SECTION 101100 - VISUAL DISPLAY UNITS

Revise this Section by deleting and inserting text to meet Project-specific requirements.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
	* + 1. RELATED DOCUMENTS
				1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			2. SUMMARY
				1. Section Includes:

Visual display board assemblies.

Floor-to-ceiling visual display assemblies.

Rail support systems for visual display board assemblies.

Modular support systems for visual display board assemblies.

Sliding visual display units.

Visual display conference units.

Glass markerboards.

Retain first Subparagraph below for display rails that are installed as a separate product; delete if display rails are accessory to chalkboards and markerboards only.

Display rails.

Natural-slate chalkboards.

* + - * 1. Related Requirements:

Retain Subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

Section 101146 "Visual Display Fabrics" for visual display wall coverings intended for use with dry-erase markers.

Section 101200 "Display Cases" for [**individually framed and enclosed, wall-mounted bulletin boards**] [**and for**] [**tackboards within display cases**].

* + - 1. PREINSTALLATION MEETINGS

Retain "Preinstallation Conference" Paragraph below if Work of this Section is extensive or complex enough to justify a conference.

* + - * 1. Preinstallation Conference: Conduct conference at Project site.

If needed, insert list of conference participants.

* + - 1. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Product Data: For each type of product.

Include construction details, material descriptions, dimensions of individual components and profiles, finishes, and accessories for visual display units.

Include electrical characteristics for motorized units.

* + - * 1. Sustainable Design Submittals:
				2. Shop Drawings: For visual display units.

Include plans, elevations, sections, details, and attachment to other work.

Show locations of panel joints.[**Show locations of field-assembled joints for factory-fabricated units too large to ship in one piece.**]

Show locations and layout of special-purpose graphics.

Include sections of typical trim members.

Include wiring diagrams for power and control wiring.

Retain "Samples for Initial Selection" and "Samples( for Verification)" Paragraphs below for two-stage Samples.

* + - * 1. Samples for Initial Selection: For each type of visual display unit indicated, for units with factory-applied color finishes, and as follows:

Samples of facings for each visual display panel type, indicating color and texture.

Fabric swatches of fabric facings for tackboards.

Actual factory-finish color samples, applied to [**aluminum**] [**wood**] substrate.

Include accessory Samples to verify color selected.

Retain option in "Samples( for Verification)" Paragraph below if retaining "Samples for Initial Selection" Paragraph above.

* + - * 1. Samples[**for Verification**]: For each type of visual display unit indicated.

Visual Display Panel: Not less than 8-1/2 by 11 inches, with facing, core, and backing indicated for final Work. Include one panel for each type, color, and texture required.

Trim: 6-inch- long sections of each trim profile.

Display Rail: 6-inch- long section of each type.

[**Rail**] [**Modular**] Support System: 6-inch- long sections.

Accessories: Full-size Sample of each type of accessory.

* + - * 1. Product Schedule: For visual display units.[**Use same designations indicated on Drawings.**]
				2. Product Test Reports: For each visual display unit, for tests performed by a qualified testing agency.
				3. Sample Warranties: For manufacturer's special warranties.
			1. CLOSEOUT SUBMITTALS
				1. [**Operation and**]Maintenance Data: For visual display units[**and motorized units**] to include in maintenance manuals.
			2. QUALITY ASSURANCE

Retain "Installer Qualifications" Paragraph below if an experienced installer is required for motorized, sliding visual display units, or for Projects with complex visual display unit requirements.

* + - * 1. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
				2. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

Retain first Subparagraph below for large-scale mockup. Mockups may be especially prudent for floor-to-ceiling visual display assemblies and for Projects with many visual display units. Indicate portion of wall represented by mockup on Drawings or draw mockup as separate element.

Build mockup of typical [**wall area**] [**visual display unit**] [**floor-to-ceiling visual display assembly**] as shown on Drawings. Include accessories.

Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Director’s Representative specifically approves such deviations in writing.

Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

* + - 1. DELIVERY, STORAGE, AND HANDLING
				1. Deliver factory-fabricated visual display units completely assembled in one piece. If dimensions exceed maximum manufactured unit size, or if unit size is impracticable to ship in one piece, provide two or more pieces with joints in locations indicated on approved Shop Drawings.
			2. FIELD CONDITIONS
				1. Environmental Limitations: Do not deliver or install visual display units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
			3. WARRANTY

Retain "Special Warranty for Porcelain-Enamel Face Sheets" Paragraph below for chalkboards and markerboards fabricated with porcelain-enamel facings. Most manufacturers' warranties only include replacement of material; labor for removal and reinstallation is excluded.

* + - * 1. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.

Failures include, but are not limited to, the following:

Surfaces lose original writing and erasing qualities.

Surfaces exhibit crazing, cracking, or flaking.

Retain one of two "Warranty Period" Subparagraphs below. Verify available warranties and warranty periods.

Warranty Period: 50 years from date of Substantial Completion.

Warranty Period: Life of the building.

Some manufacturers also offer warranties for painted-finish chalkboards and tackboards. See the Evaluations.

Consider inserting warranty provision for motors if motorized, sliding visual display units are required.

1. PRODUCTS

Manufacturers and products listed in SpecAgent and MasterWorks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications.

* + - 1. PERFORMANCE REQUIREMENTS

Retain "Surface-Burning Characteristics" Paragraph below if tackboard panels or facings are flammable and testing is required by authorities having jurisdiction.

* + - * 1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

Flame-Spread Index: 25 or less.

Smoke-Developed Index: 450 or less.

Retain "Electrical Components, Devices, and Accessories" Paragraph below if motorized visual display units are specified.

* + - * 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
			1. VISUAL DISPLAY BOARD ASSEMBLY <**Insert drawing designation**>

Visual display board assemblies consist of a visual display panel - markerboard, chalkboard, tackboard, or a combination thereof - with perimeter trim or other finished edge. Copy this article and re-edit for each type of visual display board assembly.

Insert drawing designation. Use these designations on Drawings to identify each product.

* + - * 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

AARCO Products, Inc.

AJW Architectural Products.

Ghent Manufacturing, Inc.

K-Pro Specialty Products.

Marsh Industries, Inc.

Approved equivalent.

Factory assembly in "Visual Display Board Assembly" Paragraph below may have limitations on size, configuration, or shipping.

* + - * 1. Visual Display Board Assembly: [**Field**] [**or**] [**factory**] fabricated.

Retain one or more of four options in "Assembly" Subparagraph below for type of visual display panel included in assembly.

Assembly: [**Chalkboard**] [**markerboard**] [**and**] [**tackboard**].

Corners: [**Square**] [**Rounded**].

