

# General Specifications

## 1.1 DOCUMENTS

This section of the specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

## 1.2 SCOPE

The specification applies only to manufacture and supply of signs in porcelain enamel on steel.

## 1.3 DEFINITIONS

### 1.3.1 Porcelain Enamel

Porcelain enamel on steel is a substantially vitreous, or glassy, inorganic coating bonded to metal by fusion at temperatures above 1500° Fahrenheit. Not to be confused with baked paints or organic enamels.

### 1.3.2 Steel

For purposes of this specification, steel is special purpose "vitreous or enamelling iron or steel" as defined by ASTM A424 Type 1 and tension levelled and especially manufactured for the purpose of porcelain enamelling with total additions of copper and aluminum no greater than 0.002. Supplier shall provide documentation of use of this material for project herein. Gauges of base metal as required to meet the tolerances specified but not less than 18 gauge.

### 1.3.3 Frits/Glazes/Oxides

Only specially formulated porcelain enamel frits, glazes and oxides as supplied by Ferro, Chivit, APEC, Pemco, and Degussa. This material when combined and processed in final form shall be acid resistant in order to achieve an A or AA acid resistance rating.

### 1.3.4 Art

The graphic material and images as supplied by or directed under the supervision of the architect or designer on this project. To include mechanical, text, photographs, transparencies, film and other graphic source materials.

### 1.3.5 Approvals

Approvals are the responsibility of the owner, designer or architect at every stage of process and production as submitted by the supplier to the above. Work shall not proceed without their written and signed off authorizations.

### 1.3.6 Fasteners

### 1.3.6.1 Metal

Stainless steel or cadmium plated steel.

### 1.3.7.2 Non Metal

Silicone, nylon, velcro or styrofoam.

### 1.3.8 Laminates and installation Substrate

### 1.3.9 Other Materials

## 1.4 REFERENCE STANDARDS

### 1.4.1 Porcelain Enamel Institute

"Specification for Architectural Porcelain Enamel on Steel PEI S 100 (86), " by the Porcelain Enamel institute, Arlington, VA, USA.

### 1.4.2 Vitreous Enamel Development Council

"Vitramel Quality Standards for Signs," by the Vitreous Enamel Development Council, London, England

Supply porcelain enamel sign panels as specified and shown on the drawings and supplemental specifications, as approved by the architect or designer before fabrication.

## General Requirements

### 2.1 REFERENCES

Supplier shall provide references of at least 20 clients who have used their service to satisfaction of owner/architect/designer.

### 2.2 RELATED WORK

Related work shall be carried out by a qualified contractor as approved by the architect/designer.

### 2.3 INSTALLATION

Shall be performed in workmanlike fashion consistent with porcelain enamel requirements. Porcelain enamel company shall provide detailed instructions and drawings.

### 2.4 INSTALLATION MATERIALS

As specified and detailed in drawings.

### 2.5 QUALIFICATION

Five years previous experience with projects of this scope.

## 2.6 SUBMITTAL AND SAMPLES

Porcelain enamel company must supply project specific samples and colours with bid from art work and specifications as provided by architect/designer.

## 2.7 QUALITY ASSURANCE

Quality of entire project must conform to specification and bid submittal as approved by architect/designer.

### 2.7.1 Experience

Craftsmen shall have a minimum of five years proven experience in this type of work and be approved by the architect/designer for this type of work.

### 2.7.2 Evidence

Submit evidence of having successfully completed manufacturer of two projects of similar scope to this bid within the preceding three years.

### 2.7.3 Specific Submittal

Construct project specific submittal for approval by architect/designer with this bid to indicate colour matching and graphic resolution ability.

## 2.8 ENVIRONMENTAL

Supplier must be able to demonstrate that he is in compliance with all worker's safety and environmental regulations at his location of manufacture.

## 2.9 WARRANTY

Provide a written warranty issued in the name of the owner and jointly signed by the supplier stating that the sign panels have a guaranteed life of five years against fading, spalling, pinholes, discoloration, staining, gloss reductions or rusting from date of substantial completion.

## 2.10 WRITTEN GUARANTEE

Supplier shall also certify in writing that the porcelain enamelling will be performed in accordance with the current edition of the Specification for Architectural Porcelain Enamel on Steel for Exterior Use (PEI:S 100[86]) as issued by the Porcelain Enamel institute of WA, DC.

