This addendum forms a part of the Contract Documents and modifies the original Documents dated **January 2, 2026,** as noted below. Acknowledge receipt of this addendum in the space provided on the Official Bid Form. Failure to do so may subject the Bidder to disqualification.

ENCLOSED 27 0528 – PATHWAYS FOR COMMUNCATIONS SYSTEMS
Enclosed 27 0528 – PATHWAYS FOR COMMUNCATIONS SYSTEMS, *in its entirety.*

ENCLOSED 27 1323 – COMMUNICATIONS OPTICAL FIBER BACKBONE CABLING
Enclosed 27 1323 – COMMUNICATIONS OPTICAL FIBER BACKBONE CABLING, *in its entirety.*

ENCLOSED 27 1800 – TESTING, INDENITFICATION OF FIBER INFRASTRUCTURE
Enclosed 27 1800 – TESTING, INDENITFICATION OF FIBER INFRASTRUCTURE, *in its entirety.*

SUBSTITUTION REQUESTS

APPROVED

1. Section: 05 5100 – Metal Stairs
   Product: Prefabricated Aluminum ADA Ramp and Stair Systems
   Paragraph: Part 2 - Products

   Proposed Substitution
   Manufacturer: Welcome Ramp Systems – Modular Aluminum Ramp and Stair Systems
   Description: Prefabricated modular aluminum ADA and IBC compliant ramp, stair, and landing systems. Systems are engineered for school and public facility use, meet slope, handrail, guardrail, and landing requirements, and can be configured to match project layouts.

2. Section: Window Shade – 12 2400
   Product: Roller Shades
   Paragraph: 2.03 Shade Fabric - 1-a

   Proposed Substitution
   Manufacturer: Soleffect
   Description: Manual Soloscreen Roller Shade

3. Section: Window Shade – 12 2400
   Product: Roller Shades
   Paragraph: 2.03 Shade Fabric - 1-a

   Proposed Substitution
   Manufacturer: Hunter Douglas RB-500
   Description: Fabric Sheer Weave or GlacierScreen+Twill

REVISION TO DRAWINGS
Replace the following with enclosed revised sheets

MODIFICATIONS TO G-001:

a) Add Technology Sheets to the Drawing Index.
b) Add Technology Consultant to the Project Team.

ADDENDUM 3

MODIFICATIONS TO A-111:

a) Revise Fixture Type 'F'. Type F now supports a battery back-up option for egress.
b) Update Fixture Schedule to include additional fixture information. Note: Additional information is provided to communicate intent. Final fixture selections including model numbers, options (battery back-up), wattage and CCT that are code compliant and used for ordering shall be proposed by the design/build subcontractor.

MODIFICATIONS TO A-131:

a) Add MEP Symbol Legend.
b) Revise Keynote 23-02.
c) Add keynotes 26-11 & 26-29.
d) Revise "1/A-131 Diagrammatic MEP Plan" electrical outlets per the attached.

MODIFICATIONS TO SHEET S000:

a) Revise "REINFORCED CONCRETE MASONRY" Item #1 per the attached.

MODIFICATIONS TO SHEET S500:

a) Revise notes in Detail "5/S500 - Typical Edge Detail" per the attached.

ADD SHEET T-001 – ICT Symbols and Abbreviations

ADD SHEET T-100 – ICT Site Plan

ADD SHEET T-501 – ICT Details

QUESTIONS AND CLARIFICATIONS

Clarification: FIRE ALARM

a) A Fire Alarm is required for the modular. The Code Summary notes that the system is existing. The system will be demolished with the interior improvements and new system shall be provided.

END OF ADDENDUM 3

ADDENDUM 3

SECTION 270528
PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Metal conduits and fittings.
   2. Nonmetallic conduits and fittings.
   3. Optical-fiber-cable pathways and fittings.
   4. Metallic surface pathways.
   5. Nonmetallic surface pathways.
   6. J-Hooks.
   7. Boxes, enclosures, and cabinets.
   8. Polymer-concrete handholes and boxes for exterior underground cabling.
   9. Cable trays.
   10. Ladder racks.

1.02 ACTION SUBMITTALS

A. Product Data: For each type of product used on this project, provide cut sheet with highlighted part number of product. A separate submittal is required for each specification section. Do not combine or merge specification sections.

B. Retain "Shop Drawings" Paragraph below for custom enclosures, cabinets, handholes, and boxes.

C. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

PART 2 - PRODUCTS

2.01 METAL CONDUITS AND FITTINGS

A. Description: Metal raceway of circular cross section with manufacturer-fabricated fittings.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. O-Z/Gedney; a brand of Emerson Industrial Automation.
   2. Southwire Company.
   3. Thomas & Betts Corporation; A Member of the ABB Group.

C. General Requirements for Metal Conduits and Fittings:
   1. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.
   2. Comply with TIA-569-E.

D. GRC: Comply with ANSI C80.1 and UL 6.

E. ARC: Comply with ANSI C80.5 and UL 6A.

F. IMC: Comply with ANSI C80.6 and UL 1242.

G. PVC-Coated Steel Conduit: PVC-coated IMC.
   1. Comply with NEMA RN 1.
   2. Coating Thickness: 0.040 inch (1 mm), minimum.

H. EMT: Comply with ANSI C80.3 and UL 797.

I. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
   1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
   2. Fittings for EMT:
      a. Material: Steel

b. Type: Setscrew

3. Expansion Fittings: PVC or steel to match conduit type, complying with UL-467, rated for environmental conditions where installed, and including flexible external bonding jumper.
4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

J. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.02 NONMETALLIC CONDUITS AND FITTINGS

A. Description: Nonmetallic raceway of circular section with manufacturer-fabricated fittings.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Carlon; a brand of Thomas & Betts Corporation.
2. Dura-Line.
3. RACO; Hubbell.

C. General Requirements for Nonmetallic Conduits and Fittings:
1. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
2. Comply with TIA-569-E.

D. RNC: Type EPC-40-PVC Type EPC-80-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.

E. Rigid HDPE: Comply with UL 651A.

F. Continuous HDPE: Comply with UL 651A.

G. RTRC: Comply with UL 2515A and NEMA TC 14.
1. Fittings: Comply with NEMA TC 3; match to conduit or tubing type and material.

H. Solvents and Adhesives: As recommended by conduit manufacturer.

2.03 OPTICAL-FIBER-CABLE PATHWAYS AND FITTINGS

A. Description: Comply with UL 2024; flexible-type pathway with a circular cross section, approved for plenum or riser installation unless otherwise indicated.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Carlon; a brand of Thomas & Betts Corporation.
2. Dura-Line.
3. Hubbell.

2.04 SURFACE METAL PATHWAYS

A. Description: Galvanized steel with snap-on covers, complying with UL 5.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. MonoSystems, Inc.
2. Panduit Corp.
3. Wiremold / Legrand.

C. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

D. Comply with TIA-569-E.

2.05 SURFACE NONMETALLIC PATHWAYS:

A. Description: Two- or three-piece construction, complying with UL 5A, and manufactured of rigid PVC.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Panduit Corp.
   2. Quazite: Hubbell Power Systems, Inc.
   3. Wiremold / Legrand.

C. Finish: Texture and color determined at time of submittal.

D. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

E. Comply with TIA-569-E.

2.06 J-HOOKS

A. Description: Prefabricated sheet metal cable supports for telecommunications cable.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Eaton, B-line.
   2. Panduit Corp.
   3. Wiremold / Legrand.

C. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

D. Comply with TIA-569-E.

2.07 BOXES, ENCLOSURES, AND CABINETS

A. Description: Enclosures for communications.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. O-Z/Gedney; a brand of Emerson Industrial Automation.
   2. RACO; Hubbell.
   3. Thomas & Betts Corporation; A Member of the ABB Group.

C. General Requirements for Boxes, Enclosures, and Cabinets:
   1. Comply with TIA-569-E.
   2. Boxes, enclosures, and cabinets installed in wet locations shall be listed and labeled as defined in NFPA 70, by an NRTL, and marked for use in wet locations.
   3. Retain and revise subparagraphs below to specify general requirements for boxes.
   4. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
   5. Device Box Dimensions: 4 inches square by 2-1/8 inches deep, with single gang mud ring, U.N.O.

D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

E. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.

F. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 3R, with continuous-hinge cover with flush latch unless otherwise indicated.
   1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
   2. Nonmetallic Enclosures:
      a. Material: Fiberglass.
      b. Finished inside with radio-frequency-resistant paint.
   3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

2.08 POLYMER-CONCRETE HANDHOLES

A. Description: Molded of sand and aggregate; bound together with polymer resin; and reinforced with steel, fiberglass, or a combination of the two.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Armorcast Products Company.
   2. NewBasis.
   3. Quazite: Hubbell Power Systems, Inc.

C. General Requirements for Polymer Concrete Handholes:
   1. Boxes and handholes for use in underground systems shall be listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
   2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
   3. Comply with TIA-569-E.

D. Configuration: Designed for flush burial with open bottom unless otherwise indicated.

E. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
   1. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
   2. Cover Legend: Molded lettering, "COMMUNICATIONS".

2.09 CABLE TRAYS

A. Description: wire mesh basket cable support for telecommunications cable.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Eaton, B-line.
   2. Panduit Corp.
   3. Wiremold / Legrand.

C. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

D. Comply with TIA-569-E.

2.10 LADDER RACK

A. Description: rail/rung style cable support for telecommunications cable.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Eaton, B-line.
   2. Panduit Corp.
   3. Chatsworth.

C. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

D. Comply with TIA-569-E.

PART 3 - EXECUTION

3.01 PATHWAY APPLICATION

A. Minimum Pathway Size: refer to drawings.

B. Pathway Fittings: Compatible with pathways and suitable for use and location.

C. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

D. Install surface pathways only where indicated on Drawings.

E. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.02 INSTALLATION

A. Comply with the following standards for installation requirements except where requirements on Drawings or in this Section are stricter:
   1. NECA 1.

2. TIA-569-E.
3. NECA 101.
4. NECA 102.
5. NECA 105.
6. NECA 111.

B. Comply with NFPA 70 limitations for types of pathways allowed in specific occupancies and number of floors.

C. Keep pathways at least 12 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal pathway runs above water and steam piping.

D. Complete pathway installation before starting conductor installation.

E. Install no more than the equivalent of 180-degree bends in any pathway run. Provide junction box at locations exceeding 180-degree bends. Support within 12 inches of changes in direction. Utilize long radius elbows for all optical-fiber cables.

F. Conceal rigid conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

G. Support conduit within 12 inches of enclosures to which attached.

H. Pathways Embedded in Slabs:
1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure pathways to reinforcement at maximum 10-foot intervals.
2. Arrange pathways to cross building expansion joints at right angles with expansion fittings. Comply with requirements for expansion joints specified in this article.
3. Arrange pathways to keep a minimum of 1 inch of concrete cover in all directions.
4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.

I. Stub-ups to Above Recessed Ceilings:
1. Use EMT, IMC, or RMC for pathways.
2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

J. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of pathway and fittings before making up joints. Follow compound manufacturer's written instructions.

K. Coat field-cut threads on PVC-coated pathway with a corrosion-preventing conductive compound prior to assembly.

L. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure, to assure a continuous ground path.

M. Cut conduit perpendicular to the length. For conduits of 2-inch trade size and larger, use roll cutter or a guide to ensure cut is straight and perpendicular to the length.

N. Install pull wires in empty pathways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Secure pull wire, so it cannot fall into conduit. Cap pathways designated as spare alongside pathways in use.

O. Surface Pathways:
1. Install surface pathway for surface telecommunications outlet boxes only where indicated on Drawings.
2. Install surface pathway with a minimum 2-inch radius control at bend points.
3. Secure surface pathway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight pathway section.

Support surface pathway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.

P. Pathways for Optical-Fiber and Communications Cable: Install pathways, metal and nonmetallic, rigid and flexible, as follows:
   1. 1-Inch Trade Size and Larger: Install pathways in maximum lengths of 75 feet.
   2. Install with a maximum of two 90-degree bends or equivalent for each length of pathway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

Q. Install pathway-sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed pathways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install pathway-sealing fittings according to NFPA 70.

R. Install devices to seal pathway interiors at accessible locations. Locate seals, so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all pathways at the following points:
   1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
   2. Where an underground service pathway enters a building or structure.
   3. Where otherwise required by NFPA 70.

S. Comply with manufacturer's written instructions for solvent welding PVC conduit and fittings.

T. J-Hooks:
   1. Size to allow a minimum of 25 percent future capacity without exceeding design capacity limits.
   2. Shall be supported by dedicated support wires. Do not use ceiling grid support wire or support rods.
   3. Hook spacing shall allow no more than 6 inches of slack. The lowest point of the cables shall be no less than 6 inches adjacent to ceilings, mechanical ductwork and fittings, luminaires, power conduits, power and telecommunications outlets, and other electrical and communications equipment.
   4. Space hooks no more than 4 feet o.c.
   5. Provide a hook at each change in direction.

U. Mount boxes at heights indicated on Drawings. Install boxes with height measured to center of box unless otherwise indicated.

V. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surface to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.

W. Horizontally separate boxes mounted on opposite sides of walls, so they are not in the same vertical channel.

X. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

Y. Set metal floor boxes level and flush with finished floor surface.

Z. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.03 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:
   1. Excavate trench bottom to provide firm and uniform support for conduit. Install backfill.
   2. After installing conduit, backfill and compact.
   3. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through floor unless otherwise indicated. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.

4. Retain first two subparagraphs below with either of last two subparagraphs above.
    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete around conduit for a minimum of 12 inches on each side of the coupling.
    b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
5. Underground Warning Tape: Provide warning tape 12” above trenched conduit.

3.04 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.

D. Field cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.05 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR COMMUNICATIONS PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies.

3.06 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies.

3.07 PROTECTION

A. Protect coatings, finishes, and cabinets from damage or deterioration.
    1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
    2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 271323
COMMUNICATIONS OPTICAL FIBER BACKBONE CABLING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. 9/125 micrometer single-mode, indoor-outdoor optical fiber cable (OS2).
   2. Optical fiber cable connecting hardware, patch panels, and cross-connects.
   3. Cabling identification products.

1.02 OPTICAL FIBER BACKBONE CABLING DESCRIPTION

A. Optical fiber backbone cabling system shall provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.

B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product. Separate submittal required for each specification section.

1.04 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installers and installation supervisor.

1.05 CLOSEOUT SUBMITTALS

A. Maintenance data.

B. As-built drawings

C. Test results

D. Warranty certificate

1.06 COORDINATION

A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

1.07 INSTALLER QUALIFICATIONS

A. Installer Qualifications: Division 27 sub-contractor shall be a manufacturer certified contractor and will be required to provide a minimum 25-year performance warranty on parts and labor for all fiber optic systems. Proof of the sub-contractor’s ability to provide such a warranty shall be submitted to the General Contractor at the time of bidding and to the Owner prior to the Notice To Proceed. This warranty shall cover the patch panels, adapter plates, connectors, fiber optic cabling, and patch cords.

B. Contractor shall employ, in conjunction with construction of the project, a capable, experienced, and reliable foreperson and such skilled workers as may be required for the various classes of work to be performed. Contractor shall be required to submit evidence of foreperson's skilled experience on ANSI/TIA certified fiber optic systems. Evidence of experience shall be submitted to Owner with submittal of bid. Minimum experience for any workman involved in cabling work shall be cable pulling and termination work on projects for a minimum of 5 years and completion of training (40 hrs. minimum) which certifies the person’s work in fiber optic installations. Training can be a combination of BICSI and manufacturer training.

PART 2 - PRODUCTS

2.01 REQUIREMENTS

A. General Performance: Backbone cabling system shall comply with transmission standards in TIA-568.1-E, when tested according to test procedures of this standard.

B. Telecommunications Pathways and Spaces: Comply with TIA-569-E.

C. Grounding: Comply with TIA-607-D.

D. All OSP cables shall grounded at both ends.

E. Indoor cables shall be interlocking armor cables or indoor or indoor/outdoor cables run in appropriately rated inner duct.

F. All non interlocking armor cables shall be run in appropriately rated inner duct if not in conduit.

2.02 9/125 MICROMETER, SINGLE-MODE, INDOOR-OUTDOOR OPTICAL FIBER CABLE (OS2)

A. Description: Single mode, 9/125-micrometer, optical fiber cable. Refer to drawings for strand count and cable type. Refer to Section 271800 for testing requirements.

B. Manufacturers: Subject to compliance with requirements, provide products by the following:
   1. CommScope, Inc.
   2. Corning Cable Systems.
   3. Panduit.

C. Standards:
   1. Comply with TIA-492CAAB for detailed specifications.
   2. Comply with TIA-568.3-E for performance specifications.
   3. Comply with ICEA S-104-696 for mechanical properties.

D. Armored cable shall be steel armored type.

E. Maximum Attenuation: 0.5 dB/km at 1310 nm; 0.5 dB/km at 1550 nm.

F. Jacket:
   1. Jacket Color: Black for indoor/outdoor.
   2. Cable cordage jacket, fiber, unit, and group color shall be according to TIA-598-D.
   3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals.

G. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:
   1. Plenum Rated, Nonconductive: Type OFNP
   2. Plenum Rated, Armored (Conductive): Type OFCP

2.03 OPTICAL FIBER CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. CommScope, Inc.
   2. Corning Cable Systems.
   3. Panduit.

B. Standards:
   1. Comply with Optical Fiber Connector Intermateability Standard (OFCIS) specifications of the TIA-604 series.
   2. Comply with TIA-568.3-E.
   3. Comply with TIA-607-D.

C. Fiber Optic Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors in 1U,2U, 3U, and 4U and wall-mount options. Each panel shall have a clear door, removable front and rear enclosures, strain relief brackets, routing clips and guides, mounting brackets, and labels.

D. Connector Type: Type LC complying with TIA-604-10-B.

E. Adapter Plates: LC Adapters Duplex, UPC, 12 Fiber. Blank all unused panels.

F. Patch Cords: Factory-made, LC-LC dual-fiber cables in 1-meter and 2-meter lengths. Check requirements in field prior to ordering.

2.04 IDENTIFICATION PRODUCTS

A. Comply with TIA-606-D and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

PART 3 - EXECUTION

3.01 WIRING METHODS

A. Wiring Method: Install cables in raceways and cable trays..
   1. Install plenum cable in environmental air spaces, including plenum ceilings.

B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.

