. Field cut openings smaller than 8" in all directions using power saws or core drills. Receive written approval of opening locations by the precast prestressed manufacturer and Architect before cutting. Repair all unsightly spalls or chips caused by cutting.

B. Receive approval of type and location of field installed fasteners from precast prestressed manufacturer and Architect. Anchors shall not contact prestressing steel.

3.5 FIELD QUALITY CONTROL

A. Structural Testing and Special Inspection

1. Structural Special Inspection shall be performed by qualified parties as specified herein, and in accordance with the provision of Section 01 45 33 - Structural Testing and Special Inspection. Comply with the requirements of Section 05 12 00 - Structural Steel Framing.

2. Personnel Qualifications
   a. Special Inspector – Structural I: Graduate civil/structural engineer, or other personnel acceptable to the SER, with experience in design of structural systems of the project type. Inspections shall be performed under the direct supervision of a licensed structural engineer, as defined in Section 01 45 33 - Structural Testing and Special Inspection. The licensed engineer shall review and approve all inspection reports.
   b. Individuals performing welding inspection must be AWS certified.

3. The Construction Manager (CMAR) will employ a Special Inspector for the following:
   a. Visually inspect welds connecting embeds to structural steel supporting members. Comply with the requirements of Section 05 12 00 - Structural Steel Framing.
   b. Visually inspect welds at all connections between precast members. Comply with the requirements of Section 05 12 00 - Structural Steel Framing.
   c. Detail Compatibility: On a periodic basis, inspect the following to verify member orientation, configuration, type, and size comply with details indicated on the contract documents and shop drawings. Qualifications: Structural I.
      1) Proper applications of joint details and conditions. Observations need not exceed 25% at standard connections.
      2) Other work critical to the integrity of the building structure.

3.6 PROTECTION

A. Protect members from damage caused by field welding or erection operations.

3.7 CLEANING

A. Clean weld marks, dirt, or blemishes from surface of exposed members.

B. Clean and prime exposed steel and welds immediately after erection.

END OF SECTION

SECTION 035413 - GYPSUM CEMENT FLOOR UNDERLAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes self-leveling, gypsum cement underlayment for application below interior floor coverings.

1.3 SUBMITTALS

A. Product Data: For each type of product.

B. Manufacturer’s Instruction: Indicate mix and application instructions.

C. Qualification Data: For Installer.

1.4 QUALITY ASSURANCE

A. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

B. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.

1. Place gypsum cement underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F (10 and 27 deg C).

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS.

A. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM CEMENT UNDERLAYMENTS

A. Gypsum Cement Underlayment: Self-leveling, gypsum cement product that can be applied in minimum uniform thickness of 3/4”.

1. Basis-of-Design Product: Subject to compliance with requirements, provide USG Corporation; USG Levelrock® Brand 2500 Floor Underlayment or a comparable product by one of the following:

    a. Allied Custom Gypsum Plasterworks, LLC.
    b. ARDEX Americas.
    c. Euclid Chemical Company (The); an RPM company.
    d. Hacker Industries, Inc.
    e. MAPEI Corporation.
    f. Maxxon Corporation.

2. Cement Binder: Gypsum or blended gypsum cement as defined by ASTM C 219.

3. Compressive Strength: Not less than **2500 -3500 psi (17.2 – 24.1 MPa)** at 28 days when tested according to ASTM C 472.

4. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.

B. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm); or coarse sand as recommended by underlayment manufacturer.

1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.

C. Water: Potable and at a temperature of not more than 70 deg F (21 deg C).

D. Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.

E. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

F. Surface Sealer: Designed to reduce porosity as recommended by manufacturer for type of floor covering to be applied to underlayment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for conditions affecting performance of the Work.

B. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Prepare and clean substrate according to manufacturer's written instructions.

1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
2. Fill substrate voids to prevent underlayment from leaking.

B. Wood Substrates: Mechanically fasten loose boards and panels to eliminate substrate movement and squeaks. Sand to remove coatings that might impair underlayment bond and remove sanding dust.

1. Install underlayment reinforcement recommended in writing by manufacturer.

C. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

3.3 APPLICATION.

A. General: Mix and apply underlayment components according to manufacturer's written instructions.

1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
2. Coordinate application of components to provide optimum adhesion to substrate and between coats.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Apply underlayment to produce uniform, level surface.

1. Apply a final layer without aggregate to product surface.
2. Feather edges to match adjacent floor elevations.

D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.

E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.

F. Apply surface sealer at rate recommended by manufacturer.

G. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.4 PROTECTION

A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION

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SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Shop fabricated ferrous metal fabrications manufactured from standard metal shapes and plates to conventional details. Items indicated on Drawings and specified herein. Include related connections, fittings, attachments, and accessories. Prime paint and galvanized where indicated.
2. Architecturally Exposed Metal Fabrications are classified as “Architecturally Exposed Structural Steel” (AESS) as defined by AISC.
3. Ships Ladder access to roof.
4. Elevator Ladder.
5. Guardrails and Handrails.
6. Architectural metal column covers
7. FEMA-rated Louver Access Door (Interior side) -50% PERFORATED METAL ACCESSIBLE SCREEN - heavy-gauge metal to help prevent denting in the door construction.
8. Metal perforated metal ceiling panel. Stair underside ceiling is to provide a custom CNC-cut panel that matches the perforation pattern of the stair railing.

B. Related Sections include the following:

1. Division 5 Section "Metal Stairs" for steel tube railings included with metal stairs.
2. Division 6 Section "Miscellaneous Carpentry" for wood blocking for anchoring metal fabrications.
3. Division 8 Section "Glass and Glazing" for laminated glass infill panels.
4. Division 9 Section "Gypsum Board Assemblies" for metal backing for anchoring metal fabrications.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer’s descriptive literature for products specified in this Section.

B. Shop Drawings:

1. Indicate detailed fabrication and erection of each metal fabrication.
2. Indicate profiles, sizes, plans, elevations, connection attachments, reinforcing, anchorage, sizes and types of fasteners, and accessories.
3. Indicate bearings, anchors, and other products required for construction activities of this Section. Indicate products not furnished by manufacturer of products of this Section.
4. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

C. Design Data: Connection calculations for loading and stresses, bearing seal and signature of professional engineer licensed in State of [Minnesota].

D. Mill Certificates for each type structural framing member and bolts, indicating the following information:

1. Bare metal thickness of steel, measured to 1/1000 inch.
2. Yield strength of steel.
3. Tensile strength of steel.
4. Total elongation of steel in 2 inch gauge length.
5. Chemical analysis of steel.
6. Thickness of galvanized coating, measured to 1/1000.

E. Welder's Certificates: Manufacturer's certificates, certifying welders employed on Work, verifying AWS qualifications within the previous 12 months.

1.4 QUALITY ASSURANCE

A. Prepare Shop Drawings under direct supervision of a professional structural engineer experienced in design of this Work and licensed in the State of [Minnesota].

B. Perform Work per AISC - Specifications for Architectural Exposed Structural Steel.

C. Perform welding operations per AWS, D1.1 - "Structural Welding Code Steel".

D. SSPC, Volume 2, Systems and Specifications, "Steel Structures Painting Manual".

1. Metal primers: Chromate free and VOC compliant.

E. Exterior Metalwork:

1. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

a. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver anchor bolts and other anchorage devices to be embedded in concrete or masonry construction to site in time for installation.

B. Store steel members above ground on platforms, skids, or other acceptable supports. Protect steel from corrosion.

C. Store other materials in a watertight and dry place until ready for incorporation into Work.

1.7 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Metal Surfaces: For metal fabrications exposed to view upon completion of Work, provide new materials selected for surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variation in flatness exceeding those permitted by reference standards for stretcher-leveled sheet. Provide steel tubing and plates with sharp edging, unless noted otherwise.

B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

C. Aluminum Castings: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated. ASTM B 26/B 26M, Alloy A356.0-T6.

D. Steel Sections: ASTM A36.

E. Steel Plates: ASTM A283.

F. Steel Pipe: ASTM A53-93a, Grade B.

1. Interior Type F, standard weight (schedule 40), unless noted otherwise.

2. Galvanized: Exterior locations and other areas where indicated.

G. Steel Tubing: ASTM A 500, cold-formed steel tubing.

H. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

I. Uncoated, Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, either commercial steel, Type B, or structural steel, Grade 25, unless another grade is required by design loads; exposed

J. Stainless Steel:

1. Tubing: ASTM A 554, Grade MT 304.

2. Pipe: ASTM A 312/A 312M, Grade TP 304.

3. Plate and Sheet: ASTM A 666, Type 304

K. Anchors-Inserts:

1. Threaded Type: ASTM A27; hot dip galvanized per ASTM A153.

2. Slotted Type: ASTM A283; hot dip galvanized per ASTM A153.

L. Fasteners:

1. General:

a. Select fasteners for type, grade, and class required for installation of miscellaneous metal items.
b. Uncoated Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating where concealed; Type 304 stainless-steel fasteners where exposed
c. Galvanized Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating.
d. Provide zinc coated, galvanized for exterior use or when used in exterior walls, in compliance with ASTM A153-82.
e. Stainless steel components: Provide Type 304 stainless-steel fasteners.

f. Aluminum components: Provide type 304 stainless-steel fasteners.
g. Dissimilar Metals: Type 304 stainless-steel fasteners.

2. Standard Bolts and Nuts: Regular hexagon type, ASTM A307-94, Grade A; and, where indicated, flat washers.

3. Lag Bolts: ASME B18.2.1.

4. Machine Screws: Cadmium plated steel, FS FF-S-92.

5. Plain Washers: Round, general assembly grade carbon steel, FS FF-W-92.

6. Lock Washers: Helical spring type carbon steel, FS FF-W-84.

7. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

   a. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
   b. Material for Anchors in Exterior Locations: Alloy Group 1 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

8. Anchor Bolts: ASTM F 1554, Grade 36.

   a. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized

9. Other Fastener Types: As required to suit application.

M. Welding Electrodes: Appropriate type for metal to be welded. Comply with AWS D1.1.

N. Rough Hardware:

1. Bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring and securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6.

2. Fabricate items to sizes, shapes, and dimensions required to complete Work. Furnish malleable iron washers for heads and nuts that bear on wood structural connections. Furnish steel washers elsewhere.

O. Miscellaneous Framing and Supports:

1. General: Provide steel framing and supports for applications indicated on Drawings, or those which are not a part of structural steel framework but are required to complete Work.

2. Fabricate units to sizes, shapes, and profiles indicated on Drawings and required to receive adjacent other construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connections. Cut, drill, and tap units to receive hardware, hangers, and similar items.

3. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units are to be installed after concrete is placed.

2.2 GUARDRAILS AND HANDRAILS

A. Performance Requirements:

1. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

a. Aluminum: The lesser of minimum yield strength divided by 1.65 or minimum ultimate tensile strength divided by 1.95.
b. Stainless Steel: 60 percent of minimum yield strength.
c. Steel: 72 percent of minimum yield strength.

2. Structural Performance of Railings: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

   a. Handrails:

      1) Uniform load of 50 lbf/ ft. applied in any direction.
      2) Concentrated load of 200 lbf applied in any direction.
      3) Uniform and concentrated loads need not be assumed to act concurrently.

   b. Top Rails of Guards:

      1) Uniform load of 50 lbf/ ft. applied in any direction.
      2) Concentrated load of 200 lbf applied in any direction.
      3) Uniform and concentrated loads need not be assumed to act concurrently.

   c. Infill of Guards:

      1) Uniform load of 25 lbf/ ft. applied horizontally.
      2) Infill load and other loads need not be assumed to act concurrently.

3. Fabricate railings to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacings, and anchorage, but not less than that needed to withstand indicated loads.

4. Welded Connections: Fabricate railings with welded connections. Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings. Grind welds smooth to architectural finish.

5. Brackets, Flanges, Fittings, and Anchors:

   a. Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work.
   b. Furnish inserts and other anchorage devices for connecting to concrete or masonry work
   c. Brackets, Flanges, and Anchors: Same metal and finish as supported rails, unless otherwise indicated.
   d. Connect posts to stair framing by direct welding, unless otherwise indicated.

6. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

7. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

8. Close exposed ends of railing members with prefabricated end fittings

9. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate

B. Guardrail infill materials: (Select those that apply)

1. Balusters and railings constructed from materials as specified in preceding section 055000.2.1.

2. Glazing as specified in Section 088000 – Glazing.

a. Fabricate to sizes and shapes required; provide for proper edge clearance and bite on glazing panels.

3. Tensioned stainless-steel cabling:

a. Provide cabling systems meeting all requirements listed below from any of the following manufacturers:

1) AGS Stainless, Inc. – Cable Rail
2) Feeny Inc. (CableRail, DesignRail)
3) Stainless Cable & Railing Inc.
4) The Cable Connection, Ultra-Tec Cable Railing Systems
5) Approved Equal

b. Material: ASTM A492, stainless steel, Type 316
c. Construction: 1 x 19
d. Diameter 1/8 inch (3 mm) diameter
e. Lay: Left Hand Lang's
f. Core: Stainless steel
g. Spacing: As indicated on drawings.
h. Cable provided cut to length with fittings attached to both ends
i. Cable Fitting Material: Stainless Steel, Type 316

1) Include washers, nuts, end caps and any accessory items as recommended by manufacturer for installation conditions
2) Type: Use most economical combinations of fitting practical
3) Factory Assembly: Factory Threaded Tensioner/Factory. Threaded Terminal/ Acorn Nut/ Hex Nut/ Stainless Washer.

4. Steel Wire Mesh Panels:

a. Square Weave Wire Mesh, Plain Steel Cold Rolled, 2" Square Opening, 0.1920" Wire Diameter, Lockcrimp Weave, 83% Open Area.
b. Frames: 1" x 1/2" x 1/8" thick steel channels, 1" x 1" x 1/8" thick steel angles and 1/8" thick steel bar and angle closures and other shapes as shown on drawings.
c. All wires welded to frame within channel legs and hidden from view

2.3 ARCHITECTURAL METAL COLUMN COVERS

A. Acceptable Manufacturers:

1. Column Cover Basis of Design Product: Series 100 Una-Clad Aluminum Column Cover, by Firestone Metal Products.

2. Subject to compliance with requirements, provide named product or comparable product by one of the following:
a. Centria
b. Fry Reglet
c. Pittcon Industries

B. Aluminum Plate: ASTM B209, Aluminum Association specification sheet 3003-H14/3105-H14 for painted finish.

1. Thickness: 0.125 inch.

C. Tolerances

1. Roll columns to a true radius with return attachment legs formed to accommodate proper installation.

2. Radius: Refer to Drawings.

3. Reinforce columns covers with stiffeners where applicable to meet design criteria.

D. Accessories

1. Fasteners: as recommended by the column cover manufacturer.
2. Column attachment clips: 1/8 inch thick formed metal, compatible with the column skin – column clips to ship loose for field installation.
3. Column Cover System Subgrits: Provide G90 galvanized steel of gauge and spacing required for column system structural requirements, as recommended by column manufacture and in accordance with approved shop drawings. To avoid galvanic reaction, separate dissimilar metals.

E. Column Cover Finishes:

1. Comply with NAAMM's Metal Finishes Manual for architectural metal products for recommendations for applying and designating finishes.
2. Coating shall be Spray-Applied Fluorocarbon Resin utilizing 70% Kynar 500 resins.
3. Color as selected by Architect from manufacturer's standard colors.
4. Number of Coats: 2-coat. Coating shall be factory applied on a continuous process paint line. Coating shall consist of a 0.2 mil prime coat, a 0.75 mil barrier coat, a 0.75 mil metallic/color coat containing 70% Kynar resins, and a 0.5 mil clear coat containing 70% Kynar resins (Note mil thickness is approximate.)
5. Relevant to the color selected, material to be painted in accordance with either AAMA specification 2605 or 2604.
6. Provide factory applied strippable plastic film for protection during fabrication and installation

2.4 FEMA-RATED LOUVER ACCESS DOOR AND FRAME

A. (At Interior side of Storm Dampers) - 50% PERFORATED METAL ACCESSIBLE SCREEN - heavy-gauge non-corrosive metal, to help prevent denting in the door construction. Paint to match wall color.

2.5 METAL PERFORATED METAL CEILING PANEL.

A. At Stair underside ceiling is to provide a custom CNC-cut panel that matches the perforation pattern of the stair railing. Paint color to be selected by Architect.

2.6 ACCESSSORIES

A. Non-Shrink Non-Metallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this Section.

B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.7 FABRICATION

A. Form metal fabrications from materials of size, thickness, and shapes indicated on Drawings, but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on approved Shop Drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.

B. Form exposed Work true to line and level with accurate angles and surfaces and straight sharp edges.

C. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in design, fabrication, and installation of metal assemblies to prevent buckling,

opening up of joints, and over-stressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.

D. Fabricate handrails and guardrails in accordance to approved shop drawing and field dimensions using mitered and welded joints with bends where indicated on shop drawings.

E. Provide metal free from pitting, seam marks, roller marks, grinding marks and stains at areas exposed to view on completed rail units.

F. Form bends to uniform radius, free of distortion, twists, cracks and grain separation.

G. Top rails shall be continuous over posts for strength with splices for expansion located within 6 to 12 inches of post

H. Splices and expansion joints shall utilize internal splice connectors with set screws to allow for rail expansion over ambient temperature change.

I. Shear and punch metals cleanly and accurately. Remove burrs and ease exposed edges. Form bent-metal corners to smallest radius possible without impairing work.

J. Welding:

1. Weld shop connections and field connections, unless noted or specified otherwise.
2. Weld corners and seams continuously and per requirements of AWS Code.
3. Employ welders qualified per requirements of AWS Code.
4. Weld connections to comply with the following:
    a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
    b. Obtain fusion without undercut or overlap.
    c. Remove welding flux immediately.
    d. Weld exposed corners and seams continuously, unless otherwise indicated.
    e. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface

K. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

L. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located, consistent with design of component, except where specifically noted otherwise.

M. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

N. Ease exposed edges to a radius of 1/32 inch, unless noted otherwise. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing Work.

O. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for re-assembly and coordinate installation.

P. Fabricate ladders for locations shown, complying with ANSI A14.3, welded-steel construction.

1. Provide non-slip surfaces on top of each rung, whether by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
2. Galvanize ladders and stairs, including brackets and fasteners.

2.8 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Shop Primer for Ferrous Metals:

1. Manufacturer's or fabricator's standard, fast-curing, lead-free, universal modified alkyd primer selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated, and for capability to provide a sound foundation for field applied topcoats despite prolonged exposure.

2. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications.

   a. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

      1) Zinc Rich Primer Exterior metal surfaces unless otherwise indicated.

   b. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning

3. Apply shop primer to uncoated surfaces of metal fabrications. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

4. Do not prime surfaces in the following conditions:

   a. Those with galvanized finishes.
   b. Those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated.
   c. Those in direct contact with concrete.
   d. Those where field welding is required.

E. Galvanizing Repair Paint: High zinc dust content paint for re-galvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight and complying with DOD-P-21035 or SSPC-Paint-20.

F. Exterior Exposed Ferrous Metal: Commercial blast-clean surfaces to be exposed to conform to SSPC-SP6.

1. Primer: TNEMEC No. 161-1211 TNEME-FASCURE Primer or approved substitute.

2. Dry film thickness: Minimum 4.0 mils. Verify thickness by independent testing agency.

G. Aluminum finishes: Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

H. Stainless-Steel finishes:

1. Remove tool and die marks and stretch lines or blend into finish.

2. Grind and polish surfaces to produce uniform finish indicated, free of cross scratches.

   a. Run grain of directionally textured finishes with long dimension of each piece.

3. Directional Satin Finish: No. 4.

4. Mirrorlike Reflective, Nondirectional Polish: No. 8.

5. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete or embedded in masonry with setting templates to appropriate Sections.

C. Coordinate and furnish anchorage; setting drawings, diagrams, templates, instructions, and directions for installation of anchorage, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.2 INSTALLATION

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, and other connectors.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded due to shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot dip galvanized after fabrication, and are intended for bolted or screwed field connections.

E. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding Work, and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blend so that no roughness shows after finishing and contour of welded surface matches those adjacent material and has the appearance of a weld free butt joint connection at inside and outside corners, or the appearance of a continuous piece at straight butt joints.

F. Provide anchorage devices and fasteners where needed to secure items to in-place construction.

G. Perform cutting, drilling, and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation, with edges and surfaces level, plumb, true, and free of rack.

H. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint or zinc chromate primer.

I. Installing Steel Railings

1. Adjust railing systems before anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or, if not indicated, as required by design loads. Plumb posts in each direction. Secure posts and rail ends to building construction as follows:
    a. Anchor posts to steel by welding directly to steel supporting members.
    b. Anchor handrail ends to concrete and masonry with steel round flanges welded to rail ends and anchored with post-installed anchors and bolts.
2. Attach steel handrails to wall with steel brackets and plates. Provide bracket with minimum 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets and plates as indicated or, if not indicated, at spacing required to support structural loads. Secure wall brackets to building construction as follows:
    a. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt
    b. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
    c. For hollow masonry anchorage, use toggle bolts.
    d. For steel-framed gypsum board assemblies, use hanger or lag bolts set into wood backing between studs. Coordinate with stud installation to locate backing members.

3.3 ERECTION TOLERANCES

A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset from True Alignment: 1/4 inch.

3.4 CLEANING

A. Cleaning and touch-up painting of field welds, bolted connections, and abraded areas of the shop paint on miscellaneous metal is specified in Section 09900 – Paints and Coatings.

B. For galvanized surfaces clean welds, bolted connections, and abraded areas and apply galvanizing repair paint to comply with ASTM A780.

C. Clean aluminum and stainless steel by washing thoroughly with clean water and soap, rinsing with clean water, and wiping dry.

D. Clean and polish glass.

3.5 PROTECTION

A. Protect finishes from damage during construction period with temporary protective coverings approved by manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in field to shop; make required alterations and refinish entire unit, or provide new units

3.6 SCHEDULE

A. Refer to Drawing details for items not specifically scheduled.

B. Sheet Blocking: Steel plates in connection with studs and furring necessary for engaging and fastening of wall hung items at locations indicated on Drawings, or as necessary.

1. Backing plates: Securely weld to structure, heavier than 14 gauge; self-drilling screwed or bolted to 14 gauge and lighter steel stud supporting members in required position. Galvanized finish.

C. Railings and Handrails: Steel pipe as detailed. Insure that runs of horizontal pipe on opposite sides of posts are in same plane, both vertically and horizontally. Make joints flush with

concealed seamless fittings. Accurately cut, miter, weld, and grind smooth to flush surfaces. Make bends to preserve the contour of the pipe. Shop prime finish at interior rails and hot-dip galvanize finish after fabrication for exterior rails.

1. Secured to Walls: Cast brackets of stock design providing 1-1/2 inch minimum clearance between railing and wall. Secure to wall with machine bolts and steel backer plate secured to metal studs. Attach to concrete and masonry with expansion shields and galvanized bolts

2. Pipe Sleeves Set in Concrete: Minimum 16 gauge galvanized steel with welded, closed bottoms. Deliver pipe sleeves to Project site for installation in concrete forms. Pipe standards set in metal sleeves wedged true and plumb and cemented in place with non-shrink grout. Finish surface of grout smooth and flush with concrete surface

D. Roof Ladders: Provide ladders as indicated on drawings. Accurately cut, miter, weld and grind smooth all connections.

E. Elevator Pit Ladders: Provide ladders as indicated on drawings. Accurately cut, miter, weld and grind smooth all connections. Ladders to receive hot-dip galvanize finish after fabrication.

F. Architectural Metal Column Covers.

G. Furnish other miscellaneous metal fabrications for a Project of this type, as indicated on Drawings.

END OF SECTION

SECTION 055110 - METAL STAIRS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Preassembled steel stairs with concrete-filled treads.
2. Cast-in-place metal stair nosings.
3. Miscellaneous materials.

B. Related Sections include the following:

1. Section 033000 "Cast-in-Place Concrete" for concrete fill for stair treads and landings.
2. Section 055000 "Metal Fabrications" for guardrails and handrails at steel stairs.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance of Stairs: Provide metal stairs capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Uniform Load: 100 lbf/sq. ft.
2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.
3. Uniform and concentrated loads need not be assumed to act concurrently.
4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
5. Limit deflection of treads, landings, and framing members to L/360 or 1/4 inch, whichever is less.

B. Structural Performance of Railings: See Section 055000 “Metal Fabrications”

1.4 SUBMITTALS

A. Product Data: For metal stairs and the following:

1. Abrasive nosings.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Indicate detailed fabrication and erection of each metal component.
2. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, sizes and types of fasteners, and accessories.
3. Indicate bearings, anchors, and other products required for construction activities of this Section. Indicate products not furnished by manufacturers of products of this Section.
4. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

5. Provide templates for anchors and bolts specified for installation under other Sections.
6. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer licensed in State of Minnesota responsible for their preparation.

C. Welding certificates.

D. Qualification Data: Professional Engineer for fabrication and shop design.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

B. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.

1. Preassembled Stairs: Commercial class.

C. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.3, "Structural Welding Code--Sheet Steel."

1.6 COORDINATION

A. Coordinate installation of anchorages for metal stairs. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Coordinate locations of hanger rods and struts with other work so that they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500 (cold formed).

C. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

D. Uncoated, Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, either commercial steel, Type B, or structural steel, Grade 25, unless another grade is required by design loads; exposed.

2.3 NONFERROUS METALS

A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.

B. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

2.4 FASTENERS

A. General:

1. Select fasteners for type, grade, and class required for installation of miscellaneous metal items.

    a. Uncoated Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating where concealed; Type 304 stainless-steel fasteners where exposed
    b. Galvanized Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating.
    c. Provide zinc coated, galvanized for exterior use or when used in exterior walls, in compliance with ASTM A153-82.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36.

1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts for stairs indicated to be shop primed with zinc-rich primer.

D. Machine Screws: ASME B18.6.3.

E. Lag Bolts: ASME B18.2.1.

F. Plain Washers: Round, ASME B18.22.1.

G. Lock Washers: Helical, spring type, ASME B18.21.1.

H. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

2. Material for Anchors in Exterior Locations: Alloy Group 1 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Shop Primer for Ferrous Metals:

1. Manufacturer's or fabricator's standard, fast-curing, lead-free, universal modified alkyd primer selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated, and for capability to provide a sound foundation for field applied topcoats despite prolonged exposure.
2. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications.

    a. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

        1) Zinc Rich Primer Exterior metal surfaces unless otherwise indicated.

    b. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning

3. Apply shop primer to uncoated surfaces of metal fabrications. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

4. Do not prime surfaces in the following conditions:

   a. Those with galvanized finishes.
   b. Those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated.
   c. Those in direct contact with concrete.
   d. Those where field welding is required.

C. Galvanizing Repair Paint: High zinc dust content paint for re-galvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight and complying with DOD-P-21035 or SSPC-Paint-20

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

E. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

F. Concrete Finish: Trowel smooth to receive finishes specified in Division 9.

G. Welded Wire Fabric: ASTM A 185, 6 by 6 inches--W1.4 by W1.4, unless otherwise indicated.

H. Metal perforated metal ceiling panel

2.6 FABRICATION, GENERAL

A. Provide complete stair assemblies, including metal framing, hangers, struts, railings, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.

1. Join components by welding, unless otherwise indicated.

2. Use connections that maintain structural value of joined pieces.

3. Fabricate treads and platforms of exterior stairs so finished walking surfaces slope to drain.

B. Preassembled Stairs: Assemble stairs in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

E. Form exposed work true to line and level with accurate angles and surfaces and straight edges.

F. Weld connections to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. Weld exposed corners and seams continuously, unless otherwise indicated.

5. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.

H. Fabricate joints that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

2.7 STEEL-FRAMED STAIRS

A. Stair Framing:

1. Fabricate stringers of steel channels and plates.

   a. Provide closures for exposed ends of stringers.

2. Construct platforms of steel plate, channel or tube headers and miscellaneous framing members as indicated.

3. Weld stringers to headers; weld framing members to stringers and headers.

4. Where masonry walls support metal stairs, provide temporary supporting struts designed for erecting steel stair components before installing masonry.

B. Metal-Pan Stairs: Form subtread pans, and subplatforms to configurations shown from steel sheet of thickness needed to comply with performance requirements but not less than 0.0677 inch.

1. Steel Sheet: Uncoated cold-rolled steel sheet, unless otherwise indicated.

2. Directly weld metal pans to stringers; locate welds on top of subtreads where they will be concealed by concrete fill. Do not weld risers to stringers.

3. Attach perforated riser panels to subtreads as shown on drawings.

4. Attach abrasive nosings to risers.

5. At Contractor's option, provide stair assemblies with metal-pan subtreads filled with reinforced concrete during fabrication.

C. Steel Guardrails, Handrails and Brackets: See Section 055000 “Metal Fabrications”.

2.8 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal stairs after assembly.

C. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed products:

1. Interior Stairs (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."

D. Apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes and those to be embedded in concrete or masonry unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.9 STAIR NOSINGS

A. Manufacturers:

1. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following, or other approved equal:

    a. ACL Industries, Inc.
    b. American Safety Tread Co., Inc.
    c. Armstrong Products, Inc.
    d. Balco Inc.

B. Materials:

1. Stair nosing system: for use on metal pan stair treads.

    a. Aluminum: ASTM B 221, alloy 6063-T5 for extrusions.

2. Stair nosings shall be solid, slip resistant, and removable and replaceable.

3. Abrasive:

    a. Standard Abrasive: Two (2) part Epoxy combined with aluminum oxide grit.
    b. Abrasives with cementitious-based resins shall not be acceptable.

C. Fabrication:

1. Fabricate stair nosing assemblies as detailed. Provide anchors and accessories necessary for complete installation.

    a. Fabricate solid surface abrasive tread 3/8-inch thick by full width of tread.
    b. Provide specified anchors and, where required, tread plate securing screws.

2. Package components with anchors.

D. Finishes:

1. Aluminum subchannels and tread plates shall be:

    a. Mill finish.
    b. Heat-treated for strength.
    c. Clear acrylic lacquer coated for components to be embedded in concrete.

2. Solid abrasive tread as selected from manufacturers full range

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.

C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete, unless otherwise indicated.

D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

F. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

G. Place and finish concrete fill for treads and platforms to comply with Division 3 Section "Cast-in-Place Concrete."

1. Install abrasive nosings with anchors fully embedded in concrete. Center nosings on tread width.

3.2 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 painting Sections.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION

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07 21 13 - CONTINUOUS INSULATION NAILBASE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:.

1. Class A Continuous Insulation Composite Panels (Nailbase) for Use at Exterior Walls in connection with a metal panel cladding assembly, and in other locations as identified on Drawings.

B. Related Sections include the following:

1. Division 7 Section “Fluid-Applied Membrane Air Barriers”
2. Section 033000 - Cast In Place Concrete.
3. Section 054000 - Cold Formed Metal Framing.
4. Section 061000 - Rough Carpentry.
5. Section 074213 – Metal Wall Panels..
6. Section 072700 - Weather Barrier.
7. Section 072715 - Self Adhered - Sheet Membrane Air Barrier

1.3 REFERENCES

A. ASTM C 209 – Methods of Testing Insulating Board, Structural and Decorative.

B. ASTM C 518 - Steady State Thermal Transmission by Means Of The Heat Flow Meter Apparatus (R-Value)

C. ASTM C 1289 – Specifications for Faced Rigid Cellular Polyisocyanurate Thermal Insulating Board.

D. ASTM D 1621 – Test Methods for Compressive Properties of Rigid Cellular Plastics.

E. ASTM D 2126 - Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.

F. ASTM D 3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

G. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

H. ASTM E 96 - Test Method for Water Vapor Transmission of Materials.

I. NFPA 285 - Standard Fire Test Method for Evaluation Of Fire Propagation Characteristics Of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

J. Priest and Associates Engineering Extensions Based on NFPA 285 Tests

K. DrJ TER 2102-05: Engineered fastening for non-structural applications

L. DrJ TER 1402-01: Fire Performance

M. ASHRAE 90.1- Energy Standard for Buildings Except Low-Rise Residential Buildings

N. IBC Chapter 26- Foam Plastic

O. California Code of Regulations, Title 24, Insulation Quality Standard License #TI-1420

1.4 SYSTEM DESCRIPTION

A. Nailbase Insulated Sheathing, in Exterior Wall Assembly (with metal cladding)

B. Fire-stopping at floor lines

C. WRB Exterior Insulation on base wall (vapor permeable barrier required)

1.5 DESIGN REQUIREMENTS

A. Perform work in accordance with all federal, state and local codes.

B. Physical properties (Foam Core):
1. Flame Spread Index: ASTM E 84; less than 25
2. Smoke Developed: ASTM E 84; less than 250.
3. Compressive Strength: ASTM D 1621; Grade 3 (25 psi / 172 kPa).
4. Dimensional Stability: ASTM D 2126, 2 percent linear change (7 days).
5. Moisture Vapor Permeance: ASTM E 96, 1.1 perm (57.5ng/(Pa•s•m2)).
6. Water Absorption: ASTM C 209, less than 0.1 percent by volume.
7. Service Temperature: Minus 100 degrees F to 250 degrees F (Minus 73 degrees C to 122 degrees C).
8. Resistance to Mold: ASTM D 3273 Passed (10).
9. 3rd Generation Zero ODP Blowing Agent; Contains zero CFCs, HCFCs, or HFC; Virtually no Global Warming Potential (GWP)

C. Fire Treated Plywood:
1. Flame Spread Index: ASTM E 84; less than 25
2. Smoke Developed: ASTM E 84; less than 250.
3. 5-Ply CDX

D. Hunter Panels Xci Ply Class A is evaluated and listed under DrJ TER 1402-01. Tests include:
1. Flame spread index of <25 and smoke developed index of <450 when tested in accordance with ASTM E 84.
2. Classified as Type V in accordance with ASTM C 1289

E. Hunter Panels Xci Ply Class A is evaluated and listed under DrJ TER 1508-01. Tests include:
1. Structural shearwall attachment of Xci Ply Class A to wood studs. Limited panel thicknesses for this application.

F. Xci Ply Class A has passed the following:
1. Meets the current continuous insulation standards of ASHRAE 90.1, IECC, and IBC Chapter 26.
2. NFPA 285 Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components. For a complete list of NFPA 285 compliant assembly options please call our technical team at 888-746-1114 or reference the report titled Engineering Extensions Based On NFPA 285 Test on our website, www.hunterpanels.com

1.6 SUBMITTALS

A. Product Data: For each type of product indicated. Manufacturer's data sheets on each product to be used, including:

1. Thermal performance
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations.
4. Installation instructions.

B. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

C. Metal Building Insulation System:

1. Product Data: Manufacturer's data sheets on each product to be used, including:
   a. Preparation instructions and recommendations.
   b. Storage and handling requirements and recommendations.
   c. Installation instructions.
2. Fastening Guidelines: Manufacturer’s 3rd party engineering evaluations for attachment of Xci Ply Class A, including:
   a. DrJ TER 2102-05: For all non-structural applications of Xci Ply Class A to wood and steel studs, concrete, and CMU.
3. Shop Drawings: Indicate locations of connections and attachments, general details, anchorages and method of anchorage and installation.
4. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square or long, representing actual products required for this project.
5. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.7 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.

B. Manufacturer Qualifications: Manufacturer shall be a company that regularly manufactures and assembles specified insulation in-house with no outside fabrication operations.

C. Pre-Installation Meeting: Convene a minimum of one week prior to commencing Work of this section. Review installation procedures and coordination required with Related Work and include the following:
1. Participants: Authorized representatives of the Contractor, Architect, Installer, and Manufacturer.
2. Review wall assemblies for potential interference and conflicts and coordinate layout and support provisions for interfacing work.
3. Review continuous insulation wall panels installation methods and procedures related to application, including manufacturer’s installation guidelines.
4. Review firestopping requirements and weather resistive membrane requirements and placement locations.
5. Review field quality control procedures.

D. Fire- Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by Underwriters Laboratories (UL), Intertek (OPL) or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Identify materials appropriate markings of applicable testing and inspecting agency.

E. Fire-Resistance Ratings:

1. ASTM E 2307 pertains to perimeter fire containment. ASTM E 119 pertains to fire rated walls, floors and ceilings. ASTM E 814 pertains to poke-throughs and penetration assemblies. ASTM E 1966 pertains to fire resistive joint systems.

2. Combustion Characteristics: Rated as non -combustible as defined by NFPA standard 220 when tested in accordance with ASTM E 136.

F. Insulation Installed in Concealed Locations Surface Burning Characteristics:

1. Other Insulation: 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

G. Insulation Installed in Exposed Locations Surface Burning Characteristics:

1. Other Insulation Materials: 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with the manufacturer's written instructions for handling, storing, and protecting during installation.

B. Good construction practice dictates that all insulation should be protected from moisture and direct sunlight during job-site storage.

C. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location.

D. Handling: Handle materials to avoid damage. When installing or otherwise handling these insulation products, wear a NIOSH approved dust mask or respirator, gloves and long-sleeved, loose-fitting clothing closed at the neck and wrists. Wear safety glasses when installing.

E. Protect plastic insulation as follows:

1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.9 SEQUENCING

A. Coordinate with the installation of vapor retarders, weather barrier, and air seal materials specified in Section 072726, Section 072700, and Section 072715.

B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress

1.10 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 - PRODUCTS

2.1 GENERAL

A. Basis of Design: Xci Ply Class A produced by Hunter Panels, 15 Franklin Street, Portland, Maine 04101. Phone: (207) 761-5678 or (888) 746-1114. Fax: (877) 775-1769. E-mail: info@hpanels.com.

B. Subject to compliance with requirements, approved manufacturers include the following:

1. CertainTeed Corporation.
2. DiversiFoam Products.

3. Dow Chemical Company (The).
4. Johns Manville Corporation.
5. Owens Corning.

2.2 BOARD INSULATION (NAILBASE)

A. Board Insulation Bonded to Plywood: Hunter Panels Xci Ply Class A is an energy efficient rigid insulation panel composed of a closed cell Class A polyisocyanurate foam core bonded to a premium performance coated glass facer on one side and 5/8" or ¾" fire treated plywood on the other.

B. Foam core:
   1. Grade 3 (25 psi)

C. Fire Treated Plywood Thickness:
   1. 3/4 inch.

D. Panel Size:
   1. 4 feet by 8 feet (1220 mm by 2440 mm).

E. Thickness / R Value: based on ASTM C 518 at 75 degrees F (23.9 degrees C): System R-Value and thickness to be determined on assembly performance and conformance with code requirements.
   1. Provide to the thickness and R-value indicated on the Drawings.

2.3 PANEL FASTENERS

A. Fasteners shall be approved Hunter Panels fasteners. Fasteners are a corrosion resistant type with oversized heads. Length of fasteners shall be as recommended by the panel manufacturer.
   1. Hunter SIP/HD and SIP/HD-PT (Partial Thread): 12-16 gauge steel studs
   2. Hunter SIP/SD and SIP/SD-PT (Partial Thread): 18-22 gauge steel studs
   3. Hunter SIP/SD: Concrete and CMU (pre-drilling required)
   4. Hunter SIP/WD: Wood studs
   5. Hunter SIP/WD: Concrete and CMU (pre-drilling required)
   6. Engineering Evaluations for fastening patterns (DrJ TER 2102-05 or DrJ TER 1508-01)

2.4 WRB

A. Vapor permeable barrier recommended for exterior of Xci Ply Class A panels (10-60 perms).

B. For NFPA 285 compliance, barrier must be chosen from approved options listed in our Engineering Evaluation Report from Priest and Associates

C. Single-source system: Xci VP-SA-WRB, vapor permeable air and water resistive barrier available from Hunter Panels.

2.5 LIQUID JOINT SEALANT

A. Xci BarriBond XL

B. Xci BarriBond

C. Xci Dyna-Trol I-XL Hybrid

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.

B. Do not begin installation until exterior walls have been properly prepared.

C. Verify that all exterior wall assembly construction has been completed to the point where the insulation may correctly be installed.

D. Verify that mechanical and electrical services in walls have been installed and tested and, if appropriate, verify that adjacent materials and finishes are dry and ready to receive insulation.

E. If wall assembly preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in exterior spaces without gaps or voids. Do not compress insulation.

C. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice and snow

D. Install insulation in areas and in thicknesses indicated to envelop entire area to be insulated or required to produce R-values indicated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

E. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

F. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within plane of insulation.

G. Insulation must be protected from open flame and stored in accordance with the manufacturer’s instructions.

H. Fasten composite insulation to the structural base wall. Coordinate with the cladding or wall finish manufacturer for the attachment requirements over insulation panels. Contact Hunter Panels for guidance when determining fastening pattern.

I. Install weather barriers over insulation panels as specified in Section 072700.

J. Xci Ply Class A is not intended to be left exposed for extended periods of time. During the time between the installation of the Xci Ply Class A and the application of the exterior

cladding it is recommended that the WRB be installed as soon as possible. If the WRB is not being installed right away it is recommended that the Xci Ply Class A be protected from excess moisture and UV. All unfaced foam exposed directly to daylight can be taped with a compatible waterproof tape and the edges of the boards can be buttered with a compatible sealant.

K. Install exterior cladding as recommended by the cladding manufacturer and as specified in other sections of this specification. Note: the cladding manufacturer may require you to fasten the exterior cladding through the composite insulation to the structural wall.

L. Seal joints between insulation units per manufacturer's written instructions. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Cover the top and edges of unfinished wall panel work to protect it from the weather and to prevent accumulation of water in the cores of the panels.

C. Wet panels shall be allowed to completely dry prior to application of vapor barrier and/or cladding.

D. Repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 072700 – WEATHER BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Commercial weather barrier assembly.
2. Seam Tape.
3. Air barrier manufacturer supplied membrane flashings.
4. Fasteners.

B. Related Sections include the following:

1. Section 061643 – Fiberglass Matt Gypsum Sheathing
2. Section 072100 "Thermal Insulation" for installation of exterior insulation.

1.3 DEFINITIONS

A. Weather Barrier: A combination of materials and accessories that do the following:

1. Prevent the accumulation of water as a water-resistive barrier.
2. Minimize the air leakage into or out of the building envelope as a continuous air barrier.
3. Provide sufficient water vapor transmission to enable drying as a vapor-permeable membrane.

B. Water-Resistive Barrier: A combination of materials and accessories that prevent the accumulation of water within the wall assembly per International Building Code Section 1403.2.

