

700 MATERIAL DETAILS

Materials shall conform to the stated requirements and/or the requirements of the referenced specifications including modifications as noted.

Copies of all Supplemental Specifications referenced in this section are on file with the City of Columbus Transportation Division.

708 – PAINT

708.01 Raw Linseed Oil. ASTM D 234.

708.02 Boiled Linseed Oil. ASTM D 260, Type 1.

708.03 Turpentine. Destructively distilled wood turpentine, ASTM D 13.

708.04 Mineral Spirits. ASTM D 235, Type 1.

708.05 White Structural Paint. AASHTO M 70, Type I.

708.08 Corrosion Resistant Gray Finish Paint. This specification covers a gray, corrosion resistant, oil-alkyd finish coat for structural steel.

Pigment. The pigment shall meet the following composition requirements:

	Minimum Percent	Maximum Percent
Basic lead silicon-chromate, ASTM D 1648 Type 1.....	20.0	
ASTM D 476 Type IV	30.0	40.0
Phthalocyanine green, phthalocyanine blue, lamp black (tint to require shade)	1.5	
Barium sulfate, ASTM D 602	20.0	30.0
Magnesium silicate, ASTM D 605.....		15.0
Organo-montmorillonite suspension agent (predampen with 35 percent methyl alcohol water 95-5	0.3	0.7

Vehicle. The composition of the vehicle shall meet the following requirements:

	<u>Minimum Percent</u>	<u>Maximum Percent</u>
Non-volatile vehicle	69.0	
Raw linseed oil, ASTM D 234.....	38.0	
Alkyd resin solids (FSS TT-R-266 Type I, Class A).....	31.0	
Mineral spirits, driers and anti- skinning agent		31.0
Phthalic anhydride, percent of non- volatile vehicle	10.0	0

The vehicle shall be free from rosin and rosin derivatives. It may contain additive agents such as anti-skinning and wetting aids.

Finished Paint. The finished paint shall be well ground, shall not settle to the extent that the pigment cannot be readily and uniformly dispersed throughout the vehicle, or cake, "liver" or thicken in the container. It shall be readily broken up with a paddle to smooth, uniform consistency. It shall be free working, having satisfactory brushing, flowing, covering and leveling properties. The paint shall show satisfactory adhesion to properly cleaned, weathered paint films and firmly dried fresh undercoats. The paint shall dry to a semi-gloss finish and possess a color closely approaching Federal Standard No. 595-16314. It shall also meet the following requirements:

	<u>Minimum</u>	<u>Maximum</u>
Pigment	55%	58%
Vehicle	42%	45%
Weight per gallon (Liter)	13.2 lbs. (1.58 g/mL)	
Water.....		1.0%
Coarse particles and skins		1.0%
Fineness of grind (North Standard).....	4	
Consistency (Krebs)	75 KU	85KU
Drying time: set to touch.....		6 hrs.
Dry through.....		24 hrs.

708.09 Corrosion Resistant Green Finish Paint. This specification covers a green, corrosion resistant, oil-alkyd paint suitable for use over oleoresinous prime and intermediate paints as a finish coat for structural steel.

Pigment. The pigment shall meet the following composition requirements:

	<u>Minimum Percent</u>	<u>Maximum Percent</u>
Basic lead silico-chromate, ASTM D 1648 Type 1.....	62.0	

Titanium dioxide (rutile, non-chalking), ASTM D 476 IV.....	28.0
Phthalocyanine green, phthalocyanine blue, lamp black (tint to required shade)	1.5
Chromium oxide, ASTM D 212.....	9.0
Organo-montmorillonite suspension agent (pre-wet with 20 to 30 per- cent methyl alcohol)	0.3

Vehicle. The composition of the vehicle shall meet the following requirements:

	<u>Minimum Percent</u>	<u>Maximum Percent</u>
Non-volatile vehicle	66.0	
Raw linseed oil, ASTM D 234.....	28.0	
Alkyd resin solids (FSS TT-R-266 Type I, Class A).....	38.0	
Mineral spirits, driers and anti- skinning agent		34.0
Phthalic anhydride, percent of non- volatile vehicle	11.0	

The vehicle shall be free from rosin and rosin derivatives. It may contain additional agents such as anti-skinning and wetting aids.