3.02 INSTALLATION OF OPTICAL FIBER BACKBONE CABLES

A. Comply with NECA 1, NECA 301, and NECA/BICSI 568.

B. General Requirements for Optical Fiber Cabling Installation:
   1. Comply with TIA-568.1-E and TIA-568.3-E.
   2. Comply with BICSI ITSIMM, Ch. 6, "Cable Termination Practices."
   3. Terminate all cables; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
   4. Cables may not be spliced. Secure and support cables at intervals not exceeding 48 inches and not more than 12 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
   5. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
   6. Bundle, lace, and train cable to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, "Cabling Termination Practices" Chapter. Use lacing bars and distribution spools.
   7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
   8. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
   9. In the communications equipment room, provide a 10-foot long service loop on each end of cable.
   10. Pulling Cable: Comply with BICSI ITSIMM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
   11. Cable may be terminated on connecting hardware that is rack or cabinet mounted.

C. Open-Cable Installation:
   1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
   2. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

D. Group connecting hardware for cables into separate logical fields.

3.03 FIRESTOPPING

A. Comply with TIA-569-E, Annex A, "Firestopping."

B. Comply with BICSI ITSIMM, "Firestopping" Chapter.

3.04 GROUNDING

A. Install grounding according to BICSI ITSIMM, "Grounding (Earthing), Bonding, and Electrical Protection" Chapter.

B. Comply with TIA-607-D.

C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.

D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.05 IDENTIFICATION

A. Cable and Wire Identification:

1. Label each cable within 3 inches of each termination point with a mechanically generated label
2. Label each patch panel with mechanically generated labels
3. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA 606-C.

3.06 FIELD QUALITY CONTROL

A. Perform testing per section 271800.

END OF SECTION

SECTION 271800
TESTING, IDENTIFICATION AND ADMINISTRATION OF FIBER INFRASTRUCTURE

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide all labor, materials, tools, field-test instruments and equipment required for the complete testing, identification and administration of the work called for in the Contract Documents.

B. In order to conform to the overall project event schedule, the cabling contractor shall survey the work areas and coordinate cabling testing with other applicable trades.

C. In addition to the tests detailed in this document, the contractor shall notify the Owner or the Owner's representative of any additional tests that are deemed necessary to guarantee a fully functional system. The contractor shall carry out and record any additional measurement results at no additional charge.

1.02 SCOPE

A. This Section includes the minimum requirements for the test certification, identification and administration of backbone and horizontal optical fiber cabling.

B. This Section includes minimum requirements for:
   1. Fiber optic test instruments
   2. Fiber optic testing
   3. Identification
      a. Labels and labeling
   4. Administration
      a. Test results documentation
      b. As-built drawings

C. Testing shall be carried out in accordance with this document. This includes testing the attenuation and polarity of the installed cable plant with an optical loss test set (OLTS) and the installed condition of the cabling system and its components with an optical time domain reflectometer (OTDR). The condition of the fiber end faces shall also be verified.

D. Testing shall be performed on each cabling link (connector to connector).

E. Testing shall be performed on each cabling channel (equipment to equipment) that is identified by the owner.
   1. Testing shall not include any active devices or passive devices within the link or channel other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.

F. All tests shall be documented including OLTS dual wavelength attenuation measurements and OTDR traces with event tables as well as OTDR maps.
   1. Optionally, documentation shall also include optical length measurements and pictures of the connector end face.

1.03 QUALITY ASSURANCE

A. All testing procedures and field-test instruments shall comply with applicable requirements of:
   1. ANSI Z136.2, ANS For Safe Use Of Optical Fiber Communication Systems Utilizing Laser Diode And LED Sources
   2. ANSI/TIA 526 14-C, Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant with full OTDR descriptions
   3. ANSI/TIA 526 7-A, Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
   4. TIA-TSB-4979, Practical Considerations for Implementation of Multimode Launch Conditions in the Field
   5. ANSI/TIA-568.0-E, Generic Telecommunications Cabling for Customer Premises

6. ANSI/TIA-568.3-E, Optical Fiber Cabling and Components Standard
7. ANSI/TIA-606-D, Administration Standard for Commercial Telecommunications Infrastructure, including the requirements specified by the customer, unless the customer specifies their own labeling requirements

B. Trained technicians who have successfully attended an appropriate training program, which includes testing with an OLTS and an OTDR and have obtained a certificate as proof thereof shall execute the tests. These certificates may have been issued by any of the following organizations or an equivalent organization:
   1. Manufacturer of the fiber optic cable and/or the fiber optic connectors.
   2. Manufacturer of the test equipment used for the field certification or representative.
   3. Training organization e.g. BICSI

C. The Owner or the Owner's representative shall be invited to witness and/or review field-testing.
   1. The Owner or the Owner's representative shall be notified of the start date of the testing phase five (5) business days before testing commences.
   2. The Owner or the Owner's representative will select a random sample of 5% of the installed links. The Owner or the Owner's representative shall test these randomly selected links and the results are to be stored in accordance with Part 3 of this document. The results obtained shall be compared to the data provided by the installation contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the installation contractor under supervision of the representative shall repeat 100% testing at no cost to the Owner.

1.04 SUBMITTALS

A. Manufacturers catalog sheets and specifications for fiber optic field-test instruments including optical loss test sets (OLTS; power meter and source), optical time domain reflectometer (OTDR) and video microscope for the equipment used on this project.

B. A schedule (list) of all optical fibers to be tested.

C. Sample test reports.

1.05 ACCEPTANCE OF TEST RESULTS

A. Unless otherwise specified by the Owner or the Owners representative, each cabling link shall be in compliance with the following test limits:
   1. Optical loss testing
      a. Multimode and Singlemode links
         1) The link attenuation shall be calculated by the following formulas as specified in ANSI/TIA-568.3-E.
            a) Link Attenuation (dB) = Cable_Attn (dB) + Connector_Attn (dB) + Splice_Attn (dB)
            b) Cable_Attn (dB) = Attenuation_Coefficient (dB/km) * Length (Km)
            c) Connector_Attn (dB) = number_of_connector_pairs * connector_loss (dB)
            d) Maximum allowable connector_loss = 0.75 dB
            e) Use of Reference Grade connectors in Test Reference Cords.
               Test Reference Cords shall use Reference Grade connectors and the mated loss budget value (first and last) for these cords for Multimode shall be 0.30 dB and for Single-Mode shall be 0.50 dB.
            f) Splice_Attn (dB) = number_of_splices * splice_loss (dB)
            g) Maximum allowable splice_loss = 0.3 dB
            h) The values for the Attenuation_Coefficient (dB/km) are listed in the table below:

Type of Optical Fiber	Wavelength (nm)	Attenuation coefficient (dB/km)	Wavelength (nm)	Attenuation coefficient (dB/km)
Multimode 62.5/125 µm	850	3.5	1300	1.5

Multimode 50/125 µm	850	3.0	1300	1.5
Single-mode (OS2)	1310	0.5	1550	0.5

2. OTDR testing
   a. Reflective events (connections) shall not exceed:
      1) 0.75 dB in optical loss when bi-directionally averaged
      2) -35 dB Reflectance for multimode connections
      3) -40 dB reflectance for UPC singlemode connections
      4) -55 dB reflectance for APC singlemode connections
   b. Non-reflective events (splices) shall not exceed 0.3 dB.
3. Magnified end face inspection
   a. Fiber connections shall be visually inspected to IEC 61300-3-35 Edition 1.0 for end face quality.
   b. Scratched, pitted or dirty connectors shall be diagnosed and corrected.

B. All installed cabling links and channels shall be field-tested and pass the test requirements and analysis as described in Part 3. Any link or channel that fails these requirements shall be diagnosed and corrected. Any corrective action that must take place shall be documented and followed with a new test to prove that the corrected link or channel meets performance requirements. The final and passing result of the tests for all links and channels shall be provided in the test results documentation in accordance with Part 3.

C. Acceptance of the test results shall be given in writing after the project is fully completed and tested in accordance with Contract Documents and to the satisfaction of the Owner.

Note: High Bandwidth applications such as 10GBASE-SR, FC1200, and 40GBASE-SR4 impose stringent channel loss limits. Where practical, certification should consider loss length limits that meet maximum channel (transmitter to receiver) loss. 0.75 dB per connector pair loss may not support the intended application.

D. Performance specification for multimode fiber links at 850 nm.

Fiber Type		Bandwidth	10GBASE-SR		FibreChannel 1200-MX-SN-I		40GBASE-SR4	
	µm	(MHz• Km)	Length (m)	Loss (dB)	Length (m)	Loss (dB)	Length (m)	Loss (dB)
OM1	62.5	200	33	2.5	33	2.4	N/A	N/A
OM2	50	500	82	2.3	82	2.2	N/A	N/A
OM3	50	2000	300	2.6	300	2.6	100	1.9
OM4	50	4700	400	2.9	N/A	N/A	150	1.5
OM5	50	4700	400	2.9	N/A	N/A	150	1.5

PART 2 - PRODUCTS

2.01 OPTICAL FIBER CABLE TESTERS

A. The field-test instrument shall be within the calibration period recommended by the manufacturer and a copy of the calibration certificate made available.

B. Optical loss test set (OLTS)
   1. Multimode optical fiber light source
      a. Provide dual LED light sources with central wavelengths of 850 nm and 1300 nm. VCSEL sources are not permitted per ANSI/TIA-526-14-C.
      b. Output power of –20 dBm minimum.
      c. The launch shall meet the Encircled Flux launch requirements of ANSI/TIA 526-14-C.
      d. The test reference cords must demonstrate an insertion loss ≤ 0.15 dB when mated against each other, and this test shall be stored and delivered with the other test results.
      e. Acceptable manufacturers

1) Fluke Networks

2. Singlemode optical fiber light source
   a. Provide dual laser light sources with central wavelengths of 1310 nm and 1550 nm.
   b. Output power of –10 dBm minimum.
   c. The test reference cords must demonstrate an insertion loss ≤ 0.25 dB when mated against each other, and this test shall be stored and delivered with the other test results.
   d. Acceptable manufacturers
      1) Fluke Networks

3. Power Meter
   a. Provide 850 nm, 1300 nm, 1310 nm, and 1550 nm wavelength test capability.
   b. Power measurement uncertainty of 0.25 dB.
   c. Store reference power measurements.
   d. Save at least 10,000 results to internal memory.
   e. PC interface (USB).
   f. Acceptable manufacturers
      1) Fluke Networks

4. Optional length measurement
   a. It is preferable to use an OLTS that is capable of measuring the optical length of the fiber using time-of-flight techniques.

C. Optical Time Domain Reflectometer (OTDR)
1. Shall have a bright, color LCD display with backlight.
2. Shall have rechargeable Li-Ion battery for 8 hours of normal operation.
3. Weight with battery and module of not more than 4.5 lb and volume of not more 200 in^3.
4. Internal non-volatile memory with capacity for storing at least 2,000 OTDR bi-directionally tested fiber links.
5. USB port to transfer data to a PC or thumb drive/memory stick.
6. Multimode OTDR
   a. Wavelengths of 850 nm and 1300 nm.
   b. Event dead zones not to exceed 0.7 m at 850 nm and 1300 nm.
   c. Attenuation dead zones not to exceed 2.5 m at 850 nm and 4.5 m at 1300 nm.
   d. Distance range not less than 9,000 m.
   e. Dynamic range at least 28 dB for 850 nm and 30 dB at 1300 nm.
   f. Allow bi-directional testing without moving the OTDR to the far end.
   g. Perform on-board bi-directional averaging.
7. Singlemode OTDR
   a. Wavelengths of 1310 nm and 1550 nm.
   b. Event dead zones not to exceed 0.6 m at 1310 nm and 1550 nm.
   c. Attenuation dead zones not to exceed 3.7 m at 1310 nm and 1550 nm.
   d. Distance range not less than 80 km at 1310 nm and 130 km at 1550 nm.
   e. Dynamic range at least 32 dB for 1310 nm and 30 dB at 1550 nm.
   f. Allow bi-directional testing without moving the OTDR to the far end.
   g. Perform on-board bi-directional averaging.
8. Acceptable manufacturers
   a. Fluke Networks

D. Fiber Microscope
1. Field of view 420 µm x 320 µm

a. Video camera systems are preferred.
b. Camera probe tips that permit inspection through adapters are required.
c. Test equipment shall be capable of saving and reporting the end face image to IEC 613003-3-35.

2. Acceptable manufacturers
   a. Fluke Networks

E. Integrated OLTS, OTDR and fiber microscope
1. Test equipment that combines into one instrument an OLTS, an OTDR and a fiber microscope may be used.
2. Acceptable manufacturers
   a. Fluke Networks

2.02 IDENTIFICATION

A. Labels
1. Shall meet the legibility, defacement, exposure and adhesion requirements of UL 969.
2. Shall be preprinted using a mechanical means of printing (e.g., laser printer).
3. Where used for cable marking, provide vinyl substrate with a white printing area and a clear "tail" that self laminates the printed area when wrapped around the cable. If cable jacket is white, provide cable label with printing area that is any other color than white, preferably orange or yellow – so that the labels are easily distinguishable.
4. Where insert type labels are used provide clear plastic cover over label.
5. Provide plastic warning tape 6 inches wide continuously printed and bright colored 18" above all direct buried services, underground conduits and duct-banks.
6. Acceptable Manufacturers:
   a. Panduit
   b. Silver Fox
   c. W.H. Brady
   d. d-Tools
   e. Brother
   f. Dymo
   g. Epson

2.03 ADMINISTRATION

A. Administration of the documentation shall include test results of each fiber link and channel.

B. The test result information for each link shall be recorded in the memory of the field-test instrument upon completion of the test.

C. The test result records saved within the field-test instrument shall be transferred into a Windows™-based and/or cloud-based database utility that allows for the maintenance, inspection and archiving of these test records.

PART 3 - EXECUTION

3.01 GENERAL

A. All tests performed on optical fiber cabling that use a laser or LED in a test set shall be carried out with safety precautions in accordance with ANSI Z136.2.

B. All outlets, cables, patch panels and associated components shall be fully assembled and labeled prior to field-testing. Any testing performed on incomplete systems shall be redone on completion of the work.

3.02 OPTICAL FIBER CABLE TESTING

A. Field-test instruments shall have the latest software and firmware installed.

B. Link and channel test results from the OLTS and OTDR shall be recorded in the test instrument upon completion of each test for subsequent uploading to a PC and/or a cloud-based service in which the administrative documentation (reports) may be generated.

C. Fiber end faces shall be inspected using a video scope with a field of view not less than 425 µm x 320 µm.
   1. It is preferable that the end face images be recorded in the memory of the test instrument for subsequent uploading to a PC and reporting.

D. Testing shall be performed on each cabling segment (connector to connector).

E. Testing shall be performed on each cabling channel (equipment to equipment) that is planned for use per the owner's instructions.

F. Testing of the cabling shall be performed using high-quality test reference cords of the same core size as the cabling under test, terminated with reference grade connectors. Reference grade connectors are defined as having a loss not exceeding 0.1 dB for multimode and 0.2 dB for singlemode. The test reference cords for OLTS testing shall be between 2 m and 5 m in length. The length of the launch and tail fibers for multimode OTDR testing shall be at a least 100 m (328 ft.). For singlemode, the length of the launch and tail fibers will depend on the link under test. As a guide, the following table can be used for determining the length of the launch and tail fibers.

Maximum Length of Link (km)		Typical Pulse Width (ns)	Minimum Launch and Tail Cord Length (m)
1310 nm	1550 nm only		
0 to 35	0 to 50	≤ 1,000	130
35 to 45	50 to 65	3,000	400
45 to 50	65 to 75	10,000	1,000
≥ 50	≥ 75	20,000	2400

G. Optical loss testing
   1. Horizontal/Backbone link
      a. Multimode links shall be tested in one direction at 850 nm and 1300 nm in accordance with ANSI/TIA-526-14-C, one-cord reference method, with an Encircled Flux compliant launch.
      b. Singlemode backbone links shall be tested in one direction at 1310 nm and 1550 nm in accordance with ANSI/TIA-526-7-A, Method A.1 (One-cord reference method).
      c. Link attenuation does not include any active devices or passive devices other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.

H. OTDR Testing
   1. Fiber links shall be tested at these wavelengths for anomalies and to ensure uniformity of cable attenuation, connector insertion loss and reflectance.
      a. Multimode: 850 nm and 1300 nm.
      b. Singlemode: 1310 nm and 1550 nm.
   2. Each fiber link and channel shall be tested in both directions.
      a. The launch and tail fibers shall remain in place for the measurement in the opposite direction – failing to do so will result in an increase in measurement uncertainty.
      b. The use of a loop back fiber at the far end with a tail fiber at the near end on the adjacent fiber is permitted for bi-directional testing, so long as the OTDR is able to split the trace automatically into two traces for the two fibers under test.
   3. A launch cable shall be installed between the OTDR and the first link connection.
   4. A tail cable shall be installed after the last link connection.

I. Magnified End face Inspection
   1. Fibers shall be inspected using a video scope with a minimum field of view 425 µm x 320 µm to IEC 61300-3-35 Edition 1.0. The following test limits shall be used:

a. Multimode connectors; Table 6 of IEC 61300-3-35 Edition 1.0
b. Singlemode field polished connectors; Table 5 of IEC 61300-3-35 Edition 1.0
c. Singlemode factory polished connectors; Table 3 of IEC 61300-3-35 Edition 1.0
d. Angled Physical Contact (APC) connectors; Table 4 of IEC 61300-3-35 Edition 1.0

J. Length Measurement
1. The length of each fiber shall be recorded.
2. It is preferable that the optical length be measured using an OLTS or OTDR.

K. Polarity Testing
1. Paired duplex fibers in multi-fiber cables shall be tested to verify polarity in accordance with Clause E.5.3 of ANSI/TIA-568.3-E. The polarity of the paired duplex fibers shall be verified using an OLTS.

3.03 IDENTIFICATION

A. Labeling
1. Labeling shall conform to the requirements specified within ANSI/TIA-606-D or to the requirements specified by the Owner or the Owner's representative.