C. Continuous Air Barrier: The combination of interconnected materials, assemblies, and sealed joints and components of the building envelope that minimize air leakage into or out of the building envelope per ASHRAE 90.1 section 5.4.3.1.

D. Vapor Diffusion: A slow movement of individual water vapor molecules from regions of higher to lower water vapor concentration (higher to lower vapor pressure).

E. Vapor Permeable Membrane: The property of having a water-vapor permeance rating of 10 perms (575 ng/Pa x s x sq. m) or greater, when tested in accordance with the desiccant method using Procedure A of ASTM E96 per definition in International Building Code. Vapor permeable material permits the passage of moisture vapor through vapor diffusion

1.4 REFERENCES

A. ASTM International

1. ASTM C920; Standard Specification for Elastomeric Joint Sealants
2. ASTM C1193; Standard Guide for Use of Joint Sealants
3. ASTM D882; Test Method for Tensile Properties of Thin Plastic Sheeting

4. ASTM D1117; Standard Guide for Evaluating Non-woven Fabrics
5. ASTM E84; Test Method for Surface Burning Characteristics of Building Materials
6. ASTM E96; Test Method for Water Vapor Transmission of Materials
7. ASTM E1677; Specification for Air Retarder Material or System for Framed Building Walls
8. ASTM E2178; Test Method for Air Permeance of Building Materials
9. ASTM E2357; Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

B. AATCC – American Association of Textile Chemists and Colorists

1. Test Method 127 Water Resistance: Hydrostatic Pressure Test.

C. TAPPI

1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area)
2. Test Method T-460; Air Resistance (Gurley Hill Method).

1.5 SUBMITTALS

1. Product Data: Submit manufacturer current technical literature for each component:
   a. For weather barrier, include data on air and water-vapor permeance based on testing in accordance with referenced standards
2. Quality Assurance Submittals
   a. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
   b. Manufacturer Instructions: Provide manufacturer's written installation instructions.
3. Closeout Submittals
   a. Weather Barrier Warranty: Manufacturer's executed warranty form with authorized signatures and endorsements indicating date of Substantial Completion

1.6 QUALITY ASSURANCE

A. Qualifications

1. Installer shall have experience with installation of weather barrier assemblies under similar conditions.
2. Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.
3. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer

B. Mock-up.

1. Install mock-up incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of weather barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver air barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Store air barrier materials as recommended by air barrier manufacturer

1.8 SCHEDULING

A. Review requirements for sequencing of installation of air barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.

B. Schedule installation of air barrier materials and exterior cladding within nine months of weather barrier assembly installation

1.9 WARRANTY

A. Manufacturer's Product and Labor Warranty: Manufacturer agrees to repair or replace weather barrier that fails in materials within specified warranty period, including removal and replacement of affected construction up to manufacturer's limits.

1. Warranty Period: 10 years from date of Substantial Completion

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis of Design Manufacturer: DuPont; 4417 Lancaster Pike, Chestnut Run Plaza 728, Wilmington, DE 19805; 1-800-44-TYVEK (8-9835); http://www.construction.tyvek.com.

B. Contractor may submit equal products by other manufacturers complying with all requirements listed in this Section and complying the procedures as described in Section 016200 - Product Options

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Installed weather barrier and accessories shall withstand specified wind pressures, liquid water penetration, and water vapor pressures without failure due to defective manufacture of products.

2.3 MATERIALS

A. Basis of Design: spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont™ Tyvek® CommercialWrap® and related assembly components.

B. Performance Characteristics:

1. Air Penetration: 0.001 cfm/ft2 at 75 Pa, when tested in accordance with ASTM E2178. Type I per ASTM E1677. ≤0.04 cfm/ft2 at 75 Pa, when tested in accordance with ASTM E2357.
2. Water Vapor Transmission: 28 perms, when tested in accordance with ASTM E96, Method B.
3. Water Penetration Resistance: Minimum 280 cm when tested in accordance with AATCC Test Method 127.
4. Basis Weight: Minimum 2.7 oz/yd2, when tested in accordance with TAPPI Test Method T-410.
5. Air Resistance: Air infiltration at >1500 seconds, when tested in accordance with TAPPI Test Method T-460.

6. Tensile Strength: Minimum 38/35 lbs/in., when tested in accordance with ASTM D882, Method A.
7. Tear Resistance: 12/10 lbs., when tested in accordance with ASTM D1117.
8. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: 10, Smoke Developed: 10.

2.4 ACCESSORIES

A. Seam Tape: 3 inch wide, DuPont™ Tyvek® Tape for commercial applications.

B. Fasteners: Tyvek® Wrap Caps, as distributed by DuPont: #4 nails with large 1-inch plastic cap fasteners, or 1-inch plastic cap staples with leg length sufficient to achieve a minimum penetration of 5/8-inch into the wood stud.

C. Sealants:

1. Provide sealants that comply with ASTM C920, elastomeric polymer sealant to maintain watertight conditions.

2. Products:

a. DuPont™ Commercial Sealant
b. Other sealants as recommended by air barrier manufacturer.

D. Adhesives:

a. Liquid Nails® LN-109
b. Denso Butyl Liquid
c. 3M High Strength 90
d. Other sealants as recommended by air barrier manufacturer.

E. Primers:

1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.

2. Products:

a. 3M High Strength 90
b. Denso Butyl Spray
c. SIA 655
d. Permagrip 105
e. ITW TACC Sta' Put SPH
f. Other primer as recommended by flashing manufacturer.

F. Flashing:

1. Conformable Weather Barrier Flashing: Composite flashing material composed of micro-creped, polyethylene laminate with a 100 percent butyl-based adhesive layer; AAMA 711 Class A (no primer), Level 3 thermal exposure, 176 deg F (80 deg C) for seven days.

a. DuPont™ FlexWrap™ NF, as distributed by DuPont: flexible membrane flashing materials for window openings and penetrations

2. Strip Flashing: Composite flashing material composed of spunbonded polyethylene laminate with 100 percent butyl-based, dual-sided, adhesive layer; AAMA 711, Class A (no primer), Level 3 thermal exposure, 176 deg F (80 deg C) for seven days

a. DuPont™ StraightFlash™, as distributed by DuPont: straight flashing membrane materials for flashing windows and doors

3. Fluid-Applied Flashing: Trowel or brush applied, non-water soluble, single component, silyl terminated polyether technology (STPE), vapor permeable, flashing material.
   a. DuPont™ Tyvek Fluid Applied Flashing & Joint Compound+
4. Provide other equivalent flashings as manufactured by Air Barrier Manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, to verify substrate and surface conditions are in accordance with air barrier manufacturer recommended tolerances prior to installation of air barrier and accessories.

3.2 INSTALLATION, WEATHER BARRIER

A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.

B. Install weather barrier prior to installation of windows and doors.

C. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.

D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level.

E. Sill Plate Interface: Extend lower edge of weather barrier over metal flashings at base of building, interface 3-6 inches. Secure with elastomeric sealant as recommended by weather barrier manufacturer.

F. Window and Door Openings: Extend weather barrier completely over openings.

G. Overlap weather barrier
   1. Exterior corners: minimum 12 inches.
   2. Seams: minimum 6 inches.

H. Weather Barrier Attachment:
   1. Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommended fasteners, space 12 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.

I. Apply 4 inch by 7 inch piece of DuPont™ StraightFlash™ or weather barrier manufacturer approved alternate to weather barrier membrane prior to the installation cladding anchors.

3.3 SEAMING

A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.

B. Seal any tears or cuts as recommended by weather barrier manufacturer.

3.4 OPENING PREPARATION (for use with flanged windows)

A. General: Cut weather barrier in an "I-cut" pattern. A modified I -cut is also acceptable.
   1. Cut weather barrier horizontally along the bottom and top of the window opening.

2. From the top center of the window opening, cut weather barrier vertically down to the sill.
3. Fold side and bottom weather barrier flaps into window opening and fasten.

B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.5 FLASHING (for use with flanged windows)

A. Cut 9-inch wide DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF a minimum of 12 inches longer than width of sill rough opening.

B. Cover horizontal sill by aligning DuPont™ FlexWrap™ edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.

C. Fan DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges. Mechanical fastening is not required for DuPont™ FlexWrap™ NF.

D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.

E. Install window according to manufacturer's instructions.

F. Apply 4-inch wide strips of DuPont™ StraightFlash™ at jambs overlapping entire mounting flange. Extend jamb flashing 1-inch above top of rough opening and below bottom edge of sill flashing.

G. Apply 4-inch wide strip of DuPont™ StraightFlash™ as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both jamb flashings.

H. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.

I. Tape head flap in accordance with manufacturer recommendations.

J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.6 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT BASE OF WALL

A. Overlap thru-wall flashing with weather barrier by 6-inches.

B. Mechanically fasten bottom of weather barrier through top of thru-wall flashing.

C. Seal vertical and horizontal seams with tape or sealing membrane

3.7 PROTECTION

A. Protect installed air barrier and it components from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

SECTION 074213 - METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Technical Specifications Sections may apply to this Section even when not specifically referenced.

1.2 SUMMARY

C. This section includes the following:

1. Manufactured exterior cladding aluminum metal panels wall panel system with concealed fastener and sub-girt framing assembly, with related flashings and accessory components.

D. Related Sections include the following:

1. Section 054000 – Cold-Formed Metal Framing: Wall panel substrates support framing.
2. Section 061613 - Insulated Sheathing with Factory Applied Air and Water-resistive Membrane Coating.
3. Section 072113 - Continuous Insulation Composite Panels for Exterior Walls (Nailbase sheathing) for attachment substrate).
4. Section 072726 Fluid-Applied Membrane Air Barrier for continuous air barrier systems.
5. 076200 Sheet Metal Flashing & Trim for flashing and other sheet metal work that is not part of metal wall panel assemblies.
6. Section 079200 - Joint Sealants: Sealing joints between metal wall panel system and adjacent construction.

1.3 REFERENCES

A. AAMA - American Architectural Manufacturers Association (www.aamanet.org)

1. AAMA CW-RS-1 – The Rain Screen Principle and Pressure Equalized Wall Design; 2012
2. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document).
3. AAMA 612 - Voluntary Specification, Performance requirements and Test procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum.
4. AAMA 2605-13, - “Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels
5. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a

B. ASCE (American Society of Civil Engineers; (www.asce.org)

1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

C. ASTM International (American Society for Testing and Materials; (www.astm.org)

1. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
3. ASTM D 2244 – Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
4. ASTM D 4214 – Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.
5. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
6. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
7. ASTM E331–16 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

D. NAAMM – National Association of Architectural Metal Manufacturers

E. SMACNA – Architectural Sheet Metal Manual; latest edition; Chapter 7 as a minimum standard of these specification and details, only where they exceed other referenced standards.

F. Underwriters Laboratories (UL):

1. UL 263 - Fire Tests of Building Construction and Materials

1.4 PERFORMANCE REQUIREMENTS

A. Structural performance: provide exterior wall cladding assemblies capable of withstanding the effects of load and stresses from dead loads, wind loads, snow loads and normal thermal movement without evidence of permanent defects of assemblies or components.

1. Dead load: As required by the applicable building code.
2. Live Load: As required by applicable building code.
3. Wind Loads: Determine loads based on the following minimum design wind pressures:
    a. Uniform pressure of 20 lbf/sq. ft. (957 Pa), acting inward or outward.
    b. Wind Uplift Resistance: UL 580; Class 90.
4. Thermal Movements: Provide assemblies that allow for thermal movements resulting from the following maximum changes (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components and other detrimental effects:
    c. Temperature Change (range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
5. Uniform Load Deflection Test: Provide panel system which has been tested in accordance with ASTM E330 at a design pressure of at least 60 psf without deformation or failures of structural members. Maximum allowable deflection of span: L/180.

6. Panels shall be tested in accordance with ASTM E1592 structural testing at load span of at least 5'-0" o.c. and shall perform at a design pressure of pressure of no less than 35 psf without deformation or failures of structural members
7. Sealed joints shall allow free and silent movement of panels during expansion and contraction while preventing uncontrolled penetration of moisture.
8. Manufacturing and installation shall prevent deformation of exposed surfaces.
9. Design panel system to accommodate substructure tolerance of +0 to -1/8 inch.

B. Not Permitted: Vibration harmonics; wind whistles; noises caused by thermal movement; thermal movement transmitted to other building elements; loosening, weakening, or fracturing of attachments or components of system.

C. Air Infiltration: Panel system shall not have air infiltration rate more than 0.06 cfm per sq. ft. of fixed wall area when tested in accordance with ASTM E283 at static air pressure differential of 6.24 psf

D. Static Water Penetration: Panel system shall have no water penetration as defined by in test method when tested in accordance with ASTM E331. The ASTM E331 test shall be conducted at inward static pressure differential of not less than 15.0 psf

E. Dynamic Water Penetration: Panel system shall have been tested in accordance with AAMA 501 and shall have passed with no uncontrolled water leakage at 15.00 psf dynamic pressure differential, with water application rate of 5 gallons/hr./sq. ft.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, warranty information, maintenance information, and finishes for each type of wall panel and accessory.

B. Shop Drawings: Show fabrication and installation layouts of aluminum wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish between factory-assembled, shop- assembled, and field-assembled work.

1. Accessories: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches (1:10):
    a. Flashing and trim.
    b. Anchorage systems.

C. Certificates: Product certificates signed by manufacturer certifying materials comply with the specified performance characteristics and criteria, and physical requirements.

D. Samples for initial selections: Manufacturer's color charts showing the full range of colors available for units with factory-applied color finishes.

E. Samples for verification: Provide color samples of selected finish color applied to the metal panel material, at least 12 inch by 12 inch. Samples shall involve normal color and texture variations, including sample sets showing the full range of variations expected.

F. Test and Inspection Reports: Submit test and inspection reports on each type of wall panel system provided for project based on evaluation of comprehensive tests performed by qualified testing agency.

G. Qualifications Statements: For manufacturer and installer.

H. Close-out Submittals:

1. Maintenance Data: For installed products including maintenance methods and precautions against cleaning materials and methods detrimental to finishes and performance.
2. Warranty: Warranty documents required in this section.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years of documented experience.

1. Manufacturer to be ISO 9001:2015 with design.

B. Installer Qualifications:

1. Acceptable to manufacturer.
2. Company specializing in installing products of the type specified in this section with minimum of three years of documented experience.

C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mock-up of sufficient size and scope to show typical pattern of joints, panel width, edge construction, a sample of anchorage, joinery, or soldering and finish texture and color. Mockups shall be full thickness, including insulation, supports, attachments, and accessories. Mockups shall show all perimeter conditions, intersections, and terminations.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Locate where directed by Architect.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Package metal panels for protection during transportation and handling.

B. Deliver components, sheets, wall panels, and other manufactured items so as not to be damaged or deformed. Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

C. Protect panels from accelerated weathering by removing or venting plastic shipping sheet wrap.

D. Handle, unload, store, and erect wall panels in strict compliance with manufacturer’s instructions and recommendations, and in a manner to prevent bending, warping, abrasion, twisting, and surface damage

E. Store wall panels vertically, covered with suitable weather-tight and ventilated covering. Store wall panels to ensure dryness, with a positive slope for drainage of water. Do not store wall panels in contact with other materials that might cause staining, denting, or other surface damage. Do not allow storage space to exceed 120 deg F (49 deg C).

F. Prevent contact with materials that may cause discoloration, deterioration, damage, or staining of products.

G. Retain strippable protective covering on wall panel for period of panel installation, if acceptable to manufacturer.

H. Require all personnel to wear clean white cotton gloves when handling and installing metal panels and accessories when no strippable film is present.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of wall panels to be performed according to manufacturer's written instructions and warranty requirements

B. Field Measurements: Verify actual supporting and adjoining construction by field measurements before fabrication and indicate recorded measurements on final shop drawings. Coordinate construction to ensure that flat-lock panels fit properly to support and adjoin construction and coordinate schedule with construction progress to avoid delaying the work.

1. Established dimensions: where field measurements cannot be made without delaying the work, guarantee dimensions and proceed with fabrication of flat-lock panels corresponding to the established dimensions.

1.9 WARRANTY

A. Special Warranty: Manufacturer’s standard form in which manufacturer agrees to repair or replace components of wall panel assemblies that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures, including rupturing, cracking, or puncturing.

b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer’s standard 30-year warranty in which manufacturer agrees to repair finish or replace defective wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.

b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.

c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 30 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Aluminum Metal Wall Panels - Concealed Fasteners.

1. Versa-Seam (VSS999, VSS080, VSS100, VSS120) manufactured by ATAS International, Inc. Please contact Kyle Ferenc – (Ph: 312-859-2066) kferenc@atas.com

2. DesignWall (DSV120) manufactured by ATAS International, Inc. Please contact Kyle Ferenc – (Ph: 312-859-2066) kferenc@atas.com

B. Subject to conformance with all specified requirements and drawing requirements, provide named product or comparable product by one of the following:

1. Metal Sales Manufacturing Corporation

2. Metal-Tech USA.

3. Quality Metal Crafts, LLC.

4. Firestone Metal Products
5. Petersen Aluminum Corp.

C. Substitutions: See Section 016000 - Product Requirements

2.2 FACTORY FORMED, CONCEALLED FASTENER, MANUFACTURED METAL WALL PANELS

A. Wall Panel System: Factory fabricated prefinished metal panel system; site assembled.

1. Provide exterior metal wall panel system.
2. Design and size components to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of wall.
3. Design Pressure: Conforming to requirements of ASTM E1592-05(2017), and in accordance with applicable codes.
4. Maximum Allowable Deflection of Panel: L/180 for length(L) of span.
5. Movement: Accommodate movement within the system without damage to components or deterioration of seals, movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
6. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
7. Panels to be tension leveled during the roll forming process.
8. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.
9. Attachment: Concealed clip designed for thermal movement.
10. Fire Resistance Rating: Comply with UL 263 and UL 790 Class A Fire Resistance Ratings.
11. Air Infiltration: Tested according to ASTM E 1680.
12. Water Infiltration: No leakage when tested according to ASTM E283, ASTM E331, ASTM E1592, ASTM E1646, and ASTM E2140.

B. Exterior Metal Wall Panels:

1. Profile: Versa-Seam rainscreen style panel with a reveal.
2. Vertical Orientation.
3. Side Seams: Continuous interlock, concealing all raw edges
4. Material: Precoated aluminum sheet, 18-gauge, 0.0403 inch (1.02 mm) minimum thickness.
    a. MP-1: Versa-Seam [VSS999] 6” width wall panel with 1” depth, smooth texture and without end folds. Reveal size varies based on architectural drawings.
    b. MP-2: Versa-Seam [VSS080] 8” width wall panel with 1” depth, smooth texture and without end folds. Reveal size varies based on architectural drawings.
    c. MP-3: Versa-Seam [VSS100] 10” width wall panel with 1” depth, smooth texture and without end folds. Reveal size varies based on architectural drawings.
    d. MP-4: Versa-Seam [VSS120] 12” width wall panel with 1” depth, smooth texture and without end folds. Reveal size varies based on architectural drawings.
5. Panel Layout: Per Architectural Drawings.
6. Color: As selected by Architect from manufacturers full range.

C. Exterior Wall Panels – Skyway Cladding:

1. Profile: Versa-Seam rainscreen style panel with a reveal
2. Vertical Orientation
3. Side Seams: Continuous interlock, concealing all raw edges
4. Material: Precoated aluminum sheet, 18-gauge, 0.0403 inch (1.02 mm) minimum thickness.
   a. MP-1: Versa-Seam [VSS999] 6” width wall panel with 1” depth, smooth texture and without end folds. Reveal size varies based on architectural drawings.
   b. MP-2: Versa-Seam [VSS080] 8” width wall panel with 1” depth, smooth texture and without end folds. Reveal size varies based on architectural drawings.
   c. MP-3: Versa-Seam [VSS100] 10” width wall panel with 1” depth, smooth texture and without end folds. Reveal size varies based on architectural drawings.
   d. MP-4: Versa-Seam [VSS120] 12” width wall panel with 1” depth, smooth texture and without end folds. Reveal size varies based on architectural drawings.
5. Panel Layout: Per Architectural Drawings
6. Color: As selected by Architect from manufacturers full range.

2.3 FACTORY FORMED, PERFORATED METAL EQUIPMENT SCREEN

A. Exterior Wall Panels – Mechanical Screen and Elevator Headroom Cladding: Structural Perforated Metal Equipment Screen (roof), to match metal wall panel profile, by same manufacturer.

1. Openness: 30% or max. allowed by ordinance.
2. Finish: PVDF.
3. Exterior Wall Panels – Mechanical Screen and Elevator Headroom Cladding:
4. Profile: DesignWall rainscreen style panel
5. Horizontal Orientation
6. Side Seams: Continuous interlock, concealing all raw edges
7. Material: Precoated aluminum sheet, 18 gauge, 0.0403 inch (1.02 mm) minimum thickness.
   a. MP-5: DesignWall [DSV120] 12” width wall panel with 1-7/8” depth, smooth texture and without end folds. For mechanical equipment screen.
8. Include High-Pressure clips at mechanical screen.
9. Perforated: A25 for 40% Open Air Flow
10. MP-6: DesignWall [DSV120] 12” width wall panel with 1-7/8” depth, smooth texture and without end folds. For elevator headroom.
11. Panels are smooth and solid without perforations.
12. Panel Layout: Per Architectural Drawings
13. Color: Standard color to be chosen later by Architect from manufacturer’s full range.
14. Brake-formed panels will not be accepted.
15. PE Stamp and Engineering Calculations required for the mechanical screen wall. Attach to steel members.

2.4 MATERIALS

A. Precoated Aluminum Sheet: ASTM B209 (ASTM B209M), 3105 alloy, O temper, smooth surface texture; continuous-coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.

B. Select materials with surface flatness, smoothness, and lack of surface blemishes where exposed to view in finished system.

2.5 FINISHES

A. Exterior Finish: High-performance Fluoropolymer Coil Coating System: Manufacturer's standard multi-coat aluminum coil coating system complying with AAMA 2605, including at least 70 percent polyvinylidene fluoride (PVDF) resin by weight, and at least 80 percent of coil coated aluminum surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch (0.023 mm); color and gloss to match sample.

1. Pencil Hardness – ASTM D3352-74
2. Impact Adhesion – ASTM D294-84
   a. Coating shall show no cracking and no loss of adhesion
3. Cure Test – NCCA 11-18
4. Coating shall withstand 50+ double rubs of MEK.
5. Humidity Resistance – ASTM D2247-87
   a. Coating shall show no blisters after 3000 hours of 100% humidity at 95`F.
6. Weatherometer Test – ASTM D882-86/G23-88 Coating shall show no cracking, peeling, blistering or loss of adhesion after 2000 hours.
   a. Chalking Resistance – ASTM D659-86
   b. Color Change – ASTM D2244-74
   c. After 5000 hours in Atlas Weatherometer coating shall show no objectionable chalking or color change.
7. Abrasion Resistance – ASTM D968-81 Coating shall resist 65+/- 15 liters/mil minimum of falling sand.

B. Color

1. Manufacturer's full range of standard PVDF colors - to be chosen later by Architect.

C. Cleaning and Pretreatment using Wet chemistry technology

D. Complex Chrome oxide pretreatment

E. Chrome final rinse

F. Panel Backside Finish: Panel manufacturer's standard siliconized polyester wash coat.

2.6 ACCESSORIES

A. Cladding Support Clips: Thermally broken, galvanized steel clips for support of cladding z-girts, angles, channels and other framing.

B. Sheathing Ventilation Shims: ASV Spacer Shims - Polyoxymethylene (engineered thermoplastic) ⅜" stackable shims.

C. Miscellaneous Sheet Metal Items: Provide factory formed flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, and equipment curbs of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.

D. Fabricate trim and flashing components in minimum 12'-0" lengths, or as dictated by project conditions and approved by panel manufacturer

E. Gaskets:

1. Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant.

2. Profiled Rib Closures: Provide prefabricated, factory pre-notched closures to match the panel profile close fitting components .032 Aluminum in the same color and finish as the wall panel system.

F. Sealants:

1. Exposed Sealant: High Performance Elastomeric; clear tri-polymer, as recommended by manufacturer.

2. Concealed Sealant: High Performance Space Cubes to prevent bottoming out of sealant when fasteners are installed non-curing butyl tape.

3. Seam Sealant: Factory Applied High Performance, high solid, non-skinning, non-drying formulated for roll forming application into concealed panel joints.

G. Fasteners: Provide as recommended by panel manufacturer suitable for application meeting the following characteristics.

1. All fasteners shall be non-corrosive type, as recommended by the panel manufacturer. Provide self-tapping screws and other suitable fasteners designed to withstand building design loads.

2. Self-tapping and Self-drilling for metal to metal

3. Self-tapping wood screws for metal to wood applications

4. Carbon steel thread with organic long-life coating.

5. Exposed fasteners type 304 stainless steel cap head;

a. Encapsulated EPDM washer

b. Baked on High performance compatible, chip resistant finish to match panel color.

H. Field Touch up Paint; As recommended by manufacturer

I. Sub-girt Framing Assembly:

1. 18-gauge, 0.040 inch (1.024 mm) thick formed non-precoated steel sheet.

2. Secondary panel support framing spaced per design pressures indicated by ASCE-7

3. Profile as indicated; to attach panel system to building.

J. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; shop cut, and factory mitered to required angles.

K. Expansion Joints: Same material, thickness and finish as exterior sheets; 032 or .040 mm thick (matching adjacent construction); manufacturer's standard brake formed type of design to suit system.

L. Snap J Channel: Factory formed two-piece J-channel to be used in trim areas without clip securement to minimize exposed fasteners

M. Penetration Covers (Z Boxes) to be supplied by panel manufacturer, factory fabricated in same gauge and finish as metal panels.

1. Weather Resistant Membrane: Use of air and water barrier is required with wall panel system, as specified in section 072726 Fluid-Applied Membrane Air Barriers, and where indicated on the Drawings.

N. Provide all components required for a complete wall panel assembly, including trim, copings, fasciae, mullions, sills, corner units, clips, seam covers, flashings, louvers, sealants, gaskets, fillers, closure strips, and similar items.

O. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

P. Source Quality Control:

1. Source: Obtain metal wall panels, trim and other accessories from a single manufacturer.

Q. Quality Control: Obtain metal wall panels, trim and other accessories from a manufacturer capable of providing manufacturer shop drawings, custom panel features, and on-site technical support and installation assistance.

R. Miscellaneous Metal Framing:

1. Miscellaneous Metal Framing, General: As required, provide stainless steel C and Z shaped subgirt sections, zee clips, hat-shaped rigid furring channels and other miscellaneous framing as required for a complete installation.

2. Provide components required for a complete roof assembly, including trim, copings, fasciae, clips, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

3. Fabricate cleats of same material as sheet, to interlock with sheet.

4. Fabricate starter strips of same material as sheet, continuous, to interlock with sheet.

5. Hem exposed edges on underside 1/2 inch; miter and seam corners.

6. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

2.7 FABRICATION, GENERAL

A. Fabricate and finish metal wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Fabricate metal wall panels with joints between panels designed to form weathertight seals.

C. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

2. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.

4. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal wall panel manufacturer.

D. Provide post-finishing of panels, paint aluminum wall panels only after completion of panel fabrication and ensure exposed edges are coated.

E. Provide post anodizing of panels, anodize aluminum wall panels only after completion of panel fabrication and ensure exposed edges are anodic coated without crazing of surface at formed edges.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrate framing members are ready to receive panels.

1. Examine wall framing to verify that structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.

B. Verify water-resistive barrier (WRB) has been properly installed over substrate, see Section 072500 for additional information.

C. Contractor shall inspect all surfaces, areas, and other contingent construction in or to which his work is to be installed and insure himself that they are in proper condition to receive the work to be performed under this Section.

D. Verify that sheathing surfaces are sound, dry, properly secured and that provision has been made for flashings, anchorage, and all other interface items attaching to or penetrating through the Work of this Section.

E. The Contractor shall notify the Architect in writing, before any work is installed, of any condition requiring correction. Failure to make such a report shall be construed as acceptance of the existing conditions and the responsibility to provide an acceptable installation.

F. Examine rough-in for components and systems penetrating wall panels to coordinate actual penetration locations relative to wall panel joint locations prior to installation.

G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Install subgirts perpendicular to panel length, securely fastened to substrates, shimmed and leveled to uniform plane, and spaced at intervals indicated.

B. Protect surrounding areas and adjacent surfaces from damage during execution of this work.

3.3 INSTALLATION

A. General:

1. Install metal wall panels according to manufacturer’s written instructions in orientation, sizes and locations indicated on approved shop drawings.

2. Erect panel level and plumb, in proper alignment in relation to substructure framing and established lines; follow SMACNA Architectural Sheet Metal manual and standard practices.

B. Miscellaneous Framing: Install furring, angles, sub-purlins, and other miscellaneous wall panel support members and anchorage according to metal wall panel manufacturers' recommendations.

C. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint; allow time to properly dry prior to wall panel installation.

D. Install attachment system to support wall panels and with provisions to provide a complete weather tight wall system, including sub girts, extrusions, flashings, and trim.

   a. Include attachment to supports and trims at locations using dissimilar materials.
   b. Do not apply sealants to joints, unless noted otherwise on Drawings or Shop Drawings.
   c. Install starter extrusion at base course and at cut panel locations.

E. Provide expansion and control joints where indicated.

F. Use concealed fasteners unless otherwise indicated and approved by Architect.

G. Erect panel level and plumb, in proper alignment in relation to substructure framing and established lines; follow SMACNA Architectural Sheet Metal manual and standard practices.

H. Fabricate and install work with lines and corners of exposed units true and accurate.

I. Shim and align panel units within installed tolerance of 1/16 inch in 20' –0".

J. Panel anchorage shall be structurally sound and per engineering recommendations.

K. Where wall panel materials come in contact with dissimilar materials, an isolation shim or tape shall be installed at fastening locations

L. Completed system shall be free from overbending, deforming, stretching, distortion, waves, and buckles.

M. Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of wall panel assemblies. Provide types of gaskets, fillers, and sealants as indicated or as recommended by panel manufacturer.

   1. Seal side joints where recommended by metal wall panel manufacturer.

   2. Prepare joints and apply sealants to comply with the requirements in Division 07 Section "Joint Sealants".

N. Install weather tight seals at perimeter of wall panel openings.

   1. Test for proper adhesion on small unexposed area of solid surfacing prior to use.

   2. Refer to Section 07 9200.

O. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA - Architectural Sheet Metal Manual.

P. Provide concealed fasteners where possible and set units true to line and level as indicated.

Q. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

R. Install flashing and trim as wall panel Work proceeds.

S. Install weather tight escutcheons for pipe and conduit penetrating exterior walls.

T. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action as recommended by wall panel manufacturer.

   1. Install accessories with positive anchorage to building and weather tight mounting and provisions for thermal expansion, and coordinate installation with flashings and other components.

U. Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

V. Install components required for a complete metal wall panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

W. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

X. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.

Y. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints

3.4 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. Barrier Wall Water-Spray Test: Test assembled area as directed by Architect for water penetration in accordance with AAMA 501.2.

C. Do not cover installed air/water barriers until required inspections have been completed.

D. Obtain approval of installation procedures by air/water barrier manufacturer based on a mockup installed in place, prior to proceeding with remainder of installation.

E. Take digital photographs of each portion of installation prior to covering up, and submit electronically to Architect.

CLEANING AND PROTECTION

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Protect panels from damage during construction, until the Date of Substantial Completion. Use temporary protective coverings where needed as approved by the metal panel manufacturer.

C. Remove panels damaged beyond repair and replace with new panels to match adjacent undamaged panels

D. Remove protective films immediately after installation, unless otherwise directed by manufacturer.

E. Remove site cuttings from finish surfaces.

F. Remove protective material from wall panel surfaces.

G. Clean and wash prefinished surfaces with mild soap and water, rinse with clean water.

H. Upon completion of installation, thoroughly clean prefinished aluminum surfaces in accordance with AAMA 609 & 610 and as directed by metal panel manufacturer’s written instructions.

I. Clean exposed surfaces of panels that are not protected by temporary covering to remove fingerprints and soil during construction period in accordance with AAMA 609 & 610 and as directed by metal panel manufacturer's written instructions.

J. Clean and touch up minor abrasions in finishes with air-dried coating that matches color and gloss, and is compatible with, factory–applied finish coating. Remove the remaining films.

K. Upon completion of wall panel installation, clear weep holes and drainage channels of obstructions and dirt.

L. Ensure that cleaning by other trades working in proximity to panels is in accordance with the recommendations of the manufacturers.

END OF SECTION

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SECTION 074646 – HIGH DENSITY FIBER CEMENT SIDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. High-density fiber cement siding panel system with rainscreen and cladding attachment system.

B. Section Includes:

1. High-density fiber cement siding panel with rainscreen system.
2. Attachment system.

C. Related Sections:

1. Section 061005 - Rough Carpentry for wood nailers, cants, and blocking.
2. Section 072100 - Thermal Insulation.
3. Section 076200 – Sheet Metal Flashing and Trim for metal flashings in contact with fiber cement system.
4. Section 079500 - Joint Sealants for joint sealants, joint fillers, and joint preparation, where indicated.

1.3 DESCRIPTION OF WORK

A. High Density Fiber Cement panel cladding system and accessories.

1.4 REFERENCES

A. Referenced Standards: These standards form part of this specification only to the extent they are referenced as specification requirements.

1. ASTM C1185 - Standard Test Methods for Sampling and Testing Non-Asbestos Fiber-Cement Flat Sheet, Roofing and Siding Shingles, and Clapboards.
2. ASTM C1186 - Standard Specification for Flat Fiber-Cement Sheets.
3. ASTM E84 - Surface Burning Characteristics of Building Materials.
4. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750-degree C. Determination of Non-Combustibility.
5. ASTM G155-05 – Standard Method for Using Xenon Arc Lamp Apparatus for Exposure of Non-Metallic Materials
6. CEN - European Committee for Standardization:
    a. EN 12467 - Fiber Cement Flat Sheets-Product Specifications and Test Methods.
    b. EN 13501 - Fire Test to Building Material.
    c. EN 20105 - Test for Color Fastness.
        1) Part A02 Grey Scale.
7. IAPMO - The International Association of Plumbing and Mechanical Officials
    a. IAPMO-UES Evaluation Report: 0551 Cembrit Fiber-Cement Façade Panel System
    b. IAPMO-UES Evaluation Report: 899 Cembrit Fiber-Cement Façade Panel System

1.5 SUBMITTALS

A. Product Data:

1. Provide cladding system manufacturer's printed data sufficient to show that all components of cladding system, including backup wall and fasteners, comply with the specified requirements and with the manufacturer's requirements and recommendations for the system type specified; include data for each product used in conjunction with claddinging membrane.

2. Manufacturer's data sheets on each product to be used, including:
   a. Preparation instructions and recommendations.
   b. Storage and handling requirements and recommendations.

3. Installation methods.
   a. Where UL or FM requirements are specified, provide documentation that shows that the system to be installed is UL-Classified or FM-approved, as applicable; include data itemizing the components of the classified or approved system meeting all manufacturer requirements.

4. Installation Instructions: Provide manufacturer's instructions to installer, marked up to show exactly how all components will be installed; where instructions allow installation options, clearly indicate which option will be used.

B. Manufacturer’s Warranty

C. Attachment System Engineered Drawings:

1. Provide engineered design for attachment and back-up framing to support exterior cladding.

2. Provide static calculations verifying sizing of members, attachment devices and fasteners to support the exterior cladding with a safety factor required by Authority Having Jurisdiction (AHJ).

D. Shop Drawings: Include plans, sections, details, and attachments to other Work. Provide the cladding membrane manufacturer's standard details customized for this project for all relevant conditions, including flashings, base tie-ins, cladding edges, terminations, expansion joints, penetrations, and drains.

1. Shop drawings that include a complete fiber cement cladding system, including layout, elevations, sections, details, location and type of penetrations, details, and a bill of materials.

2. Provide Installation drawings and details.

3. Provide detailed drawings of non-standard applications of fiber cement materials which are outside the scope of the standard details and specifications provided by the manufacturer.
   a. Only products that are installed and used in accordance with applicable manufacturer's instructions and specifications are warranted.
   b. The warranty is applicable only to claims made in writing and received by the manufacturer within thirty days after the defect was covered and within twenty (20) years after the date of the shipment of the product by the manufacturer. For Deco, the warranty is applicable only to claims made in writing and received by the manufacturer within thirty days after the defect was covered and within ten (10) years after the date of the shipment of the product by the manufacturer

E. Contractor’s Qualifications:

1. Each Contractor shall be prepared to submit, within 5 days of Owner’s request, written evidence that he/she:
   a. Is acceptable to and approved/certified by Manufacturer for the specified product Installation.
   b. Maintains a permanent place of business.

c. Has adequate equipment to do work properly and expeditiously within established schedules.
d. Has suitable financial status to meet obligations incident to the work including a financial statement and credit references.
e. Has a satisfactory experience record with work of this type and scope: and, if requested by the owner, can provide five references for projects of a size exceeding 75 percent of the area included in this Project that are at least five years old. These references shall include project schedules, including bid date, start and completion dates, Owner and/or Engineer contacts including names, addresses and telephone numbers, and the specific components existing and installed on each referenced project.
f. Can submit an anticipated construction schedule and staffing plan.
g. Can submit “Contractor’s Qualification Statement” AIA Document A305.
h. Can show evidence of authority to conduct business in the jurisdiction where the Project is located.

F. Manufacturer Certificates: Signed by fiber cement manufacturer certifying that the product(s) comply with requirements specified in "Performance Requirements" Article.

1. Submit evidence of compliance with performance requirements.

G. Maintenance Data: For HD fiber cement panel cladding to include in maintenance manuals.

H. Warranties: Executed Warranty as a requirement of project close-out.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Qualified firm that is approved, authorized, or licensed by cladding system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

1. Firm that is acceptable to HD Fiber Cement cladding system manufacturer.

B. Source Limitations: Obtain components for membrane cladding system from same manufacturer as cladding membrane or approved by cladding manufacturer., unless specifically noted otherwise.

C. Fire-Test-Response Characteristics: Provide membrane cladding materials with fire-test-response characteristics indicated as determined by testing identical products by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction.

D. Color Evaluation: Insignificant change after 3000 hours of QUV test (EN 20105).

E. Wind Uplift Requirements: Provide cladding assembly meeting or exceeding Factory Mutual Global Guidelines for Minimum ballast per respective wind zone, building height, deck type, parapet height, and ground roughness qualification.

1. Wind Zone: ___ mph. (To be determined by PE to meet applicable codes.)

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials between 60°and 80°F (15° and 27°C). When ambient temperatures fall below 60°F (15°), Contractor is responsible for providing heated storage areas for materials. Heat storage area in a manner which does not pose a fire hazard.

B. Apply adhesives and sealants at room temperature 60°and 80°F (15° and 27°C). Expose only enough materials to colder temperatures that can be applied within limits. Restore to room temperature when exposed to lower temperatures prior to use.

C. Protect cladding materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store indoors and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

D. Provide continuous protection of materials against wetting and moisture absorption.

E. Heed manufacturer's cautions regarding safe handling, use and storage of materials.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit cladding system to be installed per manufacturer's written instructions and warranty requirements.

B. Environmental Requirements: Wind velocity and temperature limitations shall be based on the Contractor's ability to apply materials in the specified manner. Splicing and seaming work shall not be conducted when ambient temperature is below 0°F (-18°C) or when wind chill factor is below -20°F (-29°C).

C. Proceed with work so new cladding materials are not subject to construction traffic. When necessary, new cladding sections shall be protected and inspected upon completion for possible damage

D. Provide protection, as specified, for all cladding areas exposed to traffic during construction. Plywood must be smooth and free of fasteners and splinters.

E. The surface on which the insulation or cladding membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil and grease.

F. New cladding shall be complete and weathertight at the end of the workday

G. Protection:

1. Install temporary insulation seal-offs at completion of each day's work and completely remove upon resumption of work.
2. Coordinate application of membrane to provide protection of underlying materials from wetting or other damage by the elements on a continuous basis.
3. Completely install sheet metals sleeves, caps, or enclosures daily.
4. Torches are not permitted on the cladding.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane cladding system that fail in materials or workmanship within specified warranty period. Failure includes cladding leaks.

Warranty Period: 20 years from date of Substantial Completion.

Prior to acceptance of the Work, furnish written one-year cladding watertight warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURER/SUPPLIER

A. Basis of Design: Swisspearl Fiber Cement Panel supplied by American Fiber Cement Corp.; 6901 S. Pierce St. Suite 180, Littleton, CO 80128. ASD. Tel: (303) 972-5107. Email: house@afccladding.com. Web: http://www.americanfibercement.com.

B. Requests for substitutions will be considered in accordance with the provisions of Section 001600 - Product Requirements.

2.2 FIBER CEMENT PRODUCT

A. Product: **Patina Original NXT** by Swisspearl supplied by American Fiber Cement Corp.

1. Finish: Through-colored, muted, matte finish with a unique weather-pcladding treatment.

2. Thickness: 8 mm (5/16”).
3. Untrimmed Width: 1250 mm (49.2”)
4. Untrimmed Lengths: 2500 mm (98.4”), 3050 mm (120.1”)
5. Trimmed Width: 1219.2 mm (48”)
6. Trimmed Lengths: 2438 mm (96”), 3045 mm (119.875”)
7. Color: To be selected by Owner and Architect from manufacturers full line of colors.
8. Physical Characteristics: ASTM C1185/C1186, EN 12467 'Fiber-cement flat sheets'.
   a. Durability classification: Category A.
   b. Strength classification: Class 4.
   c. Freeze thaw test: greater than 100 cycles.
9. Fire Testing:
   a. ASTM E84.
   b. ASTM E136.
   c. CAN/ULC S102.
   d. CAN/ULC S114.
   e. EN 13501-1: A2-s1-d0.
10. IAPMO – The International Association of Plumbing and Mechanical Officials
    a. IAPMO-UES Evaluation Report 0899 Swisspearl Fiber-Cement Panel System
    b. For additional test data, see product datasheet.

