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**SECTION 10100
VISUAL DISPLAY BOARDS**

PART 1 GENERAL (SCOPE)

1.01 DESCRIPTION OF WORK SHALL INCLUDE FURNISHING AND INSTALLING THE FOLLOWING ITEMS: Furnish and install new boards as detailed

1.02 RELATED WORK

- A. Division 04000 masonry block wall.
- B. Division 06100 blocking for all units at locations shown on shop drawings for attachment devices.
- C. Division 09000 gypsum wallboard.

1.03 REFERENCES

- A. ASTM C540 Gloss for ceramic materials.
- B. ASTM C614 for alkali resistance.
- C. ASTM D2244 evaluation of color differences.
- D. ASTM B221-83 for aluminum extrusions.
- E. ASTM C208-72 for cellulosic fiberboard.
- F. ANSI A208.1-79 for particleboard.
- G. ANSI H35.1-82 for aluminum temper and alloy.
- H. HNSI A424-80 for steel for porcelain enameling.
- I. FS LLL-B-810 for tempered hardboard.
- J. ANSI IES-RP-3 for school lighting (by others).
- K. PEI -104 minimums for porcelain enameling.
- L. BYK-Gardner Surface Distortion.

1.04 SUBMITTALS

- A. **Samples and colors for each:**
 - 1. Face sheet materials
 - 2. Cork materials
 - 3. Vinyl materials
 - 4. Aluminum trim or wood trim types and profiles.
- B. Anchoring devices
- C. Accessories warranty and certificate of authenticity from manufacturer.
- D. Product use and maintenance instructions.
- E. Drawings shall indicate location and actual material lengths of each unit. Room elevations shall indicate joint locations and include dimension from floor and adjacent sidewalls, cross-sections for trim, backing, face and core materials, fastener spacing and types of units provided.

1.05 QUALITY ASSURANCE

- A. Uniformity of color, corrosion, temperature, alkali, water, range of gloss test, uniform texture, light reflectance and cleanability are requirements for all groups and have specific ranges for each.
- B. Reflectivity of *P³ceramicsteel*® Chalkboard and *P³ceramicsteel* Markerboard writing surfaces shall not exceed the following:

Gloss Range / 60° Gloss meter	GU (Gloss Units)
1. <i>P³ceramicsteel</i> ® Markerboard	68 -76% (low gloss surface)
2. <i>P³ceramicsteel</i> ® Markerboard	87 -95% (high gloss surface)
3. <i>P³ceramicsteel</i> ® Chalkboard	4 - 7%

- C. *P³ceramicsteel*® writing surfaces - Surface Distortion reduction and the optimum improvements to performance characteristics.
- Contrast/waviness** for Markerboards (light and dark effects) shall be no greater than **15** [Scale 0 – 30] when tested with BYK – Gardner Wave Scan 5+ Measuring device showing visual acuity (contrast sensitivity) to the human eye at distances greater than 3 meters (10’- 0’’).
 - Resolution** (visual acuity) shall be based on 3 lines per degree and be visibly maintained beyond the current standard of 3 meters. [Byk-Gardner Wave Scan 5+ Measuring device].
 - Surface distortion** (“orange peel”/surface peaks and valleys) as tested by the BYK-Gardner Wave Scan 5+ Measuring device [Scale 0 – 60]. Values are established by the difference in the highpoint/low point of the Markerboard test surfaces. *P³ceramicsteel*® establishes the lowest range of distortion from 11.7 – 16.02.
 - Contrast/writeability** for Chalkboards (light and dark effects) shall be no less than **20** [Scale 0 – 40] as determined with the Color Contrast Measurement Test using a 773-gram load on chalk. The value measured is the difference between the surfaces without chalk and the surfaces with chalk (*P³ceramicsteel*® and other test surfaces). The higher the measured value, the greater the chalk adherence.
 - Wet Ghost** measurements shall not exceed a factor of **.49** [Scale 0.0 – 0.8] as established by the high pressure application of chalk on Chalkboard (*P³ceramicsteel*® and other test surfaces) before and after chalk has been removed using a water dampened cloth. The chalk residue remaining is the measured difference.
 - Chalk consumption** is determined by the Chalk Usage Test and establishes a value no greater than **7** [Scale 5 – 13] as measured by writing no less than 2 linear meters with weight loaded (579 grams) chalk stylus. Test results provide a measured reduction in chalk usage of no less than 40% from traditional enameled chalk surfaces.
 - Chalk dry erasability** shall provide a value no greater than **2.0** Scale 0 – 5] as the maximum amount of residue remaining which is determined by the Dry Erase Chalk Test. Values are established by writing onto Chalk surfaces (*P³ceramicsteel*® and Other traditional enameled Chalkboard surfaces) and erasing using a weight loaded latex eraser.

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1.06 DELIVERY AND STORAGE

- A. All pre-laminated units shall be stored vertically and with packing materials between each to prevent damage.
- B. Cover all units to prevent damage and dirt accumulation.

1.07 PROJECT CONDITIONS

- A. Store materials in dry areas and above temperatures above 55° F.
- B. General contractor to maintain proper environment prior to, during, and after installation.
- C. Adhesives are to be used with adequate ventilation.

1.08 **WARRANTY FOREVER WARRANTY** "PolyVision is the only company that warrants specific visual communication products and surfaces for as long as they are installed and in use, or forever, whichever occurs first. This warranty is unconditional under normal usage. If the surface fails, PolyVision agrees to repair or replace the ceramicsteel writing surface, no questions asked."

1.09 **MAINTENANCE** Submit manufacturers' standard instructions for cleaning and stain removal. Information also available on the following Web site; www.CleanMyBoard.com.

