

General Specifications

1.1 GENERAL REQUIREMENTS

(Supply) (Supply and install) PG Bell architectural porcelain enamel (panels) (wall system) as specified and as shown on the drawings.

1.2 SCOPE

1.2.1 Work included in this division shall include all labour, materials equipment and services necessary to fabricate and erect the complete preformed porcelain enamel (metal wall panels) (wall system) as called for by the tender documents.

1.2.2 The work of this section shall include: the (design), (fabrication), (supply), (erection) of the following:

1. Porcelain enamel wall panels.

2. All sealants in joints between metal panel components and between panels and adjoining construction, except between wall panels and door and window framing.

3. All necessary connection hardware for attachment of the above installations

1.3 REFERENCE STANDARDS

1.3.1 Porcelain Enamel Institute (PEI S1000)

1.4 SUBMITTALS

1.4.1 Submit with tender, for architect's review, a design proposal of the metal wall system. All technical details contained in the design proposal to be treated as strictly confidential (optional).

1.4.2 Shop drawings: Submit one (1) sepia and one (1) print for the architect's review. Shop drawings shall contain plans, elevations, sections and details for all work in this section.

1.4.3 Submit duplicate colour samples of the specified finish to the architect for final selection and approval of colour and gloss.

1.4.4 No work shall be fabricated until shop drawings and samples have been reviewed by the architect.

1.4.5 After completion provide the owner with proper cleaning and maintenance instruction.

1.5 EXAMINATION

Before commencing erection, the structure will be carefully examined and if any defects or discrepancies between the structure and the approved drawings are found, the general contractor will be notified at once and work will not commence until corrective measures are taken.

1.6 DELIVERY AND STORAGE

- 1.6.1 All units and/or their components shall be transported in a manner to preclude damage.
 - 1.6.2 Remove all units which are cracked, bent or chipped beyond repair and replace with new.
 - 1.6.3 A suitable storage area shall be provided by the general contractor to preclude damage.
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1.7 SITE PREPARATION

The general contractor shall ensure that the site, particularly in the areas which are to receive the metal cladding, is clear of all obstructions which would interfere with the storage of material and/or the use of appropriate installation equipment.

1.8 QUALIFICATION

The supplier and installer must be able to demonstrate a minimum of 10 years experience and must have successfully completed at least 5 major projects in architectural porcelain enamel. The supplier must also be able to demonstrate that all fabrication, enamelling and laminating are executed in one manufacturing location, no sub-contracting for all or part of the work is permitted.

1.9 GUARANTEE

- 1.9.1 The work included in this section shall be fully guaranteed for performance, materials and workmanship for a period of 1 year from the date of substantial completion of this contract.
- 1.9.2 The manufacturer shall further warrant for an additional 4 years the porcelain enamel finish under normal climatic conditions for Weather Resistance, Continuity of Coating, and Surface Appearance in accordance with the Porcelain Enamel Institute Standard PEI:S100.

Materials

2.1 STEEL

2.1.1 Face steel shall be mild steel used for the manufacture of porcelain enamel panels. Steel shall be of low metalloid and copper content, ASTM A424 Type 1. Steel shall be stretcher levelled. Thickness of base

metal shall be 18 ga (1.2 mm). Steel shall be stored in a heated environment in order to prevent rusting/scaling.

2.1.2 Steel back sheet when a core material is included with the porcelain panel shall be galvanized steel ASTM A525-80A G90 designation. Base metal thickness to be recommended by the manufacturer, but shall not be less than 22 ga (0.8 mm).

2.1.3 Load bearing clips for attaching panels to the sub-structure shall be Type 304-2B stainless steel and shall be attached to the panel flanges after enamelling with stainless steel pop rivets.

2.2 ENAMEL

Ground coat and cover coat frit shall be suitably selected material to achieve the finish and coverage of the panels, to the standards required in this specification. Frits selected shall be acid resistant type in order to achieve an A or AA acid resistance.

2.3 CORES

2.3.1 Core material shall be bonded to the back face of the porcelain panel when required to meet the flatness and structural requirements of the panel system.

