

ATTACHMENT B
NATIONAL PARK SERVICE
HARPERS FERRY CENTER
WAYSIDE EXHIBIT GRAPHIC
PANEL SPECIFICATIONS

WAYSIDE EXHIBIT GRAPHIC PANEL SPECIFICATION INDEX

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SECTION 1. GRAPHIC PANEL PRODUCTION

1.1 Wayside Exhibit Graphic Panels

The work includes the production of wayside exhibit graphic panels.

1.1.1 Wayside Graphic Panels

Produce the Wayside Graphic Panels from the elements included in the approved Wayside Exhibit Plan. The following types of panels shall be provided under this section as follows:

1.1.2 Fiberglass Embedded Panels

1.1.2.A Production of Fiberglass Embedded Panels from Government-Furnished Digital Files or Production Ready Materials:

Each panel shall consist of a solid one-piece panel with 600 dpi or higher ink jet graphics embedded in fiberglass.

Four-color CMYK images shall be printed on an ink jet printer using ultraviolet resistant pigmented inks. Images shall be printed on a specially formulated substrate capable of resin subsaturation to ensure a true fiberglass embedment. The shall be full size all the way to the edges of the panel.

1.1.2.A.1 Proofs

Provide full size proofs to the COR for review and approval prior to embedment. Full size proofs shall be right-reading images on embedment substrate (printed in actual color to be used in the prodction).

1.1.2.A.2 Inkjet Printer Requirements

The minimum requirements for the inkjet printer shall be 600 dpi image resolution with an output width capable of printing a 36" x 48" image in a single section.

Inks shall be ultraviolet resistant pigmented jet inks. The substate shll be a specially formulated substrate capable of resin saturation to ensure a true fiberglass embedment. Encapsulation is not acceptable.

1.1.2.A.3 Trim Size

All completed panels shall be trimmed 1/8" under normal dimensions indicated in Section C, Scope of Work with a tolerance of +/- of 1/32". The total thickness of all assembled panel components shall not exceed 0.060" for all panels 42" x 24" and 24" x 24"; 0.090" for panels 36" x 48" and 5 – 9/16" x 11 7/16" Trailside panels.

1.1.2.A.4 Imaged Substrate Embedment

(a) The imaged substrate shall be embedded in fiberglass according to the following specifications:

- Resin shall be non-yellowing R-70 clear resining or UV stablized, acrylic modified polyestester resin, reinforced with high solubility, chopped strand fiberglass mat so that the index of refraction ensures total clarify of all color, copy, and graphics. Glass fibers should not be readily discernable on the panel face.
- Panel must have a glass content of no less than 28% of the total panel weight.
- Panel must be able to withstand temperatures from -65% f. to 350 degrees f.
- Panel must have a minimum Barcol harness factor of 50, tensile strength of 12,000 psi, comprehensive strength of 20,000 psi, and flexural strength of 18,000 psi, minimum impact strength must be at 6 gt bls/in notch with a fire resistance of 500 degrees f.

Face must not be permanently defaced by seam, acid aromatics, scratching, inks, or paints and should be readily wiped clean with paint remover and solvents without affecting the appearance or legibility of finished or graphics.

- Face shall retain legibility and finished appearance when sprayed with a 10% solution of hydrochloric, nitric, or sulfuric acid for one half-hour or when scrubbed by a brush or medium hardness using common commercial cleaning compounds such as ammonia, laundry soaps, detergent, carbon tetrachloride, or petroleum based solvents.
- Panel must be opaque with a matte finish with a minimum embedment of all graphic elements of .030.
- Panel must be router cut, the edges must not be crazed or crracked, and the finish must be smooth, clean, and neat. Thicknesses will be 0.060" or 0.090" as specified in the individual task order.

1.1.2.B **Production of Fiberglass Embedded Panels**

From Government-furnished and/or produced paper prints, the contractor shall embed in the graphic panels in fiberglass in accordance with the specifications stated in paragraphs 2.1.2.A, Items 1 through 7.

1.1.3 **High Pressure Laminate (HPL) Panels**

1.1.3.A **Production of HPL Panels from Government-Furnished Digital Files or Production Ready Materials**

Each panel shall consist of a solid one-piece panel with 600 dpi or higher ink jet graphics embedded in HPL.

Four-color CMYK images shall be printed on an ink jet printer using ultraviolet resistant pigmented inks. Images shall be printed on a specially formulated substrate capable of HPL embedment. The print shall be full size all the way to the edges of the panel.

1.1.3.B.1 **Proofs**

Provide full size proofs and 8" x 10" pressed sections printed in the actual color to be used in production shall be submitted to the COR for review and approval prior to embedment.