Width: [**As indicated on Drawings**].

Height: [**As indicated on Drawings**].

Verify, with manufacturers, the availability of visual display board assemblies with rail or modular support systems; only a few manufacturers offer these systems. Coordinate "Mounting Method" Subparagraph below with "Rail Support System for Visual Display Board Assemblies" and "Modular Support System for Visual Display Board Assemblies" articles for more detail.

Mounting Method: [**Direct to wall**] [**Rail support system**] [**Modular support system**].

Retain one or more of "Chalkboard Panel," "Markerboard Panel," and "Tackboard Panel" Paragraphs below, depending on the combination of panels required in the visual display board assemblies. Coordinate with "Chalkboard Panels," "Markerboard Panels," and "Tackboard Panels" articles for more detail.

* + - * 1. Chalkboard Panel: [**Porcelain-enamel**] [**High-pressure chalkboard laminate**] [**Melamine**] [**Painted-finish**]-faced chalkboard panel on core indicated.

Color: [**Green**] [**Blue**] [**Brown**] [**Black**] [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors**].

If required, insert facing for proprietary surfaces available from some manufacturers.

* + - * 1. Markerboard Panel: [**Porcelain-enamel-faced**] [**High-pressure markerboard laminate-faced**] [**Melamine-faced**] markerboard panel on core indicated.

Color: [**White**] [**Beige**] [**Tan**] [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors**].

* + - * 1. Tackboard Panel: [**Natural-cork**] [**Plastic-impregnated-cork**] [**Vinyl-fabric-faced**] [**Polyester-fabric-faced**] tackboard panel on core indicated.

Wrapped edge is available only for vinyl- and polyester-fabric-faced tackboard panels.

Fabric Wrapped Edge: Wrap edge of tackboard panel with fabric facing.

Retain "Color and Pattern" Subparagraph below for vinyl- and polyester-fabric-faced panels or for plastic-impregnated-cork panels.

Color and Pattern: [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors**].

Retain "Aluminum Frames( and Trim)," "Factory-Applied Wood Trim," "Field-Applied Wood Trim," or "Vinyl Trim" Paragraph below, or delete all if fabric-wrapped edge tackboards are the only panels specified.

* + - * 1. Aluminum Frames[**and Trim**]: Fabricated from not less than 0.062-inch (16 ga) - thick, extruded aluminum; [**standard size and shape**] [**slim size and standard shape**] [**of size and shape indicated on Drawings**].

Retain "Field-Applied Trim" Subparagraph below for field-applied trim only.

Field-Applied Trim: Manufacturer's standard, [**snap-on trim with no visible screws or exposed joints**] [**slip-on trim**] [**screw-on trim with Phillips flat-head screws**].

Aluminum Finish: [**Clear anodic**] [**Color anodic**] [**Manufacturer's standard baked-enamel or powder-coat**] finish.

Retain one color from options in "Color" Subparagraph below with finish option retained in "Aluminum Finish" Subparagraph above. First four options below are for color anodic finish and may vary in color range and availability among manufacturers. Last three options below are for color anodic, baked-enamel, or powder-coat finish.

Color: [**Light bronze**] [**Medium bronze**] [**Dark bronze**] [**Black**] [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors and color densities**].

Retain "Factory-Applied Wood Trim" or "Field-Applied Wood Trim" Paragraph below for wood trim.

* + - * 1. Factory-Applied Wood Trim: [**Red oak**] [**Walnut**] [**Manufacturer's standard species**], not less than 1/2 inch thick; [**standard size and shape**] [**of size and shape indicated on Drawings**] with [**opaque**] [**transparent**] finish.
				2. Field-Applied Wood Trim: Comply with requirements specified in [**Section 062023 "Interior Finish Carpentry."**] [**Section 064023 "Interior Architectural Woodwork."**]

Retain "Vinyl Trim" Paragraph below only for markerboard assemblies.

* + - * 1. Vinyl Trim: [**Dark brown**] [**Black**] [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors**].

If locations of joints are critical, indicate them on Drawings and delete "Joints" Paragraph below.

* + - * 1. Joints: Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, [**balanced around center of board, as acceptable to Director’s Representative**] [**as indicated on approved Shop Drawings**].

Retain "Combination Assemblies" Paragraph below for visual display assemblies with more than one type of visual display panel.

* + - * 1. Combination Assemblies: Provide [**manufacturer's standard exposed trim**] [**H-trim**] [**hidden spline**] between abutting sections of visual display panels.
				2. Chalktray: Manufacturer's standard; continuous.

Box Type: Extruded aluminum with slanted front, grooved tray, and cast-aluminum end closures.

Solid Type: Extruded aluminum with ribbed section and smoothly curved exposed ends.

Display rails, sometimes called "map rails," are used at heads of visual display units and as dividers between panels. Coordinate with information indicated on Drawings. Revise "Display Rail" Paragraph below to suit Project.

Display rails used separately from a visual display board assembly are included in "Display Rails" Article.

* + - * 1. Display Rail: Manufacturer's standard, extruded-aluminum display rail with [**plastic-impregnated-cork**] insert, end stops, [**and continuous paper holder,**]designed to hold accessories.

Size: [**1 inch**] [**2 inches**] [**3 inches**] high by [**full length of visual display unit**] [**length indicated on Drawings**].

Map Hooks: Two map hooks for every 48 inches of display rail or fraction thereof.

Map Hooks and Clips: Two map hooks with flexible metal clips for every 48 inches of display rail or fraction thereof.

Flag Holder: One for each room.

Retain "Tackboard Insert Color" Subparagraph below if retaining plastic-impregnated-cork display rail in "Display Rail" Paragraph above.

Tackboard Insert Color: [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors**].

Aluminum Color: Match finish of visual display assembly trim.

Retain "Paper Holder Display Rail" Paragraph below if display rail has only the paper holder feature.

* + - * 1. Paper Holder Display Rail: Extruded aluminum; designed to hold paper by clamping action.
				2. Special-Purpose Graphics: Fuse or paint [**semivisible writing guidelines**] [**penmanship lines**] [**music staff lines**] [**grid, 1 inch square**] [**rectangular graph coordinates**] [**polar graph coordinates**] [**horizontal lines, 2 inches o.c.**] [**USA map**] [**world map**] [**soccer field**] [**football field**] [**basketball court**] <**Insert description of special-purpose graphics**> graphic onto surface of visual display unit[**, in locations indicated**].
			1. FLOOR-TO-CEILING VISUAL DISPLAY ASSEMBLIES

Floor-to-ceiling visual display assemblies, sometimes called "presentation walls," are field assembled and consist of multiple panels that cover an extensive amount of wall surface. Assemblies can be installed in configurations that do not fully extend from floor to ceiling; revise terminology if using this method. This article does not include trim; however, it can be revised to include trim similar to that used on visual display board assemblies.