## 2.11 ACCEPTABLE MANUFACTURERS

Enameltec Architectural Signage  
60 Armstrong Avenue  
Georgetown, Ontario  
L7G 4R9

## 2.12 PERFORMANCE BONDING

Supplier shall post bond equal to the value of the porcelain enamel components listed in the contract for the life of the contract.

## 2.13 SUBMITTAL AND SAMPLES

Submit and tender, for architect's/designer's review, a sample of metal forms and colour relating specifically to this project as a condition of qualification. All technical details contained in the submittal and colour proposal to be treated as strictly confidential.

# Fabrication and Process

## 3.1 METAL APPROVALS

Shop drawing of metal panels shall be provided to the architect/designer for approval before metal fabrication.

## 3.2 METAL FABRICATION

All work done shall be machine fabricated in accordance with approved shop drawings with straight lines, square corners or smooth bends, free from twists, kinks, warps, dents, and other imperfections which may affect appearance or serviceability. Curved sections shall be formed to smooth and even radii.

## 3.3 FLATNESS

Panels of one metre or greater shall be flat within 5 mm over all directions across the convex surface. Panels shall be flat within 1 mm over the concave surface in all directions. Panels shall not be more than 2 mm out of square when measured over the diagonal in total surface area of over 9 square feet and within 1 mm of the diagonal in panel under 1 metre of surface area. Deviations shall be measured with the aid of an accurate steel tape and straight edge.

## 3.4 WELDING

All welds shall be clean, sound and solid, free from defects, gas bubbles, and ground and sanded smooth to 3/16" to match the 3/16" radii of the mechanical break. They shall be done using hand oxyacetylene fusion technique with no additions of foreign metals.

## 3.5 HOLES AND CUTOUTS

All necessary holes and cutouts shall be drilled or punched and welded in advance of enamelling.

## 3.6 FORMING

All metal forming shall be mechanical and done in advance of welding.

## 3.7 METAL FABRICATION

All metal fabrication shall be done by a shop qualified and certified in porcelain enamel metal fabrication and supplier shall provide documentation of metal shops qualifications.

### 3.8 METAL PREPARATION/CLEANING

#### 3.8.1 Degreasing

All panels shall be degreased by immersion in an approved degreasing fluid, the panels shall then be rinsed.

#### 3.8.2 Acid Etching

After the first rinse, panels shall be sulphuric acid etched such that weight loss shall not be less than 35 40 gm/m<sup>2</sup>. Surfaces shall then be rinsed again.

#### 3.8.3 Nickel Deposition

After the second rinse, surfaces shall be treated with a nickel deposit of not less than 20 gm/m<sup>2</sup> to substantially aid in the adherence of the glass to the steel. Supplier shall provide documentation of nickel sulphate bath process.

#### 3.8.4 Neutralizing

After the third rinse, the chemical action shall be neutralized in a soda ash solution then dried rapidly.

### 3.9 PORCELAIN ENAMELLING

A porcelain enamel ground coat shall be applied to all areas of each unit, including backside, flanges and edges, by spraying methods recognized by PEI and VEDC. At least one additional separately fired cover coating shall be applied to the face side, flanges and edges of each unit. For corrosion protection and flatness, one additional coating shall be applied to the back side of each panel and to be fired simultaneously with the finish coat for panels over 3 square feet in surface area. No exposed metal is acceptable.

#### 3.9.1 Finish

Continuity of coating: Visual inspection of each unit shall reveal no visible breaks, gas bubbles, scumming, hairlines, stress lines or surface defects in the cover coat. No exposed metal is acceptable.

#### 3.9.2 Finish and Background Colour

The colour and finish shall match a colour sample previously submitted by supplier and approved by architect/designer within 1 NBS unit. (1 2 NBS unit variation is barely perceptible to the human eye.)

#### 3.9.3 Ground and Covercoat Thickness

Ground and cover coat thickness shall be applied in accordance with PEI recommendations to a

thickness range between 0.004 to 0.020", as required by the manufacturer to suit the intended use.

#### 3.9.4 Firing

Panels shall be fired in a continuous furnace (not a batch type furnace) at temperature above 1500° Fahrenheit. After firing, every panel is to be submitted to a visual inspection for colour consistency against the control panel as approved by the architect/designer.

## Art & Imaging

### 4.1 ART PREPARATION

Supplier shall produce film positive and negatives as required from mechanical art work as supplied by the architect/designer.

### 4.2 ART APPROVALS

All film to be reproduced shall be submitted to the architect/designer for approval before it is reproduced in porcelain enamel.