B. Product: AFC Carbon (Stone+ , Groove+ , Lines+ , Reflect+) supplied by American Fiber Cement Corp.

1. Product: AFC (To Be Selected By Architect: Stone+ , Groove+ , Lines+ , Reflect+) as manufactured/supplied by American Fiber Cement Corp.
2. Finish: Black, through-colored, muted, matte finish with a sanding grain, linear grooved pattern, and unique weather-protective and UV resistant surface treatment.
3. Thickness:
   a. 10mm (3/8”)
4. Untrimmed Width: 1250 mm (49.2”)
5. Untrimmed Lengths: 2510 mm (98.8”), 3050 mm (120.1”)
6. Trimmed Width: 1219.2 mm (48”)
7. Trimmed Lengths: 2438 mm (96”), 3045 mm (119.875”)
8. Color: To be selected by Owner and Architect from manufacturers full line of colors.
9. Physical Characteristics: EN 12467 'Fiber-cement flat sheets'.
   a. Durability classification: Category A.
   b. Strength classification: Class 5.
   c. Freeze thaw test: RL ≥ 0.75
10. Fire Testing:
    a. ASTM E136.
    b. CAN/ULC S114.
    c. EN 13501-1: A2-s1-d0.
11. UV Testing:
    a. UNI EN ISO 4892-3, 1500 hr, DE* = 0.61
12. For additional test data, see product datasheet.

2.3 ATTACHMENT SYSTEM

A. General: Auxiliary materials recommended by fiber cement siding system manufacturer for intended use, product, and compatible with other adjacent products.

B. Water-resistive Barrier: DELTA®- FASSADE S by Dörken Systems Inc. See Section 07280 – Water-resistive Barriers. (Supplied by American Fiber Cement Corp.)

C. Air Barrier: DELTA®-VENT SA by Dörken Systems Inc. See Section 07250 - Air Barriers. (Supplied by American Fiber Cement Corp.)

D. Aluminum Joint Closures and Cembrit Decorative Corner Profiles: Manufacturer's standard products as detailed. Maximum thickness of finishing profile to be 0.8 mm or 21-gauge.

E. Attachment System, by American Fiber Cement:
   a. XKELEX Z19, or as otherwise specified by manufacturer for application:
   b. Product: Perforated Horizontal Aluminum profiles supplied by American Fiber Cement Corp.
      1) Material: 6063-T5
      2) Finish: Black Powder Coat
   c. UV Protective Membrane: Supplied by American Fiber Cement Corp.
      1) For open joint ventilated rain screen systems.

2.4 FIXING ACCESSORIES FOR ATTACHMENT SYSTEMS

A. Rivets: Stainless steel Astro rivets (for use with metal supporting members). Supplied by manufacturer.

B. Rivets: Color-matched stainless-steel Astro rivets (for use with metal supporting members). Supplied by manufacturer.

C. Screws: Stainless steel screws (for use with wood supporting members). Supplied by manufacturer.

D. Screws: Color-matched stainless-steel screws (for use with wood supporting members). Supplied by manufacturer.

PART 3 - EXECUTION

3.1 GENERAL

A. Install cladding, rainscreen, substrate, flashings, and accessories in accordance with cladding Manufacturer's published instructions and recommendations for the specified cladding system. Where Manufacturer provides no instructions or recommendations, follow good cladding practices and industry standards. Comply with federal, state, and local regulations.

B. Obtain all relevant instructions and maintain copies at the project site for duration of installation period.

C. Store materials according to manufacturer's instructions.

D. Until ready for use, keep materials in their original containers as labeled by the Manufacturer.

3.2 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.3 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.4 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved submittals.

B. For exterior applications, comply with local codes and structural engineer's fastening calculations along with manufacturer's recommendations for fastener spacing.

3.5 EXTERIOR CLADDING FOR RAINSCREEN APPLICATIONS

A. Detailing Requirements:

1. Air space at top and bottom of building or wall termination shall be 3/4 inch (20 mm) to facilitate airflow from behind the panels. Do not block vertical airflow at windows, doors, eaves, or at the base of the building. Airflow shall be continuous from bottom to top so there is air movement behind each panel. For walls over 60 feet high (18 m), the ventilated cavity between rear of panels and exterior wall shall be increased to 1-5/8 inches (40 mm). Air flow behind the cement fiber panels is critical to the performance of the rain screen constructions.
2. Fasteners in profile shall accommodate thermal expansion/contraction of metal and not interfere with panel application.
3. Install panels from top of building to bottom.
4. For straight walls, start panel installation in center and work outward.
5. For walls with inside corners, start installation at corner and work across wall.

B. Rain Screen Installation: Comply with manufacturer's installation requirements.

C. Attachment System: Comply with manufacturer's engineered design for cladding support framing.

3.6 PROTECTION AND CLEANING

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

C. See AFC Maintenance and Cleaning Guidelines for additional information.

D. Protect cladding systems from damage and wear during remainder of construction period. When remaining construction will not affect or endanger cladding, inspect cladding for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

E. Clean all contaminants generated by claddinging work from building and surrounding areas, including bitumen, adhesives, sealants, and coatings.

F. Repair or replace building components and finished surfaces damaged or defaced due to the work of this section; comply with recommendations of manufacturers of components and surfaces.

G. Remove all claddinging materials from surfaces not specified to receive these materials such as walls, walkways, metal flashings, etc.

H. Remove leftover materials, trash, debris, equipment from project site and surrounding areas.

END OF SECTION

SECTION 075323 – ETHYLENE PROPYLENE DIENNE MONOMER (EPDM) MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Installation shall be fully adhered EDPM membrane system.

B. Section Includes:

1. Roof Vapor Retarder
2. Roof Insulation
3. Elastomeric EDPM membrane roofing, fully adhered.
4. Associated membrane flashings and accessories as provided by the roofing manufacturer as part of a roofing system.

C. Related Sections:

1. Section 061005 - Roof Related Rough Carpentry for wood nailers, cants, curbs, and blocking.
2. Section 072100 - Thermal Insulation for insulation beneath the roof deck.
3. Section 076200 – Sheet Metal Flashing and Trim for metal flashings in contact with roofing system.
4. Section 077200 - Roof Accessories: Roof hatches, vents, and manufactured curbs
5. Section 079500 - Joint Sealants for joint sealants, joint fillers, and joint preparation.
6. Division 22 Section "Storm Drainage Piping Specialties" for roof drains.

1.3 DESCRIPTION OF WORK

A. Provide new roof, insulation and associated construction at new roofs as identified on roof plans.

B. Patching is required at tie-ins where additions abut existing roofs.

1.4 REFERENCES

A. Referenced Standards: These standards form part of this specification only to the extent they are referenced as specification requirements.

1. ASTM C 1177/C 1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
2. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
3. ASTM D 4637 - Standard Specification for EPDM Sheet used in Single-Ply Roof Membrane
4. ASTM D 4811 - Standard Specification for Nonvulcanized (Uncured) Rubber Sheet Used as Roof Flashing
5. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials
6. FM 1-28 - Design Wind Loads; Factory Mutual System
7. FM 1-29 - Roof Deck Securement and Above Deck Roof Components; Factory Mutual System.

8. FM 4470 - Approval Standard - Class I Roof Covers; current version.

1.5 SUBMITTALS

A. Product Data:

1. Provide membrane manufacturer's printed data sufficient to show that all components of roofing system, including insulation and fasteners, comply with the specified requirements and with the membrane manufacturer's requirements and recommendations for the system type specified; include data for each product used in conjunction with roofing membrane.

2. Where UL or FM requirements are specified, provide documentation that shows that the roofing system to be installed is UL-Classified or FM-approved, as applicable; include data itemizing the components of the classified or approved system meeting all manufacturer requirements.

3. Installation Instructions: Provide manufacturer's instructions to installer, marked up to show exactly how all components will be installed; where instructions allow installation options, clearly indicate which option will be used.

4. Manufacturer’s Warranty

B. Shop Drawings: Include plans, sections, details, and attachments to other Work. Provide the roof membrane manufacturer's standard details customized for this project for all relevant conditions, including flashings, base tie-ins, roof edges, terminations, expansion joints, penetrations, and drains.

1. Submit to the roof system manufacturer for approval – Shop drawings that include a complete roof plan, including membrane sheet layout, tapered insulation layout, location and type of all penetrations, details, and a bill of materials. Submit a copy to the Engineer/Architect for review and approval of tapered insulation layout. Send documentation of all other information to the Owner.

C. Contractor’s Qualifications:

1. Each Contractor shall be prepared to submit, within 5 days of Owner’s request, written evidence that he/she:
   a. Is acceptable to and approved/certified by Manufacturer for Roofing Installation.
   b. Maintains a permanent place of business.
   c. Has adequate equipment to do work properly and expeditiously within established schedules.
   d. Has suitable financial status to meet obligations incident to the work including a financial statement and credit references.
   e. Has a satisfactory experience record with work of this type and scope: and, if requested by the owner, can provide five references for projects of a size exceeding 75 percent of the area included in this Project that are at least five years old. These references shall include project schedules, including bid date, start and completion dates, Owner and/or Engineer contacts including names, addresses and telephone numbers, and the specific components existing and installed on each referenced project.
   f. Can submit an anticipated construction schedule and staffing plan.
   g. Can submit “Contractor’s Qualification Statement” AIA Document A305.
   h. Can show evidence of authority to conduct business in the jurisdiction where the Project is located.

D. Manufacturer Certificates: Signed by roofing manufacturer certifying that the EDPM roofing complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of compliance with performance requirements.

E. Maintenance Data: For EDPM roofing to include in maintenance manuals.

F. Warranties: Executed Warranty as a requirement of project close-out.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

1. Firm that is acceptable to roofing system manufacturer.

B. Source Limitations: Obtain components for membrane roofing system from same manufacturer as roofing membrane or approved by roofing membrane manufacturer.

C. Fire-Test-Response Characteristics: Provide membrane roofing materials with fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Exterior Fire-Test Exposure: Class A; ASTM E108, for application and roof slopes indicated.

D. Wind Uplift Requirements: Provide roof assembly meeting or exceeding Factory Mutual Global Guidelines for Minimum ballast per respective wind zone, building height, deck type, parapet height, and ground roughness qualification.

1. Wind Zone: 90 mph.

E. Provide polyisocyanurate insulation that meets PIMA Quality Mark Certified LTTR value through third party verification meeting ASTM C 1289, Type II, Class 1, Grade 2

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials between 60°and 80°F (15° and 27°C). When ambient temperatures fall below 60°F (15°), Contractor is responsible for providing heated storage areas for materials. Heat storage area in a manner which does not pose a fire hazard.

B. Apply adhesives and sealants at room temperature 60°and 80°F (15° and 27°C). Expose only enough materials to colder temperatures that can be applied within limits. Restore to room temperature when exposed to lower temperatures prior to use.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Provide continuous protection of materials against wetting and moisture absorption.

E. Heed manufacturer’s cautions regarding safe handling, use and storage of materials.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed per manufacturer's written instructions and warranty requirements.

B. Environmental Requirements: Wind velocity and temperature limitations shall be based on the Contractor’s ability to apply materials in the specified manner. Splicing and seaming work shall not be conducted when ambient temperature is below 0°F (-18°C) or when wind chill factor is below -20°F (-29°C).

C. Proceed with work so new roofing materials are not subject to construction traffic. When necessary, new roof sections shall be protected and inspected upon completion for possible damage

D. Provide protection, as specified, for all roof areas exposed to traffic during construction. Plywood must be smooth and free of fasteners and splinters.

E. The surface on which the insulation or roofing membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil and grease.

F. New roofing shall be complete and weathertight at the end of the workday

G. Protection:

1. Install temporary insulation seal-offs at completion of each day's work and completely remove upon resumption of work.
2. Coordinate application of membrane to provide protection of underlying materials from wetting or other damage by the elements on a continuous basis.
3. Completely install sheet metals sleeves, caps, or enclosures daily.
4. Torches are not permitted on the roof.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Warranty Period: 15 years from date of Substantial Completion.
2. Prior to acceptance of the Work, furnish written one-year roof watertight warranty.

PART 2 - PRODUCTS

2.1 VAPOR RETARDER

A. 40 mil minimum composite self-adhering sheet product consisting of a layer of rubberized asphalt membrane with a 5 mil Provide new roof, insulation and associated construction at existing roofs as shown on roof plans UV resistant poly film with skid resistant surface.

1. Recognized as a by Class l vapor retarder the International Building Code with a perm rating of 0.02.
2. Acceptable to manufacturer and warranty provisions, and compatible with all components of EDPM roofing system used.

2.2 ROOF INSULATION

A. Roof sheathing at metal deck: Fiberglass matt reinforced gypsum roof sheathing board.

1. Basis of design product: GP Gypsum; DensDeck® Prime Roof Board or comparable product acceptable to manufacturer and warranty provisions, and compatible with all components of EDPM roofing system used.
2. 5/8" thickness.
3. Fire-Resistance Rating: Class A in accordance with UL 790 and ASTM E108.
4. Combustibility: Noncombustible in accordance with ASTM E136.
5. Flame Spread and Smoke Development: Zero and zero in accordance with ASTM E84.
6. Water Absorption (Percent of Weight): 5 percent or less in accordance with ASTM C473
7. Surface Water Absorption: Nominal 0.035 oz. in accordance with ASTM C473
8. Compressive Strength: 900 lbf/sq. in. in accordance with ASTM C473
9. Mold Resistance: 10 in accordance with ASTM D3273
10. Total Roof System R-Value (not inclusive of deck): 30 or greater

B. Polyisocyanurate Board Insulation: Felt or glass-fiber mat facer on both major surfaces, rigid, cellular, polyisocyanurate thermal insulation. ASTM C1289, Type II, Class 1, Grade II, with maximum flame-spread of 75 and smoke-developed of 450 based on tests performed on unfaced core on thicknesses up to 4 inches.

1. Approved Manufacturers, contingent upon acceptance of EPDM manufacturer and warranty provisions, and compatible with all components of EDPM roofing system used.
   a. Atlas
   b. CertainTeed
   c. Elevate, Nashville, TN, http://www.holcimelevate.com
   d. GAF
   e. Johns Manville
2. Maximum board size: 48 inches (1220 mm) by 96 inches (2440 mm). Insulation to be attached using adhesive or asphalt may be no larger than 48 inches (1220 mm) by 48 inches (1220 mm), nominal.
3. Maximum board thickness: 2". Use as many layers as required to achieve specified R-values, stagger joints in adjacent layers. See roof plans for required insulation thicknesses.
4. Edges: Square.
5. R-Value (LTTR): 1.0-inch (25 mm) Thickness: 5.7, minimum.
6. Compressive Strength: Minimum 20 psi (138 kPa) when tested in accordance with ASTM C 1289.
7. Density: 2 pcf.

C. Tapered Insulation: Provide factory-tapered polyisocyanurate insulation boards fabricated to slopes as indicated on roof plans. See roofing plan for extent of each slope. Direction changes shall use mitered boards. Provide slopes to maintain code compliant roof drainage to roof drainage system. ASTM C1289, Type II, Class 1, Grade II, with maximum flame-spread of 75 and smoke-developed of 450 based on tests performed on unfaced core on thicknesses up to 4 inches.

1. Manufacturer: same manufacturer as providing non-tapered insulation, upon acceptance of EPDM manufacturer and warranty provisions, and compatible with all components of EDPM roofing system used.
2. Maximum board size: 48 inches (1220 mm) by 96 inches (2440 mm). Insulation to be attached using adhesive or asphalt may be no larger than 48 inches (1220 mm) by 48 inches (1220 mm), nominal.
3. Minimum Board thickness 1/2", maximum board thickness 2".
4. R-Value (LTTR): 1.0-inch (25 mm) Thickness: 5.7, minimum.
5. Compressive Strength: Minimum 20 psi (138 kPa) when tested in accordance with ASTM C 1289.
6. Density: 2 pcf.

D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated or as required to maintain code compliant roof drainage.

1. Manufacturer: contingent upon acceptance of EPDM manufacturer and warranty provisions, and compatible with all components of EDPM roofing system used.

E. Insulation Fasteners: Type and size as required by roof membrane manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane manufacturer.

F. Adhesive for Insulation Attachment: Type as required by roof membrane manufacturer for roofing system and warranty to be provided; use only adhesives furnished by roof membrane manufacturer.

2.3 ELASTOMERIC ROOFING MEMBRANE

A. EPDM (Ethylene, Propylene, Diene Terpolymer) Roofing Membrane: ASTM D4637, Type II, scrim or fabric internally reinforced uniform, flexible sheet made from EPDM, and as follows:

1. Subject to compliance with requirements, provide products by the manufacturers specified.
   a. Carlisle SynTec Incorporated.
   b. Elevate, Nashville, TN, http://www.holcimelevate.com
   c. GenFlex Roofing Systems.
   d. Johns Manville International, Inc.
   e. Versico Inc.
2. Thickness: 60 mils, nominal.
3. Reinforcement: Polyester weft inserted scrim; membrane complying with ASTM D 4637 Type II.
4. Exposed Face Color:
   a. Black.

2.4 FASTENERS

A. Type and size as required by roof membrane manufacturer for roofing system and warranty to be provided; use only fasteners furnished by roof membrane manufacturer.

1. Membrane securement strip to wood or masonry: Coated screws as recommended by the manufacturer, with minimum 1-inch penetration into substrate. Install screws with the manufacturer's approved screw guns.
2. Flashing to lumber: Galvanized 1-½" barbed roofing nails through 1-inch metal discs.
3. All fasteners that come into contact with pressure treated lumber shall be stainless steel.

2.5 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

B. Flashing Membrane: Self-curing, non-reinforced membrane composed of nonvulcanized EPDM rubber, complying with ASTM D 4811 Type II, and with the following properties:

1. Thickness: 0.055 inch (1.4 mm).
2. Color: Same as field membrane

C. Self-Adhesive Flashing Membrane: Semi-cured 60 mil EPDM membrane laminated to 35 mil (0.9 mm) EPDM tape adhesive.

D. Pre-Molded Pipe Flashings: EPDM, molded for quick adaptation to different sized pipes

E. Bonding Adhesives, sealants, and surface cleaners: As recommended by Membrane manufacturer.

F. Sheet Flashing: 60-mil-thick EPDM, partially cured or cured, per application.

G. Seaming Tape: Self-Adhesive Lap Splice Tape: 35 mil (0.9 mm) EPDM-based, formulated for compatibility with EPDM membrane and high-solids primer, minimum 6" wide. Provide manufacturer's recommended primer.

H. Mastic: One-part, low viscosity, self-wetting butyl mastic.

I. Membrane securement strip: Reinforced EPDM fastening strip, with 2-inch diameter metal plates.

J. Membrane Protection:

1. 60-mil EPDM membrane, laid loose
2. 1" expanded polystyrene insulation

3. ¾” plywood
4. Sandbag ballast

K. Miscellaneous Accessories: Provide manufacturers recommended lap sealant, water cutoff mastic, metal termination bars, roof walkway pads, yellow safety strips, metal battens, pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other manufacturer recommended and approved accessories.

PART 3 - EXECUTION

3.1 GENERAL

A. Install roofing, insulation, flashings, and accessories in accordance with roofing Manufacturer's published instructions and recommendations for the specified roofing system. Where Manufacturer provides no instructions or recommendations, follow good roofing practices and industry standards. Comply with federal, state, and local regulations.

B. Obtain all relevant instructions and maintain copies at the project site for duration of installation period.

C. Store materials according to manufacturer's instructions.

D. Until ready for use, keep materials in their original containers as labeled by the Manufacturer.

3.2 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Examine roof deck to determine that it is sufficiently rigid to support installers and their mechanical equipment and that deflection will not strain or rupture roof components or deform deck
2. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
3. Replace all existing wood blocking shown to remain with new if existing is found to be damaged or rotted and not sound to receive roofing materials.
4. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

B. Proceed with installation only after unsatisfactory conditions have been corrected

3.3 PREPARATION

A. Take appropriate measures to ensure that fumes from adhesive solvents are not drawn into the building through air intakes.

B. Surfaces to receive new materials shall be free of all dirt, debris, loose materials, and free from moisture in any form. Mechanically scrape exposed surface as necessary to remove projections.

C. Verify that surfaces to receive new materials have no defects or errors that would result in poor application or cause latent defects in workmanship.

D. Reset or replace existing fasteners for materials exposed but left in place that are loose, deformed, damaged, or corroded.

E. All new fasteners that are to be used with existing preservative treated wood blocking are to be stainless steel.

F. Covering deck gaps:

1. Gaps less than 2”: Install backer rod in joint and cover with 6” wide uncured flashing in compatible adhesive.
2. Gaps 2” or greater: Install 24-gauge sheet metal plate, fastened to one side of joint and covered with No 30 felt (back-mopped) to the deck (over the joint).

G. Torches will not be permitted on the roof.

3.4 VAPOR RETARDER

A. The surface to which vapor retarder is to be applied shall have a smooth finish and be free of voids, spalled areas, sharp protrusions, loose aggregate, and other surface imperfections.

B. Adhere to existing construction with minimum 3-inch (76.2 mm) edge laps and 6-inch end laps.

C. Install in straight lines, flat, free of wrinkles, and fishmouths.

D. Roll in with a 75 lb. (34 kg) roller to fully mate each roll to substrate, including all lap areas.

E. Take special precautions to hold in place until remainder of roof system is installed.

3.5 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components, so insulation is not exposed to precipitation or left exposed at end of workday.

B. Maximum moisture content of insulation at time of application shall be 4 percent of dry weight.

C. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.

D. Install tapered insulation under area of roofing to conform to existing slopes.

E. Insulation shall be laid loose.

F. Maximum ¼” joint width allowed. Fill gaps greater than 1/4 inch (6 mm) with acceptable insulation. Do not leave the roofing membrane unsupported over a space greater than 1/4 inch (6 mm).

G. Install 1 or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inchesor greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inchesin each direction.

3.6 EDPM INSTALLATION

A. Install EPDM sheet according to roofing system manufacturer's written instructions and as follows:

1. Adhered Sheet Installation: Apply bonding adhesive to substrate and underside of sheet and allow to partially dry. Do not apply bonding adhesive to splice area of sheet.

3.7 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates per membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas apply splicing cement and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings per roof system manufacturer's requirements.

F. Metal Accessories: Install metal edgings, gravel stops, and copings in locations indicated on the drawings, with horizontal leg of edge member over membrane and flashing over metal onto membrane.

1. Follow roofing manufacturer's instructions.
2. Remove protective plastic surface film immediately before installation.
3. Install water block sealant under the membrane anchorage leg.
4. Flash with manufacturer's recommended flashing sheet unless otherwise indicated.
5. Where a single application of flashing will not completely cover the metal flange, install additional piece of flashing to cover the metal edge.
6. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, install an additional piece of self-adhesive flashing membrane over the metal lap to the top of the gravel stop; apply seam edge treatment at the intersections of the two flashing sections.

G. Scuppers: Set in sealant and secure to structure; flash as recommended by manufacturer.

H. Roofing Expansion Joints: Install as shown on drawings and as recommended by roofing manufacturer.

I. Flashing at Walls, Curbs, and Other Vertical and Sloped Surfaces: Install weathertight flashing at all walls, curbs, parapets, curbs, skylights, and other vertical and sloped surfaces that the roofing membrane abuts to; extend flashing at least 8 inches (200 mm) high above membrane surface.

1. Use the longest practical flashing pieces.
2. Evaluate the substrate and overlay and adjust installation procedure in accordance with membrane manufacturer's recommendations.
3. Complete the splice between flashing and the main roof sheet with specified splice adhesive before adhering flashing to the vertical surface.
4. Provide termination directly to the vertical substrate as shown on roof drawings.

J. Roof Drains:

1. Taper insulation around drain to provide smooth transition from roof surface to drain. Use specified pre-manufactured tapered insulation with facer or suitable bonding surface to achieve slope; slope not to exceed manufacturer's recommendations.
2. Position membrane, then cut a hole for roof drain to allow 1/2 to 3/4 inch (12 to 19 mm) of membrane to extend inside clamping ring past drain bolts.
3. Make round holes in the membrane to align with clamping bolts; do not cut membrane back to bolt holes.
4. Apply sealant on top of drain bowl where clamping ring seats below the membrane
5. Install roof drain clamping ring and clamping bolts; tighten clamping bolts to achieve constant compression.

K. Flashing at Penetrations: Flash all penetrations passing through the membrane; make flashing seals directly to the penetration.

1. Pipes, Round Supports, and Similar Items: Flash with specified pre-molded pipe flashings wherever practical; otherwise use specified self-curing elastomeric flashing.
2. Pipe Clusters and Unusual Shaped Penetrations: Provide penetration pocket at least 2 inches (50 mm) deep, with at least 1-inch (25 mm) clearance from penetration, sloped to shed water.

3. Structural Steel Tubing: If corner radii are greater than 1/4 inch (6 mm) and the longest side of tube does not exceed 12 inches (305 mm), flash as for pipes; otherwise, provide a standard curb with flashing.
4. Flexible and Moving Penetrations: Provide weathertight gooseneck set in sealant and secured to deck, flashed as recommended by manufacturer

L. Walkway Installation

1. Install walkways at access points to the roof, around rooftop equipment that may require maintenance, and where indicated on the drawings.
   a. Use specified walkway pads unless otherwise indicated.
   b. Walkway Pads: Adhere to the roofing membrane, spacing each pad at minimum of 1″ (25 mm) and maximum of 3″ (75 mm) from each other to allow for drainage.
   c. If installation of walkway pads over field fabricated splices or within 6″ (150 mm) of a splice edge cannot be avoided, adhere another layer of flashing over the splice and extending beyond the walkway pad a minimum of 6″ (150 mm) on either side.
   d. Prime the membrane, remove the release paper on the pad, press in place, and walk on pad to ensure proper adhesion.

3.8 FIELD QUALITY CONTROL

A. Withdrawal tests of fasteners and nailers may be required if attachment is in question.

B. Samples of the flashing may be taken to determine the degree to which it has cured prior to installation.

C. A sample of the completed splice may be required if in question, at a location selected by the Architect/Engineer. Patching the test opening shall be by the Contractor using the standard splicing methods.

D. Field tests may be performed by Architect/Engineer to evaluate moisture content of installed materials.

E. Application of the roof system may be checked by Architect/Engineer.

F. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.

G. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

3.9 PROTECTION AND CLEANING

A. Protect roofing systems from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Clean all contaminants generated by roofing work from building and surrounding areas, including bitumen, adhesives, sealants, and coatings.

C. Repair or replace building components and finished surfaces damaged or defaced due to the work of this section; comply with recommendations of manufacturers of components and surfaces.

D. Remove all roofing materials from surfaces not specified to receive these materials such as walls, walkways, metal flashings, etc.

E. Remove leftover materials, trash, debris, equipment from project site and surrounding areas.

END OF SECTION 075323

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Technical Specifications Sections may apply to this Section even when not specifically referenced.

1.2 RELATED SECTIONS

1. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
2. Section 081416 – Wood Doors.
3. Division 08 Section "Door Hardware" for door hardware for hollow metal doors.
4. Division 09 Section "Painting" for field painting hollow metal frames.
5. Division 26 Sections for electrical connections including conduit and wiring for door controls and operators.

1.3 REQUIREMENTS INCLUDED

A. Section Includes:

1. Standard hollow metal door frames.
2. Fire-rated hollow metal door frames.
3. Exterior insulated hollow metal doors.
4. FEMA package doors and frames for tornado shelters.

1.4 WARRANTY REQUIREMENTS

A. Manufacturers standard warranty.

1.5 SUBMITTALS

A. Preparation of submittals and shop drawings shall be started immediately following the Contract Notice to Proceed to ensure early frame delivery. Shop drawing door and frame numbers shall be numbered the same as on the Drawings and Door Schedule.

B. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, temperature-rise ratings, and finishes.

C. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing

D. Door hardware supplier shall furnish templates, template reference number and/or physical hardware to the steel door and frame supplier to prepare the doors and frames to receive the finish hardware items.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

B. Manufacturer Certification: Manufacturer must be certified by Steel Door Institute (SDI).

C. Quality Standard: In addition to requirements specified, comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames"

D. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled per ASTM E152 "Standard Methods of Fire Tests of Door Assemblies" by a qualified testing agency, for fire-protection ratings indicated.

1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F. above ambient after 30 minutes of standard fire-test exposure.

E. Smoke-Control Door Assemblies: Comply with NFPA 105.

1. Smoke "S" Label: Doors to bear “S” label and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

F. FEMA package doors and frames assemblies for tornado-storm shelters.

1. Assemblies tested, certified, listed, and labeled by Intertek to meet the most recent version of ICC 500 – Standard for the Design and Construction of Storm Shelters.
2. Assemblies conforming to FEMA P-361.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.

1. Provide additional protection to prevent damage to the finish of factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions

C. Inspect hollow metal Work upon delivery for damage. Minor damage may be repaired, provided refinished items are equal in all respects to new Work and are acceptable to Architect; otherwise, remove damaged items and replace with new materials

D. Store hollow metalwork under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch space between each stacked door to permit air circulation

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.9 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available products from the listed Manufacturers that may be incorporated into the Work include the following, or other approved equal:

1. Basis of Design: Steelcraft; an Allegion company.
2. CECO Door Products; an Assa Abloy Group company, subject to conformance with requirements.
3. Curries Company; an Assa Abloy Group company, subject to conformance with requirements.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 metallic coating.

D. Frame Anchors: ASTM A 879/A 879M, 4Z (12G) coating designation; mill phosphatized.

E. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot dip galvanized according to ASTM A 153/A 153M, Class B.

F. Inserts, Bolts, and Fasteners: Hot dip galvanized according to ASTM A 153/A 153M.

G. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.

H. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.

I. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

J. Glazing: Comply with requirements in Division 08 Section "Glazing."

K. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.3 STANDARD HOLLOW METAL FRAMES

A. General: General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Design: Type and size indicated on Door Schedule.

C. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.

1. Fire Door Core: As required to provide fire-protection ratings indicated.

D. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 14.

1. Locations: Exterior doors and interior doors where indicated.

E. Vertical Edges for Single-Acting Doors:

1. Vertical edges to have the face sheets joined by a continuous weld extending the full height of the door. Welds are to be ground, filled, and dressed smooth. Beveled Edge, 1/8 inch in 2 inches (3 mm in 50 mm).

F. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gage, extending the full width of the door and welded to the face sheet.

1. All exterior doors or partial height interior doors where the top of the door is visible at eye height and which have an inverted top channel to include a steel closure top plate welded in place with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.

G. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

H. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch radius.

I. Exterior Doors: Face sheets fabricated from commercial quality hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60. Provide doors complying with the requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Constructed from a steel sheet of a minimum thickness of 14 gauge.
2. Level 4 and Physical Performance Level A (Maximum Duty), Model 1 (Full Flush).

J. Interior Doors: Face sheets fabricated from cold-rolled steel sheet. Provide doors complying with the requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Typical:
   a. Constructed from a steel sheet of a minimum thickness of 18 gauge.
   b. Level 2 and Physical Performance Level B (Heavy Duty), Model 1 (Full Flush).

K. High abuse locations (at locations as noted on Opening Schedule in Drawings):

1. Constructed from a steel sheet of a minimum thickness of 14 gauge.

L. Level 4 and Physical Performance Level A (Maximum Duty), Model 1 (Full Flush).

M. Hinge Reinforcement: Minimum 7 gage (3/16") plate 1-1/4" x 9" or minimum 14 gage continuous channel with pierced holes, drilled and tapped.

N. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets. Both door models in subparagraph below are available in 1-3/4-inch (44.5-mm) thickness and have 0.067-inch- (1.7-mm-) thick faces.

O. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.4 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Frames: ANSI A250.8; conceal fastenings unless otherwise indicated.

1. Steel Sheet for Interior Frames: 0.063-inch, 16-gauge minimum thickness.
2. Double rabbet frame face profile as indicated on Drawings, unless noted otherwise.
3. Fabricate frames with mitered or coped corners.

4. Frame Construction: Full profile welded.
5. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.
6. Frame Anchors: Not less than 0.042 inch (1.0 mm) thick.

C. Fire-rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

D. Door Silencers: Except on weather-stripped or gasketed doors provide three on strike jambs of single-door frames and two on heads of double-door frames.

E. Prepare frames to receive mortised and concealed hardware according to SDI A250.6 and BHMA A156.115.

1. Mortise, reinforce, drill, and tap frames at the factory for fully template mortised hardware only, per approved hardware schedule and templates provided by the hardware supplier.

F. Reinforce frames to receive surface-applied hardware.

G. Prime Finish: Manufacturer's standard, factory-applied coat of lead- and chromate-free primer complying with SDI A250.10 acceptance criteria.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
2. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.

B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate the bottom of frames at finish floor surface.

2.6 STOPS AND MOLDINGS

A. Provide removeable moldings on doors and frames on the secure side of the door or frame.

B. Moldings for Glazed Lites in Doors: Minimum 0.032-inch-thick, fabricated from same material as door face sheet in which they are installed.

C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.

D. Loose Stops for Glazed Lites in Frames: Minimum 0.032-inch-thick, fabricated from same material as frames in which they are installed

E. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

F. Prime Finish: Manufacturer's standard, factory-applied coat of lead- and chromate-free primer complying with SDI A250.10 acceptance criteria.

2.7 FRAME ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

2.8 FEMA PACKAGE DOORS AND FRAMES FOR TORNADO SHELTERS.

A. Basis of Design Product: Paladin Series door system, PW14 Paladin Series door with FP14 Paladin Series frame, by Steelcraft.

1. Subject to compliance with requirements and approval by Architect, other manufacturers may supply similar products provided they comply with all the performance requirements of this specification and submit evidence thereof.

B. Door system shall be specifically designed and tested to conform to the Federal Emergency Management Agency (FEMA) 320 and 361 guidelines and ANSI ICC500 standards providing security and safety for tornado shelters and severe storm areas of refuge.

C. Manufacturer shall provide independent laboratory testing results certifying conformance with these standards.

D. The Authority Having Jurisdiction shall be the final authority in issues related to the installation and use of these products.

E. Door:

1. Door construction shall meet the requirements of ANSI A250.8-2014 (SDI 100).
2. Hardware preparations and reinforcements are in accordance with ANSI A250.6-2003 (R2009). Locations are in accordance with ANSI/DHI A115.
3. Provide ICC500 / FEMA COMPLIANCE LABEL (Most recent version of standards.)
4. Material Gauge: 14 Gauge [0.067" (1.7 mm)] for Extra Heavy Commercial and Institutional applications with extremely high use.
5. Steel Stiffened core construction with stiffeners welded to one face sheet and attached with epoxy to the opposite face sheet
6. Full Height, Epoxy Filled Mechanical Interlock Edges at lock and hinge edges with edge seams welded, filled, and dressed smooth.
7. Full Height Lock Side Reinforcement Channel
8. 14 Gauge (0.067") Inverted Top and Bottom Channels with additional 12 Gauge (0.105") flush channel top cap
9. Beveled Hinge and Lock Edges
10. Factory Applied Baked-On Rust Inhibiting Primer paint in accordance with ANSI A250.10-2011

F. Frame:

1. Frames shall be designed and certified to meet requirements of the ICC500 code, FEMA 361/320 guidelines, and ANSI compliance to protect the general public from the extreme effects of tornados. (Most recent version of reference standards.)
2. Overall frame construction for frames shall meet the requirements of ANSI A250.8 (SDI 100). (Most recent version of reference standards.)
3. Hardware preparations and reinforcements shall be in accordance with ANSI A250.6 (Most recent version of reference standards.) Locations shall be in accordance with ANSI/DHI A115.
4. Frames shall include the ICC500 / FEMA 361/320 Label. (Most recent version of reference standards.)
5. Frames shall be 14 Gauge [0.067" (1.7 mm)].
6. Frames are to be factory mitered and welded. The miters shall be welded in accordance with ANSI A250.8 [SDI 100]. (Most recent version of reference standards.)
7. Adjustable base anchors allow for installation adjustment when the floor is not level.

8. Factory prepared for field installed silencers
9. Factory applied baked on rust inhibiting.

2.9 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble the units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/NAAMM-HMMA 861.

C. Hollow Metal Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape.
2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicted.
3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.

D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
   a. Welded frames shall be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening
2. Equal Rabbet Frames: Provide frames with equal rabbet dimensions unless glazing and removable stops require wider dimensions on glass side of frame.
3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
5. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
6. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor
7. Jamb Anchors: Provide number and spacing of anchors as follows:
   a. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      1) Three anchors per jamb up to 60 inches high.
      2) Four anchors per jamb from 60 to 90 inches high.
      3) Five anchors per jamb from 90 to 96 inches high.
      4) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
   b. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      1) Three anchors per jamb from 60 to 90 inches high.
      2) Four anchors per jamb from 90 to 120 inches high.

8. Door Silencers: Except on weather-stripped or gasketed doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
9. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
    a. Locate hardware as indicated, or if not indicated, according to ANSI/NAAMM-HMMA 861.
    b. Reinforce frames to receive non-template, mortised and surface mounted door hardware.
    c. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware
10. Steel Finish
    a. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
        1) Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:

1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

C. Drill and tap frames to receive non-templated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    a. Where frames are fabricated in sections because of shipping or handling at fire-protection-rated openings, install frames according to NFPA 80 limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    b. Install door silencers in frames before grouting.
    c. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    d. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with Portland cement grout.
4. Concrete Walls: Solidly fill space between frames and concrete with Portland cement grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
5. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
    a. Squareness: Plus, or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus, or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
6. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
    a. Non-Fire-Rated Standard Steel Doors:
        1) Jambs and Head: 1/8 inch plus or minus 1/16 inch.
        2) Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
        3) Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
        4) Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
    b. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
    c. Smoke-Control Doors: Install doors according to NFPA 105
7. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
    a. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace

defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Install hollow metal frames to comply with SDI A250.11.

E. Install doors to provide clearances between doors and frames as indicated in SDI A250.11.

END OF SECTION

SECTION 083300 - TORNADO AND HURRICANE RESISTANT FIRE RATED OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Technical Specifications Sections may apply to this Section even when not specifically referenced.

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrication

B. Section 06 10 00 - Rough Carpentry

C. Section 07 84 00 “Firestopping:” Firestops between work of this section and other fire resistive assemblies.

D. Section 08 31 00 - Access Panels & Doors

E. Section 09 91 00 - Painting

F. Division 26 - Electrical

1.3 REQUIREMENTS INCLUDED

Provide all materials, labor, equipment and services necessary to furnish, deliver and install all work for rolling steel storm shelter doors under this section as shown on the contract documents, specified herein, and as specified by the job conditions.

1.4 REFERENCE STANDARDS

A. ANSI/DASMA 108 - American National Standards Institute Standard Method For Testing Sectional Garage Doors and Rolling Doors: Determination Of Structural Performance Under Uniform Static Air Pressure Difference.

B. NFRC 102 - Test Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems.

C. ASTM A-653/A-653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

D. ASTM A-36 – Standard Specification for Carbon Structural Steel, Hot Rolled Steel.

E. ASTM A-123 – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

F. ASTM A-312 – Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.

G. ASTM A-240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

H. ASTM A 276 – Standard Specification for Stainless Steel Bars and Shapes.

I. ASTM B 209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

J. ASTM B 221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

K. ASTM D 4549 – Standard Specification for Polystyrene and Rubber-Modified Polystyrene Molding and Extruding Materials (PS).

L. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

M. NEMA MG 1 - Motors and Generators.

N. NIJ Standard 0108.01 - Ballistic Resistant Protective Materials

O. National Fire Protection Association (NFPA):

1. NFPA 80: Standard for Fire Doors and Windows.
2. NFPA 251: Standard of Methods of Fire Tests of Building Construction & Materials
3. NFPA 252 - Fire Tests of Fire Door Assemblies.

P. Underwriters Laboratories, Inc. (UL):

1. UL 10 B - Fire Tests of Fire Door Assemblies.
2. UL 263: Fire tests of Building Construction and Materials

1.5 SUBMITTALS

A. Procedures: Furnish submittals in accordance with the general requirements specified.

B. Shop Drawing: Furnish shop drawings for architect's approval. Include elevations, sections, and details indicating dimensions, materials, finishes, conditions for anchorage and support of each door.

C. Listings and Certifications:

1. Submit manufacturer’s Underwriters Laboratories or Intertek laboratory listing report verifying product compliance in accordance with the required fire and smoke ratings.
2. Submit manufacturer’s Code Compliance Research Report published by an IAS accredited nationally recognized independent agency confirming compliance of the fire door assembly in accordance with the International Building Code.
3. Listed, labeled and certified by Underwriters Laboratories or Intertek testing laboratory for product compliance with FEMA P-361 Safe Rooms for Tornadoes and Hurricanes.
4. Listed, labeled and certified by Underwriters Laboratories or Intertek testing laboratory to ICC 500-2020 Standard for Design and Construction of Storm Shelters.
5. Listed, labeled and certified by Underwriters Laboratories or Intertek testing laboratory for a wind pressure rating of +/-252 psf for tornado shelters and +/-201 psf for hurricane shelters in accordance with ICC 500-2020.
6. Listed, labeled and certified by Underwriters Laboratories or Intertek testing laboratory for missile impact rating of 15 lbs. at 100 mph in accordance with the requirements of ICC 500-2020.
7. Provide assemblies that have been tested, certified and labeled for a minimum 3-hour fire rating.

D. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Details of construction and fabrication.
4. Installation instructions.
5. Warranty.

E. Maintenance and Operating Manuals: Furnish complete manuals describing the materials, devices and procedures to be followed in operating and maintaining all doors under this section. Include manufacturer's brochures and parts lists describing the actual materials used in the product.

F. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

G. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) long, representing actual product, color, and patterns.

1.6 DESIGN / PERFORMANCE REQUIREMENTS

A. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

1.7 QUALITY ASSURANCE

A. Fire & Smoke Rated Assemblies: Provide all doors with fire and smoke resistance rating required to comply with governing regulations which are inspected, tested, listed and labeled by UL or Intertek complying with NFPA 80 for class of opening. Provide units tested in accordance with the requirements of UL 10 B, UL 1784, NFPA 252, ASTM E-152. Provide testing laboratory label permanently fastened to each fire and smoke door assembly.

B. Regulatory Requirements:

1. Comply with applicable FEMA requirements as well as laws, codes, ordinances and regulations of federal, state and municipal authorities having jurisdiction.
2. Listed under a certified Code Compliance Research Report in accordance with the applicable sections of the International Building Code.

C. Manufacturer Requirements: Door manufacturer shall have been in the business of and have experience in manufacturing the type of product covered under this specification section as well as giving credible service for a minimum of five (5) years. Provide a list of at least ten (10) completed projects which include the products covered under this section.