Finished Paint. The finished paint shall be well ground, shall not settle to the extent that the pigment cannot be readily and uniformly dispersed throughout the vehicle or cake, "liver" or thicken in the container. It shall be readily broken up with a paddle to a smooth, uniform consistency. It shall be free working, having satisfactory brushing, flowing covering and leveling properties. The paint shall show satisfactory adhesion to properly cleaned, weathered paint films and firmly dried fresh undercoats. The paint shall dry to a semi-gloss finish and process a color closely approaching Federal Standard No. 595-24227. It shall also meet the following requirements:

	<u>Minimum Percent</u>	<u>Maximum Percent</u>
Pigment	55%	58%
Vehicle	42%	45%
Weight per gallon (<i>Liter</i>)	13.2 lbs. (1.58 g/mL)	
Water		1.0%
Coarse particles and skins		1.0%
Fineness of grind (North Standard).....	4	
Consistency (Krebs)	75 K.U.	85 K.U.
Drying time: set to touch.....		6 hrs.

Dry through..... 24 hrs.

708.11 Black Structural Paint. AASHTO M 68.

708.12 Aluminum Paint. AASHTO M 69 with the following exceptions:

Scope 1. This specification covers 2 types of aluminum paint for exterior use, both of which are two-component systems. The primer paint containing a non-leafing pigment is suitable for prime coats on wood and intermediate on metal after undercoating with a suitable primer. The finish paint containing a leafing pigment is suitable for finish coat on wood and metal.

Aluminum paste and varnish shall be furnished in separated compartments or containers and in the proportion of 2 pounds (0.2 kg) of paste per gallon (liter) of varnish. In addition, the packages shall contain the correct amount of paste to combine with the containers of varnish furnished. The aluminum paste and varnish shall be combined immediately prior to the use of the aluminum paint.

Detailed Requirements (Par. 3). The pigment shall be aluminum paste meeting the requirements of ASTM D 962. The primer shall meet Type 4, Class B, medium. The finish shall meet Type 2, Class B, medium. The primer pigment shall have no leafing.

General Requirements 4. The varnish used for both primer and finish shall be a high grade long oil, water-resisting type FSS TT-V-81 Type II and shall show the specified leafing when used with the finish pigment. It shall be clear and free from suspended matter and shall not thicken in the container. The use of free of limed rosin will not be permitted. The oils, resins, driers and thinners shall be of such type and so proportioned and treated that proper drying and brushing characteristics will be obtained on both cold and hot days. Manufacturers desiring to use solvent naphtha must first have the approval of the Laboratory. When flowed on a smooth vertical tin panel, the varnish shall dry hard without wrinkling. The varnish shall also meet the following requirements:

	Minimum Percent	Maximum Percent
Non-volatile oils and resins.....	50%	
Acid number (based on non-volatile)		15
Viscosity, Gardner Holdt	C	E
Set to touch.....	1/2 hr.	4 hrs.
Dry hard		18 hrs.

Air Dry Bend Test. The varnish shall be flowed on a smooth vertical tin panel (thickness 0.011 inches (0.28 mm)) and allowed to air dry at room temperature for 72 hours. The panel shall then be bent through 180 degrees over an 1/8 inch (3.2 mm) rod. No cracking, checking, or flaking shall be noticeable.

The same panel shall be cooled at 32° F (0° C) for 1 hour and immediately bent through 180 degrees over a 1/8 inch (3.2 mm) rod. No cracking, checking or flaking shall be noticeable.

The bent portion at either temperature shall show satisfactory adhesion under a knife test.

Cold Bend Test. The varnish shall be flowed on a smooth vertical tin panel (thickness 0.011 inches (0.28 mm)) and allowed to air dry for 1 hour at room temperature. The panel shall then be baked for 5 hours at 105° C to 110° C cooled at 0° C for 1 hour and immediately bent through 180° over 1/8 inch (3.2 mm) rod. No cracking, checking, or flaking shall be noticeable.

Water Resistance. The varnish shall be flowed on a smooth vertical tin panel and allowed to air dry for 48 hours at room temperature. The panel shall then be placed for 18 hours in a beaker containing 2 1/2 inches (63 mm) of distilled water at room temperature (immerse the end of the panel which was uppermost during the drying period). Only slight whitening shall occur and shall entirely disappear within 1 hour after removal from the water.

Color of Varnish. The color shall not be darker than a freshly prepared solution of 3 grams of potassium dichromate in 100 cubic centimeters of pure sulfuric acid (sp. gr. 1.84).

Tinting: See AASHTO M 69, Section 5.1.