3.04 ADMINISTRATION

A. Test results documentation
1. The database for the complete project shall be stored and delivered in PDF Format prior to Owner acceptance of the building.
2. The test results documentation shall be available for inspection by the Owner or the Owner's representative during the installation period and shall be passed to the Owner's representative within 5 working days of completion of tests on cabling served by a telecommunications room or of backbone cabling. The installer shall retain a copy to aid preparation of as built information.
3. The database for the complete project, including twisted-pair copper cabling links, if applicable, shall be stored and delivered in an electronic format or, preferably through a cloud-based service, prior to Owner acceptance of the building in the original format used by the cabling vendors' software.
4. Circuit IDs reported by the test instrument should match the specified label ID (see 3.3 of this Section).
5. The detailed test results documentation data is to be provided in an electronic database for each tested optical fiber and shall contain the following information
   a. The identification of the customer site as specified by the end-user.
   b. The name of the test limit selected to execute the stored test results.
   c. The name of the personnel performing the test.
   d. The date and time the test results were saved in the memory of the tester.
   e. The manufacturer, model and serial number of the field-test instrument.
   f. The version of the test software and the version of the test limit database held within the test instrument.
   g. The fiber identification number.
   h. The length for each optical fiber.
   i. The index of refraction used for length calculation when using length capable OLTS.
   j. The backscatter coefficient of the fiber under test when using an OTDR.
   k. Test results to include OLTS attenuation link and channel measurements at the appropriate wavelength(s) and the margin (difference between the measured attenuation and the test limit value).
   l. Test results to include OTDR link and channel traces, event tables at the appropriate wavelength(s) and a map of the link tested.
   m. The length for each optical fiber as calculated by the OTDR.

n. The overall Pass/Fail evaluation of the link-under-test for OLTS and OTDR measurements

o. Optional

1) A picture or image of each fiber end-face

2) A pass/fail status of the end-face using IEC 61300-3-35 Edition 1.0

B. Record copy and as-built drawings

1. Provide record copy drawings periodically throughout the project as requested by the Construction Manager or Owner, and at end of the project on CD/DVD. Record copy drawings at the end of the project shall be in CAD format and include notations reflecting the as built conditions of any additions to or variation from the drawings provided such as, but not limited to cable paths and termination point. CAD drawings are to incorporate test data imported from the test instruments.

2. The as built drawings shall include, but are not limited to block diagrams, frame and cable labeling, cable termination points, equipment room layouts and frame installation details. The as built shall include all field changes made up to construction completion:

a. Field directed changes to pull schedule.

b. Field directed changes to cross connect and patching schedule.

c. Horizontal cable routing changes.

d. Backbone cable routing or location changes.

e. Associated detail drawings.

END OF SECTION

SUBSTITUTION REQUEST: DATE SUBMITTED 1-28-26

1.01 SUBMIT TO: Matthew Guthrie, Rhizo Architecture at matthew@rhizoarchitecture.com and Erin Donoghue, HMK Company Project Manager, at erin.donoghue@hmkco.org.

1.02 PROJECT: Special Education Building Project

1.03 SPECIFIED ITEM:

A. SECTION NAME AND NUMBER: Architectural Drawings – Ramp and Stair Systems - Sheets A-572M (Ramps) and A-571 (Stairs & Rails)

B. PRODUCT TYPE AND NAME AND MODEL: Prefabricated Aluminum ADA Ramp and Stair Systems

C. PARAGRAPH AND PRODUCT DESCRIPTION: Factory-fabricated aluminum ADA-compliant ramp, stair, and landing systems, designed for temporary or long-term installation, including handrails, guardrails, landings, and connections as required.

1.04 PROPOSED SUBSTITUTION:

A. MANUFACTURER AND MODEL NUMBER(S): Welcome Ramp Systems – Modular Aluminum Ramp and Stair Systems

B. PRODUCT DESCRIPTION: Prefabricated modular aluminum ADA and IBC compliant ramp, stair, and landing systems. Systems are engineered for school and public facility use, meet slope, handrail, guardrail, and landing requirements, and can be configured to match project layouts.

C. Attached data includes product description, specifications, drawings, photographs, performance, test data and **point by point comparative matrix** adequate for evaluation of request including identification of applicable data portions. Attached data also includes description of changes to Contract Documents the proposed substitution requires for proper installation.

D. It is the responsibility of the requestee to assemble a comparative matrix outlining key elements of proposed substitution.

1.05 UNDERSIGNED CERTIFIES FOLLOWING ITEMS, UNLESS MODIFIED BY ATTACHMENTS, ARE CORRECT:

A. Proposed substitution does not affect dimensions shown on the drawings.

B. Undersigned pays for changes to building design, including engineering design, detailing, and construction costs caused by proposed substitution.

C. Proposed substitution has no adverse effect on other trades, construction schedule, or specified warranty requirements.

D. Maintenance and service parts are available locally or readily obtainable for proposed substitution.

1.06 UNDERSIGNED FURTHER CERTIFIES FUNCTION, APPEARANCE, AND QUALITY OF PROPOSED SUBSTITUTION ARE EQUIVALENT OR SUPERIOR TO SPECIFIED ITEM.

1.07 UNDERSIGNED FURTHER CERTIFIES THAT THE MANUFACTURER OF THE PROPOSED SUBSTITUTION IS AWARE OF THIS SUBSTITUTION REQUEST AND AGREES TO THE STATEMENTS NOTED ABOVE.

1.08 UNDERSIGNED AGREES THAT THE TERMS AND CONDITIONS FOR SUBSTITUTIONS FOUND IN BIDDING DOCUMENTS APPLY TO THIS PROPOSED SUBSTITUTION.

1.09 SUBMITTED BY:

A. PRINT NAME: Jacob Hair

SIGNATURE: _____

B. FIRM NAME: Michael Richardson Custom Contractor, Inc. DBA EZ Systems

C. FULL MAILING ADDRESS: 27600 SE Hwy 212

City: Boring State: OR Zip: 97009

D. PHONE: 53-523-0859 E-MAIL: jacob.hair@ezpdx.com

1.10 FOR USE BY ARCHITECT OR ENGINEER

A. APPROVED OR APPROVED AS NOTED BY: _____

B. NOT APPROVED BY: _____

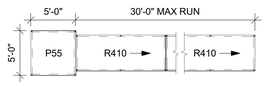
C. RECEIVED TOO LATE: _____

D. REMARKS: _____

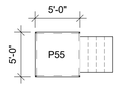
E. DATE OF RESPONSE: 02.04.2026

END OF SECTION

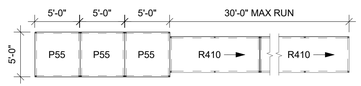
TYPICAL MODULAR RAMP & STAIR SYSTEM CONFIGURATIONS



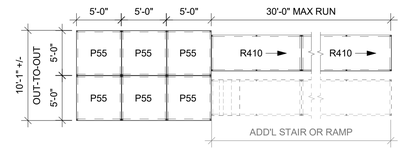
(A) TYPICAL SINGLE WITH RAMP
1/8" = 1'-0"



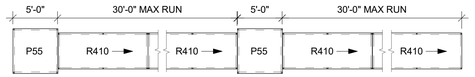
(B) SINGLE DOOR WITH STAIR
1/8" = 1'-0"



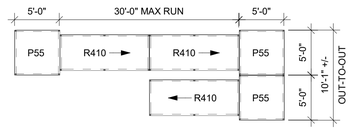
(C) DOUBLE DOOR WITH RAMP
1/8" = 1'-0"



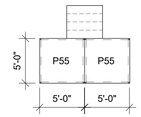
(D) TWO-BUILDING COMMON LANDING
1/8" = 1'-0"



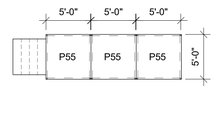
(E) TYPICAL INTERMEDIATE LANDING
1/8" = 1'-0"



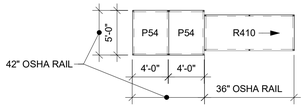
(F) TYPICAL SWITCHBACK CONFIGURATION
1/8" = 1'-0"



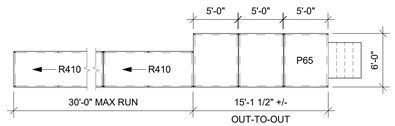
(G) DOUBLE DOOR WITH STAIR
1/8" = 1'-0"



(H) ALT. DOUBLE DOOR WITH STAIR
1/8" = 1'-0"



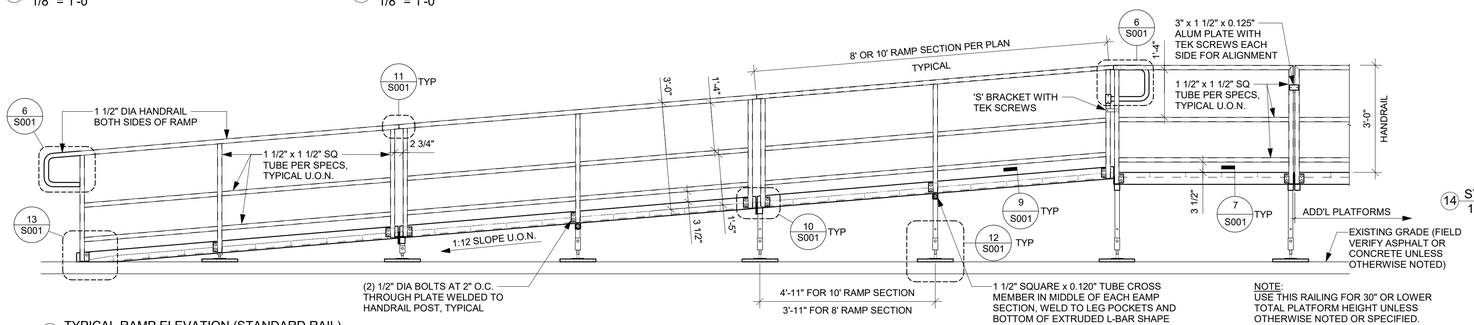
(I) TYPICAL DUMPSTER RAMP
1/8" = 1'-0"



(J) 6'x15' W/ STAIRS AND RAMP
1/8" = 1'-0"

PLAN NOTES

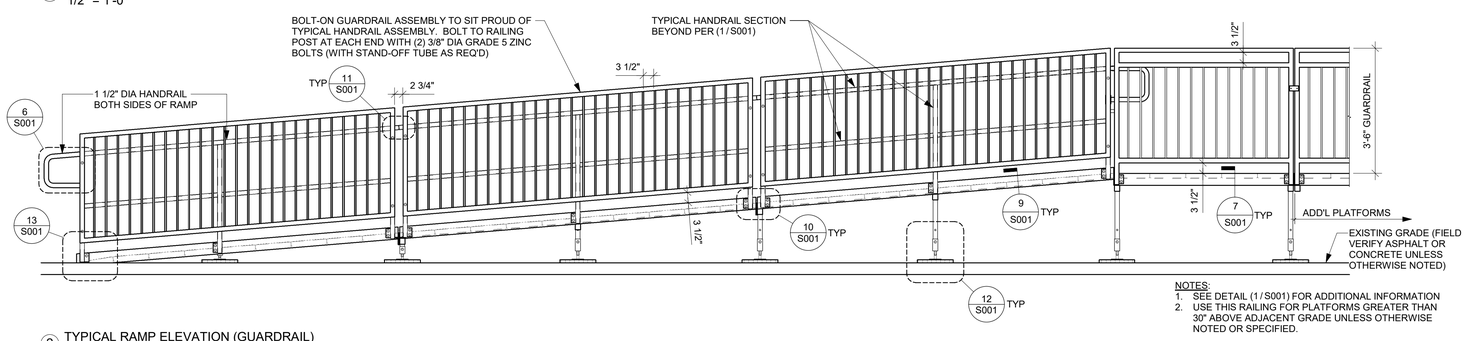
1. LANDINGS: PLATFORM MODULES CAN BE BOLTED TOGETHER FOR LARGER PLATFORMS. TYPICAL RAMPS BOLTED TOGETHER WITH (3) 1/2" DIAMETER BOLTS EQUALLY SPACED ON EACH SIDE.
2. RAMPS: RAMP SECTIONS ARE 48" WIDE U.O.N. AND CAN BE BOLTED TOGETHER PER NOTE ABOVE FOR A MAXIMUM RUN OF 30'-0" BETWEEN PLATFORMS OR LANDINGS.
3. STAIRS: MAX 6"-7" RISE, 12" WIDE TREAD (WITH RISER CLOSER PLATE AS REQ'D), 48" WIDE TYPICAL U.O.N. FIELD VERIFY REQ'D TREAD & RISER CONFIGURATION.
4. WHERE DOOR CLEARANCE ALLOWS, STAIRS CAN BE ADDED TO ANY OF THE TYPICAL CONFIGURATIONS SHOWN BELOW.
5. PLATFORM AND RAMP NOMINAL DIMENSIONS ARE SHOWN BELOW U.O.N. ACTUAL DIMENSIONS ARE NOMINAL + 1/2" (E.G. P55 = 5'-0 1/2" SQUARE)



NOTE:
USE THIS RAILING FOR 30" OR LOWER TOTAL PLATFORM HEIGHT UNLESS OTHERWISE NOTED OR SPECIFIED.

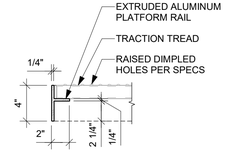
(1) TYPICAL RAMP ELEVATION (STANDARD RAIL)
1/2" = 1'-0"

(14) STANDARD RAIL CLEARANCE DETAIL
1" = 1'-0"

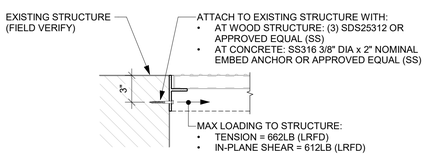


NOTES:
1. SEE DETAIL (1 / S001) FOR ADDITIONAL INFORMATION
2. USE THIS RAILING FOR PLATFORMS GREATER THAN 30" ABOVE ADJACENT GRADE UNLESS OTHERWISE NOTED OR SPECIFIED.

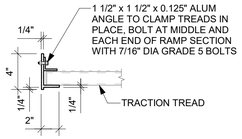
(2) TYPICAL RAMP ELEVATION (GUARDRAIL)
1/2" = 1'-0"



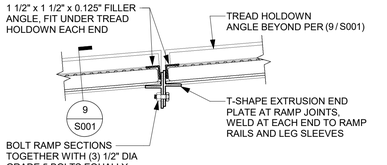
(7) PLATFORM RAIL DETAIL
1 1/2" = 1'-0"



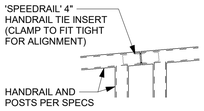
(8) PLATFORM ATTACHMENT TO STRUCTURE
1 1/2" = 1'-0"



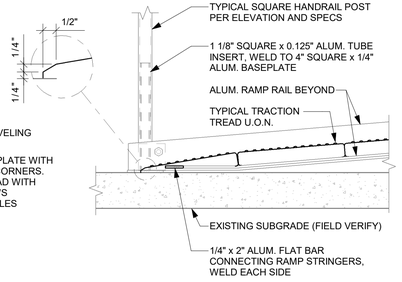
(9) RAMP RAIL DETAIL
1 1/2" = 1'-0"



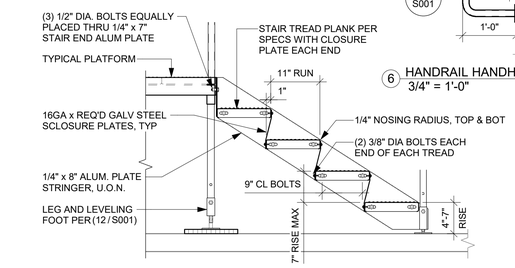
(10) RAMP CONNECTION DETAIL
1 1/2" = 1'-0"



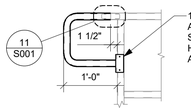
(11) HANDRAIL CONNECTION DETAIL
1 1/2" = 1'-0"



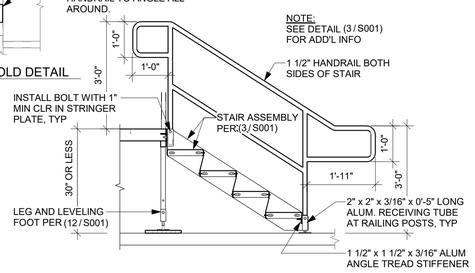
(13) RAMP END TRANSITION DETAIL
1 1/2" = 1'-0"



(3) TYPICAL STAIR SECTION
3/4" = 1'-0"

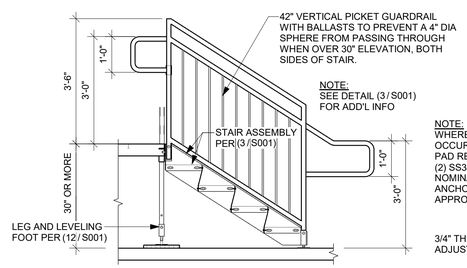


(6) HANDRAIL HANDHOLD DETAIL
3/4" = 1'-0"



NOTE:
SEE DETAIL (3 / S001)
FOR ADD'L INFO

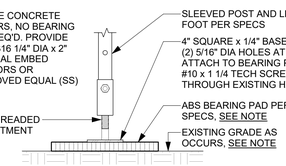
(4) TYPICAL STAIR ELEVATION (STANDARD RAIL)
1/2" = 1'-0"



NOTE:
SEE DETAIL (3 / S001)
FOR ADD'L INFO

(5) TYPICAL STAIR ELEVATION (STANDARD RAIL)
1/2" = 1'-0"

NOTE:
WHERE CONCRETE OCCURS, NO BEARING PAD REQ'D. PROVIDE (2) SS316 1/4" DIA x 2" NOMINAL EMBED ANCHORS OR APPROVED EQUAL (SS)



(12) LEVELING FOOT DETAIL
1 1/2" = 1'-0"

STRUCTURAL NOTES

STRUCTURAL DESIGN CRITERIA

Applicable Codes:	
2021 IBC	
Dead Loads:	
Welcome ramp system	7.0 psf
Live Loads:	
Distributed Live Load	100 psf
Concentrated Live Load	300 lb
Lateral Guardrail Load (uniform)	50 plf
Lateral Guardrail Load (concentrated)	200 lb
Wind Loads (Not Site Specific):	
Basic Wind Speed (V, 1.0W)	135.0 mph
Risk Category	III
Exposure Category	C
Seismic Loads (Not Site Specific):	
Importance Factor (I_p)	1.0
Risk Category	III
Site Class	D
Design spectral response acceleration parameter at short periods (S_{DS})	0.80
Seismic Response Coefficient (a_p)	2.50
Response Modification Factor (R_p)	2.50
Analysis procedure used: seismic demands on non-structural components	
Soil Design Information (Prescriptive per 2021 IBC Table 1806.2, Site Class 5)	
Allowable Bearing Pressure (DL + LL)	1,500 psf

GENERAL NOTES

1. Theses plans and specifications are not valid for any other assembly than products produced by Welcome Ramps Systems, inc. Products produced the standards set forth in these drawings and accompanying design.
2. These drawings have not been prepared a site-specific design and are intended for reference only.
3. Uses for loads in excess of those stated above require redesign by welcome ramp systems, inc.
4. Ramp design limits: the slope shall be 1:12. The maximum cross slope shall be less than 2%. The maximum run shall be 30'. The maximum height without additional engineering justification shall be 48" from the platform to finished grade.
5. Gravity loads for welcome ramps, platforms, and stairs are designed to be independently supported. Lateral loading to be resolved as noted in the plans and details.
6. Additional Ramp, Railing, and Stair general design information:
   A. Ramp slope, max. Rise = 1:12 (vert:horz)
   B. Cross slope, max. = 2%
   C. Stair rise = 7" max., 4" min.
   D. Door clearance as required by ibc.
   E. Provide standard 3 line rail for components 30" or less from grade to walking surface of ramp, landing, or stairs. Provide 42" vertical picket guardrail for components over 30" from grade.
   F. Provide graspable continuous handrail at 36" off ramp, platform, or stair nosing. Install both sides of stairs and ramp.
   G. Handrails to extend 12" horizontally over walking surface and return to wall or rail column. See details.
   H. Ramp and railings to have curbs which do not allow passage of 4" sphere where original position of shere is within 4" of the walking surface.
   I. Unless otherwise noted, provide 12"x12"x1 1/2" P.T. wood or 12"x12"x1" pre-manufactured abs pad required under all adjustable legs.