* + - * 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

AJW Architectural Products.

Claridge Products and Equipment, Inc.

K-Pro Specialty Products.

Approved equivalent.

Retain one of or both "Floor-to-Ceiling Markerboard Panel Assemblies" and "Floor-to-Ceiling Tackboard Panel Assemblies" Paragraphs below for visual display panels laminated to a core to be applied to a wall. Multiple cores are available for each type of facing; coordinate with "Markerboard Panels" and "Tackboard Panels" articles.

* + - * 1. Floor-to-Ceiling Markerboard Panel Assemblies: Consisting of markerboard panels with [**porcelain-enamel**] [**high-pressure markerboard laminate**] facing on core indicated; fabricated for floor-to-ceiling assemblies.

Color: [**White**] [**Beige**] [**Tan**] [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors**].

* + - * 1. Floor-to-Ceiling Tackboard Panel Assemblies: Consisting of tackboard panels with [**natural-cork**] [**plastic-impregnated-cork**] [**vinyl-fabric**] [**polyester-fabric**] facing on core indicated; fabricated for floor-to-ceiling assemblies.

Edge Treatments:

Panel-Joint Edges: [**Wrapped with fabric**] [**Concealed by fabric-covered trim**].

Top-of-Wall Edges: [**Wrapped with fabric**] [**Concealed by fabric-covered trim**].

Bottom-of-Wall Edges: [**Wrapped with fabric**] [**Concealed by fabric-covered trim**].

Corners: [**Wrapped with fabric**] [**Concealed by fabric-covered trim**].

Retain "Color" Subparagraph below for vinyl- and polyester-fabric-faced panels or for plastic-impregnated-cork panels.

Color: [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors**].

* + - * 1. Width: [**Full width of wall**] [**As indicated on Drawings**].
				2. Height: [**Full height of wall**] [**Full height of wall above base**] [**As indicated on Drawings**].

Insert description of trim if floor-to-ceiling panels have perimeter trim. Add chalktray and other accessories if required.

Retain "Joint Accessories" Paragraph below for rigid floor-to-ceiling visual display panels.

* + - * 1. Joint Accessories: Manufacturer's standard, [**exposed color-matched trim**] [**fabric-covered trim**] [**concealed aluminum or steel spline**] at butt joints.
			1. RAIL SUPPORT SYSTEM FOR VISUAL DISPLAY BOARD ASSEMBLIES

Rail support systems use a horizontal rail from which various visual display board assemblies can be suspended using special hanger clips that engage the rails. Retain this article with "Visual Display Board Assembly" Article and coordinate lists of manufacturers, if needed.

* + - * 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Egan Visual Inc.

KOH Design, Inc.

Approved equivalent.

Revise "Support Rails" Paragraph below if two-level track is required.

* + - * 1. Support Rails: Horizontal, wall-mounted, extruded-aluminum rails designed to receive hanger clip and to support visual display boards[**; and capable of gripping and suspending paper directly from rail**].

Finish: [**Clear anodic**] [**Color anodic**] [**Manufacturer's standard baked enamel or powder coat**].

Retain one color from options in "Color" Subparagraph below with finish option retained in "Finish" Subparagraph above. First four options below are for color anodic finish and may vary in color range and availability among manufacturers. Last three options below are for color anodic, baked-enamel, or powder-coat finish.

Color and Gloss: [**Light bronze**] [**Medium bronze**] [**Dark bronze**] [**Black**] [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from manufacturer's full range**].

* + - * 1. Hanger Clips: Extruded aluminum with finish to match rails; designed to support independent visual display board assemblies by engaging support rail and top trim of board.

Honeycomb core in "Visual Display Board Assemblies" Paragraph below is preferred for rail-supported visual display units because of its light weight. Thickness varies among manufacturers.

* + - * 1. Visual Display Board Assemblies: Fabricated from not less than 3/8-inch- thick, kraft-paper honeycomb core; designed to be rigid and to resist warpage, and with aluminum trim designed to engage hanger clips.

Insert text to indicate type, size, and quantity of visual display panels if not indicated on Drawings.

* + - 1. MODULAR SUPPORT SYSTEM FOR VISUAL DISPLAY BOARD ASSEMBLIES

Modular support systems use slotted channels mounted vertically, similar to standards used for shelving systems, to which visual display units can be mounted.

* + - * 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

ADP Lemco.

Claridge Products and Equipment, Inc.

Approved equivalent.

* + - * 1. Standards: 72-inch- long, extruded-aluminum slotted standards designed for supporting visual display boards on panel clips. Space slots at not less than 1-3/4 4 inches o.c.

Finish: [**Clear anodic**] [**Color anodic**] [**Manufacturer's standard baked enamel or powder coat**].

Retain one color from options in "Color" Subparagraph below with finish option retained in "Finish" Subparagraph above. First four options below are for color anodic finish and may vary in color range and availability among manufacturers. Last three options below are for color anodic, baked-enamel, or powder-coat finish.

Color and Gloss: [**Light bronze**] [**Medium bronze**] [**Dark bronze**] [**Black**] [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from manufacturer's full range**].

* + - * 1. Panel Clips: Extruded aluminum or steel with finish to match standards.
			1. SLIDING VISUAL DISPLAY UNITS

Horizontal-sliding visual display units are also available as component parts without tubular frames, for mounting in field-fabricated wall recesses. Revise "Horizontal-Sliding Visual Display Units" Paragraph below to suit Project.

* + - * 1. Horizontal-Sliding Visual Display Units: Factory-fabricated units consisting of extruded-aluminum tubular frame, fixed rear visual display panel, aluminum-framed horizontal-sliding visual display panels, and extruded-aluminum fascia that conceals overhead sliding track; designed for recessed mounting. Provide panels that operate smoothly without vibration or chatter.

Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

AARCO Products, Inc.

ADP Lemco.

K-Pro Specialty Products.

Marsh Industries, Inc.

Approved equivalent.

Revise "Two-Track Units," "Three-Track Units," and "Four-Track Units" Subparagraphs below for custom requirements to suit Project. Other configurations are available.

Two-Track Units: Fabricate unit with fixed rear panel covering entire rear surface. Provide two sliding panels, each equal to not less than one-half of overall length of unit.

Three-Track Units: Fabricate unit with fixed rear panel covering entire rear surface. Provide three sliding panels, each equal to not less than [**one-third**] [**one-half**] of overall length of unit.