1.1.3.B.2 **Inkjet Printer Requirements**

The minimum requirements for the inkjet printer shall be 600 dpi image resolution with an output width capable of printing a 36" x 48" image in a single section.

1.1.3.B.3 **Trim Size**

All completed panels shall be trimmed 1/8" under normal dimensions indicated in Section C, Scope of Work with a tolerance of +/- of 1/32". The total thickness *of all assembled panel components shall not exceed 0.100"* for all panels.

1.1.3.B.4 **Materials**

Outdoor Grade: High pressure laminate graphic sign material shall be composed of several layers of phenolic (opaque) resin impregnated kraft filler paper collated to a thickness from .093" and, surfaced by a layer of coated inkjet graphic image substrate, digitally imaged with ultra-violet (UV) resistant, pigment based process color inks, two UV resistant melamine (clear) overlay sheets, with a modified acrylic overlay for further UV resistance and hardness, which has been pre-consolidated with an industrial optical coating. The optical top coating assures UV resistance of over 97% of all harmful UV rays and further tempers the surface to resist vandalism and provides a surface that accommodates easy cleaning of graffiti without degrading the graphic surface.

Layers of material shall be assembled and heat/pressure consolidated in laminate presses at approximately 1300 PSF at temperatures exceeding 295 degrees Fahrenheit. Once cooled, the paper shall completely absorb the melamine to assure a solid thermoset plastic.

1.1.3.B.5 **Imaged Substrate Embedment**

- (a) The imaged substrate shall be embedded in HPL according to the following specifications:
- Panels shall be able to withstand temperatures from -65° f. to 350° f.
 - The panels shall have a minimum Barcol harness factor of 50, tensile strength of 12,000 psi, compressive strength of 20,000 psi, and flexural strength of 18,000 psi, minimum impact strength shall be 6 gt lbs/in notch with a fire resistance of 500° f.
 - The face shall not be permanently defaced by seam, acid aromatics, scratching, inks, or paints and should be readily wiped clean with paint remover and solvents without affecting the appearance or legibility of finish or graphics.
 - Face shall retain legibility and finished appearance when sprayed with a 10% solution of hydrochloric, nitric, or sulfuric acid for one half-hour or when scrubbed by a brush or medium hardness using common commercial cleaning compounds such as ammonia, laundry soaps, detergents, carbon tetrachloride, or petroleum based solvents.

1.1.4 Fused Polycarbonate Panels

1.1.4.A Production of fused polycarbonate panels from Government-Furnished Digital Files or Production Ready Materials

Each panel shall consist of a solid one-piece panel with 1200 dpi or higher ink jet graphics embedded in HPL.

Four-color CMYK images shall be printed on an ink jet printer using ultraviolet resistant pigmented inks. The print shall be full size all the way to the edges of the panel.

1.1.4.A.1 Proofs

Provide full size proofs printed in the actual color to be used in production shall be submitted to the COR for review and approval prior to embedment.

1.1.4.A.2 Inkjet Printer Requirements

The minimum requirements for the inkjet printer shall be 600 dpi image resolution with an output width capable of printing a 36" x 48" image in a single section.

1.1.4.A.3 Trim Size

All completed panels shall be trimmed 1/8" under normal dimensions indicated in Section C, Scope of Work with a tolerance of +/- of 1/32". The total thickness *of all assembled panel components shall not exceed 0.100"* for all panels.

1.1.4.A.4 Lamination

The panel shall be fused together so that delamination shall not occur. Simple cold lamination is unacceptable.

1.1.3.B.5 Imaged Substrate

- (a) The fused polycarbonate panels shall be prepared according to the following specifications:

- Panel shall be able to withstand temperatures from -65° f. to 350° f. The panel shall have a minimum Barcol harness factor of 50, tensile strength of 12,000 psi, compressive strength of 20,000 psi, and flexural strength of 18,000 psi, minimum impact strength shall be 6 ft lbs/in notch with a fire resistance of 500° f. The face shall not be permanently defaced by seam, acid aromatics, scratching, inks, or paints and should be readily wiped clean with paint remover and solvents without affecting the appearance or legibility of finish or graphics.
- Face shall retain legibility and finished appearance when sprayed with a 10% solution of hydrochloric, nitric, or sulfuric acid for one half-hour or when scrubbed by a brush or medium hardness using common commercial cleaning compounds such as ammonia, laundry soaps, detergents, carbon tetrachloride, or petroleum based solvents.