2.3.2 Core material shall be 0.5 in (12 mm) Water Resistant Gypsum Board.

2.4 ADHESIVES

Adhesives used to bond the core to the metal face shall be a high performance neoprene based cement. Adhesive shall be water resistant and heat resistant up to 2120F (100 degrees C).

2.5 SEALANTS

2.5.1 Sealant to be selected by architect from available high performance polyurethane or silicone based products. Colour shall be selected by the architect from the standard colour chart.

2.5.2 Joint backing to be compatible with sealant and shall be of type approved and recommended by sealant manufacturer. Diameter shall be 35% greater than joint width to prevent sagging.

Manufacturing

3.1 SHEET METAL FABRICATION

3.1.1 Panels shall be formed to shapes and sizes in accordance with the approved drawings. The tolerance for length and width shall be ± 0.08 in (2 mm). The tolerance for squareness shall not exceed 0.24 in (6 mm) on diagonals of panel.

3.1.2 Fabrication shall be completed before porcelain enamelling. All welds shall be clean, sound and solid, free from defects and ground smooth. All necessary holes to be drilled or cut before application of porcelain enamel. All welding shall be done using base metal as described in 2.1.1. Flanges to be punched with a series of holes for the attachment of stainless steel clips.

3.2 CLEANING

3.2.1 All face panels shall be degreased by immersion in an approved degreasing fluid. The panels shall then be rinsed.

3.2.2 After the first rinse, panels shall be acid etched such that weight loss shall not be less than 0.115 - 0.131 oz./Ft.² (35 - 190 gm/sm). Panels shall be then rinsed again.

3.2.3 After the second rinse, surfaces shall be treated with a nickel deposit of not less than 0.00085 oz./Ft.² (0.26 g/sm) . Panels shall then be dried rapidly.

3.3 ENAMELLING

3.3.1 A porcelain enamel ground coat shall be applied to all areas of each panel including back and flanges. Ground coat thickness shall be approximately 0.005 in (0.13 mm).

3.3.2 At least one additional separately fired coating shall be applied to the face side of the panel. Thickness of the finish coat shall be approximately 0.009 in (0.23 mm). Final finish shall be a satisfactory colour and texture to match the sample approved by the architect with 1 NBS unit. (1-2 NBS unit variation is barely perceptible to the human eye.) Porcelain enamel surfaces shall be fired simultaneously with the finish coat.

3.3.3 For corrosion protection, one additional coating shall be applied to the back side of each panel and to be fired simultaneously with the finish coat.

3.3.4 Enamels shall be applied by methods recognized as good commercial practice. Panels shall be fired in a continuous furnace (not a batch type furnace) at temperatures above 1475°F (800°C). After firing, every 10th panel is to be submitted to a computerized colour meter with printed log output for proper colour control.

3.3.5 This specification only applies to architectural porcelain enamel panels and shall conform to the applicable requirements of the "Specification for Architectural Porcelain Enamel on Steel PEI S-100" by The Porcelain Enamel Institute, Nashville, TN.

3.4 LAMINATION

3.4.1 The water resistant gypsum board core shall be glued to the back face of the porcelain panel with neoprene based cement.

3.4.2 The galvanized steel back sheet shall be glued to the back of the gypsum board with the neoprene based cement.

3.4.3 Immediately after assembling the core and the back sheet to the porcelain face panel, uniform pressure shall be applied.

3.4.4 After laminating, completely seal all joints on the back of the panel with an approved Sealant to prevent moisture from entering the core.

3.5 INSPECTION

3.5.1 Prior to crating, finished panels shall be inspected for blemishes, chips and for flatness. Any panel not meeting the requirements of this specification shall be rejected.

3.5.2 A fully laminated panel up to 20 sf (1.9 sm) shall meet the following flatness criteria:

1. Convex - 0.24 in (6 mm) when measured perpendicular to the nominal plane of the panel face.
 2. Concave - 0.12 in (3 mm) from actual plane of panel face.
 3. Deviations shall be measured with the aid of an accurate steel tape and straight edge.
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3.6 CRATING

3.6.1 Panels shall be packed on skids, properly protected from possible damage during shipping and storage at the construction site. Skids to be on runners for easy handling by crane and/or tow-motor.