MATERIAL SPECIFICATIONS

1. Planking:
   a. This design is limited to galvanized metal planking materials. Planks are to have 1/8" diameter anti-slip raised button-top style holes at 1 1/4" O.C., typical unless otherwise noted.
   b. Ramp: all planking shall be 13 ga. 12" wide x 1 1/2" deep.
   c. Platform: all planking shall be 13 ga. 12" wide x 1 1/2" deep. See plan for length.
   d. Stairs: all planking shall be 11 ga. 12" wide x 2" deep with end cap plates for bolted attachment to stair stringers per details.
2. Legs:
   a. Leveling feet assumed to be placed on suitable firm bearing ground.
   b. Leg material shall be 1.5" sq. x 0.120" aluminum tubing.
   c. Leg pockets shall be 1.781" sq. x 0.125" aluminum tubing.
   d. Adjusting bolt 3/8" dia. x 1 1/4" grade 5 cap screw w/ nylon lock nut, zinc plated.
3. Aluminum:
   a. The 1" 1/2" aluminum handrail shall be 6063-T5 with a yield stress of 16 ksi.
   b. All other aluminum parts shall be 6061-T6 aluminum with a yield stress of 35 ksi.
4. Hand rails:
   a. Stairs and ramps: use 1 1/2" sq. x 5/32" thick walled tubing for posts and horizontal rails except the top 1 1/2" round hand rail.
   b. Standard handrail (w/o pickets) is allowed on finished platform heights of 30" or less. All Platform heights above 30" shall use picket style handrails.
   c. Platform: use 1 1/2" sq. x 5/32" thick walled tubing for post and all horizontal rails.
   d. Height: top of gripping surfaces of handrails shall be 36" vertically above walking Surfaces.
5. Welding:
   a. All references to welding on plan set refer to in-plant fabrication. No on-site welding is required.
   b. Fabrication plan welding by welders certified by a third party inspector and in accordance with ANSI/AWS D1.2 code.
   c. Weld sizes are equal or larger than the element being welded.
   d. Welding is all around unless otherwise noted. Care is taken to avoid excess warping of welded elements.
   e. Fabricator to certify assembled part are per the drawings per IBC 1704.2.2
6. Bolts:
   a. All bolts shall be grade 5 zinc plated, unless otherwise specified. Provide locking washers under all nuts and anchor bolts unless otherwise specified.
   b. High strength bolt are designed at less than 50% capacity for additional factor of safety and do not require special inspection.
7. Tech screws:
   a. Zinc plated #10 x 1 1/4", self tapping.
8. Anchors:
   a. Simpson Strong Tie TITEN-HD ESR-2713
   b. Hilti HUS-EZ ESR-3027

EVOLVE ENGINEERING

EVOLVE ENGINEERING
(fka: StenBERG Design)
P.O. Box 1135
Beaverton, OR 97075

Contact Information
cell: 541.399.2656
email: stephen@evolveengineering.net

cell: 503.713.5380
email: colby@evolveengineering.net

03/04/2024
REGISTERED PROFESSIONAL ENGINEER 83797 OREGON NOV. 18, 2014 COLBY G ANDERSON
EXPIRES: 12/31/2025

No.	Description	Date

WELCOME RAMP SYSTEMS - ACCESS RAMPS AND STAIRS

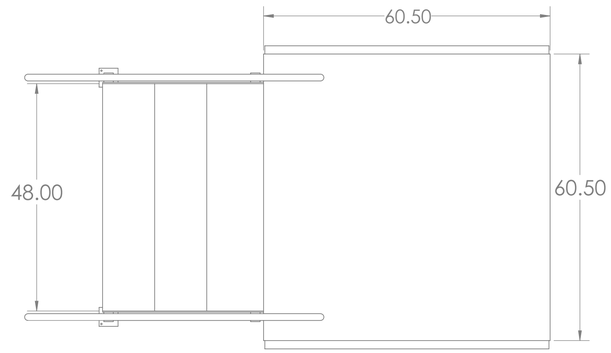
Welcome Ramp Systems, Inc.
Component Aluminum Ramp System
for Safe, User-Friendly Building Access.
www.welcomerampsystems.com

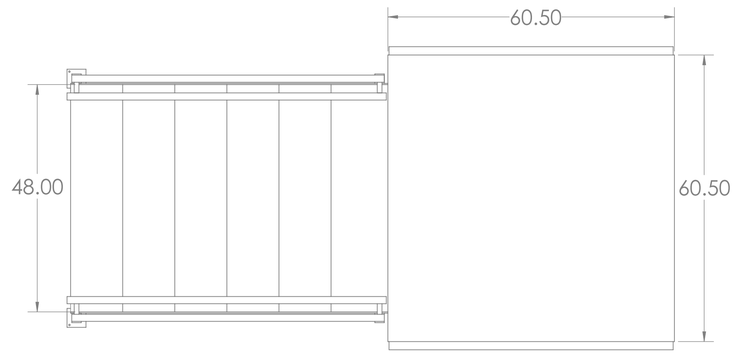
NOT LOCATION SPECIFIC

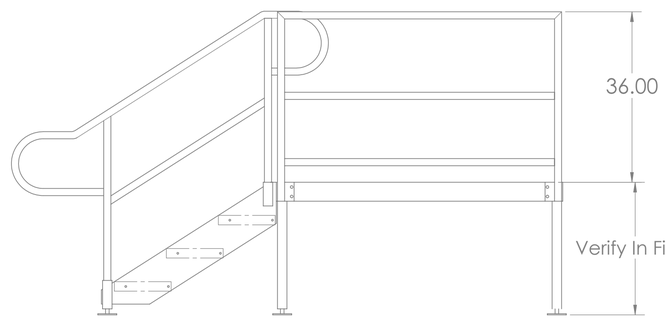
GENERAL DRAWING

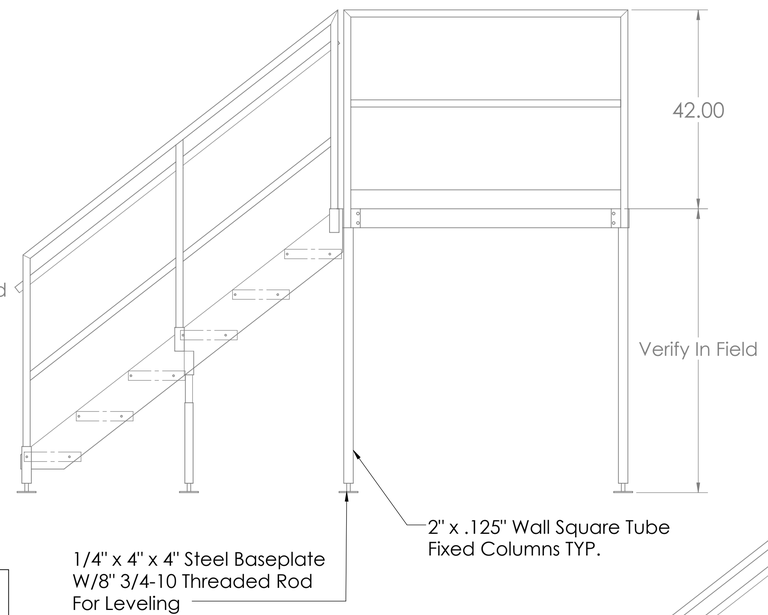
Project Number	20240139
Date	March 4, 2025
	S001
Scale	AS NOTED

3/4/2025 9:47:07 AM









Code Compliance

1. Stair Rise =Varies
2. Design Loading:

2.1. Platform 100 PSF Min.
2.2. Stair Tread 300 LBS./Tread min.
2.3. Railing 50 PLF/200 LBS. CONC.
2.4. Lateral Load 600# Pedestrian Dynamic
2.5. Wind Load 135 MPH, EXP C, Kzt=2.0
2.6. Seismic Load Sds= 1.0, Seismic CAT. 'D'

3. Graspable Continuous Round Handrail At 36" Off Stair Nosing. Install Both Sides Of Stairs.

4. Footing Information
Pre Manufactured ABS Pads Under All Adjustable Legs On Asphalt Or Soils

Material Specifications

Planking

- Platform: All Planking Shall Be 13 GA. 12" W x 1-1/2" Deep
- Stairs: All Planking Shall Be 11 GA. 12" W x 2" Deep

Legs

- Leveling Feet Assumed To Be Placed On Suitable Firm Bearing Ground.
- Leg Material Shall Be 2" sq. x .125" AL. Tubing.

Aluminum

- The 1-1/2" AL. Round Handrail Shall Be 6063 T-5 With A Yield stress Of 16 KSI.
- All Other Aluminum Parts Shall Be 6061 Aluminum With A Yield Stress Of 35 KSI.

Hand Rails

- Stairs: Use 1-1/2" Sq. x .156" Thick Walled Tubing For Posts And Horizontal Rails Except The Top 1-1/2" Round Graspable Handrail.
- Platform: Use 1-1/2" Sq. x .156" Thick Walled Tubing For Posts And All Horizontal Rails.

Welding

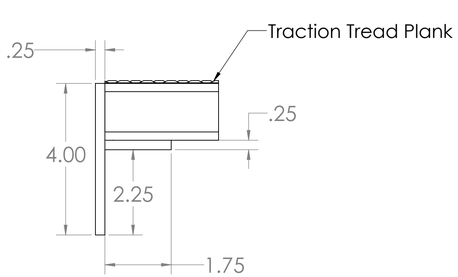
- All References To Welding On Plan Set Refer To In-Plant Fabrication. No On Site Welding Is Required.
- Fabrication Plant Welding By Welders In Accordance With ANSI/AWS D1.2 Code.
- Weld Sizes Are To Be Equal To Or Larger Than The Element Being Welded.
- Welding Is All Around Unless Otherwise Noted. Care Is Taken To Avoid Excess Warping Of Welded Elements.
- Fabricator To Certify Assembled Parts Are Per Drawings.

Bolts

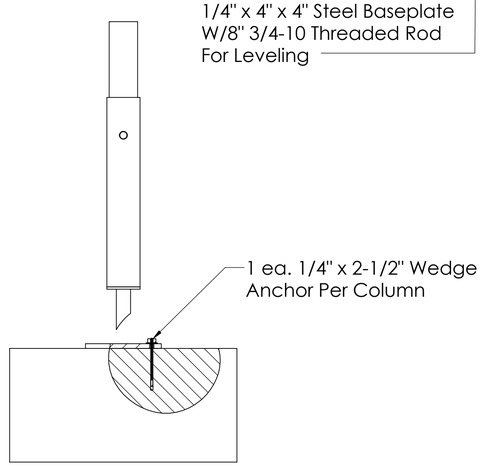
- All Bolts Shall Be Grade 5 Zinc Plated, Unless Otherwise Specified. Provide Locking Washers Under All Nuts.
- High Strength Bolts Are Designed At less Than 50% Capacity For Additional Factor Of Safety And Do Not Require Special Inspection.

Tech Screws

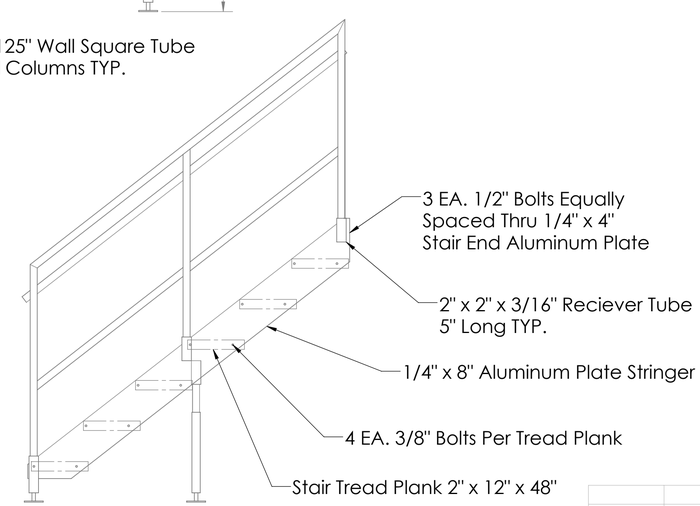
- Zinc Plated # 12 x 1-1/4" Pan Head



Platform Support Rail



Anchor Detail



Stair System

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF Welcome Ramp Systems Inc. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF Welcome Ramp Systems Inc. IS PROHIBITED.

		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±	DRAWN	Kyle G	06/03/24
			CHECKED		
			ENG APPR.		
			MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL 6061-T-6 Aluminum 6063-T-5 Aluminum Galvanized Steel	COMMENTS:		
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			

[redacted]
Location

SIZE D | Title: Access Platforms & Stairs | REV

SCALE: NTS | SHEET 1 OF 1

SUBSTITUTION REQUEST: DATE SUBMITTED 01/19/26

1.01 SUBMIT TO: Matthew Guthrie, Rhizo Architecture at matthew@rhizoarchitecture.com and Erin Donoghue, HMK Company Project Manager, at erin.donoghue@hmkco.org.

1.02 PROJECT: Special Education Building Project

1.03 SPECIFIED ITEM:

A. SECTION NAME AND NUMBER: Window Shades - 12 24 00

B. PRODUCT TYPE AND NAME AND MODEL: Roller Shades, 2.03 Shade Fabric 1-a

C. PARAGRAPH AND PRODUCT DESCRIPTION: _____

1.04 PROPOSED SUBSTITUTION:

A. MANUFACTURER AND MODEL NUMBER(S): Soleffect

B. PRODUCT DESCRIPTION: Manual Soloscreen Roller Shade

C. Attached data includes product description, specifications, drawings, photographs, performance, test data and **point by point comparative matrix** adequate for evaluation of request including identification of applicable data portions. Attached data also includes description of changes to Contract Documents the proposed substitution requires for proper installation.

D. It is the responsibility of the requestee to assemble a comparative matrix outlining key elements of proposed substitution.

1.05 UNDERSIGNED CERTIFIES FOLLOWING ITEMS, UNLESS MODIFIED BY ATTACHMENTS, ARE CORRECT:

A. Proposed substitution does not affect dimensions shown on the drawings.

B. Undersigned pays for changes to building design, including engineering design, detailing, and construction costs caused by proposed substitution.

C. Proposed substitution has no adverse effect on other trades, construction schedule, or specified warranty requirements.

D. Maintenance and service parts are available locally or readily obtainable for proposed substitution.

1.06 UNDERSIGNED FURTHER CERTIFIES FUNCTION, APPEARANCE, AND QUALITY OF PROPOSED SUBSTITUTION ARE EQUIVALENT OR SUPERIOR TO SPECIFIED ITEM.

1.07 UNDERSIGNED FURTHER CERTIFIES THAT THE MANUFACTURER OF THE PROPOSED SUBSTITUTION IS AWARE OF THIS SUBSTITUTION REQUEST AND AGREES TO THE STATEMENTS NOTED ABOVE.

1.08 UNDERSIGNED AGREES THAT THE TERMS AND CONDITIONS FOR SUBSTITUTIONS FOUND IN BIDDING DOCUMENTS APPLY TO THIS PROPOSED SUBSTITUTION.

1.09 SUBMITTED BY:

A. PRINT NAME: Brad King

SIGNATURE: _____

B. FIRM NAME: Lakeview Millworks Sales, Inc. Bestvue Blinds

C. FULL MAILING ADDRESS: 261 East Sun Ranch Drive

City: Sisters State: OR Zip: 97759

D. PHONE: 541-588-6201 E-MAIL: _____

1.10 FOR USE BY ARCHITECT OR ENGINEER

A. APPROVED OR APPROVED AS NOTED BY: _____

B. NOT APPROVED BY: _____

C. RECEIVED TOO LATE: _____

D. REMARKS: _____

E. DATE OF RESPONSE: 02.04.2026

END OF SECTION

BESTVUE BLINDS
261 East Sun Ranch Drive, P.O. Box 2401, Sisters, OR 97759
PH: 541-588-6201 Fax: 541-549-8594

SUBSTITUTION REQUEST

Project: RSD Special Education Bldg

Substitution Request Number: 01

From: Brad King

To: KNCC

Date: 1/19/26

A/E Project Number:

Re: Substitution Request - 12.24.00

Contract For:

Specification Title: Window Shades

Description: Roller Shades

Section: 12-24-00 Page: 280

Article/Paragraph: 2.03 Shade Fabric - 1.a

Proposed Substitution: Manual Soloscreen Roller Shade

Manufacturer: Soleffect Address: 13009 Los Nietos Rd. Santa Fe Springs, CA Phone: 323.275.9945

Trade Name: BestVue Blinds Model No.:

Installer: BestVue Blinds Address: 261 East Sun Ranch Dr Sisters, OR Phone: 541.549.0968

History: ☐ New product ☐ 1-4 years old ☐ 5-10 years old ☐ More than 10 years old

Differences between proposed substitution and specified product:

Equal Specifications

Reason for not providing specified item: Volatile price movements with tariffs, American made product, lower shipping cost, lower product cost, comparable or better than similar products.