Four-Track Units: Fabricate unit with fixed rear panel centered in and covering not less than one-half of rear surface, and fixed front panel on each side of unit equal to not less than one-quarter of overall length of unit. Provide four sliding panels, each equal to not less than one-quarter of overall length of unit.

Retain "Swinging Doors" Subparagraph below with "Four-Track Units" Subparagraph above; delete if not required.

Swinging Doors: Fabricated from same construction as sliding panels and supported on full-height continuous hinges. Provide visual display panel on both faces of each door.

Hardware: Manufacturer's standard, extruded-aluminum overhead track and channel-shaped bottom guides; with two nylon ball-bearing carriers and two nylon rollers for each sliding panel.

Overall Width: [**As indicated on Drawings**] <**Insert dimension**>.

Overall Height: [**As indicated on Drawings**] <**Insert dimension**>.

* + - * 1. Vertical-Sliding Visual Display Units: Factory-fabricated units consisting of extruded-aluminum tubular frame, fixed rear visual display panel, and aluminum-framed vertical-sliding panels; [**motor operated;**]designed for recessed mounting. Provide panels that operate smoothly without vibration or chatter.

Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

AARCO Products, Inc.

ADP Lemco.

Claridge Products and Equipment, Inc.

K-Pro Specialty Products.

Marsh Industries, Inc.

Approved equivalent.

Various options for kick panels are available; verify with manufacturers.

Type: Tubular frame on [**four sides**] [**top and two sides, with sides extending to floor; with kick panel to conceal sliding panels**]. Design unit to support panels independently of wall.

Revise "Two-Track Units," "Three-Track Units," and "Four-Track Units" Subparagraphs below for custom requirements to suit Project. Other configurations are available.

Two-Track Units: Fabricate unit with fixed rear panel covering entire rear surface. Provide two sliding panels, each equal to not less than one-half of overall height of unit.

Three-Track Units: Fabricate unit with fixed rear panel covering entire rear surface. Provide three sliding panels, each equal to not less than one-half of overall height of unit.

Four-Track Units: Fabricate unit with fixed rear panel centered in and covering not less than one-half of rear surface. Provide four sliding panels, each equal to not less than one-half of overall height of unit.

Hardware: Manufacturer's standard, neoprene ball-bearing end rollers, four on each side of each sliding panel. Counterbalance each sliding panel with counterweights supported by steel aircraft cable over ball-bearing sheaves; with removable cover plate for access to counterweights. Provide rubber bumpers at top and bottom for each sliding panel.

Motorized Operation: Provide not less than one motor with gearhead reducers for each sliding panel, mounted above visual display unit and connected to sliding panels with steel aircraft cable. Provide removable cover plate for access to motor. Equip motors with limit switches to automatically stop motor at each end of travel.

Electric Motors: UL approved or recognized, totally enclosed, complying with NEMA MG 1, with thermal-overload protection; 1/15 hp, single phase, [**110**] [**220**] V, 60 Hz.

Wireless remote controls are an optional feature from some manufacturers.

Control Station: Three-position, [**maintained**] [**momentary**] contact, switch-operated control station with open, close, and off functions; with NEMA ICS 6, Type 1 enclosure. Provide one control station(s) for each sliding panel unit.

Retain "Key Switch" Subparagraph below with one of first two options in "Control Station" Subparagraph above if additional security is required. Wireless remote control is also available.

Key Switch: Provide supplementary key switch for each control station. Furnish two keys for each control station, keyed alike.

Overall Width: [**As indicated on Drawings**] <**Insert dimension**>.

Overall Height: [**As indicated on Drawings**] <**Insert dimension**>.

Retain "Panels and Accessories" Paragraph below for both vertical-sliding and horizontal-sliding visual display units.

* + - * 1. Panels and Accessories:

Retain one or more of "Sliding Chalkboard Panel," "Sliding Markerboard Panel," and "Sliding Tackboard Panel" Subparagraphs below. If more than one type of sliding panel is required, indicate location of each type on Drawings.

Honeycomb core in "Sliding Chalkboard Panel" and "Sliding Markerboard Panel" Subparagraphs below is preferred for sliding units because of its light weight. Thickness varies from that indicated to as much as 1-1/8 inches.

Sliding Chalkboard Panel: [**Porcelain-enamel**] [**High-pressure chalkboard laminate**]-faced chalkboard panel on kraft-paper honeycomb core designed to be rigid and to resist warpage, not less than 3/8 inch thick.

Color: [**Green**] [**Blue**] [**Brown**] [**Black**] [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors**].

Sliding Markerboard Panel: [**Porcelain-enamel**] [**High-pressure markerboard laminate**]-faced markerboard panel on kraft-paper honeycomb core designed to be rigid and to resist warpage, not less than 3/8 inch thick.

Color: [**White**] [**Beige**] [**Tan**] [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors**].

Sliding Tackboard Panel: [**Natural-cork**] [**Plastic-impregnated-cork**] [**Vinyl-fabric-faced**] [**Polyester-fabric-faced**] tackboard panel on kraft-paper honeycomb core designed to be rigid and to resist warpage, not less than 3/8 inch thick.

Retain "Color and Pattern" Subparagraph below for vinyl- and polyester-fabric-faced panels or for plastic-impregnated-cork panels.

Color and Pattern: [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors**].

Retain "Fixed Rear Chalkboard Panel," "Fixed Rear Markerboard Panel," or "Fixed Rear Tackboard Panel" Subparagraph below. Coordinate with "Chalkboard Panels," "Markerboard Panels," and "Tackboard Panels" articles for more detail. Glass-beaded projection screens are available from some manufacturers.

Fixed Rear Chalkboard Panel: [**Porcelain-enamel**] [**High-pressure chalkboard laminate**]-faced chalkboard panel on core indicated.

Color: [**Green**] [**Blue**] [**Brown**] [**Black**] [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors**].

Fixed Rear Markerboard Panel: [**Porcelain-enamel**] [**High-pressure markerboard laminate**]-faced markerboard panel on core indicated.

Color: [**White**] [**Beige**] [**Tan**] [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors**].

Fixed Rear Tackboard Panel: [**Natural-cork**] [**Plastic-impregnated-cork**] [**Vinyl-fabric-faced**] [**Polyester-fabric-faced**] tackboard panel on core indicated.

Retain "Color and Pattern" Subparagraph below for vinyl- and polyester-fabric-faced panels or for plastic-impregnated-cork panels.

Color and Pattern: [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors**].

"Kick Panel" Subparagraph below is for vertical-sliding units only; kick panels are an option from some manufacturers. They cover the space between the vertical rails at the lower portion of the unit.

Kick Panel: Manufacturer's standard [**fabric-covered cork**] [**low-pressure laminate**].