### 4.3 ART WORK

Original artwork shall not be harmed in any way (writing, cutting, etc.) and will be stored by supplier for future return or reproduction at the Client's request.

### 4.4 SILK SCREENING

Screening of porcelain enamel line art/script shall be screened over background colours. The quality of the screen image shall be of high resolution with no ragged edges. Line art shall be screened over background colours, so that characters are not obscured by the application of colour. These specifications will be indicated on tracing paper overlay. The quality of the screen image shall be high resolution with no ragged edges. The glasses used in this process shall be acid resistant. Screen mesh shall be between 250 and 305.

### 4.5 SCREEN GLAZES

Glasses used in the screening process shall be acid resistant and opaque. The glasses shall be corrosion proof, UV proof, windproof, and vandal resistant. All screen glass must be mill to a 400 mesh particle size.

### 4.6 TECHNICAL PROFICIENCY

Supplier shall be proficient in the following imaging techniques and be able to demonstrate capabilities to the architect/designer: Reproduction of photographs by halftone and continuous tone methods, including process colour and duotones, as well as special imaging techniques including hand tinting, stencil brushing, spraying textures and air brushing.

### 4.7 COLOUR MATCHING

Supplier shall be able to match nearly the entire range of colours as represented by the Pantone Matching Systems (PMS) and Toyo inks, as well as the colour pallets of major paint companies.

## Delivery, Transport, and Related

### 5.1 INSPECTION

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

### 5.2 CLEANING

All panels shall be cleaned in advance of packaging and crating.

### 5.3 CRATING

Sign panels shall be packed in wooden crates which completely enclosing the panels from exposure to environment or equipment. The crates shall be lined with 1 " packing material to prevent movement of panels within the crates. Each sign panel shall be individually wrapped in corrugated cardboard and properly labelled for distribution on site.

### 5.4 DELIVERY

Delivery shall be the responsibility of the supplier and all materials must be insured for the total value of the contents. All freight damage claims are the responsibility of the supplier and the forwarder and replacement panels are the responsibility of the supplier. by the Pantone Matching Systems (PMS) and Toyo inks, as well as the colour pallets of major paint companies.

## Maintenance and Serviceability

### 6.1 MAINTENANCE

Submit manufacturer's documentation covering the care, cleaning and maintenance of materials for incorporation into maintenance manuals.

### 6.2 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

### 6.3 EXTENSIVE REPAIR

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

## Installation

## 7.1 INSTALLATION

Installation shall be the responsibility of the owner, subcontractor or general contractor as spelled out in the contract, based on supplier recommendations.

## 7.2 ADHESIVES

Apply silicone adhesive as shown on drawings provided by supplier.

## 7.3 ASSEMBLY

Assemble all porcelain enamel sign components flush, true and accurately straight as shown on drawings.

## 7.4 HARDWARE

Furnish and install all hardware for sign components. In addition, furnish any other hardware item not specified which would normally be furnished or required for proper functioning of the signage as shown on the drawings.

## 7.5 INSPECTION SIGN PANELS

Inspect completed signage for clarity of images, proper alignment of images on colour separations, clean backgrounds, correct colours, complete and appropriate thickness of coverage of surfaces, complete firing of the enamel, blemished, defects and general workmanship.

## 7.6 CLEANING

Clean completed sign unit surface with a soft cloth and any good quality glass cleaner.

## 7.7 INSPECTION INSTALLATION

Inspect installation site and coordinate installation schedule with owner representative.

## 7.8 STORAGE AND PROTECTION

Store signage units and related materials in an orderly and systemized fashion and in a manner to prevent damage or theft of products. Protect porcelain enamel signage units and all accompanying materials by storing in areas well ventilated and not exposed to dust, extreme changes in temperature or humidity.

## 7.9 TRANSPORT PROTECTION

Protect all signage units during transportation of signs to installation site by wrapping all signage units individually in a soft, non abrasive material. Pay special attention to the signage faces where lettering, silk screening, photos or art are applied to the sign unit surface (as applicable).

## 7.10 WORKMANSHIP

Install completed sign units square, plumb and accurately level in accordance with the drawings and

specification for the appropriate sign unit type.

### 7.11 FINAL CLEANING

Clean completed, installed sign unit with any good quality glass cleaner, ensuring removal of all fingerprints, silicones, dirt, shavings adhesive, dust particles, etc.

### 7.12 VACATING SITE

Prior to leaving the installation location, clean the work area, walls, floor, etc., that may have been soiled during the installation process