3.6.2 All skids to be shrink wrapped with plastic to prevent water and other damage during storage at the construction site.

3.7 EXECUTION

3.7.1 Erection: All work shall be performed by skilled workmen, especially trained and experienced in this trade. Work shall be carefully erected with proper provisions for thermal expansion and contraction, and installation tolerances.

3.7.2 Clips: Stainless steel clips shall be pop riveted to the panel flange either in the factory or at the con-

struction site with stainless steel pop rivets utilizing the pre-punched holes.

3.7.3 Fasteners: The type, size, quantity and spacing of all connectors, fasteners, and other anchorage devices for the porcelain enamel metal cladding system shall be as required to suit the performance standards.

3.7.4 Sequence: Erect the components of the wall system in the following sequence: 1. Girts, angles, Z-bars to receive metal panels shall be fastened to the building structure with non-corrosive fastening devices at centres recommended by the panel manufacturer. 2. Install the porcelain panels plumb, true and level and in proper alignment to established lines and elevations. 3. Apply sealant and joint backing to all joints between panels and between panels and other construction materials except between panels and door and window frames. Sealant material shall be used in strict accordance with manufacturer's written instructions. Before applying sealant, remove all dirt, dust and other foreign matter to insure proper bonding to the enamel surface. Sealants shall be physically and chemically compatible with other adjacent material. Joints shall be tooled, excess sealant shall be cleaned from all exposed surfaces.

3.7.5 Erection Tolerances: The wall cladding shall conform to the following tolerance: 1. Maximum offset from true alignment between two abutting panels shall be 0.08in (2 mm). 2. Deviation from squareness shall not be greater than 0.24 in (6 mm).

3.7.6 Touch-Up:

1. Small chips, imperfections, blemishes or other minor defects shall be touched up to the approval of the architect.

2. Defects shall be repaired with colour matched synthetic enamel and 2 part epoxy where ground coat is breached.

3.7.7 Final Cleaning:

1. Upon completion of the work of this section clean all smears, sealant, dirt and grime from the face of the porcelain panels using cleaning materials recommended by the manufacturer.

Panel Repair

If the exposed area is BLACK then there is no fear of rusting.. The base steel has a black ground-coat that has formed a molecular bond with the steel. It is very rare that this chips off and leaves bare steel showing. Proceed with painting the area.

If it really is bare steel then you will have to work quickly to cover it:

1. surface rust should be removed by rubbing with a medium grit emery paper.
2. clean with a enamel paint thinner.
3. a metal primer should be sprayed on to protect the steel, after that use a good automotive gloss enamel that matches the panel color.
4. Once the paint has had a chance to dry and harden you can use rubbing compound and polishing compound to soften the painted edge. (Remember, the unaffected part of the sign will stand up to the rubbing compound and or thinners without damage) You can also use touch-up paint made for stove tops if you want. The spray paint will leave a smoother finish though.

5. If, after painting, the chip edge is still visible, use the following method to minimize the difference

If the chip edge is very visible or damage was sufficient to actually bend the steel and pop the enamel then you need a more extensive repair as described below:

1. Clean the wound with enamel paint thinner and dry thoroughly.
2. Gently sand the steel with a fine grit emery paper to ensure that there is no rust starting.
3. With a 2 part epoxy, mix as per package direction.
(Paint can be mixed with the epoxy at this point as well, experiment first)
4. With the head of a nail or a small piece of cardboard (a business card works nicely) apply the epoxy to the wound and smooth to the level of the porcelain surface.
5. While the epoxy is still wet, clean the over flow with a rag dampened with paint thinner. If some hardens, a straight edge blade can be used to remove the build up once it is cured.
6. Allow the epoxy to cure as directed on the package. If an indent remains apply a second coat of epoxy.
7. Sand the epoxy smooth and apply a paint finish (car gloss enamel paint) to bring back to the original appearance.
8. Allow the paint to cure before cleaning up the area of finger prints, etc