1.1.5 Porcelain Enamel Panels

1.1.5.A Porcelain Enamel Imaging

1.1.5.A.1 Imaging:

- Line art/script shall be screened one color at a time with intermediate firing of each color before subsequent color is screened. The quality of the screen image shall be of high resolution with no ragged edges.
- Line art shall be screened over background colors, so that characters are not obscured by the application of color.

- Line art resolution shall be accurately printed at a standard which accepts as a minimum ½ point line thickness and type in sizes as small as 4 lines per inch (lpi). Black and white and color photographic / lithographic imaging shall be available at a resolution of up to 200 lpi.
- Multiple color work shall maintain (+ / -) 1/500 registration of all layers, one to another. Color layers shall be fully opaque, with no bleed-through, or change in hue, value or intensity as a result of the layering of color in the imaging process. Color shall match the specified color as converted from PMS reference to porcelain enamel and as approved by the COR as a match sample prior to imaging the job. Colors shall match CMYK with color shift base on inherent qualities of base frits.

1.1.5.A.2 Produce porcelain enamel panels as follows:

- (a) Image in tight register in full color on a panel size range from 6" x 6" up to 42" x 72".
- (b) Maintain a capacity to handle the above described imaging in a group of subjects (average 30 subjects) comprising one job. All production phases of the work described shall be concurrent and continuous.
- (c) Fuse glass (enamel) to various substrates including enameling steel, stainless steel and plate glass.
- (d) Image four-color process images in perfect registration of separation rulings up to 150 lines per inch.
- (e) Image fine line detail including mezzotint and other special effect conversion screens, 150 line half-tones and duo-tones, and 6 pt. serif type faces without discernable saw-tooth edge or other character defects.
- (f) Mechanical and chemical substrate preparation prior to imaging.
- (g) Fabricate, image, and reclaim screens.

- (h) Mix, apply, expose, develop, and fix enamel bearing photosensitive emulsions.
- (i) Mix and match enamel colors to PMS color specifications or government-furnished color swatches.
- (j) Maintain facilities and equipment required to prepare films, mix and match colors, fabricate screens, image screen stencils, screen print, apply presensitized coatings, prepare metal for the enameling process, and image and fire porcelain enamel exhibits.
- (k) Capability to round the panel edges and apply a continuous coat of porcelain enamel around the edges from the front of the panel to the back.

1.1.5.A.3 **Film Preparation**

Prepare film mechanicals (positives and negatives) to include the development of approved layouts.

1.1.5.A.3.a Prepare original black and white and full color illustrations and photographic images for reproduction (i.e. the intermediate photomechanical steps required to convert original images into necessary film form for porcelain enamel panels.

1.1.5.A.3.b Provide table work to include past up, negative stripping, and assembly of film positive and negative elements into final color separated and registered format required for porcelain enamel panels.

2.1 **Image Assessment, image manipulation and editing, and high resolution scanning**

2.1.1.A **Image Assessment**

2.1.1.A.1 Provide image assessment that includes accuracy of color compared to the original proofs, text sharpness, gray scale reproduction, and quality of mass tones.

- 2.1.1.A.2 Provide images that are free of mutiplexing patterns, printed on a single section without tiling, supurious writing, pixel drop-out, and other undesirable object.
- 2.1.1.A.3 Provide digital files from approved text, photographs, PMS colors, and graphics; conversion of low resolution files to high resolution files, high resolution image editing to image clean-up and restoration, lightening and darkening of image areas for legibility and other image editing as specified in each individual task order.
- 2.1.1.A.4 Provide original unaltered scans for each panel to the COR for comparison, review and approval.

3.1 **Graphic adjustments**

3.1.1 Provide graphic adjustments that include simple image alteration, or adjustment to existing graphic files required before output. These shall include, but are not limited to:

- (1) Replacing FPO images with high-resolution scans
- (2) Color management required to match PMS specifications
- (3) Creating masks from clipping paths attached to FPO images
- (4) Retouching photographs to eliminate scratches or blemishes
- (g) **Closeout**

3.1.2 **Return of Materials**

Upon conclusion of all work, the contractor shall return all government-furnished and all other outstanding materials as specified in each individual task order. All material generated by the contractor in the process of completing a task order is the property of the government.

4.1 **Labels**

4.1.1 **Weather Proof Labels**

Produce weatherproof labels that shall be placed on the back side of the wayside graphic panels.

Indicate the following specific information for every panel:

Panel Identification Number (ex: GUI5-332),
Size (ex: 36x48),
Material (ex: HPL),
Date of Manufacture,
Harpers Ferry Center, 304-535-5050.

The label shall also include a box with the words "Installation Date" above it so that the park staff can indicate the date of installation on the panel sticker. One sticker shall be secured to each panel prior to delivery of the panels to the COR or other destination designated in the task order.