D. Operational Cycle Life: Tornado and hurricane resistant coiling doors shall be designed and constructed for a minimum 10,000 operating cycles for the life of the door assembly. Cycles shall be verifiable by a non-resettable cycle counter located within the door’s motor operator control panel.

E. Manufacturer Qualifications: Company specializing in performing Work of this section with a minimum of five years’ experience in the fabrication and installation of security closures.

F. Installer Qualifications: Installer Qualifications: Company specializing in performing Work of this section with minimum three years and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store materials in a protected dry location off the ground.

C. Protect materials from exposure to moisture and sunlight.

D. Store materials in a warm, ventilated, weather-tight location.

E. Conform to manufacturer's written instructions for storage, delivery, and handling.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 COORDINATION

A. Coordinate Work with other operations and installation of adjacent materials to avoid damage to installed materials.

1.11 WARRANTY REQUIREMENTS

A. Manufacturer's Warranty: Manufacturer's Provide a Two (2) Year, 10,000 Cycle Warranty, except the counterbalance spring and finish, to be free from defects in materials and workmanship for 2 years.

B. Powdercoat Warranty: Finish warranty for 3 years.

PART 2 - PRODUCTS

2.1 TORNADO AND HURRICANE RESISTANT FIRE RATED COILING DOORS

A. Manufacturer/Model - Basis of Design: Tornado and hurricane resistant coiling doors model SafeSpace™ SS500F-PC as manufactured by McKEON. Assembly shall be approved for use in FEMA P-361 safe rooms and ICC 500-2020 storm shelters and provided with a 3-hour fire rating.

1. McKEON, 44 Sawgrass Drive, Bellport, NY 11713, USA, Toll Free: (800) 266-9392, Email: info@mckeondoor.com

B. Subject to meeting performance criteria defined in this Section and within the Contract Documents, equivalent products may be substituted with Approval by Architect, in accordance with provisions of Section 016000 - Product Requirements from the manufacturers below:

1. Overhead Door (tm) Brand, which is located at: 2501 S. State Hwy. 121 Suite 200; Lewisville, TX 75067; Toll Free Tel: 800-275-3290; Tel: 469-549-7100; Fax: 972-906-1499; Email: request info (info@overheaddoor.com); Web: https://www.overheaddoor.com
2. Manufacturer: Alpine Overhead Doors, Inc.; 8 Hulse Road Suite 1S, East Setauket, NY 11733. Telephone 800-257-4634 or 631-473-9300. Fax 631-642-0800.

2.2 MATERIALS

A. Curtain: Shall be assembled of G90 galvanized steel interlocking slats. Curtain shall be formed of slat profile sections of gauge as required to sustain the minimum required design wind pressure.

1. Slat cross section shall not be less than 3" wide by 1-1/2" deep.
2. Galvanized steel, Structural Quality Grade D, as per ASTM A-653/ A-653 M.
3. Finish: Powder Coated.

B. Bottom Bar: Shall consist of a double 2" x 3" structural steel angle assembly formed to fit and engage the curtain assembly.

1. Galvanized Steel as per ASTM A-653/ A-653 M.
2. Finish: Powder Coated.

C. Guides: Each guide assembly shall be fabricated of ASTM A-36 Carbon Structural Steel support angles no greater than 4" x 4" and guide retaining angles of a minimum 6" depth to retain curtain in the guides under the design wind pressure and impact forces specified.

1. Provide internally concealed UL Classified smoke seals located within each guide assembly. Externally mounted smoke seals shall not be acceptable.

D. Mounting Brackets: Fabricated of hot rolled 3/16” minimum steel plates, brackets shall be provided to house ends of the counterbalance barrel assembly.

1. Finish: Powder Coated.

E. Hood: Shall be provided to entirely enclose coiled curtain and counterbalance barrel assembly. Hood shall be fabricated 22-gauge G90 galvanized steel, designed and formed to match brackets. Top and bottom shall be bent and reinforced to provide for proper stiffness.

1. Provide internally concealed UL Classified smoke seals located within the hood assembly. Externally lintel mounted smoke seals shall not be acceptable.
2. Galvanized Steel as per ASTM A-653/ A-653 M.
3. Finish: Powder Coated.

F. Counterbalance Assembly: Coiling door shall be counterbalanced by means of adjustable steel helical torsion springs attached to shaft enclosed in pipe with required mounting blocks or rings for attachment of curtain. Grease sealed bearings or self-lubricating graphite bearings shall be attached to the spring barrel which shall be fabricated of hot formed structural quality carbon steel seamless pipe.

1. ASTM A-36 Carbon Structural Steel.
2. Galvanized Steel as per ASTM A-653/ A-653 M.

G. Electric Motor Operator: Door shall be provided with a compact power unit designed and laboratory listed by the door manufacturer. Operator shall be equipped with an adjustable screw-type limit switch to break the circuit at termination of travel. High efficiency planetary gearing running in an oil bath, shall be furnished together with a centrifugal governor, magnetic operated brake and a fail-safe magnetic release device, completely housed to protect against damage, dust and moisture. An efficient overload protection device, which will break the power circuit and protect against damage to the motor windings shall be integral with the unit. Operator is to be housed in a NEMA type 1 enclosure.

1. Motor: Shall be intermediate duty, thermally protected, ball bearing type with a class A or better insulation. Horsepower of motor is to be 1/2hp minimum or of manufacturer's recommended size, whichever is greater.
2. Starter: Shall be size "0" magnetic reversing starter, across the line type with mechanical and electrical interlocks, with 10-amp continuous rating and 24 volt control circuit.
3. Reducer: Planetary gear type, 80% efficiency minimum.
4. Cycle Counter: Non-resettable operational cycle counter.
5. Enclosure Material: Steel
6. Enclosure/Housing Finish: Powder Coated.

H. Control Stations: Each fire rated tornado and hurricane storm door shall be provided with flush mount three position push button control station marked open, close and stop that is active during normal conditions and as long as there is no main power failure to the motor operator.

1. Device Housing Material: Steel
2. Housing Finish: Powder Coated.

I. Master Control Station: Provide a single master control station that can simultaneously activate all of the fire rated tornado and hurricane storm doors in the facility to the emergency closed or open positions. The master control station shall remain operable as long as there is no main power failure to the door’s motor operators.

1. Device Housing Material: Steel
2. Housing Finish: Powder Coated.

J. FS Self-Closing Mechanism: The fire rated tornado and hurricane storm door with automatic release mechanism shall be activated by a fusible link, fire alarm, emergency alarm or power

failure. When activated the door shall be released and begin to self-close under gravitational force. The speed of the door shall be governed by a centrifugal governor at a rate of not greater than 9" per second or less than 6" per second.

K. Magnetic Release with 10 Second Time Delay: A fail-safe magnetic release device shall be built into the operator as an integral part of the release mechanism. When power is interrupted to the release mechanism by the facility's smoke detection or fire alarm system, the door shall begin to self-close. In the event of power failure, the time delay shall prevent the fire door from closing for a period of 10 seconds. Once the 10 seconds have lapsed, the fire door shall self-close.

L. Emergency and Fire Alarm Activation: Upon activation by the facility's alarm system the fire rated hurricane and tornado storm door shall immediately self-close to the fully closed position. Once the emergency or fire alarm condition has been cleared and main power has been restored, the door shall automatically power itself back to the fully open position.

M. Emergency Manual Operation: In the event of power failure, a time delay shall prevent the door assembly from closing for a period of 10 seconds. Once the 10 seconds have lapsed, the door assembly shall immediately self-close. The door assembly shall be equipped with an emergency hand chain that shall be operable during main power failure lasting up to six hours, as long as there is no alarm condition present. After the six hours have lapsed, the door shall automatically self-close and remain in the closed position until the main power has been restored. Upon activation of the facility's emergency alarm system the door assembly shall immediately self-close to the fully closed position and the emergency hand chain shall become inoperable. Once the emergency alarm condition has been cleared and main power has been restored, the door shall automatically power itself back to the fully open position and the emergency hand chain will now become operable.

N. Obstruction Sensing Safety Edge: The obstruction sensing safety edge shall be programable to either stop or reverse upon coming in contact with an obstruction during the close cycle of the door. During normal operation the obstruction sensing safety edge shall remain active and operable as long as there is no main power failure to the motor operator. During an alarm condition, the obstruction sensing safety edge shall reverse a maximum of three times and then comes to contact on the obstruction until the obstruction has been removed and the door returns to the fully closed position. During main power failure, if the obstruction sensing safety edge comes in contact with an obstruction during the self-closing mode, the door shall stop and remain in contact with the obstruction until it is removed and the door can continue to the fully closed position.

O. True Test Panel: Fire rated tornado and hurricane storm doors shall be provided with a True Test panel. The test panel shall be designed so that it simulates an actual emergency alarm condition and activates all of the doors to self-close to the fully closed position. Once all of the doors have satisfactorily closed and the test panel has been reset, all of the doors shall automatically power themselves back to the fully open and alarm ready reset condition. Only one test panel shall be required to test all the fire rated tornado and hurricane storm doors on this project simultaneously.

P. Powdercoat Finish: Meeting or exceeding the performance requirements of Tiger Drylac Serious 09 or 89.

1. After completion of fabrication, clean all metal surfaces to remove dirt and chemically treat to provide for powder coat adhesion. Provide powder coat finish of color as selected by architect from manufacturer's standard RAL powder coat selection chart.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and field conditions to which this work is to be performed and notify the architect if conditions of surfaces exist which are detrimental to proper installation and timely completion of work.

B. Verify all dimensions taken at job site affecting the work. Notify the architect in any instance where dimensions vary.

C. Coordinate and schedule work under this section with the work of other sections so as not to delay job progress.

3.2 INSTALLATION

A. Perform installation using only factory approved and certified representatives of the door manufacturer.

B. Install door assemblies at locations shown in perfect alignment and elevation, plumb, level, straight and true.

C. Adjust door installation to provide uniform clearances and smooth non-binding operation.

D. Install wiring in accordance with applicable local codes and the National Electrical Code Standard. Materials shall be UL listed.

E. Test door closing sequence when activated by the building's fire alarm system. Reset door after successful test.

3.3 PROTECTION AND CLEANING

A. Protect installed work using adequate and suitable means during and after installation until accepted by owner.

B. Remove, repair or replace materials which have been damaged in any way.

C. Clean surfaces of grime and dirt using acceptable and recommended means and methods.

D. Use cleaning products only on the surfaces recommended by the Manufacturer or Supplier which will not damage surfaces.

END OF SECTION

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SECTION 085213 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Extruded exterior and interior aluminum entrances and windows, including tubular aluminum sections thermally broken, shop fabricated, factory prefinished, related flashings, extruded break and panning metal, prefinished metal sills, anchorage and attachment devices, and hardware.

B. Related Work

1. Section 072726 “Fluid-Applied Membrane Air Barriers”.
2. Section 079100 "Joint Sealants" for field-applied sealants.
3. Section 087100 “Door Hardware” for hardware and its installation at door.
4. Section 088000 “Glazing” for insulated glazing to be installed into aluminum framing and entrance doors.

1.3 REFERENCES

A. ANSI/ASHRAE/IES Standard 90.1-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings (I-P Edition).

1.4 SUBMITTALS

A. Product Data: Provide component specifications and characteristics, describe components within assembly, finish information, anchorage and fasteners, glass and glazing, door hardware reinforcing, and internal drainage details.
   1. Material Ingredient Reporting:
      a. Include documentation for material reporting that has a complete list of chemical ingredients to at least 100 ppm (0.01%) that covers 100% of the product.
      b. Red List Free DECLARE label.
      c. Provide documentation that aluminum has a minimum of 50% mixed pre- and post-consumer recycled content.

B. Shop Drawings:

1. Indicate location of each opening type, component dimensions and field verified openings.
2. Elevations of each unit drawn at a minimum ½” scale. Indicate frame joinery.
3. Full size sections of each member.
4. Anchorage fastener type and location, straps/plates and reinforcing steel as required by structural calculations.
5. Elevations of each door type drawn at a minimum ½” scale. Indicate frame joinery.
6. Glass and glazing.

7. Perimeter sealants.

C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.

D. Samples for Verification: For aluminum-framed storefront system and components required.

E. Test reports: The Contractor shall submit test reports on each entrance type. Each report shall be complete, prepared by an independent testing laboratory certified by AAMA, and shall indicate that each entrance type has been tested in accordance with these Specifications and performance criteria established in Part 1 of this Section.

F. Submit manufacturer's installation instructions.

G. Manuals: Submit manufacturer's operating and maintenance manuals for entrance hardware per requirements of Division 1.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Capable of assuming engineering responsibility and performing Work of this Section and who is acceptable to manufacturer.

1. Engineering Responsibility: Preparation of data for aluminum-framed systems including Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project and submission of reports of tests performed on manufacturer's standard assemblies. Calculations and structural designs shall be completed and signed by a licensed engineer in the State of Minnesota.
2. Source Limitations: Obtain aluminum-framed storefront system through one source from a single manufacturer.
3. Installer's Certification: The Installation Subcontractor shall be a firm with a minimum of five years' experience specializing in the proper installation of the specified aluminum entrance assemblies.
4. Manufacturer's Certification: Manufacturer s shall submit written confirmation that the Installation Subcontractors have been approved by then to install their products.

B. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Dimensions, arrangements, alignment, and profiles of components and assemblies indicate aesthetic effects as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including pre-construction testing, field-testing, and in-service performance.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

C. Accessible Entrances: Comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1.6 DELIVERY, STORAGE, AND HANDLING

1.7 Make no deliveries to the Project until ready to install or until approved storage is provided. Where this provision is neglected and materials are delivered to the Project site prior to the Project being ready for installation, such materials shall be properly stored elsewhere at the expense of the Contractor with adequate insurance coverage provided for the off-site storage.

A. Deliver materials in original, un-opened containers with labels intact and legible

B. Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of aluminum-framed storefront openings by field measurements before fabrication and indicate field measurements on Shop Drawings

B. Environmental Requirements: Do not install sealants when ambient temperature is less than 40 degrees F during and 48 hours after installation.

1.9 WARRANTY

A. Total Storefront Installation

1. The Installation Contractor shall assume full responsibility and warrant for one year the satisfactory performance of the total storefront installation. This includes the glass (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc., as it relates to air, water and structural adequacy as called for in the specifications and approved shop drawings.
2. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor at their expense during the warranty period.

B. Window Material and Workmanship

1. Provide written guarantee against defects in material and workmanship for 2 years the date of substantial completion.

C. Glass

1. Provide written warranty for insulated glass units that they will be free from obstruction of vision as a result of dust or film formation on the internal glass surfaces caused by failure of the hermetic seal due to defects in material and workmanship.
2. Warranty period shall be for 10 (ten) years the date of substantial completion.

D. Finish

1. Warranty period shall be for 3 years from the date of substantial completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance:

1. Product to comply with the specified performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction, as determined by testing of aluminum storefront systems representing those indicated for this project.
2. Aluminum storefront systems shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
3. Failure includes any of these events:
   a. Thermal stresses transferring to building structure
   b. Glass breakage
   c. Loosening or weakening of fasteners, attachments, and other components
   d. Failure of operating units

B. Structural Performance: Design, engineer, fabricate, and install aluminum-framed storefronts to withstand structural loads indicated.
   1. Delegated Design:
      a. Design aluminum storefront systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated, based on 2020 MN State Building Code.
      b. Limit deflection of framing members normal to wall plane to 1/175 of clear span or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19 mm), whichever is less, when subjected to loads specified in 2018 International Building Code.
      c. Limit deflection of framing members parallel to glazing plane to L/360 of clear span or 1/8 inch (3.2 mm), whichever is smaller, when subjected to loads specified in 2018 International Building Code.
      d. Project Wind Loads (Service Level Loads in accordance with ASCE 7-10). The system shall be designed to withstand the following loads normal to the plane of the wall:
         1) Positive pressure of 22 psf at non-corner zones.
         2) Negative pressure of 24 psf at non-corner zones.
         3) Negative pressure of 28 psf at corner zones.

C. Structural Testing: Systems tested according to ASTM E 330 at 150 percent of inward and outward wind-load design pressures do not evidence of material failures, structural distress, deflection failures, or permanent deformation of main framing members exceeding 0.2 percent of clear span.

D. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air Leakage rate shall not exceed 0.06 cfm/ft2 (0.3 l/s · m2) at a static air pressure differential of 6.2 psf (300 Pa) with interior seal, or, rate shall not exceed 0.06 cfm/ft2 (0.3 l/s · m2) at a static air pressure differential of 1.6 psf (75 Pa) without interior seal. CSA A440 Fixed Rating.

E. Water Penetration: Systems do not evidence water leakage when tested according to ASTM E 331 at minimum static air pressure differential of 10 psf (479 Pa) as defined in AAMA 501.

   1. Maximum Water Leakage: Per AAMA 501.1. Water controlled by flashing and gutters that is drained to exterior and cannot damage adjacent materials or finishes is not considered water leakage.

F. Thermal Transmittance (U-factor): Thermal transmittance test results are based upon 1" (25.4 mm) clear high-performance insulating glass 1/4" (e=0.035, #2), 1/2" warm edge spacer and argon fill gas, 1/4".
   1. When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than listed here: (*Yet to be determined*.)
   2. Trifab® Versaglaze® 601 Framing System, Front Plane (0.28 COG) .52 or project specific (____) Btu/hr/ft2/°F per AAMA 507 or (____) Btu/hr/ft2/°F per NFRC 100.
   3. Trifab® Versaglaze® 601T Framing System, Front Plane (0.28 COG) .41 or project specific (____) Btu/hr/ft2/°F per AAMA 507 or (____) Btu/hr/ft2/°F per NFRC 100.
   4. Trifab® Versaglaze® 601UT Framing System, Front Plane (0.28 COG) .38 or project specific (____) Btu/hr/ft2/°F per AAMA 507 or (____) Btu/hr/ft2/°F per NFRC 100.

G. Condensation Resistance:
   1. Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than Front Plane-77 frame and 71-glass (low-e), when tested per AAMA 1503.
   2. If using CI: When tested to CSA A-440, the CI shall not be less than listed here: Trifab® Versaglaze® 601UT Framing System, Front Plane 68frame and 65glass (low-e).

H. Sound Transmission Class (STC) and Outdoor-Indoor Transmission Class (OITC):
   1. Sound transmission loss test results in accordance with AAMA 1801 are based upon 1" (25.4 mm) clear double laminated insulating glass with PVB interlayer (1/8", 0.030", 1/8", 1/2" AS, 1/8", 0.030", 1/8"). Ratings shall not be less than listed here:
      a. Trifab® VersaGlaze® 601/601T/601UT Framing System, Front Plane laminated glass STC 36 and OITC 30.
      b. Trifab® VersaGlaze® 601/601T/601UTFraming System, Front Plane non-laminated glass STC 31 and OITC 25.

I. Performance Requirements - Swing Doors:
   1. Test structural resistance to corner racking by the Dual Moment Load Test as follows:
   2. Test section: Standard top door corner assembly. 24-inch-long side rail section, 12-inch-long top rail section.
   3. Anchor top rail positively to test bench so that corner protrudes 3 inches beyond bench edge.
   4. Anchor a lever arm positively to side rail at a point 19 inches from inside edge of top rail. Attach weight support pad at a point 19 inches from inner edge of side rail.
   5. Withstand a load of 245 pounds on the lever arm before reaching the point of failure, which shall be considered a rotation of the lever arm in excess of 45 degrees.
   6. Air infiltration: Test doors per ASTM E283 at the following pressure differentials:
      a. 6.24 PSF for single doors: Results for single 3'-0" by 7'-0" entrance door and frame: Do not exceed 0.50 CFM per linear foot of perimeter crack.
      b. 1.567 PSF for pairs of doors: Results for pair of 6'-0" by 7'-0" entrance doors and frame: Do not exceed 1.0 CFM per linear foot of perimeter crack.

2.2 ALUMINUM-FRAMED STOREFRONTS

A. Manufacturers:
   1. Storefront System Basis-of-Design Product: Shall be Trifab 601UT Framing Thermal Flush-Glazed Screw Spline Storefront for thermally glazed aluminum storefronts and entrances based on 2” x 6” framing by Kawneer Company, Inc.
   2. Subject to compliance with requirements, provide named product or comparable product by one of the following:
      a. Oldcastle Building Envelope.
      b. Tubelite
      c. US Aluminum Commercial Products Group.
   3. Single Source Responsibility: Provide aluminum entrance system and doors produced by a single manufacturer of the units identical to those specified.

B. Materials:
   1. Extruded Aluminum prime billet: ASTM B221; 6063T6 alloy, T5 temper.
   2. Sheet Aluminum: 5005 H34 (anodic) ASTM B209
   3. Steel Sections: ASTM A36; hot dipped galvanized in accordance with ASMT A123, shaped to suit mullion sections.
   4. Perimeter Anchors: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
   5. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-

coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

6. Sills: Extruded aluminum; sloped for positive wash; fit under sash leg 1/2 inch beyond wall face; one-piece full width of opening jamb angles to terminate sill end.

7. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim hardware, anchors, and other components.

8. Shop and Touch-Up Primer for Steel Components: SSPC 15, Type 1, red oxide.

9. Glazing Gaskets: Elastomeric or neoprene.

10. Glazing: as specified in Section 088000 “Glazing”.

C. Manufactured Units:

1. Framing: Split vertical in screw-spline system designed to allow frame to be installed from unitized assemblies. Include positive barrier weathering at single acting entrance frames. Incorporate thermal barrier at framing members that eliminates direct contact between interior and exterior aluminum sections.

   a. Drive screws through back of vertical framing members into splines in horizontal framing members.
   b. Snap together individual units to form a complete frame.
   c. Provide for flush glazing on all sides with no projecting stops.
   d. Elastomeric extrusion glazing gaskets.

2. Frames:

   a. Factory prefinished extruded aluminum, minimum 0.125 inch frame wall thickness
   b. Nominal dimensions of 2 inches vertical and horizontal framing members and 4 1/2 inches overall depth
   c. Thermally broken with interior tubular sections insulated from exterior EXCEPT for the jambs of the doors
   d. Hinge jamb shall be reinforced a hot dipped galvanized 1-1/4” by 1-1/4” x 3/16” steel angle which runs continuously full height of the jamb and is mechanically fastened to the jamb. Hinges shall be anchored directly into steel reinforcing.
   e. Intermediate jamb frames shall be screwed to floor mounted, hot-dipped galvanized steel support angles concealed within the frame.
   f. Frames shall be shop mortised and reinforced per hardware manufacturer’s templates for specified hardware items. Reinforcing shall be hot-dipped galvanized 3/16” thick steel.
   g. Flush glazing stops, elastomeric or neoprene extrusion glazing gaskets, drainage holes, internal weep drainage system
   h. Weather-stripping shall be polypropylene pile inserted into extruded races in the door stops. Weather-stripping for exterior doors shall be continuous at head and jambs, Door bottoms shall be weather–stripped.
   i. Capable of accepting 1-inch-thick insulating glass.

3. Thermal Barrier: Thermal Break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.

4. Doors: Basis of Design: Kawneer, Wide Stile 500 Heavy Wall Entrances.
   a. 2″ (50.8mm) depth thick glazed doors with a 6-1/2″ (165.1mm) bottom rail and 5″ (127mm) vertical stile thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated

and fillet welded or that incorporate concealed tie rods. Provide snap-on, extruded-aluminum glazing stops and preformed gaskets.

b. Accessible Doors: Smooth surfaced for width of door in area within 10 inches (255 mm) above floor or ground plane.
c. Interior Doors: Provide BHMA A156.16 silencers, three on strike jamb of single-door frames and two on head of double-door frames.
d. Exterior Doors: Provide compression weather stripping at fixed stops. At other locations, provide sliding weather stripping retained in adjustable strip mortised into door edge.
e. Hardware: Provide hardware, except as noted otherwise, and hardware templates for aluminum entrance doors and frames, under Section 087100, and install under this Section.

5. Break metal, sills, and flashings: Factory prefinished extruded aluminum, minimum 0.125 inches thick, and finish to match mullion sections where exposed.

6. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30 mil (0.762 mm) thickness per coat.

7. Glazing: Comply with Section 088000 "Glazing."

8. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

9. Fasteners and Accessories: Compatible with adjacent materials, corrosion resistant, nonstaining, and nonbleeding. Use concealed fasteners except for application of door hardware.

D. Accessories:

1. Sealant Materials:

a. Frame perimeter sealant and backing materials: As specified in Section 079200.
b. Window and frame system sealant: Manufacturer’s recommended types to suit application.

2. Shims: PVC horseshoe shims in non-load bearing conditions and Korolath multipolymer plastic bearing shims per structural calculations.

3. Insulation: Batt insulation for shim spaces as specified in Section 072100.

4. Frame Anchors: Anchors, heavy duty sleeve to expansion style, vibration resistant and removable, used to secure frame to concrete or masonry shall be stainless steel. Type, size and spacing shall be per Project’s structural requirements.

E. Fabrication:

1. Fabricate framing in profiles indicated for flush glazing (without projecting stops). Provide subframes and reinforcing of types indicated or, if not indicated, as required for a complete system. Factory-assemble components to greatest extent possible. Disassemble components only as necessary for shipment and installation.

a. Door Framing: Reinforce to support imposed loads. Factory-assemble door and frame units and factory-install hardware to greatest extent possible. Reinforce door and frame units for hardware indicated. Cut, drill, and tap for factory-installed hardware before finishing components.

F. Aluminum Finish Schedule:

1. Alum-1: High-performance organic; two-coat fluoropolymer system complying with AAMA 2604, with finish coats containing at least 70 percent PVDF resin by weight; color as selected by Architect from manufacturer's full range of standard colors.
2. Alum-2: Provide exposed surfaces of aluminum storefront and entrance door, components and trim with anodized finish. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes:
    a. Provide anodic coating continuous, fully sealed, and free from powdery surfaces.
    b. AAMA 611
    c. Coating Thickness: Minimum of 0.7 mils when tested per ASTM B244. Architectural Class I.
    d. Anodic Coating: *(Anodized: Select from Kawneer's anodized finishes. by Owner/Architect)*
        1) Clear, AA-M10C22A41.
        2) Colored, AA-M12C22A44.
            a) Full Range of Standard Colors Available from Owner

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight aluminum-framed storefront installation.

1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
2. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Do not leave openings uncovered at end of working day, during wind-driven precipitation, or during excessively cold weather.

B. Perform other operations as necessary to prepare openings for proper installation and operation of units.

3.3 INSTALLATION

A. Install aluminum entrance and framing systems, glass and glazing, and hardware per manufacturer's written instructions and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specification Manual.

B. Isolate metal surfaces in contact with incompatible materials, including wood, by painting contact surfaces with bituminous coating or primer or by applying sealant or tape recommended by manufacturer.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

D. Coordinate first paragraph below with manufacturers' written recommendations

E. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.

F. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

G. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

H. Install framing components true in alignment with established lines and grades to the following tolerances:

1. Variation from Plane: Limit to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
2. Alignment: For surfaces abutting in line, limit offset to 1/16 inch (1.5 mm). For surfaces meeting at corners, limit offset to 1/32 inch (0.8 mm).
3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).
4. Maximum misalignment of 2 adjoining members abutting in plane: 1/32 inch.

I. Install doors without warp or rack. Adjust doors and hardware to provide tight fit at contact points and smooth operation.

3.4 FIELD QUALITY CONTROL

A. Field Tests: Architect shall select storefront units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present.

1. Testing: Owner will engage an AAMA certified testing agency laboratory to field test the completed trial installation for compliance with specified performance criteria for air infiltration and water resistance. Testing of the trial installation shall be by AAMA and ASTM test standards and per additional requirements, definitions and criteria listed in field quality control testing.

2. Testing Standard per AAMA 503, including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 Water Infiltration Test.

   a. Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft^2, whichever is greater.
   b. Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 6.2 psf (300 Pa).

3. Testing will occur prior to interior finish Work including interior perimeter sealant joints to allow visual access to areas being tested to check for water leakage.

4. The Contractor shall assist with the trial installation and testing procedures and otherwise cooperate with the Architect, and Owner’s Testing Agency to facilitate

testing. This includes providing all necessary scaffolding, lifts, enclosures, temporary heat and other equipment and utilities, including 220V single phase power source for blowers, to facilitate scheduled trial installation and testing.

5. If failures develop under testing, the Contractor shall identify reasons for failure and the failures shall be repaired and retested until the installation is completely free of defects. All retests shall be by the Owner's testing agency.

    a. All re-testing and associated costs shall be the responsibility of the Contractor and deducted from the Contract Sum by Change Order

3.5 ADJUSTING, CLEANING AND PROTECTION

A. Adjust operating hardware for smooth operation per hardware manufacturers' written instructions

1. For doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from latch measured to leading door edge.

2. Lubricate hardware and moving parts.

B. Cleaning

1. Clean aluminum surfaces promptly with a solution of mild detergent in warm water, apply with soft, clean wiping cloths. Remove dirt from corners. Wipe surfaces clean. Exercise care to avoid damage to protection coatings and finishes

2. Remove excess glazing and sealant compounds, dirt, joint sealant, and other substances. Clean glass promptly after installation of windows. Remove strippable coating from aluminum components.

3. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period

END OF SECTION

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SECTION 084413 - GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Labor, materials, tools, equipment, and services needed to furnish and install curtain wall.
2. Components furnished with installed curtain wall.
3. Thermally broken curtain wall frames.
4. Insulated metal infill panels.

B. Related Sections include the following:

1. 072100 “Thermal Insulation” for insulation products to be supplied at a part of curtain wall assemblies.

2. 079200 "Joint Sealants" for field-applied sealants, both primary sealant joint and secondary perimeter sealants.

3. 084113 “Aluminum Framed Entrances and Storefront” for aluminum entry doors and hardware.

4. 088000 “Glazing” for glazing to be installed into curtain wall.

1.3 REFERENCES

A. ANSI/ASHRAE/IES Standard 90.1-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings (I-P Edition).

1.4 SYSTEM DESCRIPTION

A. Design Requirements:

1. General: Provide manufacturer's stock curtain wall system, adapted to conditions indicated on Drawings, that comply with performance requirements specified as demonstrated by testing manufacturer's corresponding stock systems according to maximum criteria and test methods indicated.
2. Unitized Pre-Framed Aluminum System: Glazed aluminum curtain wall system consisting of large modular curtain wall units pre-assembled in factory from individual components into nesting or stacking frames for erection to form a continuous unit. Conceal mountings and attachments. Design system to comply with the following requirements:
    a. To accommodate expansion and deflections of joints between units.
    b. For glazing system from the exterior.
    c. To be field glazed.
    d. To fully capture each glass lite via pressure plate attachments on all sides.
3. Verify the following design wind pressure for Project with structural Construction Documents.

a. ASCE 7-05 Simplified Procedure Parameters
b. Exposure B
c. Basic wind speed 90 MPH (3 second gust)
d. Importance Factor 1.15
e. Wind Directionality Factor (Kd) 0.85
f. Topographic Factor (Kzt) 1.0

4. Design structural components including meeting rails and mullions accordingly.

B. Performance Requirements:

1. Definitions:

a. Framing: Design framing members for each individual glass pane so deflection perpendicular to glass plane does not exceed 1/175 of glass edge length or 3/4 inch, whichever is less, when subjected to loads specified in 2006 International Building Code.
b. Dead Load: Provide horizontal framing members that support glass, design deflection of those members in direction parallel to plane of wall shall not exceed an amount that will reduce the glass bite below 75 percent of the design dimension, nor an amount that would infringe upon necessary glazing clearances below. Provide at least 1/8-inch minimum clearance between member and top of fixed glazed panel, glass, or other fixed part immediately below. Maintain a minimum clearance of 1/16 inch between operable window and door.

2. When tested per the AAMA Metal Curtain Wall Manual, system(s) shall meet or exceed performance criteria.

3. Manufacturers' testing shall have been performed within the last 5 years on a representative curtain wall assembly, identical in all appropriate respects to the type proposed for this Project.

4. Air Test Performance Requirements: Curtain wall system; air infiltration maximum of 0.06 CFM per square foot for fixed units at 6.24 PSF pressure differential when tested per ASTM E283. Aluminum-framed entrances; manufacturer's testing shall be in accordance with ASTM Standards E283 for compliance with maximum permissible air infiltration rate of 1.25 cfm/sq.ft. when tested at a minimum pressure differential of 1.567 lbs./sq.ft. based on requirements of the Minnesota Energy Code.

5. Water Resistance: No water leakage at 12 PSF pressure differential when tested per ASTM E331 and where indicated below:

a. No water penetration through perimeter framing or primary sealant joint.
b. No water visible on interior surfaces.
c. No water visible on sub-sill flashing.
d. No water passing beyond vertical plane intersection innermost framing member.
e. No water present within or entering wall cavity during water resistance test.

6. Uniform Load Deflection Test: Conduct uniform load deflection test of curtain wall system per ASTM Standards E330.

a. Results of Test: The deflection of any framing member in a direction normal to the plane of the wall w3hen subjected to the calculated design wind pressure, at both a positive and negative load, shall not exceed L/175 of its clear span except for the following conditions:

1) When plastered surface or drywall subjected to bending is affected, do not exceed deflection of L/360 of span.
2) When framing member overhangs an anchor point, limit deflection to 2L/175, where L is length of cantilevered member.
3) At perimeter frames, limit deflection to 1/2 perimeter sealant joint width, minus anticipated movement from thermal and other movement,

unrelated to deflection related loads, from adjacent materials and the curtain wall

4) For spans greater than 13'-6," limit deflections at design wind pressure to L/240 plus 1/4 inch, but do not exceed maximum deflection of 1 inch.

7. Uniform Load Structural Test: Test unit at 1.5 times design test pressure both positive and negative, acting normal to plane of wall per ASTM E330.

   a. Results of Test: No glass breakage, permanent damage to fasteners, hardware parts, assembly, or permanent deformation of any main frame or ventilator member in excess of 0.2 percent of its span.

C. Framing: Framing members for each individual glass pane shall be designed so the deflection perpendicular to the glass plane shall no exceed 1/175 of the glass edge length or ¾", whichever is less, when subjected to loads specified in the current Minnesota State Building Code.

D. Condensation Resistance: When tested in accordance with AAMA 1503, the condensation resistance factor for each type of curtain wall shall be not less that the following minimum levels of thermal performance on unit size as required to produce representative areas of framing, vision glass and spandrel glass.

1. CRF Class Requirements

   a. Condensation Resistance Factor Requirements (CRF) minimum 68 (frame) and (CRF) minimum 71 (glass).

   b. Data from calculations, test results on curtain wall of different size, or unrepresentative framing/glass proportions are not acceptable.

E. Thermal Transmittance Performance Requirements:

1. The thermal performance for each type of curtain wall system shall not exceed what is allowed by the State Energy Code, ANSI/ASHRAE/IES Standard 90.1-2016.

2. U-Value Requirements: Thermal transmittance "U" assembly value maximum of 0.36 BTU per hour per square foot per degree F at 15 mph exterior wind. (2015 Minnesota State Energy Code, IECC 2018, ANSI/ASHRAE/IES Standard 90.1-2016.)

3. The Solar Heat Gain Coefficient (SHGC) Assembly maximum: 0.40. (2015 Minnesota State Energy Code, IECC 2018, ANSI/ASHRAE/IES Standard 90.1-2016.)

4. Curtain wall assemblies shall have a VT of 0.70. Visible Transmittance (VT) shall conform to the Minnesota Energy Code. VT shall be determined in accordance with NFRC 200 by an accredited independent laboratory and certified by the manufacturer.

F. Thermal Movements: Provide glazed curtain wall systems, including anchorage, that accommodates thermal movements of curtain wall system and supporting elements when subjected to a temperature differential from -30 degrees F to +180 degrees F without buckling, damaging stresses on glazing, failure of sealant joints, overstressing of components, damaging loads on fasteners, noise or vibrations, and other detrimental effect.

1.5 SUBMITTALS

A. Provide submittals in a timely manner to meet required construction completion schedule.

B. Product Data: Submit the manufacturer's specifications, technical product data, performance values, standard details of the products specified and the manufacturer's certification of the Installation Subcontractor and the manufacturer's recommendation for installation.

C. Shop Drawings: Submit Shop Drawings prepared by curtain wall manufacturer for each type of product. Include the following:

1. Indicate layout and location of each curtain wall and assembly type, component dimensions and field verified openings. Continue the curtain wall designation established in the Architectural Drawings.
2. Elevations of each unit, drawn at 1/2" =1'-0" scale. Indicate frame joinery.
3. Full size section details of every composite member.
4. Anchorage fastener types and locations, clips/straps/plates and reinforcing steel as required by structural calculations.
5. Anodized finish.
6. Installation and glazing Instructions.
7. Glass and glazing.
8. Sealants, including those selected by curtain wall manufacturer. Required if sealant specified within this Section.
9. Vapor containment systems.
10. Submit a final, complete, Shop Drawing set to Architect, and the Owner prior to start of fabrication. Incorporate review comments and notations from previous Shop Drawing submittals into Final Shop Drawing set. Provide in electronic PDF format.

D. Test Reports / Calculations: Test reports on each curtain wall type, complete, prepared by an independent testing laboratory certified by AAMA, and indicating that each curtain wall has been tested per these Specifications and performance criteria established in Part 1 of this Section.

E. Structural Calculations: Submit structural calculations and anchorage details prepared by independent structural engineer registered in the stat3e of Minnesota, indicating adequacy of all installed materials, including glass and glazing, to meet the structural load requirements as required by the uniform load structural test and the uniform load deflection test and dead load and framing criteria.

F. Manuals: Submit manufacturer's operating and maintenance manuals for entrance hardware per requirements of Division 1.

G. Contract Closeout Submittals: As-built set of Shop Drawings, prepared by the curtain wall manufacturer, showing final configuration of curtain wall installation per requirements of Division 1.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacture of specified systems and materials of this Section.

1. Window and curtain wall manufacturer: Submit letter, signed by an officer of manufacturing company, and enforced during all phases of Contract, guaranteeing that materials and components are engineered and fabricated in manufacturer's facility per these Specifications and approved Shop Drawings.
2. Submit manufacturer's written certification that curtain wall meets or exceeds specified criteria, that component parts were properly designed and selected for locale and intended installation, and that installation was made per manufacturer's written instructions.
3. Certify in writing that installers are approved to install manufacturer's products.

B. Installer Qualifications: Engage an experienced installer, with minimum of 5 years experience, who has successfully completed installation of glazed curtain wall systems similar in material, design, and extent to that indicated for Project.

C. Test reports: Submit test reports that have been performed within last 5 years on current production of specified curtain wall.

D. Structural calculations and anchorage details, prepared by an independent structural engineer licensed in the State of Minnesota, indicating adequacy of all installed materials, including glass and glazing, to meet the structural load requirements as required by the uniform load structural test and the uniform load deflection test and dead load and framing criteria.

E. Field Measurements: Verify actual locations of structural supports for glazed aluminum curtain walls by field measurements before fabrication and indicate measurements on Shop Drawings.

F. Pre-Installation Meetings:

1. Schedule pre-installation meeting for curtain wall Work. Schedule meeting after Shop Drawing review, prior to window installation, and after curtain wall materials are on site.

2. Provide a minimum of 10 working days written notice to required attendees for scheduled and rescheduled conference and testing and to confirm that curtain wall openings are complete and prepared for trial curtain wall installation(s).

3. Attendance: Require attendance of Owner, Contractor, Architect, installing Subcontractors, curtain wall manufacturer's representative, and other representatives directly associated with performance of Work.

4. Objectives: Review Specifications, approved Shop Drawings, and objectives of Trial installation and testing, mock-up test procedures, trial installation size and area, and confirm schedule for curtain wall installation.

   a. Complete trial installation and perform testing on each type of curtain wall unit with Owner retaining right to randomly select units for installation.

5. Trial Installation and Testing: Confirm that trial installation is complete in every detail, conforming to final installation and serves as a test demonstration installation for remaining Work. For mock-up, complete entire wall opening, including through-wall flashing, anchorage system, weeps, primary joint sealant, and exterior perimeter joint sealers, and review for acceptance.

G. Field Quality Control (Trial Installation):

1. Testing: Owner will engage an AAMA certified testing agency laboratory to field test the completed trial installation for compliance with specified performance criteria for air infiltration and water resistance. Testing of the trial installation shall be by AAMA and ASTM test standards and per additional requirements, definitions and criteria listed in field quality control testing.

2. The Contractor shall assist with testing procedures and otherwise cooperate with testing agency to facilitate testing. This includes providing all necessary scaffolding, lifts, enclosures, temporary heat and other equipment and utilities required to perform testing. Owner retains option to waive portions of testing as specified and will select curtain wall to be tested.

3. Testing will be performed prior to completion of interior finish Work, including installation of perimeter joint sealers, to allow visual access to areas being tested to check for water leakage.

4. Do not proceed with remainder of curtain wall installation until trial installations have passed project requirements. Correct failures and retest until installation is completely free of defects. If failures occur during testing, notify Owner and Architect as to when corrective Work will be undertaken. Owner and Architect will determine

Owner's and Architect's required presence for such Work. All retests shall be by the Owner's testing agency.

5. All re-observation, re-testing and associated costs shall be the responsibility of the Contractor and deducted from the Contract Sum by Change Order.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Make no deliveries to the Project until ready to install or until approved storage is provided. Where this provision is neglected and materials are delivered to the Project site prior to the Project being ready for installation, such materials shall be properly stored elsewhere at the expense of the Contractor with adequate insurance coverage provided for the off-site storage.

B. Deliver materials in original, un-opened containers with labels intact and legible.

C. Provide above-grade platform storage for materials and that will protect the materials from moisture damage and minimize damage to ground surfaces. Use tarpaulins to provide protection of stored materials. Factory wraps alone are not sufficient.

D. Protect pre-finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

E. Handle Work of this Section per AAMA Curtain Wall Manual #10.

1.8 WARRANTY

A. All-Inclusive Warranty: Prior to final payment, submit to Owner a written, all-inclusive warranty executed by Contractor, window manufacturer, window supplier, window installer, and respective manufacturers of each product and part used under this Section, including glass manufacturer and fabricator, that each material, product, part, workmanship, and installation is free from defects for a period of 10 years from Date of Substantial Completion. Should defects develop during Warranty period, correct such defect by repair, replacement, or other means acceptable to Architect and Owner, at no cost to Owner.

1. Submit all-inclusive warranty dated and notarized by a duly authorized Notary Public of the State of Minnesota.

B. Bonds: Aluminum Window, and Glass and Glazing Maintenance Bond:

1. When requested, provide a maintenance bond for a period of not less than 5 years for an amount of not less than 10 percent of products delivered price.