Similar Installation:

Project: Architect:

Address: Owner:

Date Installed:

Proposed substitution affects other parts of Work: ☑ No ☐ Yes; explain

Savings to Owner for accepting substitution: approx. 12% ($).

Proposed substitution changes Contract Time: ☑ No ☐ Yes [Add] [Deduct] days.

Supporting Data Attached: ☐ Drawings ☑ Product Data ☑ Samples ☐ Tests ☐ Reports ☐

SUBSTITUTION REQUEST

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: Brad King

Signed by: Bradford Jay King

Firm: Lakeview Millworks Sales, Inc / Bestvue Blinds

Address: 261 East Sun Ranch Drive

Sisters, OR 97759

Telephone: 541-588-6201

Attachments: ☑

Comments:

A/E's REVIEW AND RECOMMENDATION

☐ Approve Substitution - Make submittals in accordance with Specification Section 01 33 00 Submittal Procedures.
☐ Approve Substitution as noted - Make submittals in accordance with Specification Section 01 33 00 Submittal Procedures.
☐ Reject Substitution - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

OWNER'S REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01 33 00 Submittal Procedures. Prepare Change Order.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 33 00 Submittal Procedures. Prepare Change Order.
☐ Substitution rejected - Use specified materials.

Signed by: _____ Date: _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E

INTRODUCTION TO:

SOLEFFECT

Quality is not an act, it is a habit.

OUR COMPANY

Located in Santa Fe Springs, California, Soleffect manufactures and distributes premium manual and motorized roller shades for hospitality, health care, commercial, educational, and residential use.

Soleffect was born out of a love for the shade industry and a keen desire to provide quality workmanship, courteous productive customer service combined with competitive pricing and reliable delivery dates. With over 30 years of combined, in depth experience, our team has a fresh outlook with focus on meeting the specific criteria we know the window treatment industry wants and needs.

History

- Launched in 2018 with Lyndie Wilson and Ron Bivas as co-owners
- Lyndie - decades of experience in the industry, specializes in sales and management
- Ron - handles all purchasing and product development
- Started with 6 employees, grew the internal team and factory to >30 full time employees
- Grew out of 2 previous factories
- Expanded our reach to farther regions like Texas, Washington, and even Florida

Lead Time
~12 business days

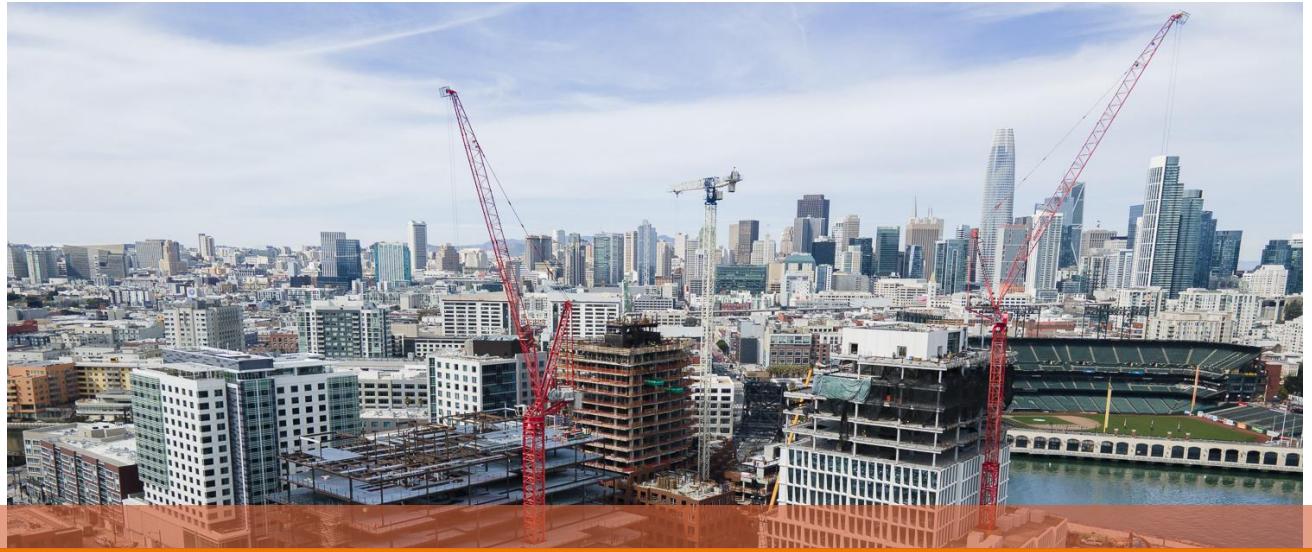
Reliable Service
Responsive team who cares about your project as much as you do.

Location
Manufactured and operated in Los Angeles, CA

LEAD TIME

- Capable of producing **650 units per day**
- Standard lead time is **12 business days**
- Rush orders vary based on product availability and current production load. Assuming material is readily available, Soleffect can reliably accommodate rushes within a week.
- Material procurement is the most important factor of project management between the dealer and manufacturer. If you have a large project, please fill out a **master file** and send it to us **8 weeks in advance if possible.**

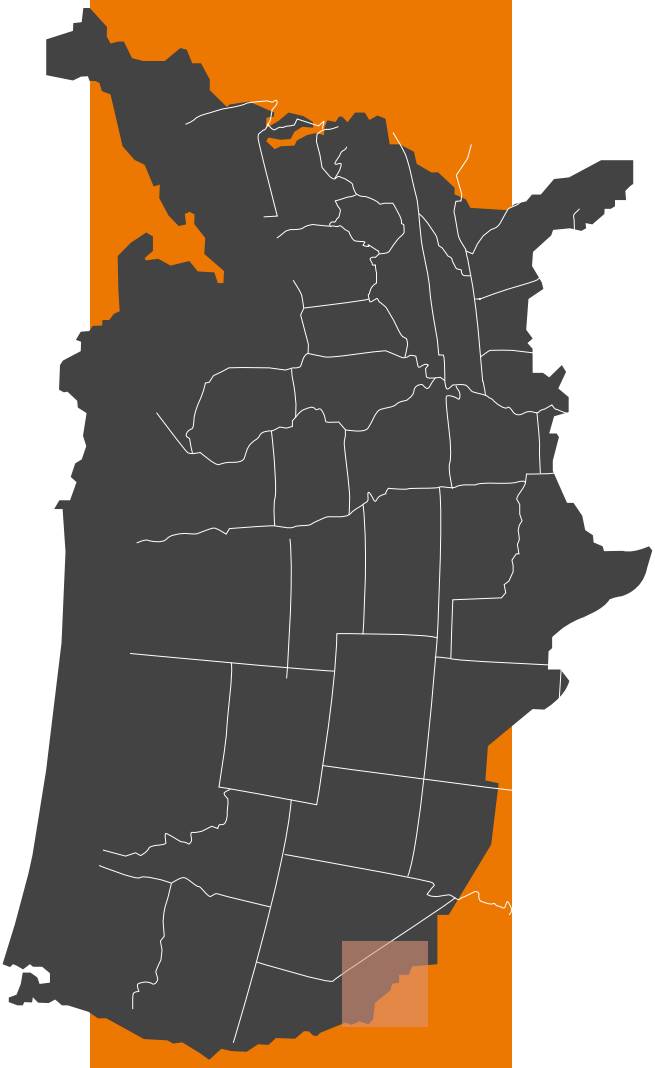
Customer Service



- Soleffect is a customer service based company who just happens to manufacture window coverings. Open communication rain or shine ensures the end user has the best product and experience.
- Our team works closely together, but making sure your needs are seen through the proper channels is important for the best service.
- For **manual order entry**, contact **Stephanie Diaz or Ashley Flores**
- For **urgent issues** please contact **Sean Wisner**
- For **technical questions**, please email **Sean Wisner**
- For **estimation** please contact **Sean Wisner**
- **On ALL inquiries cc Sean Wisner** or call at **(949)-358-5500**

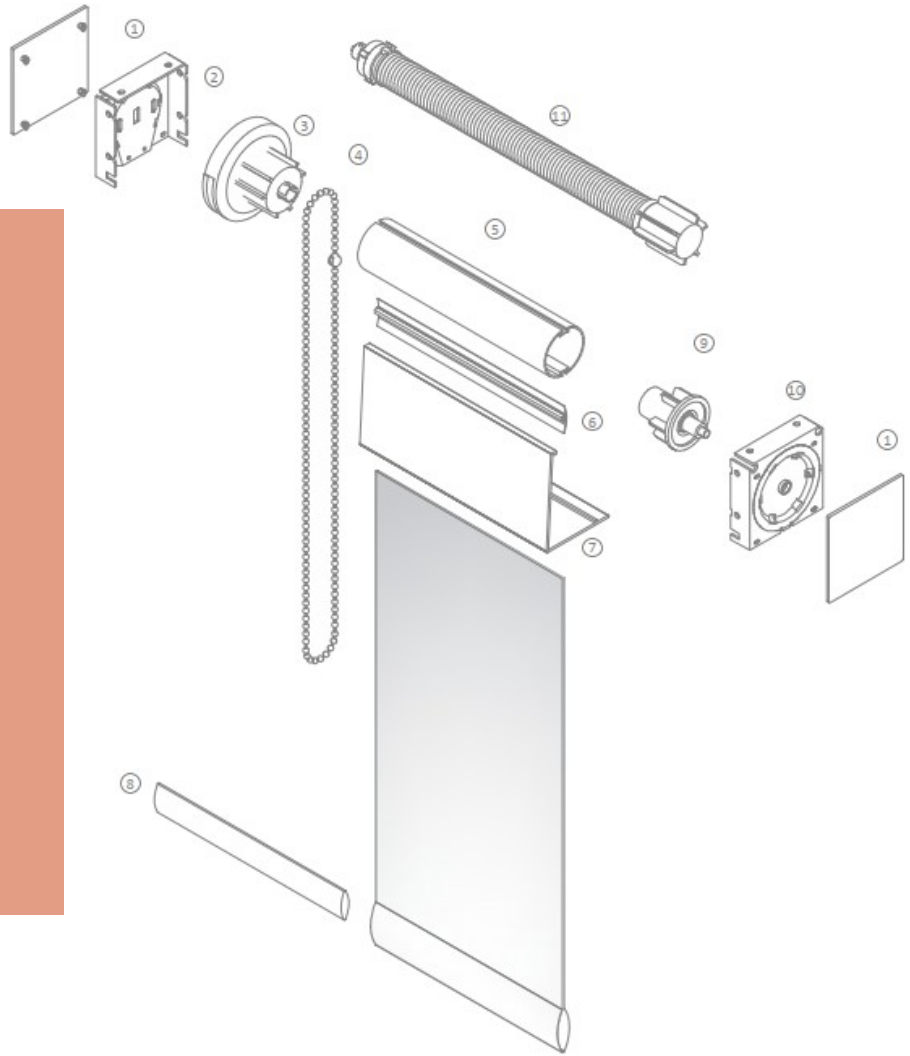
Manufactured in Los Angeles

Soleffect offers hand delivery from San Diego, CA to Los Angeles.



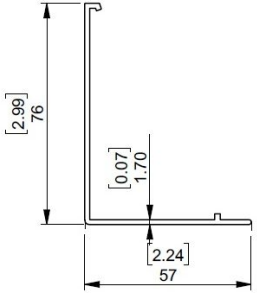
S Manual System

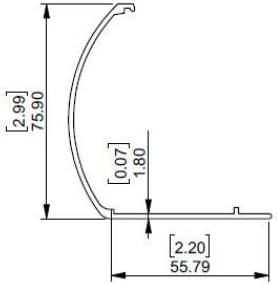
- Economic
- Exterior chain guide
- P06 plastic
- Adjustable bracket for uneven mullion
- Adaptable to Li-ion Battery configuration
- Fascia accessory is notched or notchless

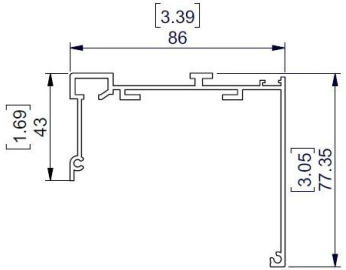


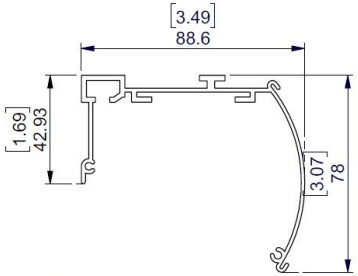
Top Treatments

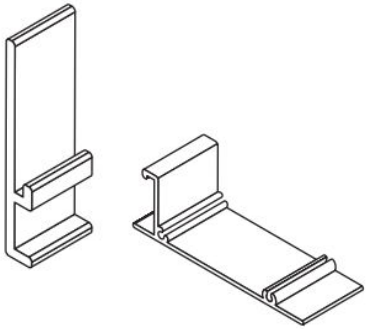
- 3” and 4” Square/Curved Fascia
- 3.25” Square/Curved Cassette
- Pocket with closure
- Curved fabric wrapped fascia
- Hanger and Closure
- Dual Shade options available

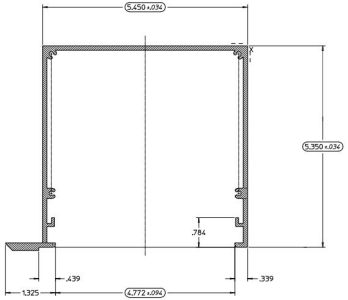




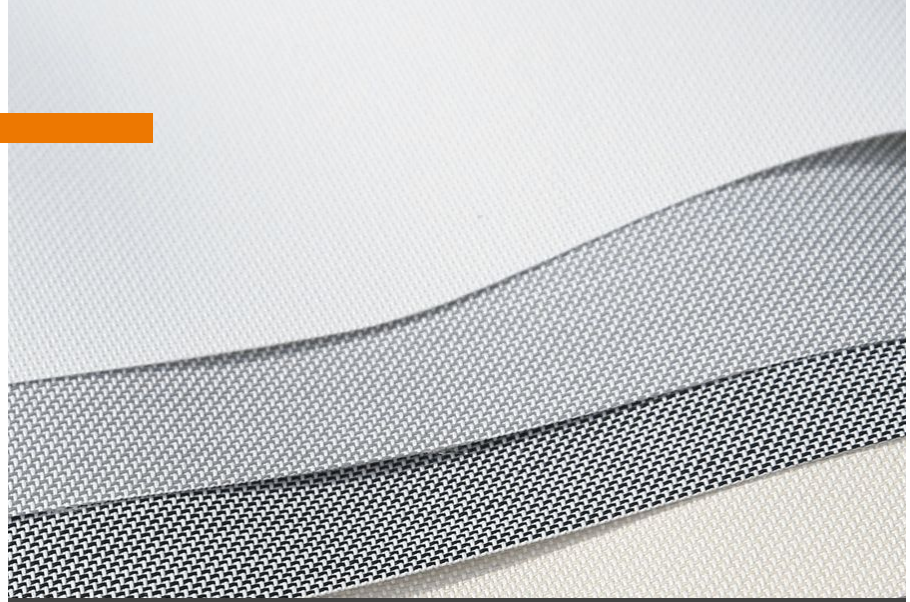








FABRICS



Soleffect carries hundreds of proprietary fabric options for the client to choose from. We are also partnered with global and United States-based fabric manufacturers with trusted products you can rely on.

HALOGEN FREE FLAME RETARDANT

SAFE USE

10 YEAR INTERIOR WARRANTY

ENERGY SAVING

5 YEAR EXTERIOR WARRANTY

PROTECTION THAT LIVES ON MICROBAN

NOISE REDUCTION

GREENGUARD GOLD

PRODUCT CERTIFIED FOR LOW CHEMICAL EMISSIONS UL.COM/GG UL 2818

PROUDLY MADE IN THE USA

CORPORATE COUNCIL SKIN CANCER FOUNDATION 2023

PHIFER INCORPORATED

MERMET Sun Control Textiles™

Fabric Overview

01	Soleffect	• Cost Effective • Readily Available • Reliable performance
02	Phifer	• Middle-ground pricing • Commonly Specified or requested • Common Availability
03	Mermet	• Premium Pricing • Larger widths (126”) • Longer lead time

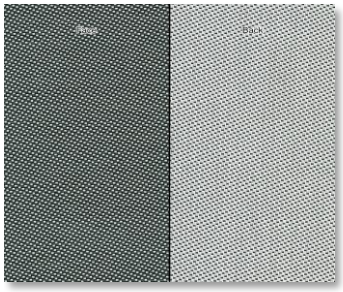
Language:

Basket Weave: 2x2 Square Design (popular in multi-family and office spaces)
Twill/Reversible: Diamond pattern biasing different colors on both sides (popular in office spaces
Blackout: Complete room darkening
LEED: PVC Free and fully recyclable
Heat resistant: Metalized backing for energy and UV reduction
Acoustic: Fabric with higher acoustical performance
Translucent: Opaque fabric allowing light in but blurring the outside/inside view.
Solar: Fabric allowing light and visibility with clear views. Most commonly in 1% and 3% openness factors

10125 Freeman Ave | Santa Fe Springs, CA 90670
PH 323.275.9945 | FX 323.607.8881
Soleffectshades.com

SHEERWEAVE | 4903 3%

Face Back



P06 CHALK

Face Back

P25 CHALK/ BLACK

Face Back

P26 CHALK/ WHEAT

Face Back

Q07 KETTAL GREY

Face Back

Q16 TOBACCO

Face Back

Q22 FLAXEN

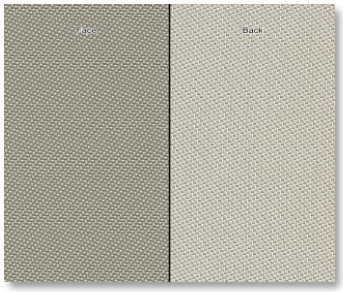
Face Back

Q23 WHITESANDS

Face Back

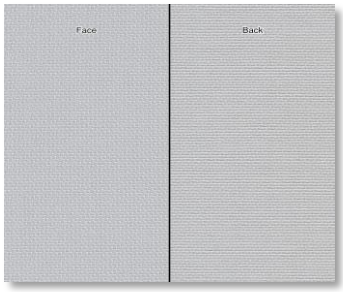
Q25 BIRCH

Face Back



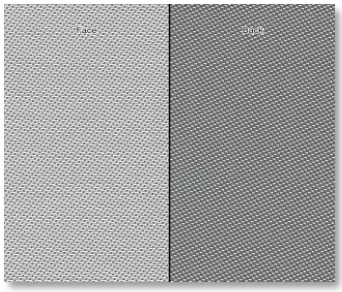
Q26 COBBLESTONE

Face Back



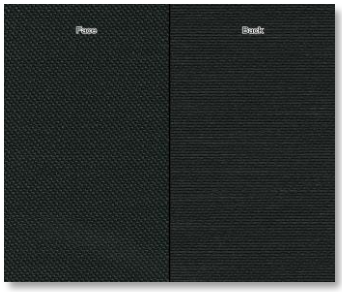
Q27 SOFT GREY

Face Back



V03 PEWTER/ CHALK

Face Back



V10 EBONY

Face Back

V28 SLATE

Care & Handling

Remove dust with vacuum cleaner or compressed air. Do not scrub. Do not use solvents or any abrasive substance which might damage the coating of the fabric. Clean with a sponge or a soft brush dipped in soapy water using mild detergent. Rinse with clean water. Leave the blind down until completely dry. You can also very gently rub the fabric with a clean white pencil eraser to remove small stains.