708.15 Prime Paint. A semi-quick drying paint suitable for use as a prime coat on clean iron and steel surfaces. This paint shall have a basic lead silico-chromate pigment and a linseed oil-alkyd (1 to 1) vehicle. The paint shall comply with FSS TT-P-615, Type II.

708.17 Inorganic Zinc Silicate Primer Paint. AASHTO M 300 Type I or Type IA with the following additions:

Color. A green colorant approximately No. 34159 of FS 595A. Prequalification prior to use, the Contractor shall submit to the Director copies of the manufacturer's certified test data showing that the material complies with the qualitative, quantitative and performance requirements of this specification. The test data shall be developed by and approved testing laboratory, and shall include the brand name of the paint, name of manufacturer, number of the lot tested and date of manufacture. When the paint has been approved by the Director, further performance testing by the manufacturer will not be required unless the formulation or manufacturing process has been changed, in which case new certified test results will be required.

Type IA shall also meet the following revisions and additions:

2.1 Type IA-Inorganic zinc-rich primer solvent-base two component to comply with regulations on volatile organic compounds (VOC).

3.1.3 The volatile organic compound (VOC) content shall be stated by the manufacturer in accordance with Section 4.

4.3.2 Volatile organic compounds (VOC) requirements shall not exceed 2.8 lb./gal. (336 g/L) as applied.

4.3.3 Volatile organic compounds (VOC) definition - any organic compound which has a vapor pressure of 0.0019 lbs./sq. inch (13.1 Pa), absolute or greater at standard condition.

Table 1. The metallic zinc percent by weight of pigment for Type IA shall have a minimum requirement of 85 percent.

Table 2. The minimum weight per gallon of Type IA shall be 18.5 lbs (2.217 g/mL). The KU at 77° F (25° C) consistency, shall be as per the manufacturer's recommendation.

4.6.8 Xenon arc or Quv ASTM Designation D 4459 may be used as an alternate. If refereeing is required, the Xenon Arc must be used.

4.7.1 New products which do not have 3-year field performance information can be accepted under and experimental basis.

4.8.5 or by other analytical procedure.

4.8.6 The x-ray diffraction pattern of the extracted pigment shall match that of the initially approved primer.

5.2 The VOC content shall be stated either on the label, product data sheet, or Material Safety Data Sheet.

6. Recoatability.

6.1 The primer shall show adequate recoatability when tested in accordance to the following method:

Panels are primed in accordance to Section 4.6.4 shall be placed into a humidity cabinet as per Section 4.6.10. Panels are then cleaned in accordance with the manufacturer's recommendation, recoated, and cured in accordance to Section 4.6.4. Adhesion testing shall then be performed in accordance to Section 4.6.6

modified to a 5 mm spacing if the total coating thickness is greater than 5 mils (130 µm). Minimum adhesion measurements shall be 3B grading.

7. Top Coating.

7.1 Topcoats shall show adequate adhesion when tested in accordance to the following method:

Panels primed in accordance to Section 4.6.4 shall be placed into a humidity cabinet as per Section 4.6.10. Panels are then cleaned in accordance to the manufacturer's recommendation and top coated with the system to be applied and in accordance with the manufacturer's specification. Panels shall be exposed in a Cleveland condensing cabinet for 30 days. After exposure, adhesion testing shall be performed in accordance to ASTM D3359, Method B, and achieve a minimum adhesion measurement of 3B.

708.18 Blue-Green Vinyl Finish Coat. This specification covers a vinyl paint suitable for use over cured inorganic zinc silicate prime paint when applied in accordance with the manufacturer's printed instructions.

Pigment. The pigments shall be finely ground and not be livered, skinned or settled to the degree that they cannot easily be redispersed.

Vehicle. The vehicle shall consist essentially of vinyl chloride-vinyl acetate copolymer resins containing sufficient plasticizers to insure and adequate tensile strength for the binder.

Finished Paint. The finished paint shall meet the following requirements and possess a color closely approaching Federal Standard No. 595-34241:

	<u>Minimum</u>	<u>Maximum</u>
Pigment, percent.....	27.0	
Vehicle solids, percent.....	21.0	
Total solids, percent.....	48.0	
Density, lbs/gal (g/mL).....	9.0 (1.078)	11.0 (1.318)

Material Quality Assurance. The viscosity of the paint shall be within ±5.0 Krebs Units of the viscosity of the previously submitted sample. The weight per gallon of the paint shall be within ±0.30 pounds (± 0.036 g/mL) of the previously submitted sample.

708.19 Structural Steel Prime Paint. FSS TT-P-615, Type V.