C. Financial Responsibility: Upon request, provide window manufacture's financial statement indicating proof of financial responsibility. Provide material, performance, and maintenance bonds for window manufacturers with less than 10 years of experience; or under financial restructuring or bankruptcy protection.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Glazed Aluminum Curtain Wall System Basis-of-Design Product:

1. Wausau Windows and Wall Systems: 8250 Superwall Series 2-piece male/female mullion.

2. Subject to compliance with requirements, available products from the listed manufacturers that may be incorporated into the Work include the following, or other approved equal

a. CMI Architectural Products, Inc.

b. EFCO Corporation
c. F-M Enterprises.
d. Kawneer North America, an Alcoa Company.
e. Modu-Line Windows, Inc.
f. Oldcastle Building Envelope.
g. Tru-Therm/Interclad.
h. Tubelite, Inc.
i. Vistawall International.

2.2 MANUFACTURED UNITS

A. Curtain Wall Aluminum Members:

1. Extruded aluminum prime billet 6063-T6 alloy, aluminum sheet 5005 H34 (anodic) per ASTM B209.

2. Steel, conforming to ASTM A36, hot-dipped galvanized in accordance with ASTM A123.

3. Nonferrous, nonmagnetic stainless steel, Type 304.

4. Principal curtain wall member thickness: Minimum 0.125-inch thickness along “X” and “Y” axis. Thickness other than 0.125 inch along either axis will not be accepted.

5. Provide extruded aluminum members with sharp well-defined corners, integral screw splines for frame joinery and flush sightlines.

6. Framing members requiring use of snap-trim for closure are not acceptable.

7. Curtainwall Thermal Separator: Rigid type with minimum 3/8-inch thermal isolator. Thickness other than 3/8 inch will not be accepted. Provide continuous, unbroken isolators in horizontal frame members.

   a. Horizontal framing member intersection to vertical members shall be made air and watertight by installation of manufacturer’s standard zone dam members

8. Curtain Wall framing shall fully capture each glass lite via pressure plate attachment on all sides.

9. Glazing gaskets: Minimum 1/4 inch. Gaskets less than 1/4 inch thick will not be accepted.

10. Exterior face dimension: 2-1/2 inches nominal.

11. Minimum system depth: 6-1/4 inch as required to meet structural requirements and as indicated on Architectural Drawings.

2.3 COMPONENTS

A. Internal Structural Members and Reinforcement:

1. Hot-dipped structural steel members and shapes to suit curtain wall framing, as required by structural calculations and as recommended and detailed by curtain wall manufacturer.

B. Anchor and Lateral Load Clips:

1. Concealed stainless steel or steel, hot-dipped galvanized. Shape, size and spacing shall be per final shop drawings and submitted structural calculations. Anchor clips and lateral load clips shall not penetrate the primary sealant joint nor inhibit independent frame movement. Profile anchor clips and lateral load anchor clips at sill locations to avoid altering or contracting the stainless-steel drip tray.

C. Glazing: Comply with requirements of Section 088000.

1. Glazing Method: Comply with GANA Glazing Manual for specified glass type.

2. Provide glazing per curtain wall and glass manufacturer's recommendation for sealants, glazing gaskets, and tapes.
3. Provide setting blocks and edge blocking in material, hardness, and locations per curtain wall and glass manufacturer's recommendations.
4. Setting Blocks/Edge Blocking: Provide in sizes and locations recommended by GANA Glazing Manual.
5. Expanded Cellular Glazing Tapes: AAMA 800.
6. Glazing Gaskets: AAMA 800:
7. Exterior Glazing Gasket: Extruded sponge EPDM
8. Interior Glazing Gasket: Extruded dense EPDM
9. Interior glazing gaskets corner butt joints shall be sealed per the curtain wall manufacturer's installation instructions.

D. Vapor Containment Assembly at Spandrel Panel:

1. Provide a 1/8" thick aluminum backpan vapor barrier with formed return legs on all four sides of opening. Verify required metal and configuration of backpan at firestop conditions. Backseal corner joints at return legs to create an air and vapor tight seal.
    a. Rigid Insulation: Provide in conformance with Section 072100, Thermal Insulation.
        1) Provide curtain wall insulation, impaling pins, washer clips, tape, shims, sealants approved by the curtain wall manufacturer.
        2) Provide non-combustible mineral fiber insulation where required per NFPA 285.
        3) The Contractor shall ensure that the spandrel cell insulation is always be kept dry until it is protected by glazing.

E. Joint Sealers:

1. Primary Joint Sealers and Vapor Containment Assembly: Silicone sealants are preferred. As a minimum use a mult-component polyurethane sealant. Curtain wall manufacturer is responsible for selecting the sealant manufacturer whose products can be warranted with sealant products used in conjunction with curtain wall frame assembly, curtain wall frame installation at interlocking male/female stack joints, decorative perimeter joints, cavity wall sealant work, stainless steel drip tray sealant work, and related building sealant work.
    a. Exterior and interior decorative perimeter sealant joints and other related curtain wall sealant Work shall match products selected for use by building sealant subcontractor.
2. Nonworking joints: Comply with AAMA 800.
3. Curtain wall Components: Suitable for application specified and as tested and approved by curtain wall manufacturer.

F. Formed Aluminum Extensions and Sills: Fabricate extensions and sills, as detailed on Drawings, to match curtain wall system. Fabricate these components by the same manufacturer as curtain wall system.

1. Provide 1/8-inch-thick formed aluminum sills in profiles indicated.
2. Provide continuous end caps to facilitate sealant installation and backer rod placement. Back seal for an air and watertight closure.
3. Furnish sill in 1 piece for full width of window opening when permissible.

4. Provide 1/4-inch-wide slotted weep holes in drip profile. Confirm spacing with manufacturer. Install reticulated foam baffles over inner surface of weep.
5. Slope sills to provide positive drainage to the exterior.
6. Provide a 1/16" inch thick formed Type 304 stainless steel continuous keeper, with predrilled holes. Diameter of predrilled holes shall correspond to recommendations and specifications of anchor manufacturer.
7. Anchors for keeper shall be engineered nylon with Type 304 stainless steel nail.
8. Provide 1/8-inch-thick bent aluminum support angle to secure and support top edge of sill.
9. Provide splice joints and expansion joints where shown on Drawings and approved Shop Drawings.
10. At splice and expansion joints, provide 1/16" inch thick, Type 304 stainless steel continuous backer plate, formed to match aluminum sill profile. Create working sealant joint between sill sections and provide bond breaker tape where required.

G. Formed Aluminum Sills at Precast Sills: Fabricate extensions and sills, as detailed on Drawings, to match curtain wall system. Fabricate these components by same manufacturer as curtain wall system.

1. Formed aluminum sills shall be 1/8" thick in profile as shown on the Drawings. Slope sills to provide positive drainage to exterior.
2. Provide splice joints and expansion joints where shown on the Drawings and final approved shop drawings. At splice and expansion joints, provide a 1/16" thick stainless-steel continuous backer plate, formed to match the aluminum sill profile. Create a working sealant joint between sill sections and provide bond breaker tape where required.

H. Interior Aluminum Trim: Fabricate trim as detailed on drawings, to match curtain wall system. Fabricate these components by same manufacturer as curtainwall system.

1. Provide splice joints and expansion joints where shown on Drawings and approved Shop Drawings.
2. At splice and expansion joints, provide 1/16" inch thick, Type 304 stainless steel continuous backer plate, formed to match aluminum profile. Create working sealant joint between sections and provide bond breaker tape where required

I. Fasteners:

1. Completely insulate pressure plate retaining screws from exterior air and pressure plate contact by means of a low conductivity coating on head and shank.

2.4 ACCESSORIES

A. Shims: PVC horseshoe shims in non-bearing locations and multipolymer plastic bearing shims per structural calculations and final Shop Drawing set. Horseshoe shaped multipolymer plastic bearing shims are not acceptable.

B. Curtain Wall Frame Anchorage Fasteners: Stainless steel anchors, heavy duty sleeve style, vibration resistant and removable, used to secure curtain wall and associated anchor clips and lateral load clips to concrete and grout filled concrete block. Type, size, and spacing per structural calculations and approved Shop Drawings.

C. Bond Breaker Tape: Recommended by curtain wall manufacturer.

2.5 FABRICATION

A. Aluminum Curtainwalls:

1. Do not begin fabrication until masonry details and field conditions have been verified and accepted by curtainwall manufacturer, and final review of Shop Drawings has been completed.
2. Finish, fabricate, and shop assemble under responsibility of 1 manufacturer (curtain wall Subcontractor is not the manufacturer).
3. Fabricate framing members into unitized assemblies of largest possible expanse, in curtain wall manufacturer's plant.
4. Provide grid frame curtain wall members and components with joints neatly made, free of burrs, and assembled using extruded screw spline frame joinery resulting in tight fitting hairline joints fastened or joined in factory to develop full structural value of members and provide permanent air and water-tight joints.
5. Provide major framing members, factory assembled in manufacturer's plant, in basic rectangular units sized for ease of erection and transportation. (Systems using individual field fabrication, installer fabricated, or field assembled members are not acceptable).
6. Provide interlocking male/female type stack joints at adjacent grid frame members to allow for thermal expansion. "Stick Built" systems with 1-piece tubular members will not be accepted.
7. Interlocking joints shall be weather-stripped to provide an air and watertight seal.
8. Provide extruded aluminum mullions with sharp, well-defined corners and flush sightlines.
9. Conceal fasteners at vertical to horizontal main framing connections and at miscellaneous trim wherever possible.
10. Fabricate curtainwall, including, anchorage, to allow for thermal movement of curtainwall system and supporting elements when subjected to temperature differentials from minus 30 degrees F to plus 180 degrees F without buckling, damaging stresses on glazing, failure of sealant joints, overstressing of components, damaging loads on fasteners, noise or vibrations, and other detrimental effects.
11. Design curtain wall system and its anchorages to accommodate differential floor movements of 1/4 inch vertically without damage.

B. Drainage System:

1. Provide Individual glass lites with pressure-equalized weepage.
2. Provide weep slots in pressure plates and weep slots in aluminum trim snap on covers to drain condensation or accumulating water within system to exterior.

C. Thermal Break:

1. Curtain wall assembly shall be thermally broken by manufacturer's standard 3/8" thick isolator, sealing against air and water infiltration. Provide continuous, unbroken isolators in horizontal frame members.
2. Framing intersections shall be made air and watertight by installation of manufacturer's standard zone dam members. Provide profile to ensure proper fit to molded corner of interior glazing gasket and to prevent gapping between frame members. Seal zone dam with manufacturer's approved sealant.
3. Ensure framing intersections are air and watertight by installation of manufacturer's standard zone dam members. Provide profile to ensure proper fit to molded corner of

interior glazing gasket and to prevent gapping between frame members. Seal zone dam with manufacturer's approved sealant.

D. End Piece Covers: End piece covers designed to complete curtain wall installation of a sharp, uninterrupted exterior profile. Design end piece covers, as detailed on Drawings, to attach to inside of end of extrusion, not to the exterior of extrusion.

1. Apply end piece covers to pressure plate. Cut to length in factory allowing for a 3/32-inch gap maximum at each end, or minimum necessary for expansion/contraction for a given member. Provide weep areas to facilitate drainage to exterior. Provide end caps on covers at non-weep areas to facilitate exterior perimeter joint sealer installation. Field fabrication of snap covers will not be accepted.

E. Weather-stripping:

1. Closed cell extruded dense neoprene.

2. 2 rows of extruded fin-type weather-strip installed in extruded races at interlocking members to provide air and watertight seal.

2.6 FINISHES

A. Provide exposed surfaces of aluminum curtainwall and entrance door, components and trim with anodized finish conforming to the Aluminum Association Designation, Architectural Class 1, AA-M10C22 and the following:

1. Provide anodic coating continuous, fully sealed, and free from powdery surfaces.

2. Coating Thickness: Minimum of 0.7 mils when tested per ASTM B244.

3. Anodic Coating at Aluminum Frame Types:

a. Aluminum Curtain Wall Systems:

1) Exterior Curtain Wall Frame: To be selected by Owner/Architect from manufacturer’s full range.
2) Interior Curtain Wall Frame: To be selected by Owner/Architect from manufacturer’s full range.

b. Interior Curtain Wall Systems:

1) To be selected by Owner/Architect from manufacturer’s full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions:

1. Verify that openings into which curtain wall will be installed are correct size to permit installation of curtain wall per manufacturer’s installation instructions. Installation start-up indicates acceptance of conditions.

2. Do not install curtain wall until this or other unsatisfactory conditions are corrected.

3. Properly prepare and clean each window opening before installation of window system and trim. Confirm that areas indicated to receive sealant joints have been cleaned per sealant manufacturer’s instructions.

4. Ensure that wall conditions at sill, jamb, and head will not short circuit thermal break in frame when installed.

3.2 INSTALLATION

A. Erection of Curtain Wall System:

1. Install curtain wall in exact compliance with approved Shop Drawings and Specifications.
2. Provide anchor clips, lateral load clips, anchorage fasteners, shims, and internal reinforcement as indicated on approved Shop Drawings and structural calculations, to secure and properly support curtain wall assembly to wall surrounds. Account for differential movement between curtain wall frame and wall surrounds caused by calculated thermal expansion and contraction of curtain wall frame sections; building live and dead load movement; supporting structure movement such as story drift, column shortening, or long term creep; and lateral loads while maintaining perimeter expansion tolerances and independent frame movement as shown on the approved Shop Drawings.
3. Set sill frame of curtain wall to not project towards exterior beyond head frame.
4. Torque pressure plate screws to manufacturer's standard compression value.
5. Cap-seal anchor clips, lateral load clips, and associated anchorage fasteners that penetrate interior perimeter sealant joint to prevent air and vapor migration. Insulate aluminum that is not organically coated from direct contact with steel, masonry, concrete, or other dissimilar metals by bituminous paint, zinc chromate primer, non-conductive shims, or other suitable insulating material.
6. End-damn open ends of curtain wall framing to provide air and water-tight seal and support to primary joint sealer.
7. Set units plumb, level, square, and true to line, without warp or rack of imposed loads on frames. Adjust Work to the following tolerances in maximum variation.
    a. Plumb: 1/8 inch maximum for entire height. Variation from plumb, with curtain wall sill projecting towards exterior, beyond top of curtain wall is not acceptable or permitted.
    b. Level: 1/8 inch per 10 feet of width, non-accumulative.
    c. Maximum offset between 2 identical members abutting end to end line: 1/32 inch.
8. Install bond breaker tape and sealant, as recommended by curtain wall manufacturer, along joint between split mullions. Set zone dams in sealant as recommended by curtain wall manufacturer. Install end dams at open ends of curtain wall framing.
9. Prior to installing vapor containment assembly, continuously cap seal curtain wall frame joinery within the spandrel panel area to prevent vapor intrusion and bypass.
10. Vapor containment assembly installation shall provide a vapor tight barrier to prevent the formation of condensation. Vapor barrier shall not be punctured.
11. Install aluminum trim snap-on covers. Do not pound covers into place with sharp edged tools. Dimpling of covers during installation is not acceptable. Replace dimpled aluminum material at no cost to Owner.
12. Fastener installation: Through-fasteners short-circuiting thermal barriers are not acceptable.
    a. Install curtain wall system so that wall conditions at sill, jamb, and head do not short circuit thermal broke system when installed.
    b. Do not install fasteners, bolts, screws, or other components to impair independent frame movement.
    c. Do not install anchor clips and lateral load clips that penetrate primary sealant joint or inhibit independent frame movement.
    d. Fasteners within weep system is prohibited.

13. Bed open bottoms of curtain wall frames at floor line in sealant to provide air and watertight seal.

14. Provide manufacturer's on-site supervision of installation.

B. Aluminum Entrances and Frames:

1. Comply with manufacturer’s instructions for installation of frames, assemblies, and hardware.

2. Set units plumb, level, and true to line, without warp or rack of frame.

3. Anchor frames solidly to surrounding construction.

4. Apply protective coating to separate aluminum from galvanically incompatible materials.

5. Apply joint sealer under thresholds and around frames (interior and exterior).

3.3 FIELD QUALITY CONTROL

A. The Contractor will provide written notice to appropriate firms and laboratories that window installation is complete and ready for field quality control testing. Provide minimum of 10 working days notice for both initial and rescheduled testing.

B. Owner will engage an independent, AAMA certified testing laboratory to field test completed window installation for compliance with specified performance criteria for air infiltration and water resistance.

1. Testing for the completed curtain wall installation will be AAMA and ASTM test standards and per additional requirements, definitions and criteria listed in the field quality control testing below. If curtain wall assembly exceeds constructability limits for a Method B test chamber, the Owner retains option to utilize AAMA 501 field test standards as tabulated and defined below.

2. Testing shall occur prior to interior finish work, including interior perimeter sealant joint, to allow visual access to areas being tested to check for water penetration.

3. The Contractor shall assist with testing procedures and otherwise cooperate with the testing agency, including provide all scaffolding, lifts, enclosures, temporary heating and other equipment and utilities to facilitate testing.

4. The Owner retains the option to waive portions of testing as specified. The Owner will randomly select curtain wall to be tested.

C. If failures develop under testing, reasons for the failure shall be identified by the Contractor and failures shall be repaired and retested until the installation is completely free of defects. If failures develop under testing, The Contractor shall notify the Owner and the A/E as to when corrective work will be undertaken, and determinations will be made by them as to their required presence for such Work. All retests shall be by the Owner’s testing agency.

D. Re-observation, re-testing, and associated costs are responsibility of Contractor and deducted from Contract Sum by Change Order.

3.4 ADJUSTING

A. Adjust movable units to operate smoothly and to be weather-tight when closed. Lubricate hardware to provide properly working condition.

3.5 CLEANING

A. Clean completed systems inside and out, promptly after erection of framing, glass, and sealants. Remove excess sealants, dirt, and other contaminants from aluminum, glass, and adjacent materials. Remove debris from Work site.

3.6 PROTECTION

A. Take protective measures to ensure installation is without damage or deterioration at time of acceptance other than normal weathering. If defects develop prior to Date of Substantial Completion of Work, repair damage or replace with new materials, at no additional cost to Owner.

3.7 TESTING SCHEDULE

Method of Testing	Pass/Fail Definitions	Frequency	Action required (If Failure)
Air Leakage: Conduct air leakage te3st per AAMA 503; including the adjacent wall substrate, exterior perimeter sealant joint and the primary sealant joint. Test Chamber shall be AAMA 502, Method B requirements and applied to the exterior of the wall except where the testing agency determines that an interior test chamber is required.	Maximum allowable rate of air leakage shall not exceed 0.06 cfm/sq.ft. Minimum air leakage test pressure shall be 6.24 lbs./sq.ft.	10% or minimum of 3 curtain wall assemblies, whichever is greater.	For each failed test: 1. Identify reason for failure. 2. Repair failure and retest the installation unit until it is completely free of defects. 3. Test two additional curtain wall assemblies.
Water Penetration: Conduct water penetration test per AAMA 503; including the adjacent wall substrate, exterior perimeter sealant joint and the primary sealant joint. Test Chamber shall be AAMA	No water shall: penetrate through the perimeter frame or primary sealant join, be visible on interior surfaces, be visible on sub-sill flashing; pass beyond the plane parallel to the glazing (the vertical plane) intersecting the innermost projection of the curtain wall: or be present within or enter the wall cavity during the water	As defined above.	As defined above.

502, Method B requirements and applied to the exterior of the wall except where the testing agency determines that an interior test chamber is required.	penetration test. Minimum water penetration test pressure shall be 12 lbs./sq.ft.		

END OF SECTION 084413

SECTION 089100 - METAL STORM LOUVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. High-density fiber cement siding panel system with rainscreen and cladding attachment system.

B. Section Includes:

1. FEMA 361/ICC-500 Approved Stationary Metal Blade Louver.
2. Louver System Accessories.

1.3 RELATED SECTIONS:

A. Section 03 30 00 - Cast-In-Place Concrete.

B. Section 04 20 00 - Masonry Units.

C. Section 05 10 00 - Structural Metal Framing.

D. Section 06 10 00 - Rough Carpentry.

E. Section 07 42 13 - Metal Wall Panels.

F. Section 07 60 00 - Flashing and Sheet Metal.

G. Section 07 92 00 - Joint Sealants.

H. Section 09 91 00 - Paints.

I. Section 23 37 00 - Air Outlets and Inlets.

J. Section 23 33 13 – Dampers.

K. Section 23 09 13 – Instrumentation and Control Devices for HVAC.

1.4 REFERENCES

A. Referenced Standards: These standards form part of this specification only to the extent they are referenced as specification requirements.

1. Federal Emergency Management Agency (FEMA) 361 - Design and Construction Guidance for Community Safe Rooms.
2. ICC 500: 2014 Standard for the Design and Construction of Storm Shelters.
3. AAMA 2604 – High Performance Organic Coatings on Architectural Extrusions and Panels.
4. AAMA 2605 - High Performance Organic Coatings on Architectural Extrusions and Panels.
5. AMCA 500 - Test Methods for Louvers, Dampers and Shutters.
6. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
7. ASTM D 1400 – Standard Test Method for Nondestructive Measurement of Dry Film Thickness of Nonconductive Coatings Applied to a Nonferrous Metal Base.
8. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
9. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

10. ASTM D822 - Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings
11. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.
12. ASTM D2244 - Standard Test Method for Calculation of Color Differences From Instrumentally Measured Color Coordinates.

1.5 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Horizontal Louver: Louver with horizontal blades.

1.6 SUBMITTALS

A. Product Data: Provide louver manufacturer's printed data sufficient to show that all components of louver system, including:

1. Manufacturer's product data including performance data.
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations.
4. Installation methods.
5. Finish information, indicating conformance to reference standards.
6. Sample Manufacturer’s Warranty.
7. Certificate(s) of Compliance/Product Test Reports: For each type of louver, for tests performed by a qualified testing agency.

B. Shop Drawings:

1. Submit manufacturer’s shop drawings indicating materials, construction, dimensions, accessories, and installation details. Include plans, sections, equipment numbers, and attachments to other Work.

C. Product Schedule: Submit schedule of materials, parts, finishes, and equipment. For louvers, use same designations indicated on Drawings. Include accessories including manufacturer’s part/product numbers.

D. Samples: Submit sample of louver to show frame, blades, bird screen vertical supports, sill, accessories, finish, and color.

E. Field quality-control reports.

F. Qualification Data: In connection with Product Data Submittal, include Qualification Data for manufacturer, product, and Installer/Contractor demonstrating conformance to Qualification Requirements.

1. Demonstrate Conformance to Contractor’s Qualifications:
   a. Each Contractor shall submit, within 5 days of Owner or Architect’s request or at the time of the Product Data Submittal, whichever is first, written evidence that Contractor:
      1) Is acceptable to and approved/certified by Manufacturer for Louver Installation.
      2) Maintains a permanent place of business.
      3) Has a satisfactory experience record with work of this type and scope: and, if requested by the owner, can provide five references for projects of a size exceeding 75 percent of the area included in this Project that are at least five years old. These references shall include project schedules, including bid date, start and completion dates, Owner and/or Engineer contacts including

names, addresses and telephone numbers, and the specific components existing and installed on each referenced project.

4) Can show evidence of authority to conduct business in the jurisdiction where the Project is located.

2. Demonstrate conformance to Manufacturer Qualifications:
   a. The manufacturer shall have implemented the management of quality objectives, continual improvement, and monitoring of customer satisfaction to assure that customer needs and expectations are met.
   b. Manufacturer shall be International Organization for Standardization (ISO) 9001 accredited.

3. Demonstrate conformance to Product Qualifications:
   a. Product AMCA Ratings Seal certificate.
   b. Certificate(s) of Compliance/Product Test Reports: For each type of louver, for tests performed by a qualified testing agency.

1.7 PRODUCT QUALIFICATIONS:

A. Louvers licensed to bear AMCA Certified Ratings Seal. Ratings based on tests and procedures performed in accordance with AMCA 511 and comply with AMCA Certified Ratings Program. AMCA Certified Ratings Seal applies to air performance, water penetration and wind driven rain ratings.

B. Louvers shall be factory engineered to withstand the specified seismic loads.

C. Minimum design loads shall be calculated to comply with ASCE – 7, and all local requirements of Authority Having Jurisdiction (AHJ).

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. The manufacturer shall have implemented the management of quality objectives, continual improvement, and monitoring of customer satisfaction to assure that customer needs and expectations are met.

2. Manufacturer shall be International Organization for Standardization (ISO) 9001 accredited.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store materials in a dry area indoors, protected from damage and in accordance with manufacturer's instructions.

C. Handling: Protect materials and finishes during handling and installation to prevent damage.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

E. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

F. Heed manufacturer’s cautions regarding safe handling, use, and storage of materials.

1.10 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.11 WARRANTY

A. Manufacturer shall provide standard limited warranty for louver systems for a period of five years (60 months) from date of installation, no more than 60 months after shipment from manufacturing plant. When notified in writing from the Owner of a manufacturing defect, manufacturer shall promptly correct deficiencies without cost to the Owner.

B. Manufacturer shall provide 20 year limited warranty for 70% fluoropolymer-based finish on extruded aluminum substrates. Manufacturer shall provide 10 year limited warranty for 50% fluoropolymer-based finish on extruded aluminum substrates.

C. Finish coating shall not peel, blister, chip, crack or check.

D. Chalking, fading or erosion of finish when measured by the following tests:

E. Finish coating shall not chalk in excess of 8 numerical ratings when measured in accordance with ASTM D4214.

F. Finish coating shall not change color or fade in excess of 5 NBS units as determined by ASTM D2244 and ASTM D822.

G. Finish coating shall not erode at a rate in excess of 10%/ 5 year as determined by Florida test sample.

PART 2 - PRODUCTS

2.1 MANUFACTURER/SUPPLIER

A. Basis of Design: High Density Fiber Cement Panels supplied by American Fiber Cement Corp.; 6901 S. Pierce St. Suite 180, Littleton, CO 80128. ASD. Tel: (303) 972-5107. Email: house@afccladding.com. Web: http://www.americanfibercement.com.

B. Requests for substitutions will be considered in accordance with the provisions of Section 001600 - Product Requirements.

2.2 FIBER CEMENT PRODUCTS

A. Product: **Patina Original NXT** by Swisspearl supplied by American Fiber Cement Corp.

1. Finish: Through-colored, muted, matte finish with a unique weather-proof treatment.
2. Thickness: 8 mm (5/16”).
3. Untrimmed Width: 1250 mm (49.2”)
4. Untrimmed Lengths: 2500 mm (98.4”), 3050 mm (120.1”)
5. Trimmed Width: 1219.2 mm (48”)
6. Trimmed Lengths: 2438 mm (96”), 3045 mm (119.875”)
7. Color: To be selected by Owner and Architect from manufacturers full line of colors.
8. Physical Characteristics: ASTM C1185/C1186, EN 12467 'Fiber-cement flat sheets'.
   a. Durability classification: Category A.
   b. Strength classification: Class 4.
   c. Freeze thaw test: greater than 100 cycles.
9. Fire Testing:
   a. ASTM E84.
   b. ASTM E136.
   c. CAN/ULC S102.
   d. CAN/ULC S114.
   e. EN 13501-1: A2-s1-d0.
10. IAPMO – The International Association of Plumbing and Mechanical Officials

a. IAPMO-UES Evaluation Report 0899 Swisspearl Fiber-Cement Panel System
b. For additional test data, see product datasheet.

11.

B.

2.3 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

B. Flashing Membrane: Self-curing, non-reinforced membrane composed of nonvulcanized EPDM rubber, complying with ASTM D 4811 Type II, and with the following properties:

1. Thickness: 0.055 inch (1.4 mm).
2. Color: Same as field membrane

C. Self-Adhesive Flashing Membrane: Semi-cured 45 mil EPDM membrane laminated to 35 mil (0.9 mm) EPDM tape adhesive.

D. Pre-Molded Pipe Flashings: EPDM, molded for quick adaptation to different sized pipes

E. Bonding Adhesives, sealants, and surface cleaners: As recommended by Membrane manufacturer.

F. Sheet Flashing: 60-mil-thick EPDM, partially cured or cured, per application.

G. Seaming Tape: Self-Adhesive Lap Splice Tape: 35 mil (0.9 mm) EPDM-based, formulated for compatibility with EPDM membrane and high-solids primer, minimum 6” wide. Provide manufacturer’s recommended primer.

H. Mastic: One-part, low viscosity, self-wetting butyl mastic.

I. Membrane securement strip: Reinforced EPDM fastening strip, with 2-inch diameter metal plates.

J. Membrane Protection:

1. 45-mil EPDM membrane, laid loose
2. 1” expanded polystyrene insulation
3. ¾” plywood
4. Sandbag ballast

Commented [JR1]: Confirm per manufacturer specs.

K. Miscellaneous Accessories: Provide manufacturers recommended lap sealant, water cutoff mastic, metal termination bars, roof walkway pads, yellow safety strips, metal battens, pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other manufacturer recommended and approved accessories.

PART 3 - EXECUTION

3.1 GENERAL

A. Install roofing, insulation, flashings, and accessories in accordance with roofing Manufacturer's published instructions and recommendations for the specified roofing system. Where Manufacturer provides no instructions or recommendations, follow good roofing practices and industry standards. Comply with federal, state, and local regulations.

B. Obtain all relevant instructions and maintain copies at the project site for duration of installation period.

C. Store materials according to manufacturer's instructions.

D. Until ready for use, keep materials in their original containers as labeled by the Manufacturer.

3.2 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Examine roof deck to determine that it is sufficiently rigid to support installers and their mechanical equipment and that deflection will not strain or rupture roof components or deform deck
2. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
3. Replace all existing wood blocking shown to remain with new if existing is found to be damaged or rotted and not sound to receive roofing materials.
4. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

B. Proceed with installation only after unsatisfactory conditions have been corrected

3.3 PREPARATION

A. Take appropriate measures to ensure that fumes from adhesive solvents are not drawn into the building through air intakes.

B. Surfaces to receive new materials shall be free of all dirt, debris, loose materials, and free from moisture in any form. Mechanically scrape exposed surface as necessary to remove projections.

C. Verify that surfaces to receive new materials have no defects or errors that would result in poor application or cause latent defects in workmanship.

D. Reset or replace existing fasteners for materials exposed but left in place that are loose, deformed, damaged, or corroded.

E. All new fasteners that are to be used with existing preservative treated wood blocking are to be stainless steel.

F. Covering deck gaps:

1. Gaps less than 2": Install backer rod in joint and cover with 6" wide uncured flashing in compatible adhesive.
2. Gaps 2" or greater: Install 24-gauge sheet metal plate, fastened to one side of joint and covered with No 30 felt (back-mopped) to the deck (over the joint).

G. Torches will not be permitted on the roof.

3.4 VAPOR RETARDER

A. The surface to which vapor retarder is to be applied shall have a smooth finish and be free of voids, spalled areas, sharp protrusions, loose aggregate, and other surface imperfections.

B. Adhere to existing construction with minimum 3-inch (76.2 mm) edge laps and 6-inch end laps.

C. Install in straight lines, flat, free of wrinkles, and fishmouths.

D. Roll in with a 75 lb. (34 kg) roller to fully mate each roll to substrate, including all lap areas.

E. Take special precautions to hold in place until remainder of roof system is installed.

3.5 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components, so insulation is not exposed to precipitation or left exposed at end of workday.

B. Maximum moisture content of insulation at time of application shall be 4 percent of dry weight.

C. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.

D. Install tapered insulation under area of roofing to conform to existing slopes.

E. Insulation shall be laid loose.

F. Maximum ¼" joint width allowed. Fill gaps greater than 1/4 inch (6 mm) with acceptable insulation. Do not leave the roofing membrane unsupported over a space greater than 1/4 inch (6 mm).

G. Install 1 or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inchesor greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inchesin each direction.

3.6 EDPM INSTALLATION

A. Install EPDM sheet according to roofing system manufacturer's written instructions and as follows:

1. Adhered Sheet Installation: Apply bonding adhesive to substrate and underside of sheet and allow to partially dry. Do not apply bonding adhesive to splice area of sheet.

3.7 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates per membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas apply splicing cement and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings per roof system manufacturer's requirements.

F. Metal Accessories: Install metal edgings, gravel stops, and copings in locations indicated on the drawings, with horizontal leg of edge member over membrane and flashing over metal onto membrane.

1. Follow roofing manufacturer's instructions.
2. Remove protective plastic surface film immediately before installation.
3. Install water block sealant under the membrane anchorage leg.
4. Flash with manufacturer's recommended flashing sheet unless otherwise indicated.
5. Where a single application of flashing will not completely cover the metal flange, install additional piece of flashing to cover the metal edge.
6. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, install an additional piece of self-adhesive flashing membrane over the metal lap to the top of the gravel stop; apply seam edge treatment at the intersections of the two flashing sections.

G. Scuppers: Set in sealant and secure to structure; flash as recommended by manufacturer.

H. Roofing Expansion Joints: Install as shown on drawings and as recommended by roofing manufacturer.

I. Flashing at Walls, Curbs, and Other Vertical and Sloped Surfaces: Install weathertight flashing at all walls, curbs, parapets, curbs, skylights, and other vertical and sloped surfaces that the

roofing membrane abuts to; extend flashing at least 8 inches (200 mm) high above membrane surface.

1. Use the longest practical flashing pieces.
2. Evaluate the substrate and overlay and adjust installation procedure in accordance with membrane manufacturer's recommendations.
3. Complete the splice between flashing and the main roof sheet with specified splice adhesive before adhering flashing to the vertical surface.
4. Provide termination directly to the vertical substrate as shown on roof drawings.

J. Roof Drains:

1. Taper insulation around drain to provide smooth transition from roof surface to drain. Use specified pre-manufactured tapered insulation with facer or suitable bonding surface to achieve slope; slope not to exceed manufacturer's recommendations.
2. Position membrane, then cut a hole for roof drain to allow 1/2 to 3/4 inch (12 to 19 mm) of membrane to extend inside clamping ring past drain bolts.
3. Make round holes in the membrane to align with clamping bolts; do not cut membrane back to bolt holes.
4. Apply sealant on top of drain bowl where clamping ring seats below the membrane
5. Install roof drain clamping ring and clamping bolts; tighten clamping bolts to achieve constant compression.

K. Flashing at Penetrations: Flash all penetrations passing through the membrane; make flashing seals directly to the penetration.

1. Pipes, Round Supports, and Similar Items: Flash with specified pre-molded pipe flashings wherever practical; otherwise use specified self-curing elastomeric flashing.
2. Pipe Clusters and Unusual Shaped Penetrations: Provide penetration pocket at least 2 inches (50 mm) deep, with at least 1-inch (25 mm) clearance from penetration, sloped to shed water.
3. Structural Steel Tubing: If corner radii are greater than 1/4 inch (6 mm) and the longest side of tube does not exceed 12 inches (305 mm), flash as for pipes; otherwise, provide a standard curb with flashing.
4. Flexible and Moving Penetrations: Provide weathertight gooseneck set in sealant and secured to deck, flashed as recommended by manufacturer

L. Walkway Installation

1. Install walkways at access points to the roof, around rooftop equipment that may require maintenance, and where indicated on the drawings.
   a. Use specified walkway pads unless otherwise indicated.
   b. Walkway Pads: Adhere to the roofing membrane, spacing each pad at minimum of 1" (25 mm) and maximum of 3" (75 mm) from each other to allow for drainage.
   c. If installation of walkway pads over field fabricated splices or within 6" (150 mm) of a splice edge cannot be avoided, adhere another layer of flashing over the splice and extending beyond the walkway pad a minimum of 6" (150 mm) on either side.
   d. Prime the membrane, remove the release paper on the pad, press in place, and walk on pad to ensure proper adhesion.

3.8 FIELD QUALITY CONTROL

A. Withdrawal tests of fasteners and nailers may be required if attachment is in question.

B. Samples of the flashing may be taken to determine the degree to which it has cured prior to installation.

C. A sample of the completed splice may be required if in question, at a location selected by the Architect/Engineer. Patching the test opening shall be by the Contractor using the standard splicing methods.

D. Field tests may be performed by Architect/Engineer to evaluate moisture content of installed materials.

E. Application of the roof system may be checked by Architect/Engineer.

F. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.

G. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

3.9 PROTECTION AND CLEANING

A. Protect roofing systems from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Clean all contaminants generated by roofing work from building and surrounding areas, including bitumen, adhesives, sealants, and coatings.

C. Repair or replace building components and finished surfaces damaged or defaced due to the work of this section; comply with recommendations of manufacturers of components and surfaces.

D. Remove all roofing materials from surfaces not specified to receive these materials such as walls, walkways, metal flashings, etc.

E. Remove leftover materials, trash, debris, equipment from project site and surrounding areas.

END OF SECTION 075323

SECTION 095000 - SUSPENDED WOOD CEILING AND WALL PANEL SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Technical Specifications Sections may apply to this Section even when not specifically referenced.

1.2 SUMMARY

C. This Section includes:
   1. Linear veneer wood panel ceiling systems with Centered Notched and Flat Backers.
   2. Exposed grid suspension system.
   3. Linear veneer wood panel wall systems with Centered Notched and Flat Backers.
   4. Wire hangers, fasteners, main runners, cross tees, wall angle moldings and accessories.
   5. Acoustical blanket insulation – to be placed over the top of wood grille ceiling systems.

D. Related Work:
   1. Section 072100 - Thermal Insulation for acoustic blanket insulation
   2. Section 095113 - Acoustical Panel Ceiling Suspension Assembly
   3. Section 092100 - Gypsum Board Assemblies
   4. Division 23 - HVAC
   5. Division 26 - Electrical Work

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
   2. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot- Dip Process.
   3. ASTM A 1008 Standard Specification for Steel, Sheet, and Cold Rolled Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
   4. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
   5. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
   6. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
   7. ASTM E 580 Application of Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels in Areas Requiring Seismic Restraint.
   8. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
   9. ASTM E 1264 Classification for Acoustical Ceiling Products.

B. Hardwood Plywood & Veneer Association (HPVA).

C. International Building Code.

D. ASHRAE Standard 62 1 2004 Ventilation for Acceptable Indoor Air Quality.

E. NFPA 70 National Electrical Code.

F. ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures.

G. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic. Qualification Testing of Non-structural Components.

H. International Code Council-Evaluation Services Report - Seismic Engineer Report.

I. ESR 1308 - Armstrong T-Bar or Dimensional Suspension.

J. California Air Resources Board (CARB) compliant.

1.4 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Warranty.

B. Shop Drawings:
   1. Provide reflected ceiling plan layout of suspended wood ceiling and suspension system coordinated with other trades that will penetrate the wood ceiling or interfere with the installation and recessed or surface mounted devices located within the ceiling panels. Indicate method of suspension where interference exists.
      a. Linear pattern.
      b. Joint pattern.
      c. Ceiling suspension members.
      d. Ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, and access panels.
      e. Ceiling perimeter and penetrations through ceiling; trim and moldings.
      f. Minimum Drawing Scale: 1/4 inch = 1 foot.
   2. Provide layout plans, elevations, and details of walls. Show locations of items that are to be coordinated with or supported by the walls.

C. Verification Samples: Submit samples or portions of full-size units showing jointing where such exists and methods of internal fastening as well as all other detailing required.

D. Certificates: Submit manufacturer's certificate that products meet or exceed specified requirements.

E. Test Reports: Upon request, submit certified test reports from recognized test laboratories.

1.5 QUALITY ASSURANCE

A. Manufacturer: Manufacturers: Provide wood ceiling and wall panel system from a single manufacturer.

B. Manufacturer shall have a minimum of three years' experience in molding solid wood panel systems or laminating veneers to fire retardant substrates and shall have completed at least five projects of the scope and quality required by this project.
   1. The manufacturer shall have tested the lamination bond of the veneer to the substrate without showing signs of delamination, cracking or blistering.
   2. The manufacturer shall have complete installation drawings and instructions to ensure a quality installation.

C. Installer Qualifications: Minimum 2-year experience installing projects of similar size and complexity.

D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship, minimally 2’ x 2’, or as required.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship is approved by Architect.
   3. Refinish mock-up area as required to produce acceptable work.

E. Source Limitations:
   1. Wood Ceiling and Wall Panel: Obtain each type through one source from a single manufacturer.
   2. Suspension System: Obtain each type through one source from a single manufacturer.

F. Suspension System: Rigidly secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of 1:360.

G. Fire-Test-Response Characteristics: Provide linear wood suspended ceilings and wall system that comply with the following requirements:
   1. Fire-Resistance Characteristics: Where indicated, provide acoustical panel ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
      a. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
      b. Identify materials with appropriate markings of applicable testing and inspecting agency.
      c. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class C products.
      d. Smoke-Developed Index: 450 or less.
      e. HPVA (Hardwood Plywood and Veneer Association) certification and audit program per ASTM E-84 tunnel test.
   2. Woodworking Standards: Manufacturer must comply with specified provisions of Architectural Woodworking Institute quality standards.
   3. Coordination of Work: Coordinate ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.2 DELIVERY, STORAGE, AND HANDLING

A. Deliver panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Store components in a dry interior location in their cartons prior to installation to avoid damage. Store cartons in a flat, horizontal position. The protectors between the panels should not be removed until installation.

C. Do not store in unconditioned spaces with humidity greater than 55 percent or lower than 25 percent relative humidity and temperatures lower than 50 degrees F or greater than 86 degrees F. Panels must not be exposed to extreme temperatures, for example, close to a heating source or near a window with direct sunlight.

D. Handle units carefully to avoid chipped edges, soiling, or damage to units in any way.

E. A minimum of 72 hours prior to ceiling and wall installation, suspended wood ceilings shall be stored in the room in which they will be installed. Temperature and humidity of the room during this period shall closely approximate those conditions that will exist when the building is occupied.

F. Provide labels indicating brand name, source of procurement, style, size and thickness.

1.3 PROJECT CONDITIONS

A. Environmental Limitations: Do not install wood ceilings and walls until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

C. Wood ceiling and wall materials should be permitted to reach room temperature and have a stabilized moisture content for a minimum of 72 hours before installation. (Remove plastic wrap to allow panels to climatize).

D. The wood panels should not be installed in spaces where the temperature or humidity conditions vary from the temperatures and conditions that will be normal in the occupied space.