SPECIFICATION

WIDTHS	63" and 98"
ROLL LENGTH	30 Linear Yards
FABRIC WEIGHT	14.90 oz/yd^2
FABRIC THICKNESS	0.027 in.
OPENNESS	~3%
UV BLOCKAGE	~97%
COMPOSITION	17% Polyester, 83% Vinyl on Polyester
WARRANTY	5-Years Exterior, 10-Years Interior

ENVIRONMENTAL BENEFITS	Certified to GREENGUARD and GREENGUARD Gold
BACTERIAL AND RESISTANCE	ASTM E 2180, ASTM G21, ASTM G22, AATCC30 Part 3, ASTM D 3273
ACOUSTICAL PERFORMANCE	NRC:0.25, SAA: 0.25
FIRE CLASSIFICATION	California U.S. Title 19 (small scale), NFPA 701 TM#1 (small scale), NFPA 101 (Class A Rating), IBC Section 803.1.1 (Class A Rating), BS 5867 Part 2 Type B Performance, NFPA 701 TM#2 (large scale), CAN/ ULC-S 109 (large and small scale), CAN/CGSB2-4. 162-M80

Care & Handling

Remove dust with vacuum cleaner or compressed air. Do not scrub. Do not use solvents or any abrasive substance which might damage the coating of the fabric. Clean with a sponge or a soft brush dipped in soapy water using mild detergent. Rinse with clean water. Leave the blind down until completely dry. You can also very gently rub the fabric with a clean white pencil eraser to remove small stains.

SHEERWEAVE®
BY PHIFER

STYLE
4901 / 4903

WEAVING
EXCELLENCE
WITH
INNOVATION

Code	Color	SOLAR OPTICAL PROPERTIES TS	RS	AS	TV	SHGC/G VALUE g-tot (glass & blind) *SINGLE* 1/4 CL	*INSULATING* 1 HA
STYLE 4901 - 1%							
P06	Chalk	9	83	8	7	0.18	0.17
P25	Chalk/Black - face	1	22	77	1	0.50	0.32
P25	Chalk/Black - back	1	54	45	1	0.33	0.24
P26	Chalk/Wheat - face	6	65	29	6	0.28	0.22
P26	Chalk/Wheat - back	6	75	19	6	0.22	0.19
Q07	Kettal Grey - face	3	48	49	3	0.37	0.26
Q07	Kettal Grey - back	3	37	60	3	0.43	0.29
Q16	Tobacco - face	2	8	90	2	0.58	0.36
Q16	Tobacco - back	2	6	92	2	0.59	0.37
Q22	Flaxen - face	3	42	55	3	0.40	0.27
Q22	Flaxen - back	3	57	40	3	0.31	0.23
Q23	Whitesands - face	7	65	28	6	0.28	0.22
Q23	Whitesands - back	7	67	26	6	0.27	0.21
Q25	Birch - face	5	57	38	4	0.32	0.23
Q25	Birch - back	5	64	31	4	0.28	0.22
Q26	Cobblestone - face	3	36	61	4	0.43	0.29
Q26	Cobblestone - back	3	55	42	4	0.33	0.24
Q27	Soft Grey	5	58	37	4	0.31	0.23
V03	Pewter/Chalk - face	3	56	41	4	0.32	0.23
V03	Pewter/Chalk - back	3	30	67	4	0.46	0.30
V10	Ebony	1	5	94	1	0.59	0.36
V28	Slate - face	2	11	87	3	0.57	0.36
V28	Slate - back	2	8	90	3	0.58	0.36
STYLE 4903 - 3%							
P06	Chalk	11	81	8	10	0.19	0.17
P25	Chalk/Black - face	3	25	72	3	0.49	0.32
P25	Chalk/Black - back	3	56	41	3	0.32	0.23
P26	Chalk/Wheat - face	9	65	26	9	0.28	0.22
P26	Chalk/Wheat - back	9	73	18	9	0.23	0.19
Q07	Kettal Grey - face	4	47	49	5	0.37	0.26
Q07	Kettal Grey - back	4	37	59	5	0.43	0.29
Q16	Tobacco - face	3	8	89	4	0.58	0.37
Q16	Tobacco - back	3	6	91	4	0.59	0.37
Q22	Flaxen - face	6	43	51	7	0.40	0.27
Q22	Flaxen - back	6	57	37	7	0.32	0.23
Q23	Whitesands - face	9	63	28	8	0.30	0.23
Q23	Whitesands - back	9	67	24	8	0.27	0.21
Q25	Birch - face	7	56	37	7	0.25	0.24
Q25	Birch - back	7	63	30	7	0.29	0.22
Q26	Cobblestone - face	4	38	58	4	0.43	0.29
Q26	Cobblestone - back	4	56	40	4	0.32	0.23
Q27	Soft Grey	8	57	35	8	0.32	0.23
V03	Pewter/Chalk - face	4	53	43	5	0.34	0.24
V03	Pewter/Chalk - back	4	29	67	5	0.47	0.30
V10	Ebony	3	5	92	5	0.60	0.37
V28	Slate - face	3	12	85	4	0.55	0.35
V28	Slate - back	3	8	89	4	0.58	0.37

PROTECTION THAT LIVES ON MICROBAN®

Microban® antimicrobial protection inhibits the growth of stain-causing bacteria, mold and mildew on the shade.

GREENGUARD GOLD

PROUD MEMBER SKIN CANCER FOUNDATION 2024

PRINTABLE

SAFE USE

ENERGY SAVING

NOISE REDUCTION

HALOGEN FREE FLAME RETARDANT

PROUDLY MADE IN THE USA

10 YEAR INTERIOR WARRANTY

5 YEAR EXTERIOR WARRANTY

TS = Solar Transmittance
RS = Solar Reflectance
AS = Solar Absorptance
TV = Visual Transmittance

SHGC = Solar Heat Gain Coefficient

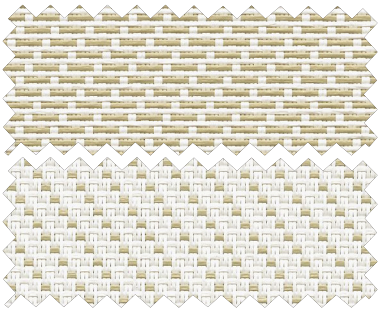
1/4 CL = 1/4” Clear Glass
1 HA = 1” Heat Absorbing Glass

Fabrics Installed Internally
Zero-Degree Profile Angle

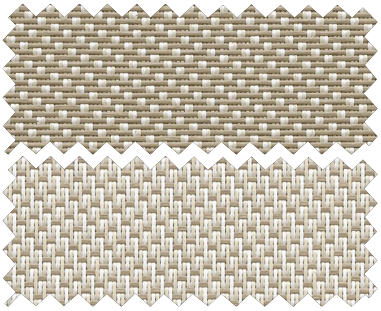
For additional performance values, test references and technical definitions visit us at phifer.com.

P06 **Chalk**

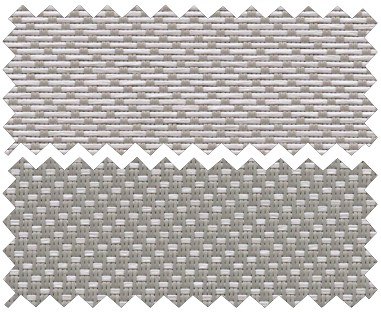
P26 **Chalk / Wheat** - face
Chalk / Wheat - back



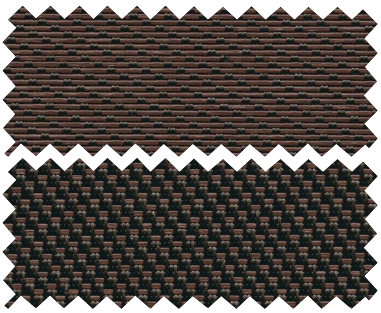
Q22 **Flaxen** - face
Flaxen - back



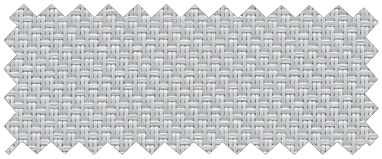
Q07 **Kettal Grey** - face
Kettal Grey - back



Q16 **Tobacco** - face
Tobacco - back

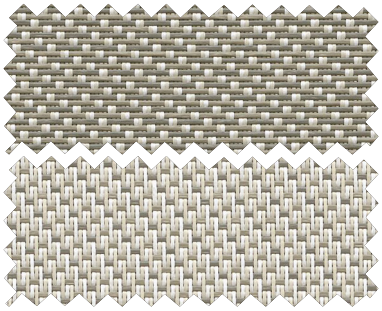


Q27 **Soft Grey**

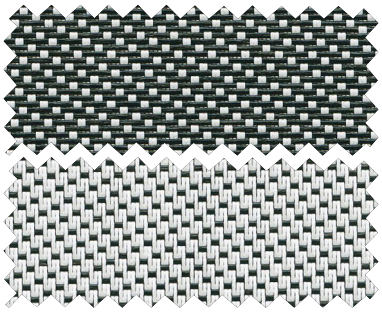


Q23 **Whitesands** - face
Whitesands - back

Q26 **Cobblestone** - face
Cobblestone - back

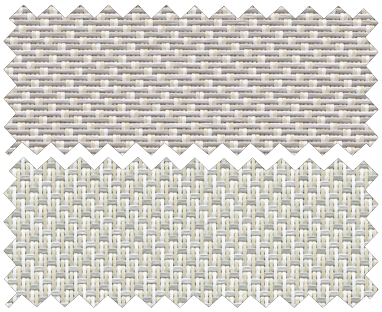


P25 **Chalk / Black** - face
Chalk / Black - back

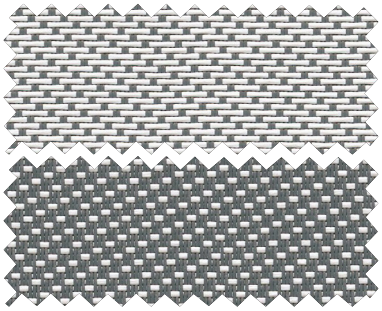


V10 **Ebony**

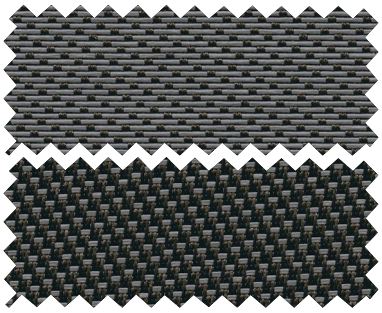
Q25 **Birch** - face
Birch - back



V03 **Pewter / Chalk** - face
Pewter / Chalk - back



V28 **Slate** - face
Slate - back



The unique twill weave of Styles 4901 and 4903 creates two fabrics in one, as distinct yet complimentary colors are exposed on the face and back. Test data for solar heat gain and glare are shown for each side to demonstrate the fabrics performance based on orientation.

STYLE 4901 / 4903 SPECIFICATIONS

Form follows function in this unique combination of color and weave. Using thin and light weight vinyl coated polyester yarns, Styles 4901 and 4903 are as versatile as they are beautiful. Styles 4901 and 4903 can also be used in exterior shading systems.

FIRE CLASSIFICATION

California U.S. Title 19 (small scale)
NFPA 701 TM#1 (small scale)
NFPA 701 TM#2 (large scale)
NFPA 101 (Class A Rating)
BS 5867 Part 2 Type B Performance
CAN/ULC-S 109 (large and small scale)
IBC Section 803.1.1 (Class A Rating)
CAN/CGSB2-4.162-M80

Fire classifications are subject to change. Please go to phifer.com for the most current information.

BACTERIA AND FUNGAL RESISTANCE

ASTM E 2180 ASTM G21 AATCC30 Part 3 ASTM D 3273 ASTM G22
GREENGUARD Mold and Bacteria Standard ASTM 6329
Includes Microban antimicrobial additives

ENVIRONMENTAL CERTIFICATION

GREENGUARD GREENGUARD Gold
Certified to these standards for low chemical emissions into indoor air during product usage

SAFE USE

RoHS Compliant
ANSI/WCMA A 100.1-2007 for lead content
REACH Compliant
US Consumer Product Safety Commission Section 101

WARRANTY

10-year interior 5-year exterior

ACOUSTICAL PERFORMANCE

NRC (Noise Reduction Coefficient) and SAA (Sound Absorption Average) tested in accordance with ASTM C423-09a

UV PROTECTION

SheerWeave sun control fabrics are an effective way to reduce harmful UV rays. Phifer Incorporated is a proud member of the Skin Cancer Foundation's Corporate Council.

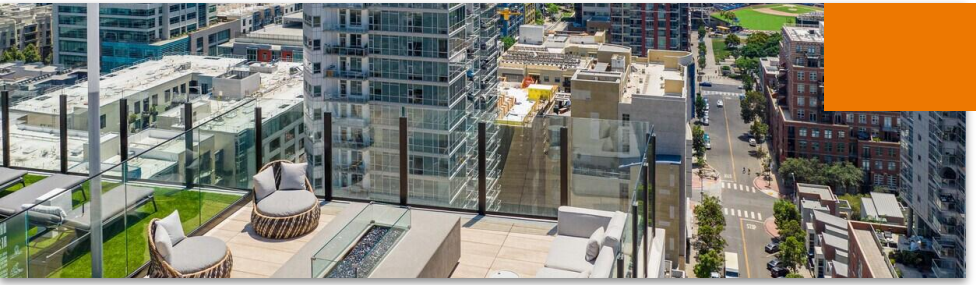
STYLE	4901	4903
WIDTHS	63" and 98" 160 cm and 248.9 cm	63" and 98" 160 cm and 248.9 cm
ROLL LENGTH	30 Linear Yards 27.4 Linear Meters	30 Linear Yards 27.4 Linear Meters
COMPOSITION	17% Polyester 83% Vinyl on Polyester	17% Polyester 83% Vinyl on Polyester
MESH WEIGHT	15.85 oz/yd^2 573 g/m^2	14.9 oz/yd^2 505.20 g/m^2
FABRIC THICKNESS	0.028 in 0.71 mm	0.027 in 0.69 mm
OPENNESS FACTOR	Approximately 1%	Approximately 3%
UV BLOCKAGE	Approximately 99%	Approximately 97%
ACOUSTICAL VALUE	NRC .60 / SAA .59	NRC .25 / SAA .25

PHIFER INCORPORATED

P. O. Box 1700 • Tuscaloosa, Alabama 35403-1700 USA
Phone: 205.345.2120 • FAX: 205.391.0799
Toll Free USA/Canada: 1.800.221.5497
phifer.com • ISO Registered

® SheerWeave is a registered trademark of PHIFER INCORPORATED.
® MICROBAN is a registered trademark of Microban Products Company.
TM UL, the UL logos and the UL mark are trademarks of UL LLC.
Photo courtesy of DRAPER INC., Spiceland, Indiana, USA.
© PHIFER INCORPORATED V24 030624 3033840

Recommended Fabrics

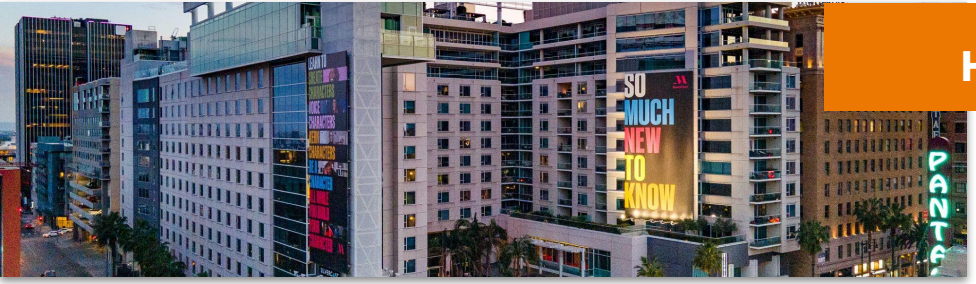


Multi-Family / Education

- Soloscreen
- Vinyl Blackout
- Ariel Blackout
- Soloscreen 0.5% Privacy

Office Spaces

- Soloscreen
- Ibiza
- SW 4400
- SW 4903



Hotel/Residential

- Companion Series
- Soloscreen 0.5% Privacy
- SW 7450
- SW 7000
- Mermet fabrics

SUBSTITUTION REQUEST: DATE SUBMITTED _____2/1/2026_____

1.01 SUBMIT TO: Matthew Guthrie, Rhizo Architecture at matthew@rhizoarchitecture.com and Erin Donoghue, HMK Company Project Manager, at erin.donoghue@hmkco.org.

1.02 PROJECT: Special Education Building Project

1.03 SPECIFIED ITEM:

A. SECTION NAME AND NUMBER: Window Coverings 12-24

B. PRODUCT TYPE AND NAME AND MODEL: ___Manual Roller Shades RS-1_

C. PARAGRAPH AND PRODUCT DESCRIPTION: _____

1.04 PROPOSED SUBSTITUTION:

A. MANUFACTURER AND MODEL NUMBER(S): ____Hunter Douglas RB- 500 _____

B. PRODUCT DESCRIPTION: __Fabric Sheer Weave or GlacierScreen+ Twill

C. Attached data includes product description, specifications, drawings, photographs, performance, test data and **point by point comparative matrix** adequate for evaluation of request including identification of applicable data portions. Attached data also includes description of changes to Contract Documents the proposed substitution requires for proper installation.