PART 2 GENERAL (MATERIALS)

2.01 MANUFACTURERS

- A. Acceptable manufacturers
 - 1. **PolyVision** – NACO Brand
 - 2. Products as manufactured by other manufacturers must comply with all requirements of the specifications.
- B. Substitutions shall be made 21 days in advance of the bid date. Manufacturers must submit all data required in its entirety for review by the architect. Samples of the facing sheet showing progressive enamel coatings along with metering devices capable of measuring coating thickness, ground coat thickness, manufacturers' certificate of compliance of all items. Prior to consideration, lamination and fabrication sections must be submitted to the architect for testing and also inspection of methods and quality (samples will be retained).

2.02 MATERIALS FOR *P³ceramicsteel*® Surface by ALLIANCE, MARKERBOARDS AND CHALKBOARDS

- A. Facing sheet
 - 1. Shall be light gauge enameling grade cold rolled steel suitable for either preframed boards without joints or joinery for use with steel splines. Manufacturer shall offer all of the following items as standard to the owner.
 - a) *P³ceramicsteel*® Chalkboard with improved writing and erasing surface (3 colors)
 - b) *P³ceramicsteel*® Markerboard with improved writing and erasing surface (3 colors low gloss and 3 colors high gloss)
 - 2. Facing sheet construction
 - a) 1.7-2.5 mils enameled ground coat on face minimum thickness.

- b) 2.0-2.5 mils enameled cover (color) coat for chalkboard.
- c) 3.0 – 4.0 mils enameled cover (color) coat for markerboard.
- d) 1.7-2.5 mils enameled minimum ground coat on back of facing.
- e) Firing temperatures shall be 1250° –1300° minimum for *P³ceramicsteel®* Chalkboard and 1475° - 1500° minimum for *P³ceramicsteel®* Markerboard.

B. Core

- 1. ½” thick particleboard shall be provided.
(Units 16’0” width and greater will require H-bar type joint joint).
 - 2. ¼” thick hardboard shall be provided only in areas where replacement panels are furnished and the thickness of existing grounds or conditions will not permit ½” thick particleboard.
- C. Moisture backer shall be factory laminated to core material. Aluminum backer shall be provided standard on all units with routed steel spline joints.
- D. Perimeter trim shall be existing wood removed and reinstalled by the contractor.
- E. Chalk/markerboard tray: shall remain in place.
- F. Maprail: if required shall be removed and reinstalled by the contractor.
- G. Mullion Trim: shall be removed and reinstalled by the contractor.
- H. Insert (choose from): furnish new if required
- 1. Linoleum grade cork - shall be ¼” in thickness and a minimum 43 pounds per cubic foot density with burlap backing.
 - 2. Natural cork – shall be ¼” in thickness and a minimum 15 pounds per cubic foot density with no burlap backing.
 - 3. Natural cork with vinyl covering – shall be ¼” in thickness and a minimum 15 pound per cubic foot density laminated to 15 oz. per L.Y. vinyl to match tackboards installed inclusive with board.
- I. Accessories (1” or 2”)
- 1. Maphooks (minimum two per marker/chalkboard).
 - 2. Flag holders (one per classroom).
 - 3. Map roller brackets (one pair per marker/chalkboard).
 - 4. Maprail end stops (one pair per display rail).
- J. Attachment devices
- 1. Adjustable slotted wall brackets(zinc plated).
 - 2. Attachment screws (at wall brackets and MR-D2).
- K. Lamination
- 1. Factory machine type only.
 - 2. Specially formulated adhesives.

2.03 MATERIALS FOR TACKABLE SURFACES**

- A. Core materials* (choose from):
- 1. 1/4” hardboard
 - 2. 3/8” industrial fiberboard
 - 3. 7/16” industrial fiberboard
 - 4. 1/2” industrial fiberboard
- B. Natural cork* (choose from):
- 1. 1/4” thickness
 - 2. 1/8” thickness
 - 3. 1/16” thickness
- C. Linoleum grade cork with burlap backing* (choose from):

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- 1. 1/4" thickness
- 3. 1/8" thickness
- D. Vinyl covering-choose from:
 - 1. 15 oz. per L.Y.-Nacoweave I, Nacoweave IA.
 - 2. 20 oz. per L.Y.-Nacolinen, Nacotwill, Nacostar.
 - 3. 34 oz. per L.Y.-Self-sealing form vinyl-Naco Vinyl Plus.
- E. Fabric covering
 - 1. 2- ply 100% polyester fabric with plain weave pattern.
 - 2. 16.0 oz. per L.Y.

*All thickness' are nominal

** Total laminated thickness of materials to equal 1/2"

- F. Lamination
 - 1. Factory machine type.
 - 2. Specially formulated adhesives.
- G. Attachment devices
 - 1. Adjustable slotted wall brackets(zinc plated).
 - 2. Attachment screws (for bracket attachment to boards).

PART 3 GENERAL

3.01 INSTALLATION

- A. Provide factory-trained installers.
- B. Apply manufacturers' adhesive behind each board using egg-sized gobs 16" on center.
- C. Mounting heights from the floor for each room shall be:

1. Kindergarten	24"
2. First – third grades	26"
3. Fourth – sixth grades	30"
4. Seventh – ninth grades	34"
5. Tenth and up grades	37"
- D. Provide covering for H-moldings to match vinyl-covered boards.
- E. Clean boards using manufacturers' recommended procedures and install cleaning labels for each room.
- F. Locate accessories on each board as specified.
- G. Provide mitered and wrapped hairline joints for all trims.
- H. Provide fasteners at perimeter trims 16" – 24" and 12" – 16" on trays.

3.02 PROTECTION General Contractor shall cover and protect all boards after installation and cleaning.

3.03 CLOSEOUT DOCUMENTS Provide all maintenance and warranty, cleaning and use documents to General Contractor.