E. As interior finishes, the Veneered wood panels are designed for installation in temperature conditions between 50 degrees F and 86 degrees F, in spaces where the building is enclosed, and HVAC systems are functioning and will be in continuous operation. Relative humidity should not fall below 25 percent or exceed 55 percent.

1.4 COORDINATION

A. Coordinate layout and installation of wood ceilings and suspension system and of wood wall panels with other construction that penetrates ceilings and walls or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, partition assemblies, and other devices and equipment.

1.5 EXTRA MATERIALS

A. Extra Materials: Provide 5 percent for use by owner in building maintenance and repair.

1.6 WARRANTY

A. Wood Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to:
   1. Wood Panels: Defects in materials or factory workmanship.
   2. Grid System: Rusting and manufacturing defects.

B. Warranty Period:
   1. One (1) year from date of installation.
   2. Grid: Ten years from date of installation.

C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 – Products articles where titles below introduce lists, the following requirements apply for product selection:
   1) Basis-of-Design Manufacturer: Armstrong World Industries, Inc.

B. The design for each type is based on each product named. Subject to compliance with requirements, provide either the named product or a comparable product approved by the architect, by one of the other manufacturers specified.
   1) ASI Architectural, 123 Columbia Court N, Chaska, MN 55318. Phone: 888-258-4637. Fax: 952-448-2613. Website: www.asiarchitectural.com
   2) CertainTeed, www.certainteed.com/wood-ceilings

2.2 WOOD CEILINGS

A. Wood Ceiling System Type – "Wood" - WoodWorks Grille Forté Veneer Ceiling Panels, by Armstrong World Industries, Inc.
   1. Acceptable Product: WoodWorks Grille Forté Veneered Panels –items 6333L_ S14-S17, 6334L_S14-S14, 6335L _S14_S17, 6336L_S14-S16 as manufactured by Armstrong World Industries.
   2. Surface Texture: Smooth
   3. Composition: Real wood veneer on fire rated particle board
   4. Finish(s): Real Wood Veneer, to be selected by Owner/Architect from the options below.
      a. Plain Slice White Maple (NWM)
      b. Plain Slice White Ash (NWA)
      c. Plain Slice White Oak (NOK)
      d. Plain Slice Cherry (NPC)
      e. Plain Slice Walnut (NWN)
      f. Quartered Mahogany (NQM)
      g. Quartered Sapele (NQS)
      h. Quartered Walnut (NQW)
      i. Rift White Oak (NRO)
      j. Vertical Grain Fir (NVF)
   5. Panel Width: 12-inch

6. Panel Length Size(s): With 1” reveal panel to panel @ length, as indicated on drawings or approved shop drawings.
    a. 48-inch (Nominal): 47-inch (Actual)
    b. 72-inch (Nominal): 71-inch (Actual)
    c. 96-inch (Nominal): 95-inch (Actual)
7. Slat Width 3/4-inch:
8. Height – Number of Slats (Spacing) [item#]
    a. 2-1/2” – 3 Slats (3-1/4”) [6333L_S14---], 4 Slats (2-1/4”) [6334L_S14---], 5 Slats (1-5/8”) [6335L_S14---], 6 Slats (1-1/4”) [6336L_S14---]
    b. 3” – 3 Slats (3-1/4”) [6333L_S15---], 4 Slats (2-1/4”) [6334L_S15---], 5 Slats (1-5/8”) [6335L_S15---], 6 Slats (1-1/4”) [6336L_S15---]
    c. 3-1/2” – 3 Slats (3-1/4”) [6333L_S16---], 4 Slats (2-1/4”) [6334L_S16---], 5 Slats (1-5/8”) [6335L_S16---], 6 Slats (1-1/4”) [6336L_S16---]
    d. 4” – 3 Slats (3-1/4”) [6333L_S17---], 4 Slats (2-1/4”) [6334L_S17---], 5 Slats (1-5/8”) [6335L_S17---]
9. Acoustical Performance Infill Options:
    a. Calla Square Layin panel - Item 2820BK – NRC 0.85, CAC 35
    b. School Zone Fine Fissured - Item 1713BL – NRC 0.70. CAC 35
    c. Back Stage Noir - Item 1318 - NRC 0.75, CAC 30
    d. BioAcoustic Infill Panes - Item 5823 or 6657 – NRC 0.75, CAC N/A
10. Flame Spread:
    a. Class A: ASTM E84 surface burning characteristics. Flame Spread Index 25 or less. Smoke Developed Index 50 or less.
    b. CAN/ULC S102 surface burning characteristics. Flame Spread Rating 25 or less. Smoke Developed Classification 50 or less.
11. Accessories:
    a. Backer Clip - item 5687
    b. Flat Backer Kit - item7920GBL
    c. Heavy Duty Wall Anchor – item 7100

2.3 SUSPENSION SYSTEMS

A. Components: All main beams and cross tees shall be commercial quality hot dipped galvanized steel as per ASTM A653. Main beams and cross tees are double-web steel construction with 15/16-inch type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
    1. Structural Classification: ASTM C635 (Heavy Duty).
    2. Color: Tech Black.
    3. Acceptable Product: Prelude XL 15/16" Exposed Tee Main beam item 7301BL, Prelude XL Exposed Tee item XL7341BL, Prelude XL Exposed Tee 2’ item XL7328BL as manufactured by Armstrong World Industries, Inc.

B. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

C. Wire for Hangers and Ties: ASTM A641, Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least times-three design load, but not less than 12 gauge.

D. Accessories/Edge Moldings and Perimeter Trim:
    1. 7/8” Angle Wall Molding - item7800BL
    2. 4” Veneered Trim with 4 Clips – item 6481F07W1H4---(Finish Suffix)
    3. 6” Veneered Trim with 4 Clips – item 6481F07W1H6---(Finish Suffix)
    4. 8” Veneered Trim with 4 Clips – item 6481F07W1H8---(Finish Suffix)

5. Replacement Trim Clip – item 5925
6. Adjustable Trim Clip – item 7239
7. Axiom Vector Straight Trim - Recommend in Black 6” and up – AX_STR (Finish)
8. Axiom Vector Curved Trim - Recommend in Black 6” and up – AX_Cur (Finish)
9. WoodWorks Edgebanding – item 6408---(Finish Suffix)

2.4 WOOD WALL PANEL UNITS

A. Wall Panels Type AP-1:
   1. Surface Texture: Smooth
   2. Composition: Real wood veneer on fire rated particle board
   3. Finish(s): Real Wood Veneer
      a. Plain Slice White Maple (NWM)
      b. Plain Slice White Ash (NWA)
      c. Plain Slice White Oak (NOK)
      d. Plain Slice Cherry (NPC)
      e. Plain Slice Walnut (NWN)
      f. Quartered Mahogany (NQM)
      g. Quartered Sapele (NQS)
      h. Quartered Walnut (NQW)
      i. Rift White Oak (NRO)
      j. Vertical Grain Fir (NVF)

B. Panel Width: 12-inch

C. Panel Length Size(s): With 1” reveal panel to panel @ length
   1. 48-inch (Nominal): 47-inch (Actual)
   2. 72-inch (Nominal): 71-inch (Actual)
   3. 96-inch (Nominal): 95-inch (Actual)

D. Panel Length Size(s): 48-inch, 72-inch, 96-inch (Nominal): 47-inch, 71-inch, 95-inch (Actual) With 1” reveal panel to panel @ length
   1. Slat Width 3/4-inch:

E. Height – Number of Slats (Spacing) [item#]
   1. 2-1/2” – 3 Slats (3-1/4”) [6333L_S14---], 4 Slats (2-1/4”) [6334L_S14---]

F. Flame Spread:
   1. Class A: ASTM E84 surface burning characteristics. Flame Spread Index 25 or less. Smoke Developed Index 50 or less.
   2. CAN/ULC S102 surface burning characteristics. Flame Spread Rating 25 or less. Smoke Developed Classification 50 or less.

G. Acceptable Product: WoodWorks Grille- Forté Veneered Panels – items 6333L_ S14--- and 6334L_ S14---, as manufactured by Armstrong World Industries.

2.5 ACCESSORY PRODUCTS

A. Acoustic Blanket Insulation:
   1. Basis of Design product: SelectSound Acoustic Blanket by Owens Corning
      a. Provide product listed or equal product by other manufacturer approved by Architect and meeting all requirements in this section.
   2. UL 723 - Test for Surface Burning Characteristics of Building Materials. Flame spread 25, smoke developed 50 (Class A).

3. Black mat faced finish
4. Thickness: 2 inches
5. Standard density of 2.0 pcf.
6. Water vapor sorption - by weight (Tested to ASTM C1104): <3% at 120°F (49°C) at 95% relative humidity
7. Fungi resistance: Meets all requirements of ASTM C1338

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out.

B. Proper designs for both supply air and return air, maintenance of the HVAC filters and building interior space are essential to minimize soiling. Before starting the HVAC system, make sure supply air is properly filtered and the building interior is free of construction dust.

C. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of linear wood to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width pans at borders, and comply with layout shown on reflected ceiling plans.

B. Measure each wall area and establish layout of acoustical units to balance border widths at opposite edges of each wall. Avoid use of less than half width units at borders and comply with wall elevations. Coordinate panel layout with mechanical and electrical fixtures.

C. Coordinate panel layout with mechanical and electrical fixtures.

3.3 INSTALLATION, GENERAL

A. General: Install WOOD panel ceilings to comply with UBC Standard 25-2 and seismic requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Ensure environmental conditions conform to the manufacturer’s written instructions.
   1. Unless otherwise indicated by the manufacturer, install the veneered wood panels in temperature conditions between 50 degrees F and 86 degrees F, in spaces where the building is enclosed, and HVAC systems are functioning and will be in continuous operation. Relative humidity should not fall below 25 percent or exceed 55 percent.

C. Install the suspension system and panels in compliance with ASTM C636, ASTM E580, with the approval of the authorities having jurisdiction, and in accordance with the manufacturer’s written installation Instructions.

1. Suspend ceiling hangers from building's structural members and as follows:
   a. The ceiling system shall be suspended by T-grid with main runners on 2’ centers and cross T’s every 4’
   b. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
   c. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
3. Secure wire hangers to ceiling suspension members and supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
4. Fasten hangers to cast-in-place hanger inserts, post installed mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
5. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.

D. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Provide 2” black acoustic blanket insulation continuously over the top of each wood grille panel section. Cut insulation blankets so edge of insulation is set back 1” from edge of each section of wood grille ceiling. Insulation shall not overhang edges of ceiling or be suspended over spaces between sections of wood grille ceiling.

F. Interior veneered wood panels are designed for installation in temperature conditions between 50 degrees F and 86 degrees F, in spaces where the building is enclosed, and HVAC systems are functioning and will be in continuous operation. Relative humidity should not fall below 25 percent or exceed 55 percent.

3.4 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.

B. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 095426 – ACOUSTIC BAFFLES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general conditions of the contract, including general and supplementary conditions and division 1 specification sections, apply to the work of this section.

1.2 SUMMARY

A. Section includes:

1. Sound absorptive PET ceiling mounted baffles.

B. Related sections
1. Section 034100 - Precast Structural Concrete
2. Section 055000 - Metal Fabrications
3. Section 095113 – Acoustical Panel Ceilings
4. Section 09900 – Painting

1.3 SUBMITTALS

A. Product Data: Manufacturer’s technical data and installation instructions for each type of ceiling baffle required.

B. Certifications: Certified test reports showing compliance with performance requirements specified.

C. Samples: Submit a minimum of three (3) samples of each panel type and finish type required. Include samples that show the range of variation expected in grain, texture and color.

D. Shop Drawings: Submit shop drawings, including details, for all suspended baffles. Coordinate ceiling baffle layout, installation and suspension system components. Show overall layout with dimensions and details of penetrations and intersections with other materials or building components.

E. Submit operation and maintenance data for installed products. Include precautions relating to harmful cleaning materials and methods that would affect the service life of the baffles.

F. Independent testing agency test reports.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility: Provide acoustic baffles from a single manufacturer with at least 5 years of prior experience fabricating projects of similar size and complexity.

B. Installer: Installation shall be done by qualified carpenters with at least 2 years experience in the installation of architectural woodwork or acoustical ceilings. Installers must receive training on handling, cutting, machining and field finishing the specified product prior to receiving materials on site.

C. Fire Performance Characteristics: Class A as tested by an independent accredited testing facility. Tests: ASTM E84. Flame spread: 25 or less. Smoke developed: 450 or less as specified by state or local codes.

D. Coordination of Work: Installing contractor shall organize and conduct a pre-installation survey of temperature, humidity and construction elements attaching, penetrating or concealed behind the acoustic baffles.

1.7 REFERENCES

A. Test Methods:

1. ASTM C423 Sound absorption and sound absorption coefficients by the reverberation room method performed by an independent testing agency
2. ASTM E84 Standard test method for surface burning characteristics of building materials
3. ASTM D1037 Linear expansion with change in moisture content.
4. ASTM C1338 Standard Test Method for Mold and Fungal Resistance of Building Materials.

1.8 PERFORMANCE REQUIREMENTS

A. Acoustical Absorption: Perform testing in accordance with ASTM C 423, Type J mounting method unless otherwise specified.

B. Flame Spread Rating: Provide all components with Class A flame spread rating when tested in accordance with ASTM E 84, unless otherwise specified.

C. Mold and Fungal Resistant: Provide testing in accordance with ASTM C1338 showing material passes Mold and Fungal resistance testing.

1.9 DELIVERY, STORAGE AND HANDLING

A. Deliver baffles to the project in original, unopened packages. Inspect containers for visible damage and report any questionable condition to the shipper and manufacturer immediately.

B. Store products in a fully enclosed, clean, dry space out of direct sunlight and protected from damage with temperature controlled between 50 and 86 degrees F.

C. Handle products carefully to avoid damaging baffle surfaces or chipping edges. Report any damage immediately. Installation of damaged baffles is not covered by the manufacturer’s warranty.

1.10 PROJECT CONDITIONS

A. Do not install acoustic ceiling baffles until space is enclosed and weather-proofed, wet work is completely dry and ambient temperature and humidity conditions are maintained at the levels indicated for the project when occupied for its intended use.

B. Permit baffles to reach room temperature, 50 to 86 degrees F, and stabilized moisture content of 25% to 55% RH for at least 72 hours before installation per AWI standards. Building should be enclosed and HVAC systems functioning in continuous operation with relative humidity maintained between 25 and 55 percent.

1.11 WARRANTY

A. Provide manufacturer's standard one-year written product warranty per Section 017700 – Closeout Procedures

B. Manufacturer's warranty is limited to decorative or acoustical baffle materials only. Other components used in the ceiling system are excluded. Refer to the appropriate provisions in the related specification section.

1.12 MAINTENANCE

A. Maintenance Instructions: Provide manufacturer's standard maintenance and cleaning instructions for finishes provided.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Basis of Design Manufacturer:

1. G&S Acoustics; 3555 Scarlet Oak Blvd., St. Louis, MO 63122. ASD. Tel: (636) 225-8800 or (800) 737-0307. Email: inquiry@gsacoustics.com. www.gsacoustics.com.

2. Contractor may submit equal products by other manufacturers complying with all requirements listed in this section, and complying with the procedures as described in Section 016200 – Product Options

2.2 MATERIALS

A. Acoustical Baffles: aCapella Chorus Baffles (ACB) , 100% PET 12 pcf Polyester core with integral color throughout, suspended from ceiling, as follows:

1. Core Thickness: .5 inches (12 mm);

2. NRC: .95

3. Size: Size up to 9'w x 2' h, Sizes as noted on drawings.

4. Color: To be selected from manufacturer's full standard range of colors and patterns.

5. Edges: Square

6. Corners: Square

7. Bottom edge design: Wave

8. Mounting Chorus grouped Baffles

9. G&S Grip5 attached to G&S C-Tube 1 ¼" x 1 ¼" aluminum tubing with D-rings for suspension, four points of suspension for each group of baffles

B. ACCESSORIES

1. Mounting: Connection to ceiling above not included in this specification section.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Inspect installation area and conditions under which work is to be performed for compliance with all manufacturer's environmental requirements. All wet work in the installation area must be complete, cured and dry prior to installation. Do not proceed until all unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Installation must be done by qualified installers with 2 years' experience in the installation of acoustic ceilings. The firm must demonstrate successful experience installing materials of similar type and quality of those required for this project. The use of proper carpentry tools and techniques will be required for the installation.

B. Comply with manufacturer's instruction and recommendations for hanging baffles.

1. For suspended grid, install adjustable coupler, suspension cable, and choice of grid mounting hardware.

2. For direct mount, install using direct cable suspension with adjustable coupler, suspension cable, and panel anchors.

C. Confirm all field dimensions are coordinated with shop drawings.

3.3 ADJUSTING AND CLEANING

A. Clean soiled surfaces of baffles per manufacturer's instructions.

B. Remove and replace damaged or discolored materials not in compliance with manufacturer's tolerances.

END OF SECTION

SECTION 096516 - RESILIENT HOMOGENEOUS VINYL SHEET FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Technical Specifications Sections may apply to this Section even when not specifically referenced.

1.2 SUMMARY

A. This Section includes the following:

1. Resilient Homogeneous Vinyl Sheet Flooring. (Note: This product is for Alternate #3 – Great Room Flooring.)

2. Installation Accessories.

B. Related Sections

1. Section 033000 – "Cast-in-Place Concrete" for poured concrete floor substrate.

2. Section 07 92 00 - Joint Sealants: Rod and sealant at construction, control and expansion joints in masonry.

3. Section 096513 – "Resilient Base and Accessories" for wall base, floor transition (reducer) strips and stair finishing accessories.

1.3 REFERENCES

A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source

B. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials

C. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

D. ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

E. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

F. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

G. NFPA 258 Standard Test Method for Measuring the Smoke Generated by Solid Materials

1.4 QUALITY ASSURANCE

A. Single-Source Responsibility: provide types of flooring and accessories supplied by one manufacturer, including moisture mitigation systems, primers, leveling and patching compounds, and adhesives.

B. Installer Qualifications: Minimum two years' experience and completed at least three projects of similar magnitude, material, and complexity. Upon request, provide project references including contact names and telephone numbers for three projects. An installer is "qualified" if trained by the manufacturer or a certified INSTALL (International Standards & Training Alliance) resilient floor covering installer.

C. Mockups: Provide resilient products with mockups specified in other Sections.

D. Fire Performance Characteristics: Provide resilient vinyl composition tile flooring with the following fire performance characteristics as determined by testing material in accordance with ASTM test methods indicated below by a certified testing laboratory or other testing agency acceptable to authorities having jurisdiction:

1. ASTM E 648 Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I
2. ASTM E 662 (Smoke Generation) Maximum Specific Optical Density of 450 or less

E. Pre-Installation Testing: Conduct and document pre-installation testing as specified by manufacturer in accordance with the latest version of the specified test methods.

1. Substrate Porosity Testing: ASTM F 3131 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.
2. pH testing: ASTM F 710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
3. Bond Testing: Conduct testing and document results in accordance with the manufacturer's recommendations.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification:

1. 12" x 12" samples of each color and pattern of flooring is required.

C. Submit shop drawings show floor patterns, seaming plan, extent of installation, and transitions.

D. Qualification Data: For qualified Installer.

E. Maintenance Data: For resilient products to include in maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in original, unopened containers labeled with manufacturer's name, brand, pattern, color and run number.

B. Inspection: Inspect all deliveries to ensure undamaged goods, and for accurate product type for thickness, edge type, color, and speckle. Contact manufacturer immediately if product is damaged or inconsistent with order specifications.

C. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 55 deg F or more than 90 deg F.

D. Flooring material and adhesive (if required) shall be acclimated to the installation area for a minimum of 24 hours prior to installation. See manufacturer's installation guidelines for details on proper acclimation procedures. Longer acclimation may be required if product has been stored for extended time periods.

1.7 PROJECT CONDITIONS

A. Environmental Requirements/Conditions:
   1. Install resilient products after other finishing operations, including painting, have been completed.
   2. Areas to receive material should be clean, fully enclosed and weather tight. The permanent HVAC should be fully operational and controlled and set at a minimum temperature of 65 F (18.3° C). If this is not possible, the areas should be acclimated and controlled by means of temporary HVAC to the service level conditions expected during occupancy. The temperature and humidity should range from 75° F ± 10°F (23.9° C ± 5.5° C) with a 50% ± 10% ambient relative humidity. These conditions **MUST** be established at least seven days prior to beginning the installation, maintained during the installation, and continued for at least seven days following the installation.
   3. The flooring material should be conditioned in the same manner for at least 48 hours prior to the installation.
   4. Substrate evaluation and preparation should not begin until a stable, conditioned environment has been established as described in this section.
   5. Areas to receive flooring must have adequate lighting to allow for proper inspection and preparation of the substrate, installation of the flooring and final inspection.

B. Temperature Requirements: Maintain air temperature in spaces where products will be installed for time period before, during, and after installation as recommended by manufacturer.
   1. Temperature Conditions: 65 F (18.3° C) for at least seven days prior to beginning the installation, maintained during the installation, and continued for at least seven days following the installation.

C. Maintain the ambient relative humidity between 40% and 60% during installation.

D. Substrate Conditions:
   1. Concrete Curing: Do not install flooring over concrete substrates until substrates have cured and are dry to bond with adhesive as determined by the concrete and flooring manufacturer's recommendations.
   2. Testing Results: Conduct and document pre-installation testing as specified by manufacturer in accordance with the latest version of the specified test methods.
      a. Substrate Porosity Testing: ASTM F 3131 – Standard Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.
      b. pH testing: ASTM F 710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
      c. In-situ Relative Humidity Testing: ASTM F 2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
      d. Calcium Chloride Testing: ASTM F 1869 – Standard Test Method for Measuring Moisture Vapor Emissions Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
      e. Surface Moisture Testing: ASTM F 2659 – Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and other Floor Slabs and Screeds Using a Non- Destructive Electronic Moisture Meter.
      f. Bond Testing: Conduct testing and document results in accordance with the manufacturer’s recommendations.

E. Close spaces to traffic during installation.

F. Close spaces to traffic for 48 hours after installation.

G. Install resilient products after other finishing operations, including painting, have been completed.

H. Where demountable partitions and other items are indicated for installation on top of resilient flooring material, install flooring material before these items are to be installed.

I. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 85 deg F (29 deg C).

1.8 WARRANTY

A. Warranty Period: Manufacturer's standard 10 Year Warranty against manufacturing defects.

1.9 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Vinyl Floor Sheet: Furnish an additional 3% of the flooring sheet product in each color/finish installed.

PART 2 - PRODUCTS

A. **RESILIENT SHEET FLOORING**

B. Basis-of-Design Product: IQ HOMOGENOUS VINYL SHEET FLOORING WITH PUR, by Tarkett North America, Phone: (800) 899-8916, 30000 Aurora Rd. (440) 543-8916, Solon, Ohio 44139, Web: www.tarkettna.com

1. Subject to compliance with all requirements, provide either the named product or a comparable product by one of the other manufacturers specified.
   a. Burke Mercer Flooring Products, Division of Burke Industries Inc
   b. Armstrong Commercial Flooring
   c. Mannington Commercial Flooring

2. All proposed substitutions shall provide all colors matching those indicated in the drawings. The Architect shall be the final arbiter for all proposed color matches and intended aesthetic effect. Substitutions not providing colors that are judged by the Architect as not providing satisfactory matches to those specified shall be rejected.

C. Sheet Standard: ASTM F1913, Standard Specification for Vinyl Sheet Floor Covering Without Backing.

D. Colors and Patterns: To be selected by Architect from manufacturer’s full range of standard colors and patterns.

E. Thickness/Wearlayer: 0.080 inch (2.0 mm).

F. Sheet size: To be selected by Architect from the full range of manufacturers standard sizes.

G. Test data:

1. Flexibilty (ASTM F137): Passes
2. Chemical Resistance (ASTM F925): Passes
3. Static Load Limit (ASTM F970): Passes 250 psi
4. Resistance to Heat (ASTM F1514): $\Delta E \leq 8$

5. Resistance to Light (ASTM F1515): ΔE ≤ 8
6. Residual Indentation (ASTM F1914): Passes
7. Static Coefficient of Friction (ASTM D 2047): ≥ 0.5 SCOF
8. Flammability (ASTM E648, Critical Radiant Flux): Class 1 (≥ 0.45 W/cm

H. Limited Commercial Warranty: 20 years

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement- or blended-hydraulic-cement-based formulation provided or approved by flooring manufacturer for applications indicated.

B. Liquid Applied Vapor Retarder Membrane at existing concrete slabs on grade:

1. Basis-of-Design Product: Subject to compliance with manufacturer's requirements, provide UZIN, a brand of Uzin Utz North America, Inc.; PE 460 or comparable product by one of the following:

   a. ARDEX Americas
   b. KOSTER American Corporation
   c. MAPEI Corporation.
   d. Schonox HPS North America

2. MVE-Control System: ASTM F3010-qualified, fluid-applied, two-component, 100 percent solids epoxy-resin, membrane-forming system; formulated for application on concrete substrates to reduce MVER to level required for installation of floor coverings indicated and acceptable to manufacturers of floor covering products indicated, including adhesives

   a. Water-Vapor Transmission: 0.1 perm (5.72 ng/s x sq. m x Pa) in accordance with ASTM E96/E96M

3. Acrylic Primer: UZIN PE 280, bonding agent directly applied to epoxy-based primer/moisture vapor retarders.

C. Adhesives: Water-resistant type recommended by manufacturer to suit floor covering and substrate conditions indicated.

1. Low-Emitting Materials: Adhesives shall have a VOC content of **50** g/L or less.
2. Low-Emitting Materials: Adhesives shall comply with Green Seal's GS-36 and with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
3. Provide a means to control adhesive odors.

D. Provide transition/reducing strips tapered to meet abutting materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions,

scale, and foreign deposits that might interfere with adhesion of resilient products. Where substrates do not comply with tolerances and other requirements, correct, and prepare substrate as necessary.

2. Proceed with installation only after unsatisfactory conditions have been corrected.

3. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

B. Visually inspect flooring materials, adhesives, and accessories prior to installation. Flooring material with visual defects shall not be installed and shall not be considered as a legitimate claim

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.

B. Concrete Substrates:

1. New or existing concrete subfloors shall meet the guidelines of the latest edition of ACI 302 and ASTM F 710, “Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

2. Verify that substrates are dry and free of curing compounds, sealers, and hardeners dust, solvent, paint, wax, oil, grease, residual adhesive, adhesive removers, film-forming curing compounds, silicate penetrating or parting compounds, alkaline salts, excessive carbonation or laitence, mold, mildew, and other foreign materials that may affect dissipation rate of moisture from the concrete, discoloration or adhesive bonding.

3. Mechanically remove contamination on the substrate that may cause damage to the resilient flooring material. Permanent and non-permanent markers, pens, crayons, paint, etc., must not be used to write on the back of the flooring material or used to mark the substrate as they could bleed through and stain the flooring material.

4. Do not use curing compounds in concrete substrate. If present they can interfere with the bond of the adhesive to the concrete.

5. Concrete floors shall be flat: 3/16" in 10 ft.

6. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer on concrete floors regardless of their age or grade level. pH of concrete sub-floor shall not be greater than 10. Proceed with installation only after substrates pass testing.

7. Moisture Testing: Perform tests recommended by manufacturer in accordance with ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride or ASTM F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes. on concrete floors regardless of their age or grade level. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb. of water/1000 sq. ft. in 24 hours.

8. Perform all other tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

C. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.

D. Floor covering shall not be installed over expansion joints.

E. Installation of Liquid Applied Vapor Retarder Membrane on Existing Concrete Slabs on Grade:

1. Concrete Substrates: Prepare and clean substrates in accordance with MVE-control system manufacturer's written instructions to ensure adhesion of system to concrete.
    a. Remove coatings and other substances that are incompatible with MVE-control system and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by MVE-control system manufacturer. Do not use solvents.
    b. Provide concrete surface profile complying with ICRI 310.2R CSP 3 by shot blasting using apparatus that abrades the concrete surface with shot, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
    c. After shot blasting, repair damaged and deteriorated concrete in accordance with MVE-control system manufacturer's written instructions.
    d. Before installing MVE-control systems, broom sweep and vacuum prepared concrete.
2. Install MVE-control system in accordance with ASTM F3010 and manufacturer's written instructions to produce a uniform, monolithic surface free of surface deficiencies such as pin holes, fisheyes, and voids
3. Install cementitious underlayment over cured membrane if required to maintain manufacturer's warranty in thickness required to maintain the warranty.

F. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
    1. Do not install resilient products until they are same temperature as space where they are to be installed.

G. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 RESILIENT SHEET FLOORING INSTALLATION

A. Install flooring in strict accordance with the latest edition of the manufacturer’s written installation instructions for each product used.

B. Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.

C. Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.

D. Resilient Sheet Flooring:
    1. Install with manufactuer’s adhesive specified for the site conditions and follow adhesive label for proper use.
    2. Install rolls in sequential order following roll numbers on the labels.
    3. Reverse non-pattern sheets as referenced in the Tarket Installation Instructions.
    4. Roll the flooring in both directions using a 100 pound three-section roller.
    5. Vinyl sheet flooring must be welded.
    6. Note: It is recommended to heat weld seams to provide a more watertight seam.
    7. Tarkett Resilient Sheet Flooring may be flash coved.

a. Use Johnsonite CFS-00-A Cove Filler Strip.
b. Net fit flooring material into the appropriate Johnsonite cove cap.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient product.

B. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.
    a. Do not wash surfaces until after time period recommended by manufacturer.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

D. No traffic for 24 hours after installation.

E. No heavy traffic, rolling loads, or furniture placement for 72 hours after installation.

F. Wait 72 hours after installation before performing initial cleaning.

G. A regular maintenance program must be started after the initial cleaning. Cover products installed on horizontal surfaces with undyed, untreated building paper until Substantial Completion.

H. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION

SECTION 09 65 65 – INDOOR RESILIENT ATHLETIC SURFACING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Supply and installation of the indoor resilient surfacing in shelter/mezzanine.
   2. Application of the game lines (if shown on drawings).
   3. References for the correct construction and preparation of concrete slabs to receive resilient flooring.

B. Related Sections include the following:

   1. Division 3 Section “Cast-in-Place Concrete”.

   2. Section 09 65 13 – Resilient Base and Accessories

C. System Description:

   1. A resilient athletic sports flooring system composed of: a moisture and vapor underlayment layer, and a composite multi-layer system with a high-cell density cushion layer, a performance layer, and a vinyl wear layer meeting ASTM F1303 (Grade 1) and achieving Class 3 shock absorption.

1.3 REFERENCE STANDARDS

A. ASTM F710 “Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring”.

B. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

C. ASTM D412-16(2021) “Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension”.

D. ASTM F970-22 “Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading”.

E. ASTM F925-13(2020) “Standard Test Method for Resistance to Chemicals of Resilient Flooring”.

F. ASTM C423-22 “Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method”.

G. ASTM E492-09(2016)e1 “Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine”.

H. ASTM C518-21 “Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus”

I. ASTM D8397-22 “Standard Specification for Acrylic and Reactive Adhesives for Installation of Vinyl and Rubber Floor Coverings”

J. ACI 117 “Specification for Tolerances for Concrete Construction and Materials”

K. ACI 302.2R-06 “Guidelines for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials” for concrete design and construction.

1.4 SUBMITTALS

A. General: Submit in accordance with applicable Division 1 Requirements.

B. Product Data:
1. Manufacturer’s promotional brochures, specifications, product maintenance, colors/finish options, and installation instruction including warranties, certifications, qualifications, product data, test results, environmental requirements, performance data, etc.

C. Samples:
1. Submit for selection and approval three (3) sets of the indoor resilient multipurpose surfacing, manufacturer’s brochures, samples or sample boards of all of the available colors, textures and styles.
2. Submit color samples of all the available game line paint colors for selection and approval.

D. Shop Drawings:
1. Indicate seams, game line layout, locations and sizes of special graphics, floor mounted items, and equipment anchors. Note colors and thickness of game lines and graphic inserts.

E. Closeout Submittals:
1. Submit the indoor resilient multipurpose surfacing and manufacturer’s maintenance instructions.
2. Submit the material and installation warranties as specified.

1.5 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish 1%, of each resilient athletic flooring product, color, and pattern installed. Products shall be clearly marked indicating manufacturer's name, product name, product number, product color and pattern.

2. Supply roll goods in full widths, in an upright position, with roll wrapped in a protective cover to prevent damage.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain resilient flooring system components through one source from a single manufacturer

B. Qualifications:
1. The indoor resilient multipurpose surfacing shall have been actively marketed for a minimum of five (5) years.
2. The indoor resilient multipurpose surfacing shall be manufactured in an ISO 9001 certified plant.
3. The indoor resilient multipurpose surfacing supplier shall be an established firm, experienced in the field, and competent in the techniques required by the manufacturer.
4. The installer of the indoor resilient multipurpose surfacing shall have a minimum of five (5) years of experience in the field installing indoor resilient multipurpose surfacing and have worked on at least five (5) projects of similar size, type and complexity.

C. Certifications:

1. Installer to submit the indoor resilient athletic surfacing manufacturers or distributor's certification attesting that they are an approved installer of the indoor resilient multipurpose surfacing.

D. Testing:
1. Tests shall be relative for multi-purpose use with certificates from independent testing resources to be made available upon request. Test results shall be no more than 5 years old and performed according to ASTM and/or EN standard testing procedures.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Material shall not be delivered until all related work is in place and finished and/or proper storage facilities and conditions can be provided and guaranteed stable according to Tarkett recommendations.

B. Storage: Protect materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with the manufacturer's written instructions for handling, storing, and protecting during installation.
1. Store the material in a secure, clean and dry location.
2. Maintain storage temperature between 55° and 85° Fahrenheit.
3. Store the indoor resilient athletic surfacing on a clean flat surface.
4. Do not stack rolls.

C. Handling: Handle materials to avoid damage. When installing or otherwise handling these products, wear PPE and take protective measures, as described in the manufacturer's SDS.

1.8 PROJECT/SITE CONDITIONS

A. It is the responsibility of the construction manager (CMaR) to maintain project/site conditions acceptable for the installation of the indoor resilient multipurpose flooring.

B. The area in which the indoor resilient multipurpose surfacing will be installed shall be dry and weather tight. Permanent heat, light and ventilation shall be installed and operable.

C. All other trades shall have completed their work prior to the installation of the resilient athletic flooring. The general contractor or construction manager shall maintain a secure and clean working environment before, during and after the installation.

D. Maintain a stable room temperature of at least 65°F for a minimum of one (1) week prior to, during and thereafter installation.

E. An effective low-permeance vapor barrier is placed directly beneath the concrete subfloor. For "on" or "below grade" installations, it is recommended to provide a permanent vapor barrier resistant to long term hydrostatic pressure/moisture exposure. Protrusions should be sealed to prevent moisture migration into the slab. Moisture should not be allowed to enter the slab after the completed construction.

F. Concrete subfloor surface pH level within the 7 to 11 range dependent upon installation type.

G. Concrete subfloor should be no greater than 1/8" within a 10 ft diameter. This tolerance can be measured in accordance with ASTM E1155. A specified (FF) of 50 and an (FL) of 30 should reach this degree of floor flatness and floor level. There is no numerical correlation between F numbers and the deviation from the straight edge. However, the above specified numbers should achieve a flat floor with minimal deviation in the slab. Reference ACI 117 and ACI 302.1R. The general contractor should provide a certificate of compliance with the above recommendations.

H. Concrete subfloor must be clean and free of all foreign materials or objects including, but not limited to, curing compounds and sealers.

I. Fill cracks, grooves, voids, depressions, and other minor imperfections. Follow the manufacturer's directions. Moveable joints must be treated utilizing specific transitioning

joint devices depending upon the architect's recommendations. Follow current ASTM F710 guidelines for the preparation of concrete slabs to receive resilient flooring.

J. Refer to ACI 302.2R "Guidelines for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials" for concrete design and construction.

K. Concrete slab shall be fortified with continual steel reinforcement. Fiber reinforcement alone shall not be considered adequate fortification.

1.9 WARRANTY

A. Material Warranty: Material warranty must be from the product manufacturer.
   1. The indoor resilient athletic surfacing shall be covered by the manufacturer against product defects for 3 years.

B. Installer's Limited Warranty:
   1. Installer's standard form in which installer agrees to repair or replace sports flooring that fails due to poor workmanship or faulty installation within 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The basis of the design for the indoor resilient multipurpose surfacing is Dropzone Speckle, as manufactured by FieldTurf USA, Inc./Tarkett.
   1. All other installation accessories and related components must be either made or approved by the indoor resilient athletic surfacing manufacturer.

B. Other products may be approved as equal if deemed qualified and submitted in accordance with the General Conditions.

C. Test reports confirming compliance from an independent sports laboratory must be provided along with samples, technical data, installation, maintenance, and warranty prior to acceptance as an alternative product.

2.2 MATERIALS

A. General: Provide materials that comply with requirements and with referenced standards.

B. Dropzone Speckle Roll Flooring, 8mm recycled non-laminated rubber flooring.
   1. Field constructed products will not be accepted.

C. Physical properties of the indoor resilient athletic surfacing shall conform to the following minimums:

Width	…….	Roll Width 4ft – Tile 2ft x 2ft
Length	…….	Specify length (min. 15 ft)
Total Thickness	…….	8 mm
Weight	…….	1.92 lbs/sq.ft.
Tensile Strength	ASTM D412	200 minimum
Static Load	ASTM F970	1000 p.s.i (modified test)
Coefficient of Friction	ASTM 2047	>.9
Chemical Resistance	ASTM F925	Excellent
Ambient Noise Reduction	ASTM C423	.10
Impact Sound Insulation	ASTM E492	.45 minimum
Thermal Conductivity	ASTM C518	Approximate .406
Sound Transmission	ASTM 413	.45 minimum

VOC Emissions	SCS-105 Version 4.2 – 2023	FloorScore® certified by SCS Global Services.

D. Design
   1. Color: As available from the indoor resilient athletic surfacing manufacturer's full standard range.
   2. Texture: Texture to remain consistent throughout flooring product.

E. Adhesive: As approved and available by the indoor resilient athletic surfacing manufacturer.

F. Game Line Paint and Primer: As approved by the indoor resilient athletic surfacing manufacturer. (If indicated on drawings.)

PART 3 - EXECUTION

3.1 EXAMINATION

A. It is the responsibility of the general contractor/construction manager to ensure that project/site conditions are acceptable for the installation of the indoor resilient athletic flooring.

B. Examine substrates and conditions, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.
   1. Verify that the area in which the indoor resilient athletic surfacing will be installed is dry and weather tight. Verify that permanent heat, light and ventilation are installed and operable.
   2. Verify that all other work that could cause damage, dirt and dust or interrupt the normal pace of the indoor resilient athletic flooring installation is completed or suspended.
   3. Verify that there is a stable room temperature of at least 65°F.
   4. Verify that there are no foreign materials or objects on the subfloor and that the subfloor is clean and ready for installation.
   5. Direct Full Spread Adhering to Concrete Subfloor: moisture content less than 98 % RH when tested per ASTM F2170. Use only manufacturer's recommended Multi-Poxy adhesive.
   6. If both tests are performed, use the highest value. Do not average the results of the tests. Report all field test results in writing to the General Contractor/Construction Manager, Architect, and End User prior to installation.
   7. Verify that the concrete subfloor surface pH level is within the 7 - 9 range.
   8. Document the results confirming the slab is within manufacturer's tolerances for slab deviation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Sand the entire surface of the concrete slab, according to manufacturer's instructions, taking care not to damage the slab.
   1. Sweep the concrete slab so as to remove all dirt and dust. If a sweeping compound is to be used it must be a sweeping compound that does not contain oil or other items that may inhibit the adhesive bond. A HEPA vacuum may also be used to remove dust. Ensure dust does not become airborne.
   2. Remove dust from facility and dispose of slab dust and debris from sweeping and cleaning, meeting requirements of regulatory authorities.

B. Slab must be dust free. In the event that dust impairs adhesive bond, priming the slab prior to application of adhesive may be necessary. Follow installation guidelines.

C. Follow OSHA guidelines.

3.3 MOISTURE MITIGATION

A. A. For projects with moisture conditions higher than the specified tolerances, TARKOLAY (by Tarkett) may be used for conditions that do not 98% per ASTM F2170. Use only approved adhesive as directed by the manufacturer.

B. Tarkolay is available for roll goods only.

3.4 INSTALLATION

A. Comply with the manufacturer's written instructions applicable to products and application indicated.

B. The installation area shall be closed to all traffic and activity for a period to be set by the indoor resilient athletic surfacing installer. The indoor resilient athletic surfacing installation shall not begin until the installer is familiar with the existing conditions.

C. All necessary precautions should be taken to minimize noise, smell, dust, the use of hazardous materials and any other items that may inconvenience others.

D. Install Tarkolay in strict accordance with the indoor resilient athletic surfacing manufacturer’s written instructions, if above moisture threshold for direct application to concrete.

E. Install the indoor resilient athletic surfacing in strict accordance with the indoor resilient athletic surfacing manufacturer’s written instructions.

F. Install the indoor resilient athletic surfacing minimizing cross seams. Provide a seam diagram during the submittal process for approval prior to installation.

G. Confirm locations of all equipment. Coordinate locations of game lines with equipment. Paint game lines using approved game line paint primer and game line paint in strict accordance with the game line paint manufacturer’s instructions.

H. Install threshold plates or transition strips.

3.5 CLEANING

A. Remove all unused materials, tools, and equipment and dispose of any debris properly. Clean the indoor resilient athletic surfacing in accordance with the manufacturer’s instructions.

3.6 PROTECTION

A. Protect the indoor resilient athletic surfacing from damage using coverings approved by the manufacturer immediately after installation.

B. Protect installed flooring from damage due to harmful weather exposures, physical abuse, and other causes.

END OF SECTION

SECTION 09 65 66 – INDOOR MULTI-LAYER RESILIENT ATHLETIC SURFACING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Supply and installation of the indoor resilient multipurpose surfacing in shelter/gymnasium.
   2. Application of the game lines
   3. References for the correct construction and preparation of concrete slabs to receive resilient flooring.

B. Related Sections include the following:

   1. Division 3 Section “Cast-in-Place Concrete”.

   2. Section 09 65 13 – Resilient Base and Accessories

C. System Description:

   1. A resilient athletic sports flooring system composed of: a moisture and vapor underlayment layer, and a composite multi-layer system with a high-cell density cushion layer, a performance layer, and a vinyl wear layer meeting ASTM F1303 (Grade 1) and achieving Class 3 shock absorption.