D. It is the responsibility of the requestee to assemble a comparative matrix outlining key elements of proposed substitution.

1.05 UNDERSIGNED CERTIFIES FOLLOWING ITEMS, UNLESS MODIFIED BY ATTACHMENTS, ARE CORRECT:

A. Proposed substitution does not affect dimensions shown on the drawings.

B. Undersigned pays for changes to building design, including engineering design, detailing, and construction costs caused by proposed substitution.

C. Proposed substitution has no adverse effect on other trades, construction schedule, or specified warranty requirements.

D. Maintenance and service parts are available locally or readily obtainable for proposed substitution.

1.06 UNDERSIGNED FURTHER CERTIFIES FUNCTION, APPEARANCE, AND QUALITY OF PROPOSED SUBSTITUTION ARE EQUIVALENT OR SUPERIOR TO SPECIFIED ITEM.

1.07 UNDERSIGNED FURTHER CERTIFIES THAT THE MANUFACTURER OF THE PROPOSED SUBSTITUTION IS AWARE OF THIS SUBSTITUTION REQUEST AND AGREES TO THE STATEMENTS NOTED ABOVE.

1.08 UNDERSIGNED AGREES THAT THE TERMS AND CONDITIONS FOR SUBSTITUTIONS FOUND IN BIDDING DOCUMENTS APPLY TO THIS PROPOSED SUBSTITUTION.

1.09 SUBMITTED BY:

A. PRINT NAME: _____Coton Carey_____

SIGNATURE:_____

B. FIRM NAME: _____Skyline Blinds

C. FULL MAILING ADDRESS: ____21212 Limeston Ave_____

City: _____Ben_____ State: __OR_Zip:__97703_____

D. PHONE: _____ E-MAIL: _____

1.10 FOR USE BY ARCHITECT OR ENGINEER

A. APPROVED OR APPROVED AS NOTED BY: _____

B. NOT APPROVED BY: _____

C. RECEIVED TOO LATE: _____

D. REMARKS: _____

E. DATE OF RESPONSE: 02.04.2026

END OF SECTION

EuroTwill®

1% open	3% open
6200 series	6000 series

This series features reversible broken twill weave shade cloths.
Its extensive color range will complement any interior.

Fire Classification | NFPA 701
Railroading Available | Yes
Bacteria & Fungal Resistance | ASTM G21 & ASTM E2180
Stocked Width | 118"

order free swatches &
up-to-date shade cloth information

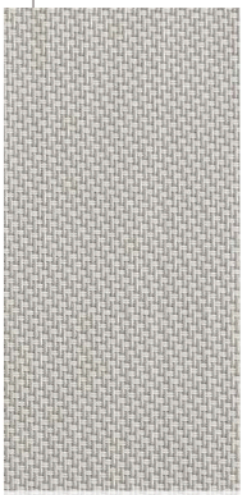
White
6201 | 6001

Sand
6204 | 6004

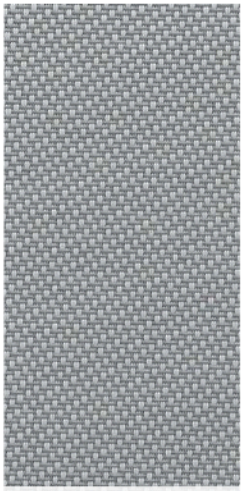
Stone
6218 | 6018

Silver Birch
6206 | 6006

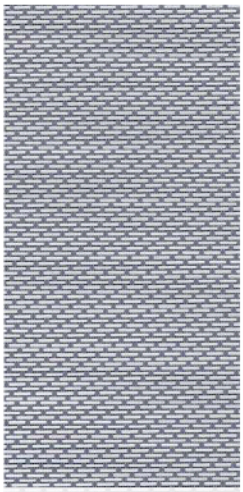
White/Black
6220 | 6020



Dove Grey
6209 | 6009

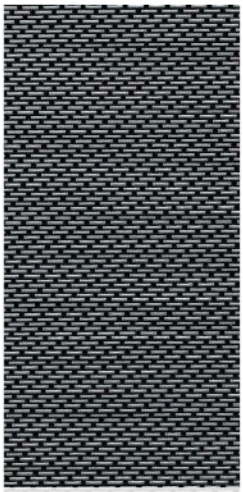


Nickel
6210 | 6010



Slate
6216 | 6016

Smoke
6215 | 6015



Graphite
6211 | 6011

Charcoal
6212 | 6012

Bronze
6213 | 6013

GREENGUARD hpd NFPA 701 EPD®

Mecho®

EuroTwill® Shade Cloth Properties

1% open 6200 series

#	Name	Fabric Content	Solar Optical Properties				Single Shading Coefficient			Insulating Shading Coefficient		
			Ts	Rs	As	Tv	1/8CL	1/4CL	1/4HA	1/2CL	1CL	1HA
6201	White	70% PVC / 30% Polyester	22	67	11	19	0.34	0.34	0.32	0.32	0.32	0.25
6204	Sand	70% PVC / 30% Polyester	16	55	29	11	0.41	0.41	0.36	0.39	0.38	0.29
6206	Silver Birch	70% PVC / 30% Polyester	15	53	32	10	0.42	0.42	0.36	0.40	0.39	0.29
6218	Stone	70% PVC / 30% Polyester	10	32	58	7	0.56	0.54	0.42	0.53	0.49	0.35
6220	White/Black	70% PVC / 30% Polyester	8	25	67	7	0.61	0.58	0.45	0.57	0.53	0.37
6209	Dove Grey	70% PVC / 30% Polyester	11	40	49	6	0.50	0.49	0.40	0.47	0.45	0.33
6210	Nickel	70% PVC / 30% Polyester	7	30	63	4	0.57	0.54	0.43	0.54	0.50	0.35
6216	Slate	70% PVC / 30% Polyester	4	36	59	3	0.52	0.50	0.40	0.49	0.46	0.33
6215	Smoke	70% PVC / 30% Polyester	3	20	78	2	0.63	0.6	0.46	0.59	0.55	0.38
6211	Graphite	70% PVC / 30% Polyester	3	17	81	2	0.65	0.62	0.47	0.61	0.56	0.39
6212	Charcoal	70% PVC / 30% Polyester	2	8	90	2	0.71	0.67	0.49	0.67	0.60	0.41
6213	Bronze	70% PVC / 30% Polyester	2	6	92	2	0.72	0.68	0.50	0.68	0.62	0.42

Acoustic Performance
0.30 NRC, 0.33 SAA

Mesh Weight
14.21 oz/yd²

Fabric Thickness
0.029 in

Embodied Carbon
3.53 kg CO_2/yd²

3% open 6000 series

#	Name	Fabric Content	Solar Optical Properties				Single Shading Coefficient			Insulating Shading Coefficient		
			Ts	Rs	As	Tv	1/8CL	1/4CL	1/4HA	1/2CL	1CL	1HA
6001	White	70% PVC / 30% Polyester	25	66	9	22	0.36	0.36	0.33	0.33	0.33	0.26
6004	Sand	70% PVC / 30% Polyester	18	55	27	14	0.42	0.41	0.36	0.39	0.38	0.29
6006	Silver Birch	70% PVC / 30% Polyester	18	51	31	13	0.45	0.44	0.37	0.42	0.40	0.30
6018	Stone	70% PVC / 30% Polyester	12	30	58	9	0.58	0.55	0.43	0.54	0.50	0.36
6020	White/Black	70% PVC / 30% Polyester	10	20	70	9	0.64	0.61	0.46	0.60	0.55	0.39
6009	Dove Grey	70% PVC / 30% Polyester	13	39	48	9	0.52	0.5	0.41	0.49	0.46	0.33
6010	Nickel	70% PVC / 30% Polyester	10	28	62	8	0.59	0.56	0.44	0.55	0.51	0.36
6016	Slate	70% PVC / 30% Polyester	7	38	55	5	0.51	0.49	0.40	0.48	0.46	0.33
6015	Smoke	70% PVC / 30% Polyester	5	20	75	4	0.63	0.6	0.46	0.59	0.55	0.38
6011	Graphite	70% PVC / 30% Polyester	5	18	77	4	0.65	0.61	0.46	0.61	0.56	0.39
6012	Charcoal	70% PVC / 30% Polyester	4	9	87	4	0.71	0.67	0.49	0.67	0.60	0.41
6013	Bronze	70% PVC / 30% Polyester	5	7	89	4	0.72	0.68	0.50	0.68	0.61	0.42

Acoustic Performance
0.10 NRC, 0.14 SAA

Mesh Weight
13.12 oz/yd²

Fabric Thickness
0.028 in

Embodied Carbon
3.53 kg CO_2/yd²

The solar optical properties are used to calculate the shading coefficient. The shading coefficient represents the percentage of solar heat gain that is transmitted to the interior through the glass and shading system.

Ts = Solar Transmittance
Rs = Solar Reflectance
As = Solar Absorptance
Tv = Visual Transmittance

1/8CL = 1/8" Clear Glass
1/4CL = 1/4" Clear Glass
1/4HA = 1/4" Heat Absorbing Glass

1/2CL = 1/2" Insulating Clear Glass
1CL = 1" Insulating Clear Glass
1HA = 1" Insulating Heat Absorbing Glass

GlacierScreen+ Basketweave

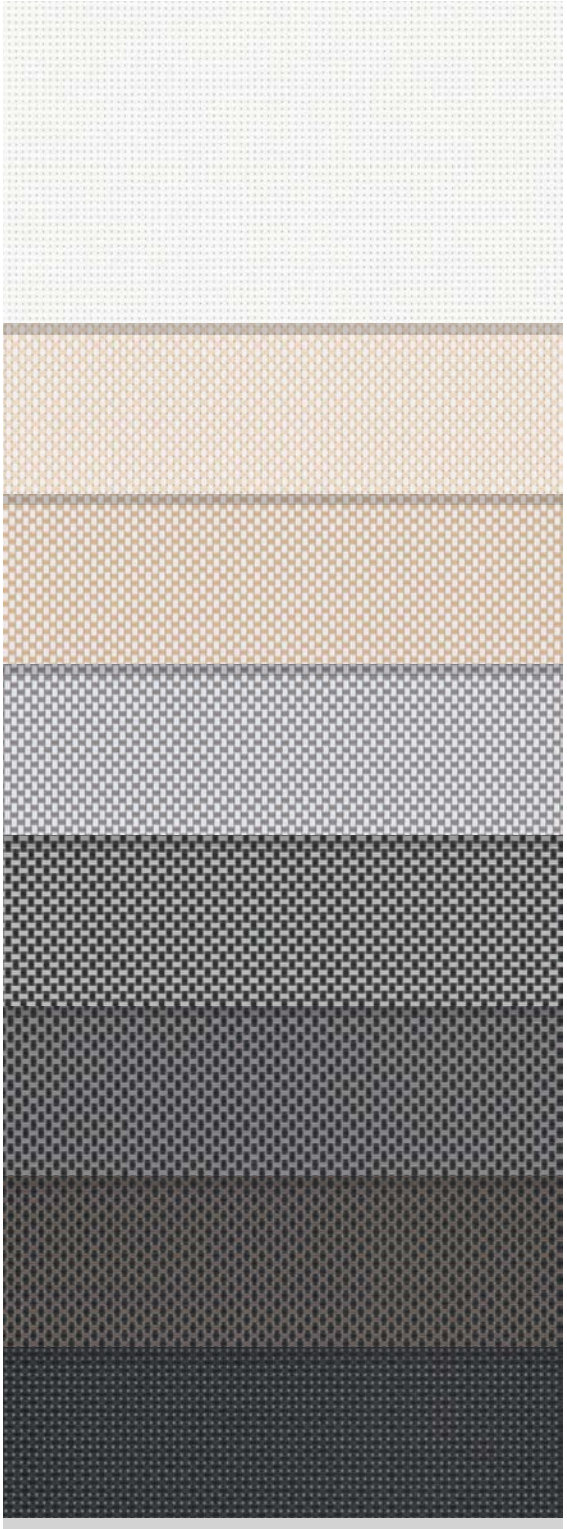
Conventional | 1% 3% 5% 10%

1% White/Pearl

3% White/Pearl

5% White/Pearl

10% White/Pearl



White/White

White/Linen

White/Sand

White/Grey

Black/Pearl

Black/Grey

Black/Brown

Black/Black

Fabric on waterfalls are 5% openness

Hunter Douglas Architectural
800.727.8953
HDarchitectural.com

HunterDouglas Architectural

GlacierScreen+ Basketweave 1%, 3%, 5%, 10%

SPECIFICATIONS			CLASSIFICATIONS	
Product Category	Conventional		Fire Classification	NFPA 701-2010 TM#1, California U.S. Title 19
Fabric Style	Basketweave		Bacterial & Fungal Resistance	ASTM E2180, ASTM G21
Openness Factor	1%, 3%, 5%, 10%		Environmental	GREENGUARD Gold
Composition	25% Polyester, 75% PVC			
UV Blockage	Approximately 90%–99%			
Roll Length	32.8 yd			
Max Fabric Width	118"			
Weight	1%–14.70 oz/yd²	3%–13.67 oz/yd²		
	5%–12.35 oz/yd²	10%–11.17 oz/yd²		
Thickness	1%–0.028"	3%–0.026"		
	5%–0.024"	10%–0.023"		
Railroad	Yes			
Seaming	Yes			

Hembars Options
- Sealed Pocket with Weight
- 2" Flat Exposed
- RB 500

FENESTRATION	FABRIC PROPERTIES								FABRIC & GLASS	
	SOLAR						OPTICAL		SHGC% IMPROVEMENT	
	Ts (%)		Rs (%)		As(%)		Tv (%)			
COLOR	1%	3%	1%	3%	1%	3%	1%	3%	1%	3%
White/White	16	18	72	70	12	12	13	15	0.21	0.23
White/Linen	17	15	65	59	18	26	13	11	0.23	0.24
White/Pearl	17	14	60	52	23	34	14	11	0.24	0.25
White/Sand	12	14	55	51	33	35	8	10	0.23	0.26
White/Grey	8	9	45	40	47	51	5	7	0.25	0.27
Black/Pearl	0	4	11	13	89	83	0	4	0.34	0.34
Black/Grey	0	3	8	9	92	88	0	3	0.35	0.35
Black/Brown	1	3	5	6	94	91	1	3	0.35	0.36
Black/Black	0	3	3	3	97	94	0	3	0.36	0.37

	Ts (%)		Rs (%)		As(%)		Tv (%)		SHGC% IMPROVEMENT	
COLOR	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%
White/White	21	21	67	61	12	18	17	17	0.25	0.26
White/Linen	18	18	56	56	26	26	14	14	0.25	0.26
White/Pearl	16	16	49	49	35	35	13	13	0.27	0.27
White/Sand	14	18	46	48	40	34	12	12	0.28	0.30
White/Grey	12	18	38	36	50	46	9	15	0.30	0.33
Black/Pearl	8	12	15	17	77	71	8	10	0.35	0.35
Black/Grey	7	11	3	4	90	85	7	10	0.38	0.38
Black/Brown	7	11	6	5	87	84	7	10	0.38	0.38
Black/Black	6	10	3	3	91	87	3	6	0.37	0.37

WARRANTY 5 Year Interior

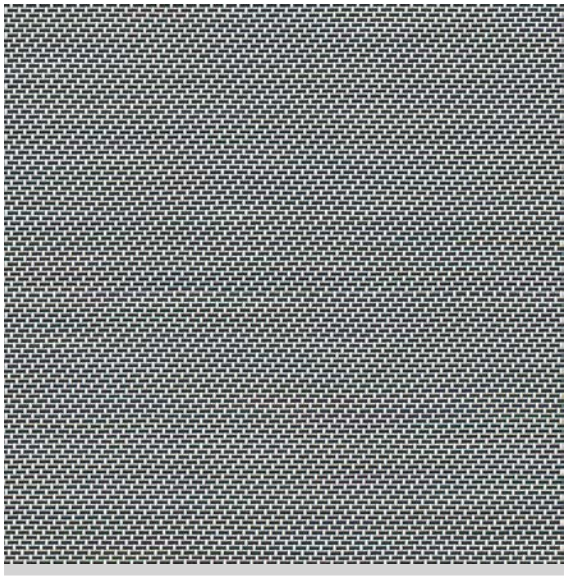
CARE & HANDLING Remove dust with a vacuum cleaner or compressed air. Do not scrub. Clean with a sponge or soft brush dipped in warm soapy water. If cleaners other than mild soap and water are desired, test in an inconspicuous area, prior to use. Rinse with clean water. Do not use any abrasive substances that might damage the fabric. Paint solvents will damage the polymer surface and should not be used. Avoid strong cleaners, bleach and disinfectants, especially those containing quaternary ammonium compounds and phenols. Leave the blind down until completely dry. A clean white pencil eraser may also be used to gently rub the fabric to remove small stains.

Ts (Solar transmittance): Proportion of solar energy transmitted through the fabric. Rs (Solar reflectance): Proportion of solar radiation reflected by the fabric. As (Solar absorptance): Proportion of solar radiation absorbed by the fabric. Tv (Visible light transmittance): Total percentage of light radiation through the fabric over a wavelength of 380 to 780 nm. Rv (Visible light reflectance): Total percentage of light radiation reflected by the fabric over a wavelength of 380 to 780 nm. SHGC (Total solar factor): Solar energy which actually penetrates into a room through the blind and glazing. A low value means good thermal performance.