Color and Pattern: [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors**].

Accessories: [**Chalktray**] [**locks**] [**and**] [**easel pad clamps**].

Display Rail: Manufacturer's standard, extruded-aluminum display rail with [**plastic-impregnated-cork**] insert, end stops, [**and continuous paper holder,**]designed to hold accessories.

Size: [**1 inch**] [**2 inches**] [**3 inches**] high by full length of visual display unit.

Map Hooks: Two map hooks for every 48 inches of display rail or fraction thereof.

Flag Holder: One for each sliding visual display unit.

Retain "Tackboard Insert Color" Subparagraph below if retaining plastic-impregnated-cork display rail option in "Display Rail" Subparagraph above.

Tackboard Insert Color: [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors**].

Manufacturers' standard finish in "Aluminum Trim" Subparagraph below is typically clear anodic finish. Verify availability of other finishes with manufacturers and add color if required.

Aluminum Trim: [**Factory applied**] [**Field applied**]; in [**manufacturer's standard**] size and profile; with clear anodic finish.

* + - 1. VISUAL DISPLAY CONFERENCE UNITS

Wall-mounted conference units in this article are often used in conference rooms and executive offices. Consult manufacturers for available finishes and options.

* + - * 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

AARCO Products, Inc.

Claridge Products and Equipment, Inc.

Egan Visual Inc.

K-Pro Specialty Products.

Marsh Industries, Inc.

Approved equivalent.

If more than one type of visual display conference unit is required, copy "Visual Display Conference Units" Paragraph below, insert a designation in the text, and indicate locations on Drawings.

* + - * 1. Visual Display Conference Units: Factory-fabricated units consisting of hinged-door wood cabinet with perimeter face frame, sides, and back; not less than 3-inch interior depth and designed for surface wall mounting. Fabricate inside of cabinet and cabinet doors with fixed visual display units.

Retain "Wood Cabinets" or "Plastic-Laminate Cabinets" Subparagraph below.

Wood Cabinets: Fabricated from solid wood with integral, solid-wood marker tray. Fabricate hinged door panels with solid-wood frame and wood-veneer exterior surface.

Species and Finish: [**Red oak**] [**Walnut**] [**Mahogany**] with [**natural lacquered**] [**oiled**] [**stained**] finish.

Plastic-Laminate Cabinets: Cabinet and hinged door panels fabricated from manufacturer's standard wood panels finished with high-pressure decorative laminate; with integral marker tray.

Color: [**Match Director’s Representative's sample**] [**As indicated by referencing manufacturer's designations**] [**As selected by Director’s Representative from full range of industry colors**].

Cabinet Corners: [**Square**] [**Rounded**].

Hardware: Manufacturer's standard, full-height continuous hinges[**, wire door pulls,**] and door bumpers.

Revise "Fixed Rear Panel" Subparagraph below if a specific markerboard panel type, rather than manufacturer's standard, is required. Confirm availability. Revise text if including glass markerboard rear panels, which are available from some manufacturers.

Fixed Rear Panel: Manufacturer's standard [**porcelain-enamel**] [**high-pressure markerboard laminate**] [**glass**] markerboard panel.

Color: [**White**] [**Beige**] [**Tan**] [**Match Director’s Representative's sample**] [**As indicated by referencing manufacturer's designations**] [**As selected by Director’s Representative from full range of industry colors**].

Retain one of two "Inside Surface of Doors" Subparagraphs below. Revise text if specific type of tackboard panel is required, or use tackboard panel designation to refer to "Tackboard Panels" Article.

Inside Surface of Doors: Same as fixed rear panel.

Inside Surface of Doors: Tackboard panel consisting of [**natural-cork**] [**plastic-impregnated-cork**] [**vinyl-fabric**] [**polyester-fabric**] facing on manufacturer's standard core.

Retain "Color" Subparagraph below if retaining plastic-impregnated-cork, vinyl-fabric, or polyester-fabric options in last "Inside Surface of Doors" Subparagraph above.

Color: [**Match Director’s Representative's sample**] [**As indicated by referencing manufacturer's designations**] [**As selected by Director’s Representative from full range of industry colors**].

Retain "Projection Screen" and "Fluorescent Light" Subparagraphs below if required. Projection screen and fluorescent light are not available on same unit because of space limitations.

Projection Screen: Manufacturer's standard, pull-down, matte, white projection screen, not less than 8 inches smaller in each direction than overall cabinet size, and mounted above rear visual display panel.

Fluorescent Light: Manufacturer's standard, not less than 24 inches long, and mounted above rear visual display panel.

Width: [**48 inches**] [**As indicated on Drawings**].

Height: [**36 inches**] [**48 inches**] [**72 inches**] [**As indicated on Drawings**].

Accessories: [**Cylinder lock**] [**and**] [**flip-chart pad clamp**].

* + - 1. GLASS MARKERBOARDS
				1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

AARCO Products, Inc.

ADP Lemco.

Claridge Products and Equipment, Inc.

Egan Visual Inc.

Approved equivalent.

Low-iron glass, clearer and less green than standard glass, is available from some manufacturers for tempered markerboards and tempered-laminated markerboards. Some manufacturers offer products manufactured from proprietary ultra-thin glass.

* + - * 1. Glass Markerboards: Fabricated of [**6-mm tempered**] [**or**] [**6-mm tempered-laminated**] [**low-iron**] [**ultra-thin**] glass[**with steel backing for use with magnets**].

Retain "Edge Treatment" or "Frame" Subparagraph below.

Edge Treatment: Smooth polished edge with [**rounded**] [**eased**] corners.

Frame: Aluminum trim in profile indicated.

Surface: [**Glossy**] [**Matte**].

Color: [**White**] [**Gray**] [**Translucent**] [**Clear**] [**Black**] [**Red**] [**Blue**].

Retain one of three "Mounting" Paragraphs below. A variety of mounting methods are available, with various thicknesses; consult manufacturers.

* + - * 1. Mounting: Round, stainless steel standoffs, holding glass approximately 1 inch from wall surface; mounted [**through holes in**] [**in notches in standoffs at top and bottom edges of**] markerboard.
				2. Mounting: Concealed, Z-shaped brackets.
				3. Mounting: Manufacturer's standard adhesive or adhesive-foam tape mounting.

Revise text in "Graphics" Paragraph below if using a manufacturer's standard product.

* + - * 1. Graphics: Provide screen-printed graphics as indicated.
				2. Marker Tray: [**Glass**] [**Aluminum**], attached with [**stainless steel clips**] [**magnet**].

Custom sizes and shapes are available; consult manufacturers for more information.