1.3 REFERENCE STANDARDS

A. ASTM F710 “Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring”.

B. ASTM F410-08(2022) “Standard Test Method for Wear Layer Thickness of Resilient Floor Coverings by Optical Measurement”

C. ASTM F1303-04(2021) “Standard Specification for Sheet Vinyl Floor Covering with Backing”

D. ASTM F1516-13(2018) “Standard Practice for Sealing Seams of Resilient Flooring Products by the Heat Weld Method (when Recommended)”

E. ASTM F1303-04(2021) “Standard Specification for Sheet Vinyl Floor Covering with Backing”

F. ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

G. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

H. ASTM F2772-24 “Standard Specification for Athletic Performance Properties of Indoor Sports Floor Systems”

I. ACI 117 “Specification for Tolerances for Concrete Construction and Materials”

J. ACI 302.1R provides guidelines and recommendations on materials and slab construction.

K. ACI 302.2R “Guidelines for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials” for concrete design and construction.

1.4 SUBMITTALS

A. General: Submit in accordance with Division 1 Requirements.

B. Product Data:
   1. Manufacturer's promotional brochures, specifications, warranty, product maintenance, performance data, surface finish options, and installation instructions.

C. Manufacturer Certifications:
   1. Provide certification that accurately identifies the Original Equipment Manufacturer (OEM) of flooring furnished for this project including manufacturer's name, address and factory location.
   2. Suppliers of private label flooring for this project must identify themselves as such and fully disclose the OEM information listed above.
   3. All "manufacturer" requirements in these specifications must be complied with by the OEM, including warranties, certifications, qualifications, product data, test results, environmental requirements, performance data, etc.

D. Samples:
   1. Submit for selection and approval three (3) sets of the indoor resilient multipurpose surfacing, manufacturer's brochures, samples or sample boards of all of the available colors, textures and styles.
   2. Submit color samples of all the available game line paint colors for selection and approval.

E. Shop Drawings:
   1. Indicate game line layout, locations and sizes of special graphics, floor mounted items, and equipment anchors. Note colors and thickness of game lines and graphic inserts. Designate locations of gym equipment such as basketball hoops/backstop, volleyball standards, dividers, etc. (including overhead).

F. Closeout Submittals:
   1. Submit the indoor resilient multipurpose surfacing and manufacturer's maintenance instructions.
   2. Submit the material and installation warranties as specified.

1.5 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

   1. Floor Tile: Furnish 1%, of each resilient athletic flooring product, color, and pattern installed. Products shall be clearly marked indicating manufacturer's name, product name, product number, product color and pattern.

   2. Supply roll goods in full widths, in an upright position, with roll wrapped in a protective cover to prevent damage.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain resilient flooring system components through one source from a single manufacturer

B. Qualifications:
   1. The indoor resilient multipurpose surfacing shall have been actively marketed for a minimum of ten (10) years.
   2. The indoor resilient multipurpose surfacing shall be manufactured in an ISO 9001 certified plant.
   3. The indoor resilient multipurpose surfacing shall be manufactured in an ISO 14001 certified plant.

4. The indoor resilient multipurpose surfacing supplier shall be an established firm, experienced in the field, and competent in the techniques required by the manufacturer.
5. The installer of the indoor resilient multipurpose surfacing shall have a minimum of five (5) years of experience in the field installing indoor resilient multipurpose surfacing and have worked on at least five (5) projects of similar size, type and complexity.

C. Certifications:
1. Installer to submit the indoor resilient athletic surfacing manufacturer's or distributor's certification attesting that they are an approved installer of the indoor resilient multipurpose surfacing.
2. The ind**o**or resilient multipurpose surfacing manufacturer to submit official ISO 9001 certification for the facility in which the indoor resilient multipurpose surfacing is manufactured.

D. Testing:
1. Tests shall be relative for multi-purpose use with certificates from independent testing resources to be made available upon request. Test results shall be performed according to ASTM standard testing procedures including ASTM F2772 "Standard Specification for Athletic Performance Properties of Indoor Sports Floor Systems".

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Material shall not be delivered until all related work is in place and finished and/or proper storage facilities and conditions can be provided and guaranteed stable according to FieldTurf USA, Inc. recommendations.

B. Storage: Protect materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with the manufacturer's written instructions for handling, storing, and protecting during installation.
1. Store the material in a secure, clean and dry location.
2. Maintain storage temperature between 55° and 85° Fahrenheit.
3. Store the indoor resilient athletic surfacing rolls in an upright position on a smooth flat surface immediately upon delivery to jobsite.
4. Rolls shipped in rigid protective cardboard containers can be laid horizontally prior to unpacking and installation.

C. Handling: Handle materials to avoid damage. When installing or otherwise handling these products, wear PPE and take protective measures, as described in SDS.

1.8 PROJECT/SITE CONDITIONS

A. It is the responsibility of the construction manager (CMaR) to maintain project/site conditions acceptable for the installation of the indoor resilient multipurpose flooring.

B. The area in which the indoor resilient multipurpose surfacing will be installed shall be dry and weather tight. Permanent heat, light and ventilation shall be installed and operable.

C. All other trades shall have completed their work prior to the installation of the resilient athletic flooring. The general contractor or construction manager shall maintain a secure and clean working environment before, during and after the installation.

D. Maintain a stable room temperature of at least 65°F for a minimum of one (1) week prior to, during and thereafter installation.

E. An effective low-permeance vapor barrier is placed directly beneath the concrete subfloor. For "on" or "below grade" installations, it is recommended to provide a permanent vapor barrier resistant to long term hydrostatic pressure/moisture exposure. Protrusions should be sealed to prevent moisture migration into the slab. Moisture should not be allowed to enter the slab after the completed construction.

F. Concrete subfloor surface pH level within the 7 to 11 range dependent upon installation type.

G. Concrete subfloor should be no greater than 1/8" within a 10 ft diameter. This tolerance can be measured in accordance with ASTM E1155. A specified (FF) of 50 and an (FL) of 30 should reach this degree of floor flatness and floor level. There is no numerical correlation between F numbers and the deviation from the straight edge. However, the above specified numbers should achieve a flat floor with minimal deviation in the slab. Reference ACI 117 and ACI 302.1R. The general contractor should provide a certificate of compliance with the above recommendations.

H. Concrete subfloor must be clean and free of all foreign materials or objects including, but not limited to, curing compounds and sealers.

I. Fill cracks, grooves, voids, depressions, and other minor imperfections. Follow the manufacturer's directions. Moveable joints must be treated utilizing specific transitioning joint devices depending upon the architect's recommendations. Follow current ASTM F710 guidelines for the preparation of concrete slabs to receive resilient flooring.

J. Refer to ACI 302.2R "Guidelines for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials" for concrete design and construction.

K. Concrete slab shall be fortified with continual steel reinforcement. Fiber reinforcement alone shall not be considered adequate fortification.

1.9 WARRANTY

A. Special Limited Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace sports flooring including labor that fails within specified warranty period.

B. Material warranty must be from the product manufacturer.
   1. Material warranties must come from original manufacturer or division thereof. Private label warranties from distributors or brokers are not valid. Supply original point of manufacturing upon request. In the event Contractor fails to obtain the manufacturer's warranty, Contractor to provide the same.

C. Failures include, but are not limited to, the following:
   1. Material manufacturing defects.
   2. Surface wear and deterioration to the point of wear-through of wear layer per ASTM F410/ASTM F1303.
   3. Delamination and fading.

D. Warranty Period:
   1. For material defects and surface wear-through: 25 years from date of substantial completion.
   2. For moisture vapor tolerance: 25 years from date of substantial completion.

E. Installer's Limited Warranty:
   1. Installer's standard form in which installer agrees to repair or replace sports flooring that fails due to poor workmanship or faulty installation within the specified warranty period.
   2. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The basis of the design for the indoor resilient multipurpose surfacing is Omnisports Active+, manufactured by Tarkett.
   1. All other installation accessories and related components must be either made or approved by the indoor resilient athletic surfacing manufacturer.

B. Other products may be approved as equal if deemed qualified and submitted in accordance with the General Conditions.

C. Test reports confirming compliance from an independent sports laboratory must be provided along with samples, technical data, installation, maintenance, and warranty prior to acceptance as an alternative product.

2.2 MATERIALS

A. General: Provide materials that comply with requirements and with referenced standards.

B. Omnisports Active+ - Prefabricated sport surface 8.1 mm with wood flooring design, single surface embossing and Extreme Three (3) Layers technology (X3LT) as supplied by Tarkett.

C. Embossing of wood design and solid colors must be the same; varying embossing or surface textures will not be allowed.

D. Printing of wood design shall closely resemble standard wood strip flooring in size, color, board length, and grain appearance.

E. Surface embossing combined with TopClean XP must offer proper balance of surface friction per the ASTM F2772.

F. Surface embossing combined with TopClean XP must provide resistance to stains and scratches. Surface profile must not incorporate linear embossing.

G. The wood design shall be protected by a clear layer of pure PVC (Polyvinyl Chloride) and TopClean XP, a factory-applied UV cured urethane treatment.

H. Extreme Three (3) Layers technology (X3LT) includes Omnisports XCS cushion, glass veil and calendared sheet must offer improved shock absorbing comfort while providing better indentation recovery

I. The XCS cushion force reduction layer shall be high-density closed cell PVC foam with honeycomb embossing, and is applied in one continuous manufacturing process.

J. Laminated or adhered foam layers will not be allowed.

K. Field constructed products will not be accepted.

L. Physical properties of the indoor resilient athletic surfacing shall conform to the following minimums:

Width	—	6’ 6” (2 m)
Length	—	85’ (25.9m) approx.
Wear Layer	—	2 mm
Total Thickness	—	8.1 mm
Wear Layer	Type 1– Grade 1	ASTM F1303/F410
Vertical Deformation	PASSED	ASTM F2772
Rolling Load	PASSED	0.30 (EN 1569 {11/1999})
Surface Finish Effect	PASSED	ASTM F2772 (80 – 110)
Chemical Resistance	Excellent	ASTM F925
Impact Resistance	PASSED	EN 1717
Abrasion Resistance	PASSED	0.10 (EN ISO 5470-1 {06/1999})
Static Load Limit	PASSED	ASTM F970- Load 175 Lbs
Sound Insulation	Excellent	+/= 19 dB (ISO 717/2)
In-Room Sound Insulation	Excellent	61dB (NF S31-074)
Ball Rebound	PASSED	ASTM F2772 > 90%
Force Reduction	PASSED	ASTM F2772 Class 3

Fire Rating	PASSED	ASTM E648 Class 1
Microbial Assays Test	No Growth	G21 ASTM - Backing
Asthma and Allergy Friendly™	ASP: 05-01/101	Certified Compliant
Phthalate-free technology	—	YES
REACH Compliant	—	YES
Heavy Metals	—	NO
ISO 9001	—	YES
ISO 14001	—	YES
VOC Emissions	SCS-105 Version 4.2 – 2023	FloorScore® certified by SCS Global Services.

M. Design
1. Color: As available from the indoor resilient athletic surfacing manufacturer's full standard range.
2. Hardwood Design Series: A wood look design as available from the indoor resilient athletic surfacing manufacturer's full standard range.
3. Texture: Texture to remain consistent between solid colors and wood design when blending colors.

N. Tarkolay – A high quality low permeance slip sheet vapor retarder designed to separate the installed system from the substrate below.
1. Tarkolay as manufactured by Tarkett, shall be be used above concrete slab substrates.
2. Moisture tolerances shall have no limitation per ASTM F2170. Physical properties of the indoor resilient athletic surfacing shall conform to the following minimums:

Width	—	6' 6" (2 m)
Length	—	147'7"' (45 m) approx.
Total Thickness	—	1.3 mm
Dimensional Stability	PASSED	.01% (EN 1434)
Permeance	Excellent	<0.20 (ASTM E96

O. Welding Rod: As supplied by the indoor resilient athletic surfacing manufacturer or supplier.
1. Color to blend with the indoor resilient athletic surfacing color or design.
2. All seams shall be welded to create a monolithic and impermeable surface.

P. Adhesive: As approved by the indoor resilient athletic surfacing manufacturer.

Q. Game Line Paint and Primer: As approved by the indoor resilient athletic surfacing manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. It is the responsibility of the general contractor/construction manager to ensure that project/site conditions are acceptable for the installation of the indoor resilient athletic flooring.

B. Examine substrates and conditions, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.
1. Verify that the area in which the indoor resilient athletic surfacing will be installed is dry and weather tight. Verify that permanent heat, light and ventilation are installed and operable.

2. Verify that all other work that could cause damage, dirt and dust or interrupt the normal pace of the indoor resilient athletic flooring installation is completed or suspended.
3. Verify that there is a stable room temperature of at least 65°F.
4. Verify that there are no foreign materials or objects on the subfloor and that the subfloor is clean and ready for installation.
5. Installation with Tarkolay to Concrete Subfloor: moisture content no limitation when tested per ASTM F2170.
6. Follow Tarkett Omnisport Active + and Tarkolay installation recommendations.
7. Do not average the results of the tests. Report all field test results in writing to the General Contractor, Architect, and End User prior to installation.
8. Verify that the concrete subfloor surface pH level is within the 7 - 11 range.
9. Document the results confirming the slab is within manufacturer's tolerances for slab deviation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Sand the entire surface of the concrete slab, according to manufacturer's instructions, taking care not to damage the slab.
   1. Sweep the concrete slab so as to remove all dirt and dust. If a sweeping compound is to be used it must be a sweeping compound that does not contain oil or other items that may inhibit the adhesive bond. A HEPA vacuum may also be used to remove dust. Ensure dust does not become airborne.
   2. Remove dust from facility and dispose of slab dust and debris from sweeping and cleaning, meeting requirements of regulatory authorities.

B. Slab must be dust free. In the event that dust impairs adhesive bond, priming the slab prior to application of adhesive may be necessary. Follow installation guidelines.

C. Follow OSHA guidelines.

3.3 INSTALLATION

A. Comply with the manufacturer's written instructions applicable to products and application indicated.

B. The installation area shall be closed to all traffic and activity for a period to be set by the indoor resilient athletic surfacing installer. The indoor resilient athletic surfacing installation shall not begin until the installer is familiar with the existing conditions.

C. All necessary precautions should be taken to minimize noise, smell, dust, the use of hazardous materials and any other items that may inconvenience others.

D. Install Tarkolay in strict accordance with the indoor resilient athletic surfacing manufacturer's written instructions.

E. Install the indoor resilient athletic surfacing in strict accordance with the indoor resilient athletic surfacing manufacturer's written instructions.

F. Install the indoor resilient athletic surfacing minimizing cross seams. Provide a seam diagram during the submittal process for approval prior to installation. Vinyl Sheet Flooring Seams: Comply with ASTM F 1516. Rout joints and heat weld to permanently and seamlessly fuse sections together.

G. Confirm locations of all equipment. Coordinate locations of game lines with equipment. Paint game lines using approved game line paint primer and game line paint in strict accordance with the game line paint manufacturer's instructions.

H. Install threshold plates or transition strips.

3.4 CLEANING

A. Remove all unused materials, tools, and equipment and dispose of any debris properly. Clean the indoor resilient athletic surfacing in accordance with the manufacturer's instructions.

3.5 PROTECTION

A. Protect the indoor resilient athletic surfacing from damage using coverings approved by the manufacturer immediately after installation.

B. Protect installed flooring from damage due to harmful weather exposures, physical abuse, and other causes.

END OF SECTION

SECTION 098316 – ACOUSTICAL FINISH SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general conditions of the contract, including general and supplementary conditions and division 1 specification sections, apply to the work of this section.

1.2 SUMMARY

A. Section includes:

1. Sound absorptive sprayed cellulose acoustical finish system.

B. Related sections
1. Section 034100 - Precast Structural Concrete.

C. Related Items:
1. Clips, hangers, supports, sleeves and other attachments to spray bases are to be placed by other trades prior to the application of sprayed finish.
2. Ducts, piping, conduit or other suspended equipment shall not be positioned until after the application of sprayed finish.
3. Roof penetrations to be installed prior to application.
4. All equipment installed prior to application shall be protected from spray and application.

1.3 SUBMITTALS

A. Submit product data that the product meets or exceeds the following specified requirements.

1. Bond strength shall be greater than 600 psf per ASTM E 736.

2. Product shall be Class 1 Class A per ASTM E 84/ UL 723.

3. Non-corrosive per ASTM C 1149

4. Bond Deflection per ASTM E 759: 6Ó Deflection in 10Õ Span Đ No Spalling or De-lamination.

5. Comply with 2015 IBC Section 803.12 stability requirements for interior finishes.

6. Product shall be Cradle to Cradle¨ Certified v.3.1 or higher to a minimum certification level of Bronze.

7. Product shall be UL GREENGUARD Gold Certified.

8. Product must have a publicly available Health Product Declaration (HPD) to 100 PPM.

9. Manufacturer's written certification that product contains no asbestos, fiberglass or other man-made mineral fibers.

10. Copy of manufacturer’s ISO 9001:2015 Certification.

11. Minimum Fiber Recycled Content to be 75%.

12. Cannot contain any added Urea-Formaldehyde Resins.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility: Provide acoustic baffles from a single manufacturer with at least 5 years of prior experience fabricating projects of similar size and complexity.

A. Manufacturer must be in compliance with the 2009-2021 International Building Code.

B. Manufacturer must be ISO 9001:2015 Certified.

C. Manufacturer shall have a minimum 10-year successful performance history of producing and installation of spray-applied cellulose on similar projects

D. Manufacturer must be Forest Stewardship Council (FSC) Chain-of-Custody Certified.

E. Applicator: Licensed by manufacturer.

F. Mock-up: Apply a 100 square foot representative sample to be reviewed by the Architect and/or Owner prior to proceeding.

G. Material must be tested in accordance with ASTM E 1042 by a NVLAP accredited testing laboratory. Independent testing agency test reports.

H. Installer: Installation shall be done by qualified carpenters with at least 2 years experience in the installation of architectural woodwork or acoustical ceilings. Installers must receive training on handling, cutting, machining and field finishing the specified product prior to receiving materials on site.

I. Fire Performance Characteristics: Class A as tested by an independent accredited testing facility. Tests: ASTM E84. Flame spread: 25 or less. Smoke developed: 450 or less as specified by state or local codes.

J. Coordination of Work: Installing contractor shall organize and conduct a pre-installation survey of temperature, humidity and construction elements attaching, penetrating or concealed behind the acoustic baffles.

1.7 REFERENCES

A. Test Methods:

1. ASTM C423 Sound absorption and sound absorption coefficients by the reverberation room method performed by an independent testing agency

2. ASTM E84 Standard test method for surface burning characteristics of building materials

3. ASTM D1037 Linear expansion with change in moisture content.

4. ASTM C1338 Standard Test Method for Mold and Fungal Resistance of Building Materials.

1.8 PERFORMANCE REQUIREMENTS

A. Flame Spread Rating: Provide all components with Class A flame spread rating when tested in accordance with ASTM E 84, unless otherwise specified.

1.9 DELIVERY, STORAGE AND HANDLING

A. Deliver in original, unopened containers bearing name of manufacturer, product identification and reference to U.L. testing.

B. Store materials dry, off ground, and under cover.

C. Protect liquid adhesive from freezing.

D. Water to be potable.

1.10 WARRANTY

A. Provide manufacturer's standard product warranty per Section 017700 – Closeout Procedures

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Basis of Design Manufacturer:

1. International Cellulose Corporation
   12315 Robin Boulevard
   Houston, Texas 77045
   Phone: (713) 433-6701 or (800) 444-1252
   Fax: (713) 433-2029
   Website: www.spray-on.com
   Email: icc@spray-on.com

   For approved applicators contact ICC at (800) 444-1252.

2. Contractor may submit equal products by other manufacturers complying with all requirements listed in this section, and complying with the procedures as described in Section 016200 – Product Options

2.2 MATERIALS

A. SonaSpray "fc": Acoustical Finish System

1. Color shall be from Manufacturers standard color chart or custom color as noted

2. Each bag must be labeled with appropriate UL classification markings

3. Each drum of adhesive must be labeled "SK-2000 FC adhesive to be used with SonaSpray fc".

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine surfaces and report unsatisfactory conditions in writing. Do not proceed until unsatisfactory conditions are corrected.

B. Verify surfaces to receive spray-applied finish to determine if priming/sealing is required to insure bonding and/or to prevent discoloration caused by migratory stains.

3.2 PREPARATION

A. Provide masking, drop cloths or other satisfactory coverings for materials/surfaces that are not to receive spray-applied finish to protect from over-spray. Completely seal off fixtures and devices.

B. Coordinate installation of the sprayed cellulose fiber with work of other trades.

C. Prime surfaces as required by manufacturer's instructions or as determined by examination.

3.3 INSTALLATION

A. Install spray applied finish according to manufacturer's recommendations.

B. Comply with local Building Code requirements.

C. Install spray-applied finish to achieve an average NRC of .75 per ASTM C 423.

END OF SECTION

SECTION 098400 – ACOUSTICAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section.

1.2 SUMMARY

A. This Section includes the following:

1. Cementitious Wood Fiber Plank Acoustical Wall and Ceiling System.
2. Three-Dimensional Polyester Fabric Wrapped Acoustic Wall tile System.
3. Acoustical wall product accessories and installation components.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
2. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
3. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of panel indicated.

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations
3. Installation methods

B. Shop Drawings: Layout and details of direct-attached wall panels show locations of items that are to be coordinated with the installation. Field verify locations of all other wall mounted items impacting installation.

C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns. Note: Submit either manufacturers printed color charts or physical samples accurately demonstrating the product colors. Electronic files, reproductions from electronic files or other types of copies or prints are not acceptable.

D. Samples for Verification:

1. Minimum 6-inch x 6-inch samples of specified direct-attached acoustical wall panels.

E. Certifications: Manufacturer’s certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, products must be tested to the A, D-20, C-20, or C-40 method.

1.5 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

B. Manufacturer Qualifications: Minimum 5 years of experience manufacturing similar products.

C. Installer Qualifications: Minimum 2 years of experience installing similar products.

D. Coordination of Work: Coordinate acoustical work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

E. Fire Performance Characteristics: Identify acoustical wall/ceiling components with appropriate markings of applicable testing and inspecting organization.

1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 Classification

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. It is recommended to have clean, dry hands while handling the Artofix tiles.

C. Panels shall be stored in a dry interior location and shall remain in cartons prior to installation to avoid damage. The cartons should be stored in a flat, horizontal position.

1. Do not store in unconditioned spaces with humidity greater than 85% or lower than 25% RH and temperatures lower than 32°F or greater than 120°F.

2. Panels must not be exposed to extreme temperatures, for example, close to a heating source or near a window where there is direct sunlight

D. Provide labels indicating brand name, style, size, and thickness.

E. Before installing panels, permit them to reach room temperature and a stabilized moisture content.

F. Handle acoustical panels carefully to avoid chipping edges or damaged units in any way.

1.7 PROJECT CONDITIONS

A. Do not install ceiling panels until building is closed in and HVAC system is operational.

B. All wet work must be complete and dry prior to installation.

C. Store panels on site to reach room temperature and have stabilized moisture content for a minimum of 72 hours before installation.

D. Maintain the following conditions in areas where acoustical materials are to be installed 24 hours before, during and after installation:

1. Relative Humidity: 65 - 75%.

2. Uniform Temperature: 55 - 70 degrees F (13 - 21 degrees C).

1.8 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

1. Acoustical panel products: Furnish quantity of full-size units equal to 5.0 percent of amount installed of each type and color.

1.9 WARRANTY

A. Acoustical wall/ceiling products: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical wall/ceiling products that fail within the warranty period. Failures include, but are not limited to:

1. Acoustical ceiling/wall products: Manufacturer's defects
2. Warranty Period: Acoustical ceiling/wall products: One (1) year from date of substantial completion

B. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Three-Dimensional Polyester Fabric Wrapped Acoustic Wall Tile System Manufacturer Basis of Design: Atrofix, 2271, Boul. Fernand-Lafontaine, Suite 220, Longueuil QC CANADA, J4G 2R7, Phone: +1.450.646.7555 info@artofix.com, artofix.com

B. Cementitious Wood Fiber Plank Acoustical Wall and Ceiling System Manufacturer, Basis of Design: Tectum® by Armstrong World Industries, Inc., Armstrong World Industries P.O. Box 3001, Lancaster, Pennsylvania 17604, Phone: 717.397.0611

C. Contractor may submit equal products by other manufacturers complying with all requirements listed in this Section, along with a similar aesthetic to the product specified, which provide similar design and color options as listed in this Section and as shown on the Construction Documents, and complying the procedures as described in Section 016200 - Product Options. The Architect shall be the sole judge of the proposed substitute product's design conformance with the specified product.

2.2 PRODUCTS

A. Three-Dimensional Polyester Fabric Wrapped Acoustic Wall Tile System

1. AWP-1: Basis of Design Product: Ruby 3D Acoustical Wall Tile, by Artofix.
   a. Locations as identified on the Drawings.
   b. Composition: 100% Polyester fabric (min 45% (+/-) recycled material) wrapped rock wool.
   c. Color: As selected by architect from manufacturer's standard color selections
   d. Thickness: irregular/angular
   e. Size: 24 in x 24 in, See drawings for quantities and locations of panels.
   f. Mounting Type: Adhesive. Panels to be directly mounted to wall surface.
   g. Noise Reduction Coefficient (NRC): NRC 0.85, ASTM C423
   h. Flame Spread: ASTM E 84; Class A, Flame Spread: 0 – Smoke Developed: 45
   i. Accessories:
      1) Artotrim: C1, ARTC-1144-M-X-0000-0002, Perimeter molding for whole tiles.
      2) ARTOCLIP retention clips.
      3) Artotrim-L4 Finishing molding (for backing).
      4) 3/8" OSB backing.
      5) Stainless steel #6 X 1 1/8 screws.

6) #8 Stainless steel screws.

B. Cementitious Wood Fiber Plank Acoustical Wall/Ceiling System (intended for wall mount)
1. AWP-2: Basis of Design Product: Tectum®, high NRC, Direct-Attached Wall Panels, by Armstrong World Industries Locations as identified on the Drawings.

a. Surface Texture: Coarse
b. Composition: Aspen wood fibers bonded with inorganic hydraulic cement
c. Finish: Surface appearance shall be consistent from panel to panel
d. Color: Custom: Sherwin Williams color(s) to be selected by Owner and Architect.
e. Size: 24" x 24"
f. Thickness: Custom 1-1/2"
g. Edge Profile: Bevel or Square - TBD
h. UL Classified Noise Reduction Coefficient (NRC): 75 - ASTM C 423; Mounting; A (0.40 Classified with UL label.
i. UL Classified Flame Spread: ASTM E 1264; Class A. Product must be able to meet this criterion after being painted six times.
j. Light Reflectance (LR) White Panel: ASTM E 1477; (Light Reflectance); Panel to be painted.
k. Dimensional Stability/Mold Resistance: HumiGuard Plus and no significant mold growth when tested by ASTM D3273.
l. Sustainable: Third party verified EPD (Environmental Product Declaration) and HPD (Health Product Declaration) and Living Product Imperative Certification.
m. USDA Certified Biobased Product, 98%
n. Provide manufacturers' recommended fastener for Direct Attachment to Concrete Substrate.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with installation.

2. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Do not proceed with installation until all wet work such as concrete, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

C. It is recommended to have clean, dry hands while handling the Artofix and Tectum tiles.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Measure each wall/ceiling area and establish layout of acoustical units. Coordinate panel layout with mechanical, electrical, and lighting fixtures.

D. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.

3.3 CEMENTITIOUS WOOD FIBER PLANK ACOUSTICAL WALL AND CEILING SYSTEM PANEL INSTALLATION

A. Install wall/ceiling products by attaching/installing the products per the manufacturer's written instructions and in accordance with the authorities having jurisdiction.

B. Measure each wall area and establish layout of wall units. Coordinate panel layout with mechanical and electrical fixtures.

C. Coordination: Furnish layouts for preset inserts, clips, and other anchors whose installation is specified in other sections.

D. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

E. Attachment of wall/ceiling products to be installed using manufacturer's recommended fasteners.

3.4 THREE-DIMENSIONAL POLYESTER FABRIC WRAPPED ACOUSTIC WALL TILE SYSTEM INSTALLATION

A. Artofix acoustic tiles will need to be installed on an OSB backing of 3/8'' (9,53mm) thickness.

B. The backing of appropriate grade must be installed in accordance with the recommendations of a professional, with the help of anchors adapted to the type of surface.

C. Install perimeter molding.

D. Measure the perimeter of the installation surface to calculate the lengths of moldings required.

E. Install the system according to manufacturer's written instructions.

3.5 ADJUSTING AND CLEANING

A. Replace damaged and broken tiles/panels.

B. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove any panels that cannot be successfully cleaned and or repaired. Replace with new product to eliminate evidence of damage.

C. Use only a clean, soft, lint-free cloth to lightly wipe dirt off the surface of acoustic tiles/panels.

D. On fabric panels, use only a gentle soap and a bit of water on the surface for more stubborn stains.

E. Do not use a solvent-based cleaning product or any other chemical products that could damage the tiles.

3.5 PROTECTION

A. Protect finished work from damage due to subsequent construction activity on the site.

B. Touch-up, repair or replace damaged products before Substantial Completion

END OF SECTION

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SECTION 102600 - WALL PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rub rails.

1.2 SUBMITTALS

A. Product Data: Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes for each impact-resistant wall protection unit.

B. Shop Drawings: For each impact-resistant wall protection showing locations and extent. Include sections, details, and attachments to other work.

C. Samples for Verification: For each type of exposed finish required, provide sample of finished product

D. Remaining paragraphs are defined in Division 01 Section "Submittal Procedures" as "Informational Submittals."

E. Maintenance Data: For each impact-resistant wall protection unit to include in maintenance manuals.

1. Include recommended methods and frequency of maintenance for maintaining optimum condition under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

F. Warranty: Sample warranty.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Source Limitations: Obtain impact-resistant wall protection units from single source from single manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store impact-resistant wall protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1. Maintain room temperature within storage area at not less than 70 deg F (21 deg C) during the period plastic materials are stored.
2. Keep sheet material out of direct sunlight.
3. Store wall protection components for a minimum of 72 hours, or until material attains a minimum room temperature of 70 deg F (21 deg C).

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install impact-resistant wall protection units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F (21 deg C) for not less than 72 hours before beginning installation and for the remainder of the construction period.

1.6 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. 2 percent of each type, color, and texture of units installed

B. Include mounting and accessory components. Replacement materials shall be from same production run as installed units.

PART 2 - PRODUCTS

2.1 RUB RAILS

A. MANUFACTURER

1. InPro Corporation
2. Approved Equal Substitutions Meeting all Requirements of Product, Style, and Manufacturer.

B. Palladium Rigid Vinyl Rubrails

1. Thickness: .060”
2. Width: 8”
3. Length: See plan
4. Material: Vinyl - Palladium Rigid Vinyl Rubrails shall be manufactured from chemical and stain resistant polyvinyl chloride with the addition of impact modifiers.
5. Adhesives: Manufacturer’s recommended adhesive
6. Finish: Designer White 0101

C. FABRICATION

1. Fabricate impact-resistant wall protection units to comply with requirements indicated for design, dimensions, and member sizes, including thicknesses of components.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Complete finishing operations, including painting, before installing wall protection components.

B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

A. General: Install impact-resistant wall protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

1. Install impact-resistant wall protection units in locations and at mounting heights indicated on Drawings.

3.4 CLEANING

A. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION

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SECTION 105113 – METAL LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Technical Specifications Sections may apply to this Section even when not specifically referenced.

1.2 RELATED SECTIONS

1. Section 033000 - Cast-in-Place Concrete: for embedding anchors for hollow metal work into masonry construction.
2. Section 061000 - Rough Carpentry: Wood blocking and nailers.
3. 093000 - Ceramic Tiling, for
4. Division 09 Section "Painting" for touching up paint.

1.3 REQUIREMENTS INCLUDED

A. Section Includes:

1. Standard-duty Z-shaped metal lockers, for use in corridors.
2. Heavy-duty ventilated athletic metal lockers, for use in locker room.

1.4 WARRANTY REQUIREMENTS

A. Manufacturers standard warranty.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker.

1. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.
2. Warranty: Sample special warranty.

B. Shop Drawings: For metal lockers. Include plans, elevations, sections, details, and attachments to other work.

1. Show locker trim and accessories.
2. Include locker identification system and numbering sequence.

C. Samples for Initial Selection: For units with factory-applied color finishes.

1. Samples for Verification: For metal lockers, in manufacturer's standard sizes.

1.6 Qualification Data: For qualified Installer.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three (3) years' documented experience.

1.8 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. 2020 Minnesota State Building Code, Chapter 1341, the Minnesota Accessibility Code.

C. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2024DELIVERY, STORAGE, AND HANDLING

1.9 QUALITY CONTROL

A. Installer Qualifications: Manufacturer’s authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain metal lockers and accessories from single source from single manufacturer.

C. Regulatory Requirements: Where metal lockers are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" Minnesota Accessibility Code, and ICC/ANSI A117.1.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for their installation.

B. Conform to manufacturer’s written instructions.

C. Protect locker finish and adjacent surfaces from damage.

D. Store indoors.

E. Inspect lockers and benches upon receipt of delivery and store in secure area until ready for assembly or installation.

1.11 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.12 COORDINATION

A. Coordinate installation of anchorages for lockers. Furnish drawings, templates, and directions for installing anchorages, including concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.13 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Full-size units of the following metal locker hardware items equal to 10 percent of amount installed for each type and finish installed, but no fewer than five units:

1. Locks.
2. Identification plates.
3. Hooks.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available products from the listed Manufacturers that may be incorporated into the Work include the following, or other approved equal:

1. Basis of Design: ASI Storage Solutions, located at 2171 Liberty Hill Road, Eastanollee, GA 30538. Tel: 706-827-2700. Web: www.asi-storage.com.
2. Penco Products, Inc.
3. Hadrian Manufacturing Inc.
4. Republic Storage Systems Company

2.2 PERFORMANCE

A. Accessibility: Comply with MN Chapter 1340. Accessibility Code, and ICC A117.1, and DOJ 2010 ADA Standards, Accessibility Guidelines.

2.3 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B, suitable for exposed applications.

B. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.

C. Anchors: Material, type, and size required for secure anchorage to each substrate.

D. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls for corrosion resistance.

E. Provide toothed-steel expansion sleeves for drilled-in-place anchors.

2.4 FABRICATION

A. Fabricate lockers square, rigid, without warp, with metal faces flat and free of distortion.

B. Knock-Down Lockers: Fabricate lockers on the unit principle, each locker with individual door and frame, individual top, bottom, back, and shelves, with common intermediate divisions separating compartments. Verify dimensions and arrangement before fabrication.

C. Finish: Hybrid Polyester powder coat paint finish electrostatically applied and properly cured to manufacturer’s specifications for optimum performance.

D. Finishes containing volatile organic compounds and subject to out-gassing are not acceptable.

E. Powder Coat - Dry Thickness: 2 mils (0.05 to 0.055 mm).

2.5 CORRIDOR METAL LOCKERS

A. Basis of Design: ASI Storage Solutions Inc., Traditional Collection. Knocked down metal lockers constructed from powder-coated steel.

1. Sizes and Configurations:
   a. Double tier locker, size as required to fit within provided openings, Contractor shall field verify to determine sizes and quantities.

B. Selectable Attributes:

1. Locker Configuration: Two-person Z-style.
2. Accessible Units: Lockers constructed to comply with referenced accessibility standards.
3. Width: 18 inches (457 mm).
4. Depth: 18 inches (457 mm).
5. Enclosed Locker Height: 72 inches (182 cm).

6. Interior Color: Manufacturer’s standard color.
7. Exterior Color: Selected from manufacturer's standard colors.
8. Locker Body Components: Formed and flanged from steel sheet of the following type and minimum thicknesses:
    a. Steel Sheet: Commercial Steel (CS), Type B, supplied for exposed applications and complying with ASTM A1008/A1008M.
    b. Ventilation Type: Louvered door.
    c. Sheet Metal Thickness:
        1) Door Frame: 16 gauge.
9. Vertical door frame members: Include additional [[3/8-inch] (9.5 mm)] flange to act as full-height door strike.
10. Horizontal frame members: Constructed of 16-gauge steel formed in a channel shape and securely welded to vertical frame members to ensure rigidity, including horizontal cross-frame members found on double- and triple-tier lockers.
11. Door: 16-gauge, minimum; formed into channel shapes on both lock and hinge side with single bend angle formations across top and bottom.
    a. Doors wider than 18 inches (0.46 m) include full-height hat channel welded to inner face of door for added rigidity and reinforcement.
12. Back: 24-gauge, minimum.
13. Side: 24-gauge, minimum.
14. Top: 24-gauge, minimum.
15. Shelf: 24-gauge, minimum.
16. Bottom: 16-gauge, minimum.
17. Door Latching: Multipoint.
18. Hinges: 16-gauge continuous type riveted to both door and frame. Powder-coated to match exposed color.
19. Handle: One piece, 20-gauge, stainless steel cup designed to accommodate padlocks.
20. Latching Type: Positive, automatic-type locking device allowing locker door to be locked when open, then closed without unlocking.
21. Locking Type: [Hasps for combination locks provided by user] [Built-in combination] [Built-in key locks]. (Note: CMAR meet Nova’s existing building standard.)
22. Number Plates: Polished aluminum number plate with black numerals 3/8 inch (9.5 mm) high. Attached to door with rivets.
23. Accessories: (Note: CMAR meet Nova’s existing building standard.)
    a. Base: 6-inch legs with base closure panels (150 mm).
    b. Top: Continuous sloped hoods.
    c. Trim: [Filler panels] [Finished end panels] and [Recessed trim].
    d. Provide shelf
    e. 1 interior hook at sidewall.
    f. Ceiling Hook: One double-prong hook.

2.6 HEAVY DUTY VENTILATED ATHLETIC METAL LOCKERS

A. Basis of Design: ASI Storage Solutions Inc., Student Lockers, Competitor Collection by ASI Storage Solutions. Knocked down metal lockers constructed from powder-coated steel.

B. Selectable Attributes:

1. Locker Configuration: Two-tier.
2. Accessible Units: Lockers constructed and designed to comply with referenced accessibility standards.
3. Width: 15 inches (381 mm).
4. Depth: 18 inches (457 mm).
5. Enclosed Locker Height: 72 inches (182 cm).

6. Color: **Selected from manufacturer's standard colors.** Selected color applied to interior and exterior metal components.
7. Innate Attributes:
   a. Locker Case Construction: Made of formed sheet steel; metal edges finished smooth without burrs.
   b. Locker Body Components: Formed and flanged from steel sheet of the following type and minimum thicknesses:
   c. Steel Sheet: Commercial Steel (CS), Type B, supplied for exposed applications and complying with ASTM A1008/A1008M.
   d. Ventilation Type: Diamond perforated openings.
   e. Locker sides and doors less than **20 inches (0.51 m)** high include doors with diamond-shaped perforations **7/16 inch (11 mm)** wide x **15/16 inch (24 mm)** high.
   f. Locker doors and sides **20 inches (0.51 m)** or higher included diamond-shaped perforations **3/4 inch (19 mm)** wide x **1-1/2 inches (38 mm)**.
   g. Sheet Metal Thickness:
   h. Door Frame: 16 gauge.
   i. Vertical door frame members: Include an additional **3/8-inch (9.5 mm)** flange to act as full-height door strike.
   j. Horizontal frame members: Constructed of 16-gauge steel formed in a channel shape and securely welded to vertical frame members to ensure rigidity, including horizontal cross-frame members found on double- and triple-tier lockers.
   k. Door: 14 gauge minimum formed into channel shapes on both lock and hinge side with single-bend angle formations across top and bottom.
   l. Rubber door silencers.
   m. Include full-height hat channel welded to inner face of door for added rigidity and reinforcement.
   n. Back: 18-gauge, minimum.
   o. Side: 16-gauge, minimum.
   p. Top: 16-gauge, minimum.
   q. Shelf: 16-gauge, minimum.
   r. Bottom: 16-gauge, minimum.
   s. Door Latching: Single point.
   t. Hinges: 16-gauge continuous type riveted to both door and frame. Powder-coated to match exposed color.
   u. Handle: One piece, 20-gauge, stainless steel cup designed to accommodate padlocks.
   v. Latching Type: Positive, automatic-type locking device allowing locker door to be locked when open, then closed without unlocking.
   w. Locking Type: [Hasps for combination locks provided by user] [Built-in combination] [Built-in key locks]. (To be selected by Owner/Architect from available options.)
   x. Number Plates: Polished aluminum number plate with black numerals 3/8 inch (9.5 mm) high. Attached to door with rivets.
8. Accessories:
   a. Base: 6-inch legs with base closure panels (150 mm).
   b. Top: Continuous sloped hoods.
   c. Trim: **[Filler panels] [Finished end panels] and [Recessed trim]**. (To be selected by Owner/Architect from available options.)
   d. Interior Equipment:
   f. Ceiling Hook: One double-prong hook.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify existing conditions and field dimensions meet manufacturer's requirements before starting work, including 1/16-inch (1.6 mm) assembly growth per locker within a set of lockers.

C. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

D. Do not begin installation until substrates and bases have been properly prepared.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install in accordance with manufacturer's written instructions.

B. Place and secure on prepared substrate.

C. Install lockers plumb, level, and square.

D. Secure lockers with anchor devices to suit substrate materials.

E. Minimum Pullout Force: 100 lb. (445 N)

F. Bolt adjoining locker units together to provide rigid installation.

G. Install and [end panels] [filler panels] [sloped tops] [miscellaneous panels] As selected by Owner/Architect from available options.)

H. Install accessory items.

3.3 ADJUSTING

A. Adjust moving parts for smooth operation.

1. Adjust doors and latches to operate without binding.
2. Verify latches are operating properly.
3. Adjust built-in locks to prevent binding.

B. Final Adjustments: Check and readjust operating items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including all work that is warped, bowed, damaged, or otherwise unacceptable.

3.4 CLEANING

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Clean interior and exterior surfaces of lockers.

3.5 PROTECTION

A. Protect products and finishes until completion of project.

B. Touch-up with factory-supplied paint and repair or replace damaged products prior to Substantial Completion.

END OF SECTION

SECTION 124940 - ROLLER SHADES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Manually operated room-darkening shades to include mounting and operating hardware.
2. Motor operated room-darkening shades to include mounting and operating hardware.