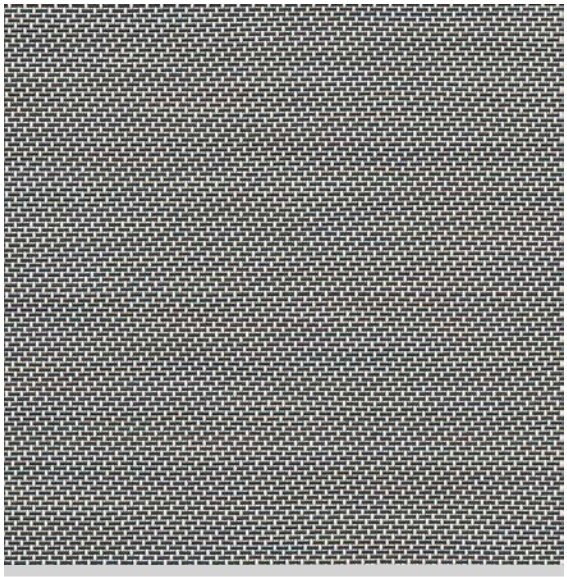
The fenestration data provided above and derived from information provided by Hunter Douglas' vendors and/or testing conducted by Hunter Douglas or its vendors. Test methods used a intended to demonstrate the qualities and performance of the specific fabric samples tested, and the data may not reflect or predict the quality or performance of the fabric under actual conditions. In addition, tests may not have been conducted by certified or governmentally approved testing facilities and, accordingly, the results may vary from those that would be obtained at such certified or approved facilities. Hunter Douglas assumes no liability to its customer or any other person or entity whatsoever arising out of any loss or damage suffered or sustained, or for any amounts required to be paid, as a result of the performance (or nonperformance) of the fabric under actual conditions.

GlacierScreen+ Twill

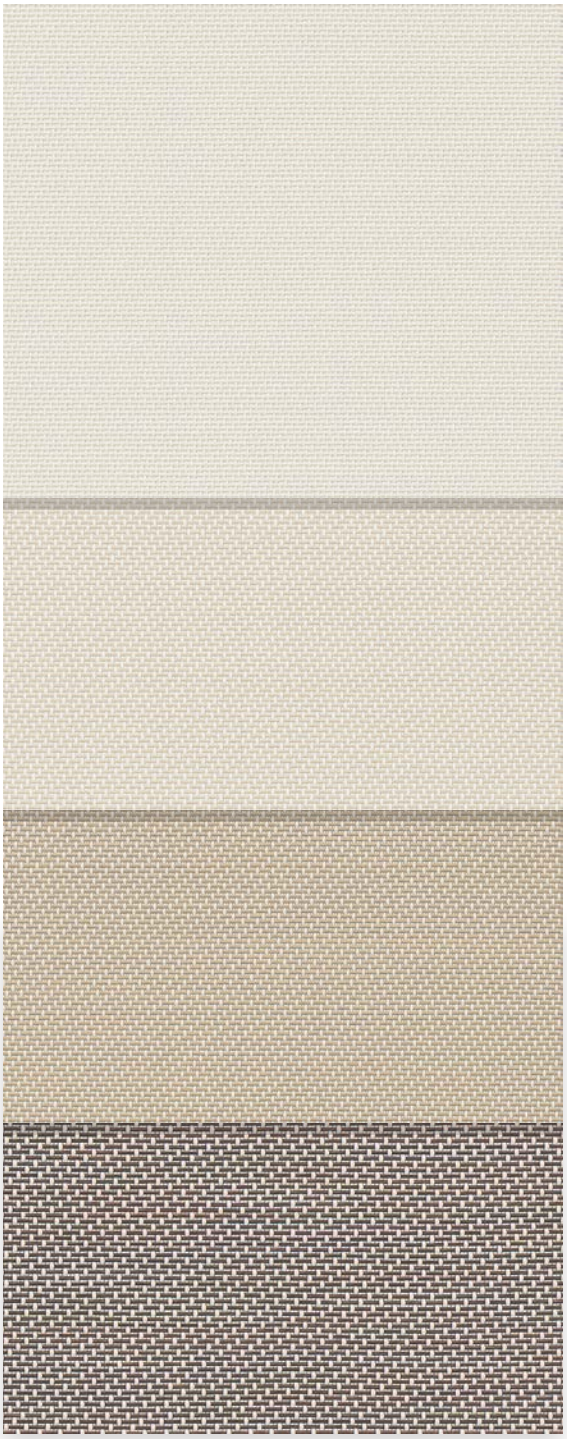
Performance | 1% 3%



1% White/Black



3% White/Black



White/White

White/Linen

White/Sand

White/Bronze

Fabric on waterfalls are 3% openness

Hunter Douglas Architectural
800.727.8953
HDarchitectural.com

HunterDouglas Architectural

GlacierScreen+ Twill 1% 3%

SPECIFICATIONS			CLASSIFICATIONS	
Product Category	Performance		Fire Classification	NFPA 701-10 TM#1
Fabric Style	Twill			
Openness Factor	1% 3%		Bacterial & Fungal	
Composition	25% Polyester, 75% Vinyl		Resistance	ASTM E2180, ASTM G21
UV Blockage	Approximately 97%-99%			
Roll Length	33 yd		Environmental	GREENGUARD Gold, RoHS- Lead Free
Max Fabric Width	118"			
Weight	1%–13.23 oz/yd²	3%–12.64 oz/yd²		
Thickness	1%–0.026"	3%–0.025"		
Railroad available	No			
Seaming available	Yes			

Hembars available
- Sealed Pocket with Weight
- 2" Flat Exposed
- RB 500

FENESTRATION		FABRIC PROPERTIES										FABRIC & GLASS			
		THERMAL						*OPTICAL*				SHGC % Improvement		SHGC	
		Ts(%)		Rs(%)		As (%)		Rv (%)		Tv (%)					
COLOR	Side	1%	3%	1%	3%	1%	3%	1%	3%	1%	3%	1%	3%	1%	3%
White/White	front	17	19	66	64	17	17	73	71	14	16	55	53	0.22	0.23
White/Linen	**front**	**15**	**19**	**63**	**63**	**22**	**18**	**68**	**67**	**11**	**13**	**52**	**53**	**0.22**	**0.23**
	back	15	17	57	62	28	21	60	59	11	13	46	45	0.24	0.25
White/Sand	**front**	**14**	**15**	**60**	**58**	**26**	**27**	**65**	**62**	**10**	**11**	**50**	**48**	**0.22**	**0.24**
	back	14	11	49	34	37	55	50	48	10	11	40	38	0.26	0.28
White/Bronze	**front**	**6**	**13**	**54**	**44**	**40**	**43**	**52**	**50**	**5**	**11**	**45**	**43**	**0.26**	**0.27**
	back	8	14	28	25	64	61	34	14	6	12	31	29	0.28	0.29
White/Black	**front**	**7**	**8**	**47**	**43**	**46**	**49**	**47**	**34**	**6**	**7**	**42**	**39**	**0.27**	**.027**
	back	9	9	22	20	69	71	32	8	8	8	30	27	0.29	0.29

WARRANTY 5 Year Interior

CARE & HANDLING Remove dust with a vacuum cleaner or compressed air. Do not scrub. Clean with a sponge or soft brush dipped in warm soapy water. If cleaners other than mild soap and water are desired, test in an inconspicuous area, prior to use. Rinse with clean water. Do not use any abrasive substances that might damage the fabric. Paint solvents will damage the polymer surface and should not be used. Avoid strong cleaners, bleach and disinfectants, especially those containing quaternary ammonium compounds and phenols. Leave the blind down until completely dry. A clean white pencil eraser may also be used to gently rub the fabric to remove small stains.

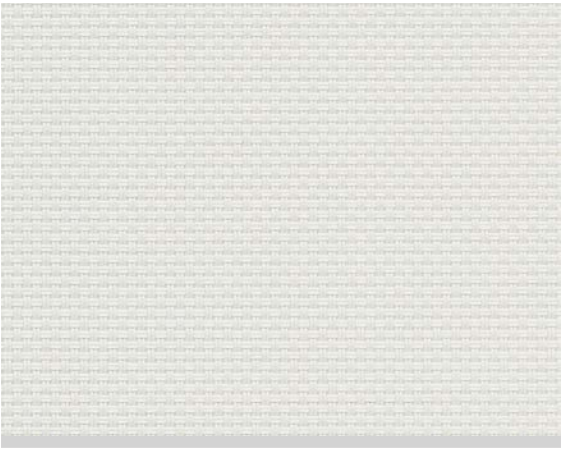
Ts (Solar transmittance): Proportion of solar energy transmitted through the fabric.
Rs (Solar reflectance): Proportion of solar radiation reflected by the fabric.
As (Solar absorptance): Proportion of solar radiation absorbed by the fabric.
Tv (Visible light transmittance): Total percentage of light radiation through the fabric over a wavelength of 380 to 780 nm.
Rv (Visible light reflectance): Total percentage of light radiation reflected by the fabric over a wavelength of 380 to 780 nm.
SHGC (Total solar factor): Solar energy which actually penetrates into a room through the blind and glazing. A low value means good thermal performance.

The fenestration data provided above and derived from information provided by Hunter Douglas' vendors and/or testing conducted by Hunter Douglas or its vendors. Test methods used a intended to demonstrate the qualities and performance of the specific fabric samples tested, and the data may not reflect or predict the quality or performance of the fabric under actual conditions. In addition, tests may not have been conducted by certified or governmentally approved testing facilities and, accordingly, the results may vary from those that would be obtained at such certified or approved facilities. Hunter Douglas assumes no liability to its customer or any other person or entity whatsoever arising out of any loss or damage suffered or sustained, or for any amounts required to be paid, as a result of the performance (or nonperformance) of the fabric under actual conditions.

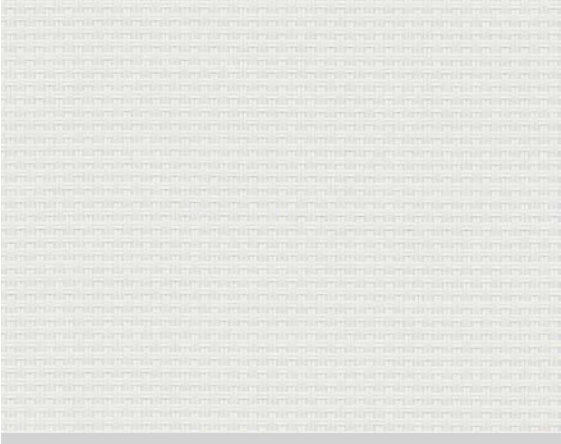
SheerWeave® 4400 / 4000 / 4100

Conventional | 3% 5% 10%

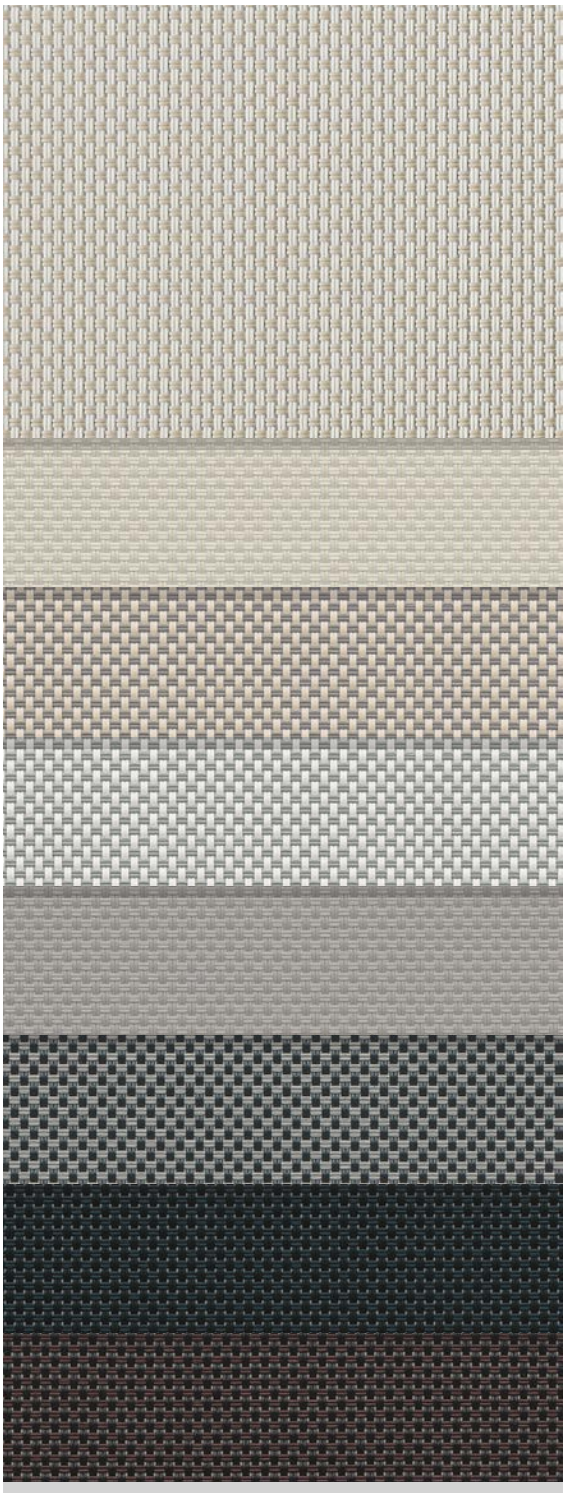
3% | 4400 Eco / Chalk



5% | 4000 Eco / Chalk



10% | 4100 Eco / Chalk



Eco / Alabaster

Eco / Pebblestone

Eco / Greystone

Eco / Granite

Eco / Pewter

Eco / Ash

Eco / Ebony

Eco / Tobacco

Fabric on waterfalls are 5% openness

Hunter Douglas Architectural
800.727.8953
HDarchitectural.com

HunterDouglas Architectural

SheerWeave® 4400 3%, 4000 5%, 4100 10%

SPECIFICATIONS

Product Category	Conventional	
Fabric Style	Basketweave	
Openness Factor	4400–3%, 4000–5% 4100–10%	
Composition	25% Polyester, 75% PVC on Polyester	
UV Blockage	Approximately 90-97%	
Roll Length	30 ly	
Max Fabric Width	126"	
Weight	3%–19.9 oz/yd² 10%–16.7oz/yd²	5%–18.0 oz/yd²
Thickness	3%–0.034" 10%–0.032"	5%–0.032"
Railroad	Yes	
Seaming	Yes	

CLASSIFICATIONS

Fire Classification	California U.S. Title 19 (small scale), NFPA 701 TM#1 (small scale), NFPA 101 (Class A Rating), IBC Section 803.1.1 (Class A Rating), BS 5867 Part 2 Type B Performance, NFPA 701 TM#2 (large scale), CAN/ULC-S 109 (large and small scale), CAN/CGSB2-4.162-M80
Bacterial & Fungal Resistance	ASTM E 2180, ASTM G21, ASTM G22, AATCC30 Part 3, ASTM D 3273, GREENGUARD Mold and Bacteria Standard ASTM 6329: includes Microban antimicrobial additives
Environmental	GREENGUARD Gold
Acoustic	3%–NRC 0.20 / SAA 0.19 5%–NRC 0.10 / SAA 0.11 10%–NRC 0.05 / SAA 0.05
Acoustic Performance	NRC (Noise Reduction Coefficient) and SAA (Sound Absorption Average) tested in accordance with ASTM C423-09a

Hembars Options
- Sealed Pocket with Weight
- 2" Flat Exposed
- RB 500

FENESTRATION	FABRIC PROPERTIES								SHGC/G VALUE g-tot (glass & blind)			
	SOLAR OPTICAL								SINGLE		INSULATING	
	Ts (%)		Rs (%)		As(%)		Tv (%)		1/4 CL		1 HA	
COLOR	3%	5%	3%	5%	3%	5%	3%	5%	3%	5%	3%	5%
Eco / Chalk	12	16	70	68	18	16	7	12	0.26	0.28	0.13	0.22
Eco / Alabaster	10	15	62	57	28	28	6	13	0.30	0.34	0.15	0.24
Eco / Pebblestone	9	14	51	49	40	37	6	12	0.37	0.38	0.24	0.26
Eco / Greystone	6	10	39	34	55	56	5	9	0.42	0.45	0.28	0.21
Eco / Granite	6	11	48	41	46	48	5	10	0.37	0.42	0.17	0.20
Eco / Pewter	3	8	26	27	71	65	2	9	0.49	0.49	0.22	0.31
Eco / Ash	3	7	10	11	87	82	4	8	0.57	0.57	0.36	0.26
Eco / Ebony	3	6	3	5	94	89	3	8	0.61	0.60	0.37	0.37
Eco / Tobacco	3	7	5	5	92	88	3	8	0.60	0.61	0.37	0.27
COLOR	10%		10%		10%		10%		10%		10%	
Eco / Chalk	18		66		16		15		0.30		0.22	
Eco / Alabaster	19		56		25		16		0.36		0.25	
Eco / Pebblestone	16		48		36		15		0.39		0.27	
Eco / Greystone	14		35		51		14		0.46		0.30	
Eco / Granite	15		42		43		14		0.43		0.20	
Eco / Pewter	12		26		62		14		0.50		0.32	
Eco / Ash	10		10		80		11		0.58		0.27	
Eco / Ebony	10		4		86		11		0.62		0.37	
Eco / Tobacco	10		5		85		11		0.61		0.28	

WARRANTY 5 Year Interior

CARE & HANDLING Clean with mild soap and water. Commercial and hospital grade cleaners/disinfectants may be used. Test in an inconspicuous area prior to use. Diluted bleach solution (10% dilution or less). Rinse thoroughly after cleaning.

TS - Solar Transmittance, RS - Solar Reflectance, AS - Solar Absorptance, TV - Visual Transmittance
SHGC = Solar Heat Gain Coefficient, 1/4 CL = Clear Glass, 1 HA = 1" Heat Absorbing Glass
Fabrics Installed Internally, Zero-Degree Profile Angle, Solar Heat Gain Coefficient (SHGC) shown calculated according the Office of Building Technology, State and Community Programs, Energy Efficiency and Renewable Energy, U.S. Department of Energy's definition of SHGC. SHGC represents the percentage of solar heat gain that is transmitted to the interior through the glass and shading system. If you are using glass whose performance is listed in terms of SC, you may convert to SHGC by multiplying the SC by 0.87.

The fenestration data provided above and derived from information provided by Hunter Douglas' vendors and/or testing conducted by Hunter Douglas or its vendors. Test methods used a intended to demonstrate the qualities and performance of the specific fabric samples tested, and the data may not reflect or predict the quality or performance of the fabric under actual conditions. In addition, tests may not have been conducted by certified or governmentally approved testing facilities and, accordingly, the results may vary from those that would be obtained at such certified or approved facilities. Hunter Douglas assumes no liability to its customer or any other person or entity whatsoever arising out of any loss or damage suffered or sustained, or for any amounts required to be paid, as a result of the performance (or nonperformance) of the fabric under actual conditions.