* + - * 1. Size: [**18 by 24**] [**24 by 36**] [**36 by 48**] [**48 by 96**] inches.
			1. DISPLAY RAILS

Retain this article for standalone visual display rails, sometimes called "map rails," which are not part of a visual display unit assembly.

* + - * 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

AARCO Products, Inc.

ADP Lemco.

Claridge Products and Equipment, Inc.

K-Pro Specialty Products.

Marsh Industries, Inc.

Approved equivalent.

Retain "Aluminum Display Rail," "Paper Holder Display Rail," or "Wood Display Rail" Paragraph below. Tackable units that are not in an aluminum extrusion are also available; revise "Aluminum Display Rail" Paragraph if including them.

* + - * 1. Aluminum Display Rail: Manufacturer's standard, extruded-aluminum display rail with plastic-impregnated-cork tackable insert, [**and continuous paper holder,**]designed to hold accessories.

Display rail in "Paper Holder Display Rail" Paragraph below has only the paper holder feature.

* + - * 1. Paper Holder Display Rail: Extruded aluminum; designed to hold paper by clamping action.

Manufacturers' standard finish is typically clear anodic finish. Verify, with manufacturers, availability of other finishes and add color if required.

Aluminum Finish: Clear anodic finish.

* + - * 1. Wood Display Rail: Manufacturer's standard wood display rail with plastic-impregnated-cork insert.

Finish: Natural oak.

Tan and gray are common insert colors. Verify availability of other colors.

* + - * 1. Tackable Insert Color: [**Tan**] [**Gray**] [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors**].
				2. Size: [**1 inch**] [**2 inches**] [**3 inches**] high by length indicated on Drawings.
				3. End Stops: [**Aluminum**] [**Not required**].
				4. Accessories:

Revise quantities for each item in "(Metal) (Plastic) Map Hooks," "Roller Brackets," and "Flag Holders" Subparagraphs below.

[**Metal**] [**Plastic**] Map Hooks: Include two map hooks per room 20 feet of installed display rail.

Roller Brackets: Include two roller brackets per room .

Flag Holders: Include one flag holder per room .

* + - 1. CHALKBOARD PANELS

A chalkboard panel consists of a writing surface laminated to a backing, used as a component in another visual display unit. Porcelain enamel is the most common chalkboard facing, offered by several manufacturers. High-pressure chalkboard laminate, melamine, and painted facings are also offered by a limited number of manufacturers. See the Evaluations.

If multiple chalkboard panel types are required, copy "Porcelain-Enamel Chalkboard Panels" Paragraph below and reference each type on Drawings, in schedules, or in applicable Part 2 articles.

* + - * 1. Porcelain-Enamel Chalkboard Panels: High-pressure factory-laminated chalkboard panels of balanced three-ply construction, consisting of moisture-barrier backing, core material, and porcelain-enamel face sheet with matte finish. Laminate panels under heat and pressure with manufacturer's standard, flexible waterproof adhesive.

Several manufacturers offer a choice of porcelain-enamel face sheet thicknesses. Retain "Face Sheet Thickness" Subparagraph below if a particular thickness is desired; confirm availability from manufacturers. Delete Subparagraph if manufacturers' standard thickness is acceptable.

Face Sheet Thickness: [**0.021 inch**] [**0.013 inch**] uncoated base metal thickness.

Retain "Manufacturer's Standard Core," "Hardboard Core," "Particleboard Core," "Fiberboard Core," or "MDF Core" Subparagraph below. Verify availability and thickness with manufacturers. Particleboard and medium-density fiberboard (MDF) are the most dimensionally stable core materials listed.

Manufacturer's Standard Core: Minimum 1/4 inch thick, with manufacturer's standard moisture-barrier backing.

Hardboard Core: 1/4 inch thick; with [**0.005-inch- thick, aluminum foil**] [**0.015-inch (28 ga)- thick, aluminum sheet**] [**0.0129-inch (30 ga)- thick, galvanized-steel sheet**] backing.

Particleboard Core: 3/8 inch thick; with [**0.005-inch- thick, aluminum foil**] [**0.015-inch (28 ga)- thick, aluminum sheet**] [**0.0129-inch (30 ga)- thick, galvanized-steel sheet**] backing.

Fiberboard Core: [**3/8 inch**] [**1/2 inch**] thick; with [**0.001-inch- thick, aluminum foil**] [**0.015-inch (28 ga)- thick, aluminum sheet**] [**0.0129-inch (30 ga)-- thick, galvanized-steel sheet**] backing.

MDF Core: 7/16 inch thick; with manufacturer's standard moisture-barrier backing.

Laminating Adhesive: Manufacturer's standard moisture-resistant thermoplastic type.

* + - * 1. High-Pressure Chalkboard Laminate Panels: Factory-laminated chalkboard panels of balanced three-ply construction, consisting of backing, fiberboard core material, and high-pressure chalkboard laminate writing surface.
				2. Melamine Chalkboard Panels: Fabricated from 1/4-inch- thick, sealed and primed hardboard core permanently bonded with thermally fused, melamine-impregnated decorative paper writing surface complying.
				3. Painted-Finish Chalkboard Panels: Fabricated from 1/4-inch- thick, treated, tempered hardboard core permanently surfaced with manufacturer's standard, heat-cured organic coating formulated for chalk-receptive matte finish.

If needed, insert requirements for carborundum-slating surface available from Ghent.

* + - 1. MARKERBOARD PANELS

A markerboard panel consists of a writing surface laminated to a backing, used as a component in another visual display unit. Porcelain enamel is the most common markerboard facing, offered by several manufacturers. Melamine and high-pressure markerboard laminate are also offered by a limited number of manufacturers. See the Evaluations.

If multiple markerboard panel types are required, copy "Porcelain-Enamel Markerboard Panels" Paragraph below and reference each type on Drawings, in schedules, or in applicable Part 2 articles.

* + - * 1. Porcelain-Enamel Markerboard Panels: Balanced, high-pressure, factory-laminated markerboard assembly of three-ply construction, consisting of moisture-barrier backing, core material, and porcelain-enamel face sheet with [**high**] [**low**]-gloss finish. Laminate panels under heat and pressure with manufacturer's standard, flexible waterproof adhesive.

Several manufacturers offer a choice of face sheet thickness. Retain "Face Sheet Thickness" Subparagraph below if a particular thickness is desired; confirm availability from manufacturers. Delete Subparagraph if manufacturers' standard thickness is acceptable.

Face Sheet Thickness: 0.021 inch (25 ga) uncoated base metal thickness.