1.2 REFERENCES

A. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. NFPA 70 - National Electrical Code.

C. NFPA 701-99 - Fire Tests for Flame-Resistant Textiles and Films.

1.3 SUBMITTALS

A. Product Data: Manufacturer’s data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
3. Storage and handling requirements and recommendations.
4. Mounting details and installation methods.

B. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.

C. Copy of compliance with UL standards for electric shade motors.

D. Selection Samples: For each finish product specified, one set of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shade cloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.

F. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.

B. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.

C. Fire-Test-Response Characteristics: Provide roller shade band materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

D. Flame Resistance Ratings: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.

E. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 WARRANTY

A. Provide under the provisions of Section 017000 Contract Closeout: 5 years warranty against defects in materials and workmanship for clutch operating mechanism.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Basis-of-Design: Hunter Douglas Contract/ 13915 Danielson St., Ste.100/ Poway, CA 92064/ Phone: 800-727-8953 Fax: 800-205-9819/ Website: www.hunterdouglascontract.com.
2. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.
    a. MechoShade
    b. Draper, Inc.
    c. Levolor; Levolor-Kirsch Window Fashions
    d. Lutron Shading Solutions by VIMCO
    e. Shade Techniques, Inc.
    f. Verosol USA, Inc.; OEM Shades Inc.

2.2 APPLICATIONS/SCOPE

A. Provide roller shades at all locations indicated on the drawings.

2.3 MANUAL OPERATED WINDOW SHADES: RLR-1

A. Manually Operated Window Shades with Independent Control: Manually operated, vertical roll-up, fabric window shade with components necessary for complete installation: Hunter Douglas Contract “RB 500 Manual Roller Shades”

B. Control System:

1. Clutch Operated:
    g. Engineered heavy duty chain drive pulley operating system consisting of metal clutch housing and locking plug.
    h. Lift torque enhancement provided by Counterbalance System with integrated spring support module.
    i. Adjustment-free continuous T304 stainless steel ball chain with 110 lbs. breaking strength.
    j. Chain tensioner to be compliant with WCMA safety standard A100.1.
    k. Components will be maintenance free from adjustments or lubrication for trouble-free operation
2. Roller Tube: Circular-shaped aluminum tube extruded from alloy and temper 6063 T-6. 2”outside diameter extruded tube to have a .063” wall thickness (2.5” outside diameter to have a .079” wall thickness). Heavily reinforced with minimum six internal ribs providing additional tensile strength and allows for secure placement of clutch & end plug
3. Heavy Duty Tube Bearing Plug: Die cast metal and reinforced idler assembly containing spring loaded end plug with positive locking wheel allows for up to 7/8” adjustment and provides for a secure installation and removal of shade.
4. Bottom Bar: Extruded aluminum weight in a Sealed Pocket Hem Bar, or RB Bottom Bar for fabrics that are not seamable.
5. Mounting hardware: Manufacturer’s standard heavy duty bracket constructed of hardened 1/8” thick steel to support full weight of shade with bracket & screw hole covers to provide uniform look. Integrated leveling device for enhanced level adjustment of overall shade. Locking mechanism on bracket adapter provides for a secure installation and removal of the shade
6. Fascia: L shape removable aluminum extrusion valance that attaches to brackets and conceals roller shade.
7. Fabric: E Screen 7505
    a. Content: 36% Fiberglass, 64% Vinyl.
    b. 5% openness factor.
    c. Meets or Exceeds Fed. FR Spec. NFPA 701 (small scale)
    d. Fire Classification: NFPA 701-10 TM#1 California U.S. Title 19, M1
    e. Color: Charcoal/charcoal
    f. Bottom Hem: Fabric wrapped and electronically sealed at ends. Sewn hems and open hem pockets are not acceptable.

2.5 FABRICATION

A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise. Fabricate shade cloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shade cloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design.

B. Installation Brackets: Designed for easy removal and reinstallation of shade, for supporting roller, and operating hardware and for hardware position and shade mounting method indicated.

C. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to shade hardware and adjoining construction; type designed for securing to supporting substrate; and supporting shades and accessories under conditions of normal use.

D. Color-Coated Finish: For metal components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

E. Colors of Metal and Plastic Components Exposed to View: As selected by Architect from manufacturer's full range, unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances.

B. Do not begin installation until substrates have been properly prepared.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Coordinate requirements for blocking and structural supports to ensure adequate means for installation of window shades

B. Clean surfaces thoroughly prior to installation.

C. Coordinate installation of recessed shade pockets with construction of suspended acoustical panel ceilings specified in Section 09 51 00

D. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions

B. Install roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow proper clearances for window operation hardware.

C. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

D. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

E. Engage Installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.5 DEMONSTRATION

A. Demonstrate operation method and instruct Owner’s personnel in the proper operations and maintenance of the roller shades, motors and controls.

END OF SECTION

SECTION 14 21 23.16
MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Machine room-less electric traction passenger elevators as shown and specified. Elevator work includes:
   1. Gearless electric traction passenger elevators.
   2. Elevator car enclosures, hoistway entrances and signal equipment.
   3. Operation and control systems.
   4. Accessibility provisions for physically disabled persons.
   5. Equipment, machines, controls, systems and devices as required for safely operating the specified elevators at their rated speed and capacity.
   6. Materials and accessories as required to complete the elevator installation.

B. Related Sections:
   1. Division 1 General Requirements: Meet or exceed all referenced sustainability requirements.
   2. Division 3 Concrete: Installing inserts, sleeves and anchors in concrete.
   3. Division 4 Masonry: Installing inserts, sleeves and anchors in masonry.
   4. Division 5 Metals:
      a. Providing hoist beams, pit ladders, steel framing, auxiliary support steel and divider beams for supporting guide-rail brackets.
      b. Providing steel angle sill supports and grouting hoistway entrance sills and frames.
   5. Division 9 Finishes: Providing elevator car finish flooring and field painting unfinished and shop primed ferrous materials.
   6. Division 16 Sections:
      a. Providing electrical service to elevators, including fused disconnect switches where permitted. (note: fused disconnect switch to be provided as part of elevator manufacture product)
      b. Emergency power supply, transfer switch and auxiliary contacts.
      c. Heat and smoke sensing devices.
      d. Convenience outlets and illumination in control room (if applicable), hoistway and pit.
   7. Division 22 Plumbing
      a. Sump pit
   8. Division 23 Heating, Ventilation and Air Conditioning
      a. Heating and ventilating hoistways and/or control room.

C. Work Not Included: General contractor shall provide the following in accordance with the requirements of the Model Building Code and ANSI A17.1 Code. For specific rules, refer to ANSI A17.1, Part 2 for traction elevators. State or local requirements must be used if more stringent. The cost of this work is not included in the TK Elevator's proposal, since it is a part of the building construction.
   1. A plumb and legal hoistway, properly framed and enclosed an including a pit of proper depth, and a pit ladder for each elevator. Hoistway walls require a minimum two hours of fire rating. Hoistway should be clear and plumb with variations not to exceed 1/2" at any point. Drains, lights, access doors, waterproofing and hoistway ventilation, as required.

2. Elevator controller space
    a. Door jamb controller option - controller landing wall thickness must be a minimum of 8 1/2 inches thick. This is due to the controller being mounted on the top floor landing in the door frame on the return side of the door. For center opening doors, the controller is located on the right hand frame (from inside the elevator cab looking out). Provide telephone line, light fixture (200 lx / 19 fc), and convenience outlet in the hoistway at the landing where the elevator controller is located. Final location must be coordinated with elevator contractor. These requirements must be coordinated between the general contractor and the elevator contractor.
    b. Control room option - provide a suitable control closet with access and ventilation in accordance with all applicable codes and regulations. The control closet shall be maintained at a temperature between 32 F (0 C) and 104 F (40 C). To be measured at 6 feet (1830 mm) above the floor and 1 foot (305 mm) out from the front center of the car controller(s). Relative humidity is not to exceed 95% non-condensing. Local codes may require tighter temperature ranges, and higher ventilation levels, please check with your local code authority for the exact requirements in your area. If your control closet temperatures exceed these requirements, contact your local TK Elevator sales representative for assistance. All telephone wiring to controller room control panel, and installation of telephone instrument or other communication equipment in elevator cab with all connections to elevator in controller room.
3. Hoistway must be maintained between 32ºF (0ºC) and 122ºF (50ºC) measured at the machine.
4. Adequate supports to carry the loads of all equipment, including overhead machine and machine beams located in hoistway including supports for guide rail brackets.
5. Complete 3 phase connections from the electric power mains to each controller, including necessary circuit breakers and fused mainline disconnect switches unless otherwise specified herein by elevator manufacture.
6. Electric power of the same characteristics as the permanent supply without charge for the construction, testing and adjusting.
7. Provide proper piping and conduit.
8. Divider beams for rail bracket support as required.
9. Cutting of walls floor, etc. and removal of such obstructions as may be necessary for proper installation of the elevator.
10. Grouting of door sills, hoistway frames, and signal fixtures after installation of the elevator equipment.
11. All painting, except as otherwise specified.
12. Provide hoistway walls designed and constructed in accordance with the required fire rating (including those places where elevator fixture boxes, rail bracket fastenings, and any other penetration into the hoistway walls).
13. Temporary enclosures, barricades and other protection from open hoistways and elevator work area during the time the elevator is being installed to meet all permanent installation safety codes. A temporary work platform to be provided at the top landing across the hoistway; if required, it should conform to all code and safety requirements.
14. Smoke detector\ sensing devices and contacts wired to elevator control as required by local code. A means to automatically disconnect the main line power supply to the elevator prior to the application of water in the elevator controller room shall be furnished by the electrical contractor. This means shall not be self-resetting.

15. Before erection of rough walls and doors; erect hoistway sills, headers, and frames. After rough walls are finished; erect fascias and toe guards. Set sill level and slightly above finished floor at landings.
16. A standby power source, including necessary transfer switches and auxiliary contact, where elevator operation from an alternate power supply is required.
17. Adequate storage facilities for elevator equipment prior to and during installation at ground level within 150 feet of hoistway.
18. Setting of anchors and sleeves.
19. Install bevel guards at 75° on all recesses, projections or setbacks over 2" (4" for A17.1 2000 areas) except for loading or unloading.
20. For car light and fan: provide a feeder and branch wiring circuits to elevator control cabinet.
21. Locate a light fixture (200 lx / 19 fc) and convenience outlet in pit with switch located adjacent to the access door.
22. Where pit access is by means of the lowest hoistway entrance, a vertical ladder of non-combustible material extending 42" minimum, (48" minimum for A17.1-2000 areas) shall be provided at the same height, above sill of access door or handgrips.

1.02 SUBMITTALS

A. Product data: When requested, the elevator contractor shall provide standard cab, entrance and signal fixture data to describe product for approval.

B. Shop drawings:
   1. Show equipment arrangement in the corridor, pit, and hoistway and/or optional control room. Provide plans, elevations, sections and details of assembly, erection, anchorage, and equipment location.
   2. Indicate elevator system capacities, sizes, performances, safety features, finishes and other pertinent information.
   3. Show floors served, travel distances, maximum loads imposed on the building structure at points of support and all similar considerations of the elevator work.
   4. Indicate electrical power requirements and branch circuit protection device recommendations.

C. Powder Coat paint selection: Submit manufacturer’s standard selection charts for exposed finishes and materials.

D. Plastic laminate selection: Submit manufacturer’s standard selection charts for exposed finishes and materials.

E. Metal Finishes: Upon request, standard metal samples provided.

F. Operation and maintenance data. Include the following:
   1. Owner’s manuals and wiring diagrams.
   2. Parts list, with recommended parts inventory.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: An approved manufacturer with minimum 15 years of experience in manufacturing, installing, and servicing elevators of the type required for the project.
    1. The manufacturer of machines, controllers, signal fixtures, door operators cabs, entrances, and all other major parts of elevator operating equipment.
        a. The major parts of the elevator equipment shall be manufactured by the installing company, and not be an assembled system.
    2. The manufacturer shall have a documented, on-going quality assurance program.
    3. ISO-9001:2000 Manufacturer Certified
    4. ISO-14001:2004 Environmental Management System Certified
    5. LEED Gold certified elevator manufacturing facility.

B. Installer Qualifications: The manufacturer or an authorized agent of the manufacturer with not less than 15 years of satisfactory experience installing elevators equal in character and performance to the project elevators.

C. Regulatory Requirements:
    1. ASME A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
    2. NFPA 70 National Electrical Code.
    3. NFPA 80 Fire Doors and Windows.
    4. Americans with Disabilities Act - Accessibility Guidelines (ADAAG)
    5. Section 407 in ICC A117.1, when required by local authorities
    6. CAN/CSA C22.1 Canadian Electrical Code
    7. CAN/CSA B44 Safety Code for Elevators and Escalators.

D. Fire-rated entrance assemblies: Opening protective assemblies including frames, hardware, and operation shall comply with ASTM E2074, CAN4-S104 (ULC-S104), UL10(b), and NFPA Standard 80. Provide entrance assembly units bearing Class B or 1 1/2 hour label by a Nationally Recognized Testing Laboratory (2 hour label in Canada).

E. Inspection and testing:

    1. Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation.
    2. Arrange for inspections and make required tests.
    3. Deliver to the Owner upon completion and acceptance of elevator work.

F. Sustainable Product Qualifications:
    1. Environmental Product Declaration:
        a. GOOD: If Product Category Rules (PCR) are not available, produce a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that has at least a cradle to gate se.
        b. BEST: If Product Category Rules (PCR) are available, produce and publish an Environmental Product Declaration (EPD) based on a critically reviewed life-cycle assessment conforming to ISO 14044, with external verification recognized by the EPD program operator.
    2. Material Transparency:
        a. GOOD: Provide Health Product Declaration at any level

b. BETTER: Provide Health Product Declaration (HPD v2 or later). Complete, published declaration with full disclosure of known hazards, prepared using the Health Product Declaration Collaborative's "HPD builder" on-line tool.
c. BEST: Cradle to Cradle Material Health Certificate v3, Bronze level or higher.

3. LEED v4 – Provide documentation for all Building Product Disclosure AND Optimization credits in LEED v4 for product specified.
4. Living Building Challenge Projects: Provide Declare label for products specified.

1.04 DELIVERY, STORAGE AND HANDLING

A. Manufacturing shall deliver elevator materials, components and equipment and the contractor is responsible to provide secure and safe storage on job site.

1.05 PROJECT CONDITIONS

A. Temporary Use: Elevators shall not be used for temporary service or for any other purpose during the construction period before Substantial Completion and acceptance by the purchaser unless agreed upon by Elevator Contractor and General Contractor with signed temporary agreement.

1.06 WARRANTY

A. Warranty: Submit elevator manufacturer's standard written warranty agreeing to repair, restore or replace defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or care for 12 months after final acceptance.

1.07 MAINTENANCE

A. Furnish maintenance and call back service for a period of 12 months for each elevator after completion of installation or acceptance thereof by beneficial use, whichever is earlier, during normal working hours excluding callbacks.
   1. Service shall consist of periodic examination of the equipment, adjustment, lubrication, cleaning, supplies and parts to keep the elevators in proper operation. Maintenance work, including emergency call back repair service, shall be performed by trained employees of the elevator contractor during regular working hours.
   2. Submit parts catalog and show evidence of local parts inventory with complete list of recommended spare parts. Parts shall be produced by manufacturer of original equipment.
   3. Manufacturer shall have a service office and full time service personnel within a 100 mile radius of the project site.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer: Design based around TK Elevator’s evolution 200 Self-Supported Machine Room-Less elevator.

2.02 MATERIALS, GENERAL

B. All Elevator Cab materials including frame, buttons, lighting, wall and ceiling assembly, laminates and carpet shall have an EPD and an HPD, and shall meet the California Department of Public

Health Standard Method V1.1–2010, CA Section 01350 as mentioned in 1.03.9 of this specification.

C. Colors, patterns, and finishes: As selected by the Architect from manufacturer's full range of standard colors, patterns, and finishes.

D. Steel:
   1. Shapes and bars: Carbon.
   2. Sheet: Cold-rolled steel sheet, commercial quality, Class 1, matte finish.
   3. Finish: Factory-applied baked enamel for structural parts, powder coat for architectural parts. Color selection must be based on elevator manufacture’s standard selections.

E. Plastic laminate: Decorative high-pressure type, complying with NEMA LD3, Type GP-50 General Purpose Grade, nominal 0.050" thickness. Laminate selection must be based on elevator manufacture’s standard selections.

F. Flooring by others.

2.03 HOISTWAY EQUIPMENT

A. Platform: Fabricated frame of formed or structural steel shapes, gusseted and rigidly welded with a wood sub-floor. Underside of the platform shall be fireproofed. The car platform shall be designed and fabricated to support one-piece loads weighing up to 25% of the rated capacity.

B. Sling: Steel stiles bolted or welded to a steel crosshead and bolstered with bracing members to remove strain from the car enclosure.

C. Deflector Sheaves: None

D. Guide Rails: Dry, non-lubricated steel, fastened to the building with steel brackets.

E. Guides: Guide shoes or roller guides with a minimum of three tires shall be mounted on top and bottom of the car and counterweight frame and be held in contact with the guide rail by adjustable devices.

F. Buffers: Provide substantial buffers in the elevator pit. Mount buffers on continuous channels fastened to the elevator guide rail or securely anchored to the pit floor. Provide extensions if required by project conditions.

G. Machine: The hoisting machine shall be a compact energy efficient permanent magnet Gearless traction type, consisting of PMAC motor, brake and driving sheave mounted on a rigid bedplate in the top of the hoistway. A large solid, forged shaft shall serve as a support for the motor rotor assembly and for the drive sheave and brake system. It shall be supported by roller bearings mounted in the machine housing.

H. Drive System:

1. The drive system shall be of the Variable Voltage Variable Frequency (VVVF) regenerative.
2. The system shall be a vector controlled pulse-width modulated AC drive. The variable voltage variable frequency drive shall convert the AC power supply using a two-step process to a variable voltage variable frequency power supply for use by the hoist motor.
3. The speed control shall be by means of vector control providing direct torque and field excitation automatically provided by permanent magnet. A digital absolute velocity encoder shall be provided giving feedback to the controller on armature position and motor speed.
4. Dual solid state electronics (IGBT Insulated Gate Bipolar Transistor) in series shall be used in place of mechanical contactors.

I. Motor/Machine: The motor shall be PMAC, totally enclosed, non-ventilated with class "B" insulation. Ventilation fans are used if the situation requires a larger motor such as systems requiring six belts or speeds greater than 350 fpm. The motor armature shall be dynamically balanced and supported by roller bearings of ample capacity. The armature and driving sheave shall be properly balanced for smooth, high-speed elevator performance. The PM machine shall be mounted horizontally in the top of the hoistway in a unitized formed steel structure on bearing plates furnished by the elevator installer. The unitized formed steel structure shall be mounted on the guide rails provided by TK Elevator.

J. Brake: The brake shall be a spring applied electric brake; held open by an electro-magnet actuated by a digital brake controller and designed to make smooth, positive stops. The Brake shall be designed to automatically apply in the event of interruption of power supply from any cause. Operation and control of the brake shall be all digital. The setting and lifting of the brake shall be software based and all electronic. All adjustments and setup of the brake shall be made using a PC interface. No contactors or resistors shall be used in the actuation of the brake.

K. Suspension Belts and Governor Rope: Suspension belts shall be flat belts of polyurethane with an inner core of 12 steel cords with an FT1 fire rating such that hoistway sprinklers are not required by NFPA-13. Each belt shall have a suspension strength of 60 KN (13,488 pounds).
    1. Four to six belts shall be used depending on the car capacity.
    2. Suspension tension monitor shall detect differences in belt tension and for loss of tension. If fault is detected, the car shall stop at the nearest floor and an Out of Service call be registered.
    3. Trip criteria shall be monitored and data shall be stored in redundant non-volatile locations. Belts shall be replaced prior to the end of service life. Messages shall be issued at 180, 90, and 30 days prior to the last day of service life.
    4. Governor ropes shall be of iron construction.
    5. Any special tools, devices, software or equipment required for monitoring the wear of suspension shall be included with the installation of the equipment and become the property of the owner at time of elevator completion. This includes special ongoing monitoring systems, special tools and instruction needed to monitor the suspension system.

L. Counterweight: Counterbalance each elevator for smooth and economical operation by using iron or steel plate weights securely fastened in a steel counterweight frame. Counterweight shall equal

the weight of the complete elevator car and approximately 50 percent of the specified capacity load.

M. Safety and Governor: Car safety shall be mounted on the bottom members of the car frame and be operated by a centrifugal speed governor. The governor shall be designed to cut off power to the motor and apply the brake whenever the governor indicates the car has excessive speed. The governor shall function when the car over speeds.

N. Emergency Terminal Limits: Place electric limit devices in the hoistway near the terminal landings. Limit switch(es) shall be designed to cut off the electric current and stop the car if it runs beyond either terminal landing.

O. Automatic Self-Leveling: Provide each elevator car with a self-leveling feature to automatically bring the car to the floor landings and correct for over travel or under travel. Self-leveling shall, within its zone, be automatic and independent of the operating device. The car shall be maintained approximately level with the landing irrespective of its load.

2.04 HOISTWAY ENTRANCES

A. Doors and Frames: Provide complete hollow metal type hoistway entrances at each hoistway opening bolted\knock down construction.
   1. Manufacturer's standard entrance design consisting of hangers, doors, hanger supports, hanger covers, fascia plates (where required), sight guards, and necessary hardware.
   2. Main landing door & frame finish: Stainless steel panels, no. 4 brushed finish with no. 4 brushed finish entrance frame.
   3. Typical door & frame finish: Stainless steel panels, no. 4 brushed finish with no. 4 brushed finish entrance frame.

B. Interlocks: Equip each hoistway entrance with an approved type interlock tested as required by code. Provide door restriction devices as required by code.

C. Door Hanger and Tracks: Provide sheave type two point suspension hangers and tracks for each hoistway horizontal sliding door.
   1. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
   2. Hangers: Provide an adjustable device beneath the track to limit the up-thrust of the doors during operation.
   3. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.

D. Hoistway Sills: Extruded metal, with groove(s) in top surface. Provide mill finish on aluminum.

2.05 PASSENGER ELEVATOR CAR ENCLOSURE

A. Car Enclosure:
   1. Walls: Cab type TKS, reinforced cold-rolled steel. Walls shall be constructed of stainless steel, no. 4 brushed finish.
   2. Reveals and frieze: Not Applicable
   3. Canopy: Cold-rolled steel with hinged exit.

4. Ceiling: Downlight type, metal pans with suspended LED downlights and dimmer switch. Number of downlights shall be dependent on platform size with a minimum of six. The metal pans shall be finished with a stainless steel, no. 4 brushed finish.
5. Cab Fronts, Return, Transom, Soffit and Strike: Provide panels faced with brushed stainless steel
6. Doors: Horizontal sliding car doors reinforced with steel for panel rigidity. Hang doors on sheave type hangers with polyurethane tires that roll on a polished steel track and are guided at the bottom by non-metallic sliding guides.
    a. Door Finish: Stainless steel panels: No. 4 brushed finish.
    b. Cab Sills: Extruded aluminum, mill finish.
7. Handrail: Provide 1.5' diameter cylindrical metal on side and rear walls on front opening cars and side walls only on front and rear opening cars. Handrails shall have a stainless steel, no. 4 brushed finish.
8. Ventilation: Manufacturer’s standard exhaust fan, mounted on the car top.
9. Protection pads and buttons: Provide one set of vinyl protection pads with metal grommets for the project. Provide pad buttons on cab front(s) and walls.

B. Car Top Inspection: Provide a car top inspection station with an “Auto-Inspection” switch, an "emergency stop" switch, and constant pressure "up and down" direction and safety buttons to make the normal operating devices inoperative. The station shall give the inspector complete control of the elevator. The car top inspection station shall be mounted in the door operator assembly.

2.06 DOOR OPERATION

A. Door Operation: Provide a direct or alternating current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. The door control system shall be digital closed loop and the closed loop circuit shall give constant feedback on the position and velocity of the elevator door. The motor torque shall be constantly adjusted to maintain the correct door speed based on its position and load. All adjustments and setup shall be through the computer based service tool. Door movements shall follow a field programmable speed pattern with smooth acceleration and deceleration at the ends of travel. The mechanical door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at the landing and automatically close after an adjustable time interval or when the car is dispatched to another landing. AC controlled units with oil checks, or other deviations are not acceptable.
    1. No Un-Necessary Door Operation: The car door shall open only if the car is stopping for a car or hall call, answering a car or hall call at the present position or selected as a dispatch car.
    2. Door Open Time Saver: If a car is stopping in response to a car call assignment only (no coincident hall call), the current door hold open time is changed to a shorter field programmable time when the electronic door protection device is activated.
    3. Double Door Operation: When a car stops at a landing with concurrent up and down hall calls, no car calls, and no other hall call assignments, the car door opens to answer the hall call in the direction of the car's current travel. If an onward car call is not registered before the door closes to within 6 inches of fully closed, the travel shall reverse and the door shall reopen to answer the other call.

4. Nudging Operation: The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door closing is prevented for a field programmable time, a buzzer shall sound. When the obstruction is removed, the door shall begin to close at reduced speed. If the infra-red door protection system detects a person or object while closing on nudging, the doors shall stop and resume closing only after the obstruction has been removed.
5. Door Reversal: If the doors are closing and the infra-red beam(s) is interrupted, the doors shall reverse and reopen. After the obstruction is cleared, the doors shall begin to close.
6. Door Open Watchdog: If the doors are opening, but do not fully open after a field adjustable time, the doors shall recycle closed then attempt to open six times to try and correct the fault.
7. Door Close Watchdog: If the doors are closing, but do not fully close after a field adjustable time, the doors shall recycle open then attempt to close six times to try and correct the fault.
8. Door Close Assist: When the doors have failed to fully close and are in the recycle mode, the door drive motor shall have increased torque applied to possibly overcome mechanical resistance or differential air pressure and allow the door to close.

B. Door Protection Device: Provide a door protection system using microprocessor controlled infra-red light beams. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen.

2.07 CAR OPERATING STATION

A. Car Operating Station, General: The main car control in each car shall contain the devices required for specific operation mounted in an integral swing return panel requiring no applied faceplate. Wrap return shall have a brushed stainless steel finish. The main car operating panel shall be mounted in the return and comply with handicap requirements. Pushbuttons that illuminate using long lasting LED’s shall be included for each floor served, and emergency buttons and switches shall be provided per code. Switches for car light and accessories shall be provided.

B. Emergency Communications System: Integral phone system provided.

C. Auxiliary Operating Panel:

D. Column Mounted Car Riding Lantern: A car riding lantern shall be installed in the elevator cab and located in the entrance. The lantern, when illuminated, will indicate the intended direction of travel. The lantern will illuminate and a signal will sound when the car arrives at a floor where it will stop. The lantern shall remain illuminated until the door(s) begin to close.

E. Special Equipment:
Limited Access Operation: Keyswitch and card reader space.(card reader by others)

2.08 CONTROL SYSTEMS

A. Controller: The elevator control system shall be microprocessor based and software oriented. The system shall operate in real time, continuously analyzing the car(s) changing position, condition, and work load. All controller and operational circuits including the brake control and drive system shall be digital. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops, and by "up-down" push buttons at each intermediate landing and "call" push buttons at terminal landings.
    1. Momentary pressing of one or more buttons shall dispatch the car to the designated landings in the order in which the landings are reached by the car, irrespective of the sequence in which the buttons are pressed. Each landing call shall be canceled when answered.
    2. When the car is traveling in the up direction, it shall stop at all floors for which car buttons or "up" hall buttons have been pressed. The car shall not stop at floors where "down" buttons have been pressed, unless the stop for that floor has been registered by a car button or unless the down call is at the highest floor for which any buttons have been pressed. Pressing the "up" button when the car is traveling in the down direction shall not intercept the travel unless the stop for that floor has been registered by a car button or unless the up call is the lowest for which any button has been pressed.
    3. When the car has responded to its highest or lowest stop, and stops are registered for the opposite direction, its direction of travel shall reverse automatically and it shall then answer the calls registered for that direction. If both up and down calls are registered at an intermediate floor, only the call corresponding to the direction of car travel shall be canceled upon the stopping of the car at the landing.
    4. A car that is stopping for the last hall call in the preference direction, and that hall call is for the opposite direction with no onward car calls, shall reverse preference when the selector position advances to the landing at which the car is committed to stop. A car that is stopping for the last hall call in the preference direction, and that hall call is for the same direction, shall hold its preference until the door is almost closed allowing time for a passenger to register an onward car call which shall maintain the preference. If no car call is registered before the door is almost closed, the car shall lose its preference and shall be available to accept calls in either direction.

B. Operation: Selective Collective – ETA based. The system is optimized to get a car to the floor where a hall call has been registered, in the shortest time. The system receives input information from standard call pushbuttons located in the hall, car position and car load information from individual car loadweighers.

    1. When group operation is required, the group supervisory operation shall be embedded within selected car controllers. No separate group controller shall be supplied. The microprocessor shall constantly scan the system for hall calls. When hall calls are registered, the control system shall immediately calculate the estimated time for arrival using such information as, number of floors to travel from the current position, the time it takes to travel one floor at top speed, calls assigned to a car, and car reversal time to respond to a call in the opposite direction of travel. When a car’s status changes or additional hall calls are registered, the estimated time of arrival shall be recalculated and calls reassigned if necessary.
    2. Traffic Pattern: The microprocessor shall provide flexibility to meet well defined patterns of traffic, including up peak, down peak, and heavy interfloor demands, and adjust for indeterminate variations in these patterns which occur in buildings.

3. Artificial Intelligence: Artificial Intelligence shall be an integral part of the group control system software. The enhanced artificial intelligence shall optimize the interfloor traffic performance. Inputs for the artificial intelligence shall include accurate passenger load from an electronic loadweigher, probable car calls generated from each hall call, type of building and observed traffic patterns.

C. Load Weighing Device: Provide a load weighing device on each car which, when the particular car is filled to an adjustable percentage of the capacity load, shall cause the car to bypass landing calls but not car calls. The passed landing calls shall remain registered for the next following car.
   1. The device shall be unaffected by the action of compensating chain or rope. The device shall detect a 50 pound (23 Kg.) load change under all conditions.
   2. The load sensor shall use a load cell to accurately measure the weight in the car. The information shall be transferred via a serial link to the elevator controller.

D. Anti-Nuisance Call Control: The microprocessor control system shall evaluate the number of people on the car and compare that value to the number of car calls registered. If the number of car calls exceeds the number of people by a field programmable value, the car calls shall be canceled after the first call has been answered.

E. Position Selector: The position selector shall be part of the microprocessor system. The car position in the hoistway shall be digitized through a primary position encoder. The microprocessor control system shall store the floor position and slow down points in memory.

F. Motion Control: The drive control system shall be dual-loop feedback system based primarily on car position. The velocity profile shall be calculated by the microprocessor control system producing extremely smooth and accurate stops. The velocity encoder shall permit continuous comparison of machine speed to velocity profile and to actual car speed. This accurate position/velocity feedback shall permit a fast and accurate control of acceleration and retardation.

G. Motor Pre-Torque: Current shall be applied to the elevator drive before the brake is released and the speed pattern is dictated to eliminate roll back and sling shot effects of unbalanced loads in the car. The electronic loadweigher shall determine the load on the car determining a pre-torque reference to send to the drive.

H. Emergency Power Operation: This operation is only available with Green Drive. Once the loss of normal power has been detected, the elevator car is moved up or down to the next available landing, depending on the load in the car and will open the doors. After passengers have exited the elevator, the doors are closed. It is NOT designed to lower the car to a specified landing such as Battery Lowering used for Hydraulic applications. For a Green Drive auto rescue, an isolation transformer is NOT required, unless building power voltage matching is necessary. A single rescue unit is not capable of rescuing a group of cars --- this is a per car option. Maximum travel on rescue operation is 160 feet. This feature is included in the elevator contract and does not utilize a building-supplied standby power source.

I. Destination Dispatch: Not Applicable

J. Automatic Light and Fan shut down: The control system shall evaluate the system activity and automatically turn off the cab lighting and ventilation fan during periods of inactivity. The settings shall be field programmable.

K. Special Operation: spe

2.09 HALL STATIONS

A. Hall Stations, General: Vandal resistant buttons with center jewels which illuminate to indicate that a call has been registered at that floor for the indicated direction. Each button shall be provided with an internal automatic stop to prevent damage of switches that register the call. Provide 1 set of pushbutton risers. All fixtures shall be vandal resistant type.
    1. Provide one pushbutton riser with faceplates having a brushed stainless steel finish.
        a. Phase 1 firefighter's service key switch, with instructions, shall be incorporated into the hall station at the designated level.

B. Floor Identification Pads: Provide door jamb pads at each floor. Jamb pads shall comply with Americans with Disabilities Act (ADA) requirements.

C. Hall Position Indicator: An electronic dot matrix position indicator shall be provided and mounted for optimum viewing. As the car travels, its position in the hoistway shall be indicated by the illumination of the alphanumeric character corresponding to the landing which the elevator is stopped or passing. When hall lanterns are provided, the position indicator shall be combined with the hall lanterns in the same faceplate. Faceplates shall match hall stations. Provide at all typical landings.

D. Hall lanterns: Not Applicable

E. Special Equipment:
Limited access operation: Not Applicable

2.10 CONTROLLER LOCATION

A. A control closet shall be provided adjacent to the hoistway. The control closet for simplex cars shall be 5'-6" x 6'-4" x 7'-6" high minimum size. For two-car group operation, the control closet shall be 8'-0' x 5'-6" x 7'6" high minimum. The control closet must be located within a distance that limits the wire length to 150'-0" or less from the elevator machine to elevator controller. The control closet shall have a 3?-0? wide door minimum. The control closet disconnect is provided by others. A disconnect shall be provided by others for each elevator in the optional control closet.

PART 3 EXECUTION

3.01 EXAMINATION

A. Before starting elevator installation, inspect hoistway, hoistway openings, pits and/or control room, as constructed, verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 INSTALLATION

A. Install elevator systems components and coordinate installation of hoistway wall construction.
    1. Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.
    2. Comply with the National Electrical Code for electrical work required during installation.

B. Perform work with competent, skilled workmen under the direct control and supervision of the elevator manufacturer's experienced foreman.

C. Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports, and bracing including all setting templates and diagrams for placement.

D. Welded construction: Provide welded connections for installation of elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualification of welding operators.

E. Coordination: Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure dimensional coordination of the work.

F. Install machinery, guides, controls, car and all equipment and accessories to provide a quiet, smoothly operating installation, free from side sway, oscillation or vibration.

G. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing.

H. Erect hoistway sills, headers, and frames before erection of rough walls and doors; erect fascia and toe guards after rough walls finished. Set sill units accurately aligned and slightly above finish floor at landings.

I. Lubricate operating parts of system, including ropes, as recommended by the manufacturer.

3.03 FIELD QUALITY CONTROL

A. Acceptance testing: Upon completion of the elevator installation and before permitting use of elevator, perform acceptance tests as required and recommended by Code and governing regulations or agencies. Perform other tests, if any, as required by governing regulations or agencies.

B. Advise Owner, Contractor, Architect, and governing authorities in advance of dates and times tests are to be performed on the elevator.

3.04 ADJUSTING

A. Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately.

3.05 CLEANING

A. Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided. Stainless steel shall be cleaned with soap and water and dried with a non-abrasive surface; it shall not be cleaned with bleach-based cleansers.

B. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoistway. Remove trash and debris.
    1. Use environmentally preferable and low VOC emitting cleaners for each application type. Cleaners that contain solvents, pine and/or citrus oils are not permitted.

3.06 PROTECTION

A. At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

3.07 DEMONSTRATION

A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.

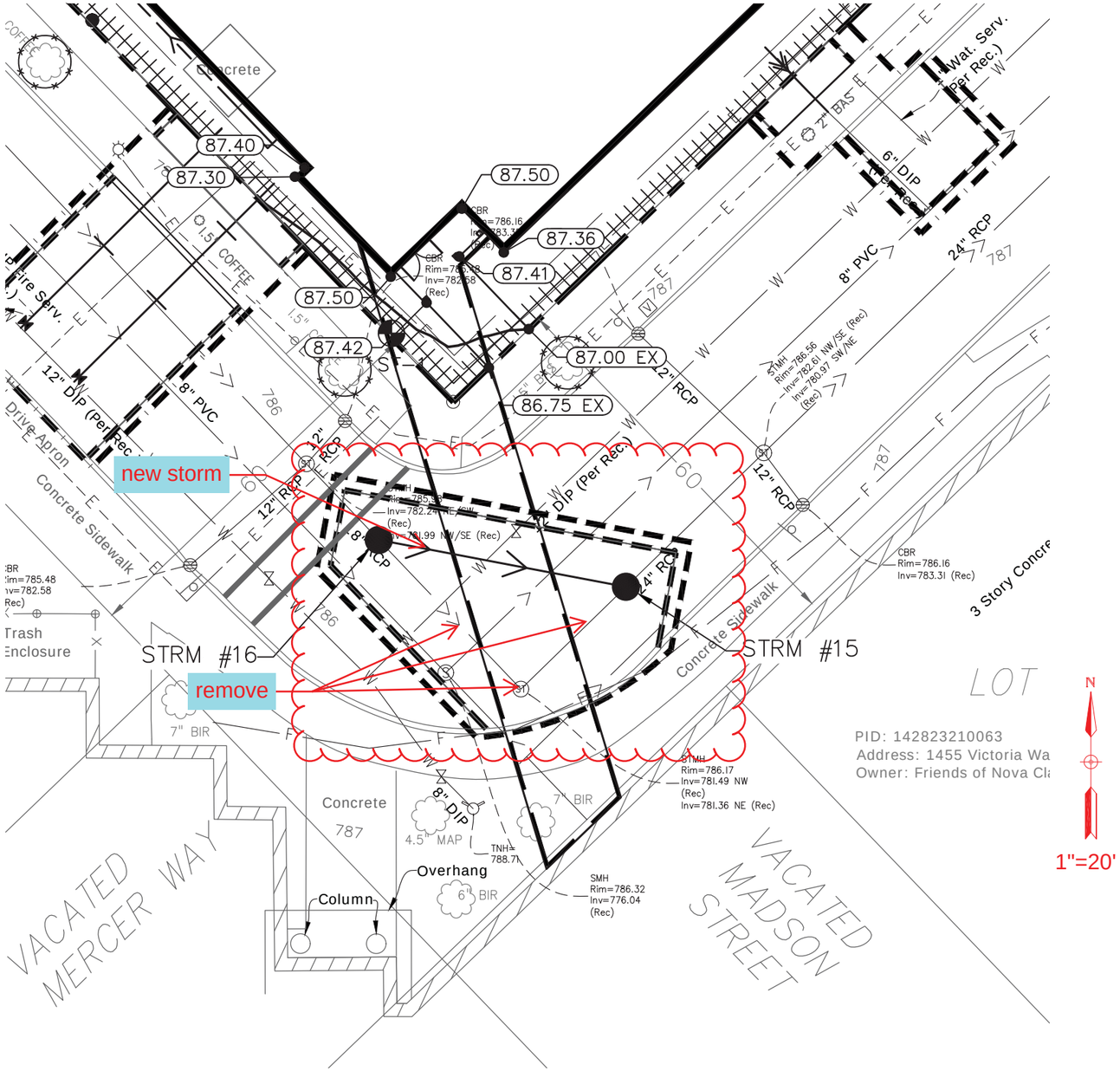
B. Make a final check of each elevator operation, with Owner's personnel present, immediately before date of substantial completion. Determine that control systems and operating devices are functioning properly.

3.08 ELEVATOR SCHEDULE

A. Elevator Qty. 1
    1. Elevator Model: evolution 200
    2. Elevator Type: Gearless Traction Machine Room-Less, Passenger
    3. Rated Capacity: 4000 lbs.
    4. Rated Speed: 350 ft./min.
    5. Operation System: TAC32T
    6. Travel: 28'-0"
    7. Landings: 2 total
    8. Openings:
        a. Front: 2
        b. Rear: 0
    9. Clear Car Inside: 7'-8" wide x 5'-5" deep
    10. Inside clear height: 7'-4" standard
    11. Door clear height: 7'-0" standard
    12. Hoistway Entrance Size: 3'-6" wide x 7'-0" high
    13. Door Type: One-speed | LH Side opening
    14. Power Characteristics: 208 volts, 3 Phase, 60 Hz.
        a. Note: Isolation Transformer required for jobs with less than 480vac, 3 Phase building power.
    15. Seismic Requirements: Zone
    16. Hoistway Dimensions: 9'-6" wide x 6'-11" deep
        a. Note: Hoistway dimensions listed above are for Seismic Zone 1 only. If you have chosen a seismic zone other than zone 1 please consult your local TK Elevator Sales Representative for the proper hoistway dimensions.
    17. Pit Depth: 5'-6"
    18. Button & Fixture Style: Vandal Resistant Signal Fixtures
    19. Special Operations:
        Limited Access with card readers by others

3.09 SPECIAL CONDITIONS (Note: Add Special Conditions as Needed)

END OF SECTION



BHD NOTES FOR PRICING:

1. MEET ALL CITY REQUIREMENTS/STANDARDS.
2. CAP EXISTING PIPING AND REMOVE EXISTING MANHOLE AND PIPING PER CIVIL.
3. SEE CIVIL SHEETS AND SPECS. FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
4. PROVIDE FOR REPAVING (TEMPORARY AND PERMANENT) AS REQUIRED BY THE CITY.
5. PROVIDE A TURN-KEY PRICE FOR ALL UTILTY, PAVING, STRIPING, TRAFFIC CONTROL, EARTHWORK, SHORING, PERMITS, CONNECTION FEES, AND ASSOCIATED WORK, INCIDENTAL TO THE GMP PRICE FOR THIS WORK.
6. FINAL LOCATION TO BE DETERMINED BY SEWER DEPARTMENT AND CIVIL ENGINEER. ALLOW FOR ADJUSTMENTS TO FINAL LOCATION IN ROADWAY, IN GMP PRICE.

PRELIMINARY CIVIL SKETCH - SK-C01
MANHOLE AND PIPING RELOCATION

Date: 08/04/2025
PROJECT NO.: 23008.003

Nova Classical Academy

Saint Paul, Minnesota

SK-C01