Retain "Manufacturer's Standard Core," "Hardboard Core," "Particleboard Core," "Fiberboard Core," or "MDF Core" Subparagraph below. Verify availability and thickness with manufacturers. Particleboard and MDF are the most dimensionally stable core materials listed.

Manufacturer's Standard Core: Minimum 1/4 inch thick, with manufacturer's standard moisture-barrier backing.

Hardboard Core: 1/4 inch thick; with [**0.005-inch- thick, aluminum foil**] [**0.015-inch (28 ga)- thick, aluminum sheet**] [**0.013-inch (30 ga)- thick, galvanized-steel sheet**] backing.

Particleboard Core: [**3/8 inch**] [**1/2 inch**] thick; with [**0.005-inch- thick, aluminum foil**] [**0.015-inch (28 ga)- thick, aluminum sheet**] [**0.013-inch (30 ga)- thick, galvanized-steel sheet**] backing.

Fiberboard Core: [**3/8 inch**] [**1/2 inch**] thick; with [**0.001-inch- thick, aluminum foil**] [**0.015-inch (28 ga)- thick, aluminum sheet**] [**0.013-inch (30) - thick, galvanized-steel sheet**] backing.

MDF Core: 7/16 inch thick; with manufacturer's standard moisture-barrier backing.

Laminating Adhesive: Manufacturer's standard moisture-resistant thermoplastic type.

* + - * 1. High-Pressure Markerboard Laminate Panels: Factory-laminated markerboard panel of three-ply construction, consisting of backing, fiberboard core material, and high-pressure markerboard laminate writing surface.
				2. Melamine Markerboard Panels: Fabricated from 1/4-inch- thick, sealed and primed hardboard panels permanently bonded with thermally fused, melamine-impregnated decorative paper writing surface.
			1. TACKBOARD PANELS

A tackboard panel consists of a tackable surface, often laminated to a backing, used as a component in another visual display unit. Retain types of tackboard assemblies below to suit Project. Tackboard panels consist of a facing and a core, with a total thickness of approximately 3/8 to 1/2 inch. Several manufacturers also offer tackboard assemblies with a 7/16-inch-thick, fiberboard backing. Also available are hook-and-loop fabric-faced panels and recycled rubber-faced panels. Verify availability with manufacturers. See the Evaluations.

If multiple tackboard panel types are required, copy "Tackboard Panels" Paragraph below and reference each type on Drawings, in schedules, or in applicable Part 2 articles.

* + - * 1. Tackboard Panels:

Retain one of three "Facing" Subparagraphs below. Facings must be applied to cores that accept tacks; fiberboard, or cork over hardboard or particleboard are typical. 1/4-inch-thick, natural or fabric-faced cork can be applied directly to hardboard or particleboard cores.

Facing: [**1/16-inch- thick,**] [**1/8-inch- thick,**] [**1/4-inch- thick,**] [**natural cork**] [**plastic-impregnated cork**].

Facing: [**Vinyl**] [**Polyester**] fabric.

Facing: [**Vinyl**] [**Polyester**] fabric factory laminated to [**1/16-inch-**] [**1/8-inch-**] [**1/4-inch-**] thick, cork sheet.

Facing: Recycled rubber, 0.44 inch thick; with [**tan**] [**red**] [**green**] [**grey**] [**blue**] color flecks.

Retain one of three "Core" Subparagraphs below.

Core: Manufacturer's standard.

Core: [**3/8-inch-**] [**7/16-inch-**] thick fiberboard.

Hardboard and particleboard substrate below is generally used only in combination with 1/4-inch-thick, natural or fabric-faced cork in order to accept tacks.

Core: 1/4-inch- thick [**hardboard**] [**or**] [**particleboard**].

* + - 1. MATERIALS

Retain materials from this article that are used in the manufacture of visual display units. Coordinate with materials retained in other Part 2 articles.

Porcelain-enamel face sheets are used in the manufacture of chalkboard panels and markerboard panels that are incorporated into various visual display unit products. Each visual display unit manufacturer purchases its porcelain-enamel face sheets from one of a limited number of face sheet manufacturers. If a specification using a proprietary porcelain-enamel face sheet is desired, research visual display unit manufacturers using that sheet, and restrict list to those manufacturers in applicable Part 2 articles.

* + - * 1. Porcelain-Enamel Face Sheet: PEI-1002, with face sheet manufacturer's standard two- or three-coat process.
				2. High-Pressure Decorative Laminate: NEMA LD 3.
				3. High-Pressure Markerboard Laminate: Complying with physical testing requirements of NEMA LD 3.
				4. High-Pressure Chalkboard Laminate: Complying with physical testing requirements of NEMA LD 3.

Verify availability of product components tested for surface-burning characteristics in "Natural-Cork Sheet," "Plastic-Impregnated-Cork Sheet," "Vinyl Fabric," and "Polyester Fabric" Paragraphs below. If testing of entire assemblies is required by authorities having jurisdiction, add requirement to the Section Text.

Natural-cork sheet is also available with large cork particles.

* + - * 1. Natural-Cork Sheet: Seamless, single-layer, compressed fine-grain cork sheet; bulletin board quality; face sanded for natural finish; with surface-burning characteristics indicated.
				2. Plastic-Impregnated-Cork Sheet: Seamless, homogeneous, self-sealing sheet consisting of granulated cork, linseed oil, resin binders, and dry pigments that are mixed and calendared onto fabric backing; with washable vinyl finish and integral color throughout; with surface-burning characteristics indicated.
				3. Vinyl Fabric: Mildew resistant, washable, complying with ASTM F793, Type II, [**burlap weave**] <**Insert texture or pattern**>; weighing not less than 13 oz./sq. yd.; with surface-burning characteristics indicated.
				4. Polyester Fabric: Nondirectional weave, 100 percent polyester; weighing not less than 15 oz./sq.yd.; with surface-burning characteristics indicated.

Revise "Hardboard," "Particleboard," "MDF," or "Fiberboard" Paragraph below if product components tested for surface-burning characteristics are required to suit Project. Verify availability with manufacturers.

* + - * 1. Hardboard: ANSI A135.4, tempered.
				2. Particleboard: ANSI A208.1, Grade M-1.
				3. MDF: ANSI A208.2, Grade 130.
				4. Fiberboard: ASTM C208 cellulosic fiber insulating board.
				5. Clear Tempered Glass: ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality Q3, with exposed edges seamed before tempering.
				6. Extruded Aluminum: ASTM B221, Alloy 6063.
				7. Adhesives for Field Application: Mildew-resistant, nonstaining adhesive for use with specific type of panels, sheets, or assemblies; and for substrate application; as recommended in writing by visual display unit manufacturer.

Delete "Primer/Sealer" Paragraph below if primer/sealer is specified in another Section. If not, retain Paragraph for use with visual display board assemblies and floor-to-ceiling visual display assemblies that are adhered to wall surfaces with adhesive, or revise Section Text to include primer/sealer here.

* + - * 1. Primer/Sealer: Mildew-resistant primer/sealer as recommended in writing by visual display unit manufacturer for intended substrate.
			1. GENERAL FINISH REQUIREMENTS
				1. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
				2. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
				3. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
			2. ALUMINUM FINISHES

Retain finishes in this article to suit Project. If retaining more than one, indicate location of each on Drawings or by inserts.

* + - * 1. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.
				2. Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.

"Baked-Enamel or Powder-Coat Finish" Paragraph below references AAMA standard for pigmented organic coating on extrusions and panels.

* + - * 1. Baked-Enamel or Powder-Coat Finish: AAMA 2603, except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
1. EXECUTION
	* + 1. EXAMINATION
				1. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.
				2. Examine roughing-in for electrical power systems to verify actual locations of connections before installation of motorized, sliding visual display units.
				3. Examine walls and partitions for proper preparation and backing for visual display units.
				4. Examine walls and partitions for suitable framing depth where sliding visual display units will be installed.
				5. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. PREPARATION
				1. Comply with manufacturer's written instructions for surface preparation.
				2. Clean substrates of substances, such as dirt, mold, and mildew, that could impair the performance of and affect the smooth, finished surfaces of visual display boards.
				3. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, projections, depressions, and substances that will impair bond between visual display units and wall surfaces.

Retain first Paragraph below if priming of surfaces to receive direct-applied visual display units, including floor-to-ceiling assemblies, is not performed in another Section.

* + - * 1. Prime wall surfaces indicated to receive [**visual display units**] [**direct-applied, floor-to-ceiling visual display assemblies**] and as recommended in writing by primer/sealer manufacturer and visual display unit manufacturer.
				2. Prepare recesses for sliding visual display units as required by type and size of unit.
			1. INSTALLATION
				1. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
				2. Field-Assembled Visual Display Board Assemblies: Coordinate field-assembled units with grounds, trim, and accessories indicated. Join parts with a neat, precision fit.

If locations of joints are critical, indicate them on Drawings and delete first Subparagraph below.

Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, [**balanced around center of board, as acceptable to Director’s Representative**] [**as indicated on approved Shop Drawings**].

Retain Subparagraph below if required.

Where size of visual display board assemblies or other conditions require support in addition to normal trim, provide structural supports or modify trim as indicated or as selected by Director’s Representative from manufacturer's standard structural support accessories to suit conditions indicated.

Retain one of two "Factory-Fabricated Visual Display Board Assemblies" Paragraphs below or revise to suit product and Project.

* + - * 1. Factory-Fabricated Visual Display Board Assemblies: Adhere to wall surfaces with egg-size adhesive gobs at 16 inches o.c., horizontally and vertically.
				2. Factory-Fabricated Visual Display Board Assemblies: Attach concealed clips, hangers, and grounds to wall surfaces and to visual display board assemblies with fasteners at not more than 16 inches o.c. Secure tops and bottoms of boards to walls.

Retain "Visual Display Board Assembly Mounting Heights" Paragraph below if mounting heights are not indicated on Drawings.

* + - * 1. Visual Display Board Assembly Mounting Heights: Install visual display units at mounting heights indicated on Drawings, or if not indicated, at heights indicated below.

Verify mounting heights required; mounting heights in "Mounting Height( for Grades K through 3)," "Mounting Height( for Grades 4 through 6)," and "Mounting Height( for Grades 7 and higher)" Subparagraphs below are common.

Mounting Height for Grades K through 3: 24 inches above finished floor to top of chalktray.

Mounting Height for Grades 4 through 6: 28 inches above finished floor to top of chalktray.

Mounting Height for Grades 7 and Higher: 36 inches above finished floor to top of chalktray.

* + - * 1. Display Rails: Install rails at mounting heights indicated on Drawings, or if not indicated, at height indicated below. Attach to wall surface with fasteners at not more than 16 inches o.c.

Mounting Height: [**48**] [**60**] [**72**] inches above finished floor to top of rail.

* + - * 1. Floor-to-Ceiling Markerboard Panels: Attach panels to wall surface with egg-size adhesive gobs at 16 inches o.c., horizontally and vertically.

Retain one of two Subparagraphs below.

Join adjacent panels with concealed steel splines for smooth alignment.

Join adjacent panels with exposed, H-shaped aluminum trim painted to match wall panel.

* + - * 1. Floor-to-Ceiling Tackboard Panels: Attach panels to wall surface with egg-size adhesive gobs at 16 inches o.c., horizontally and vertically.

Install wrapped-edge panels with butt joints between adjacent wall panels.

Join adjacent panels with exposed, H-shaped aluminum trim covered with same fabric as wall panels.

* + - * 1. Rail Support System: Install horizontal support rail at mounting heights indicated on Drawings, or if not indicated, at height indicated below. Attach to wall with fasteners at 12 inches o.c.

Mounting Height: 72 inches above finished floor to top of rail.

Hang visual display units on rail support system.

* + - * 1. Modular Support System: Install adjustable standards at mounting heights indicated on Drawings, or if not indicated, at height indicated below. Install standards at 48 inches o.c., vertically aligned and plumb, and attached to wall with fasteners at 12 inches o.c.

Mounting Height: 12 inches above finished floor to bottom of standard.

Install single-slotted standard at each end of each run of standards and double-slotted standards at intermediate locations.

Provide locking screw at top corner of visual display board at each standard.

Hang visual display units on modular support system.

* + - * 1. Sliding Visual Display Units: Install units at mounting heights indicated. Attach to wall framing with fasteners at not more than 16 inches o.c.

Adjust panels to operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

* + - * 1. Visual Display Conference Units: Install units at mounting heights indicated on Drawings, or if not indicated, at height indicated below. Attach to wall surface with [**fasteners through back of cabinet**] [**concealed brackets screwed to wall**] [**concealed wood cleats screwed to wall**].

Mounting Height: 72 inches above finished floor to top of cabinet.

* + - 1. CLEANING AND PROTECTION
				1. Clean visual display units in accordance with manufacturer's written instructions. Attach one removable cleaning instructions label to visual display unit in each room.
				2. Touch up factory-applied finishes to restore damaged or soiled areas.
				3. Cover and protect visual display units after installation and cleaning.
			2. DEMONSTRATION

Retain this article for motorized, sliding visual display units.

* + - * 1. Company Service Advisor to train maintenance personnel to adjust, operate, and maintain motorized, sliding visual display units.

END OF SECTION 101100