

SUNBELT transformer

WIDTFA3501 PAINTING TRANSFORMERS WITH WATERBORNE PAINT SYSTEMS *INTERNAL USE ONLY*

DOCUMENT HISTORY

REV.	DATE	DESCRIPTION OF CHANGE AND REASON FOR CHANGE
A	JUNE 10, 1999	NEW ISSUE
B	JULY 20, 1999	REVISIONS BASED ON COMMENTS TO DRAFT A
C	AUG 23, 1999	REVISIONS BASED ON MEETING ON AUG 10, 1999
00	OCT 25, 1999	CHANGE TO PITTSBURGH WATERBORNE PAINTS
01	FEB 03, 2000	REWRITE OF SECTION 6.1
02	MAR 03, 2000	REWRITE OF SECTION 5.5 UNDERCOATING
03	MAR 19, 2002	REWRITE OF SECTION 4.0, 5.8, 6.1 & 6.8, ADD 7.0

REVISION 03

APPROVED: _____
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1.0 PURPOSE

This procedure documents the approved methods for preparing and painting distribution transformers with the **STANDARD WATERBORNE PAINT FINISH SYSTEMS (ACRYLIC ENAMEL OR EPOXY)**.

2.0 SCOPE

This procedure applies to employees involved with the design, scheduling, manufacturing and painting of distribution transformers which have the standard waterborne acrylic enamel or epoxy paint finish systems.

3.0 GENERAL

3.1 DRY TIMES

The dry times indicated in this procedure are calculated for an ambient temperature of 77 degrees F and 50% relative humidity.

3.2 GENERAL PROCESS

The fabricated steel tanks are shot blasted, primed, given a color coat, and undercoated if required, prior to assembly. Other parts are painted individually and/or left untreated until final assembly. After tanking, testing, and welding, the transformer is steam cleaned and air-dried. Miscellaneous parts are installed. The unit is deburred and sanded. Unpainted surfaces are primed and given a color coat. Finally, the entire unit is finished with a topcoat and allowed to air dry for 18 hours before shipping.

3.3 FINISHED UNIT

The finished unit has a minimum of 3 mils dry film thickness of paint on a minimum of 1.5 mils dry film thickness of primer, which results in a durable finish suitable for the industrial and/or construction marketplace.

3.4 WASTE WATER

The direct discharge of water-based paint into the sewer system is prohibited, but the discharge of the rinse/wash waters into the sewer system is approved.

4.0 PAINTING THE RADIATORS

Radiators will be supplied with an epoxy primer and acrylic top coat finish in padmount green (PMG), ASA 70 light grey, and ASA 61 grey only. The PMG and ASA70 colors from Tranter are powdercoated. The ASA61 grey color on 54" & above welded header radiators are powdercoated ASA 70 and then painted by Tranter with an ASA61 acrylic enamel. The ASA 61 grey color on 52" & below integral header radiators are primed and then flow coated by Tranter with an ASA61 acrylic enamel. Radiators with a color coat from Tranter are not re-painted on site. They are masked off prior to the transformer being painted.

For other colors, the only radiators we paint are primer radiators. Radiators should be washed and abrasively prepped prior to painting. Radiators will be pre-painted with the specified color before being welded to the transformer. The radiators will receive a single final color coat when the whole transformer receives its final color coat.

NOTE 1: DO NOT APPLY PRIMER TO VENDOR PRE-PAINTED RADIATORS.

NOTE 2: DO NOT PAINT VENDOR PRE-PAINTED RADIATORS (EXCEPT TOUCH UP PAINT FOR FREIGHT OR OTHER DAMAGE).

NOTE 3: DO NOT APPLY PRIMER TO VENDOR PRIMERED RADIATORS. RADIATORS SHOULD BE MASKED ON ALL PRIMER UNITS AT THE TIME THE TANK IS PRIMERED.

ANY EXCEPTIONS RE: RADIATOR PAINTING SHOULD BE APPROVED BY ENGINEERING.

5.0 STANDARD WATERBORNE ACRYLIC ENAMEL PAINT FINISH

5.1 HANDLING SINGLE COMPONENT WATERBORNE PAINT

The waterborne primer and topcoat come ready to spray in 5 gallon and 55 gallon containers and **SHALL NOT BE THINNED**. Any clean up of paint equipment is done using clean tap water. The waterborne paint shall be mixed by stirring or shaking for 5 to 10 minutes prior to application. The drum agitators are to be left running continually on open 55 gallon primer and paint containers to prevent a skin from forming or separation.

5.2 SHOTBLASTING

Tank exteriors are to be thoroughly cleaned by steel grit shot blasting with particular attention given to welded areas. Covers, compartments, cabinets, and other enclosures are shot blasted on both interior and exterior surfaces. Shot blasted steel remains indoors throughout the assembly until the final topcoat has been applied and allowed to dry.

5.3 PRIMING

Excessive identification chalk marks from shot blasting, dye penetrant from weld checking, minor surface rust, dust and/or grit, shall be removed prior to priming.

Tanks, compartments, and any bolt on accessory items are primed within 72 hours after shot blasting. Enclosures and items to be welded on the tank are left as bare metal. Areas on the tank requiring welding are masked off prior to priming to provide a clean surface for the weld.

The waterborne acrylic primer is applied with an airless spray to a wet film thickness of 4 mils. (Dry film thickness of 1.5 mils). The dry time is approximately 20 to 30 minutes. Re-coating or top coats can be applied any time after the unit is dry.

5.4 INITIAL COLOR COAT

- 5.4.1 The primed tanks, compartments, and any bolt on accessory items have an initial color coat of waterborne acrylic enamel topcoat applied with an airless spray to a wet film thickness of 4 mils. (Dry film thickness of 1.5 mils). Dry time is 20 to 30 minutes.
- 5.4.2 There is an eight (8) hour minimum dry time required between the initial topcoat application and the start of the Tanking process.

5.5 UNDERCOATING, IF REQUIRED

The standard light gray material for undercoating, is Pittsburgh Paint Pittguard All Weather DTR 2 part Epoxy Mastic Coating. This is a two component material,

which is mixed in a one to one ratio. Add one part of component "B" to one part of component "A". Use a mechanical mixer, and mix for a minimum of 10 minutes. Pot life is 4 hours at 77 degree Fahrenheit, and decreases to 1 hour at 100 degree Fahrenheit. Apply undercoating to shot blast, un-primed metal. Wet film thickness is to be between 7 and 10 mils; dry film thickness 5 to 7 mils. Coverage is 160-255 square feet per gallon. Mix only enough to do the job at hand, within the pot life time.

Dry time at 77 degree Fahrenheit: to touch 3-4 hours; to handle 7-8 hours; to re-coat 3 hours minimum.

Time to re-coat increases to 3 days at 32 degree Fahrenheit, so make sure that undercoated area stays at or near 77 degree Fahrenheit.

Apply to all corners and hard to reach areas with disposable brush first. For larger areas use a short nap roller, or continue with brush.

Under-coated areas can be covered with our primer and/or topcoat waterborne or epoxy systems. This undercoating is not compatible with alkyd oil coatings.

Apply in well ventilated area, or wear NIOSH approved respirator. Avoid skin or eye contact. Refer to MSDS for details.

Unless otherwise instructed, apply undercoating to the following areas:

- All surfaces and braces under the tank, and inside the base.
- Cabinets, air terminal chambers, flanges, inside, on the bottom, minimum of three inches up from bottom (pad) surface.
- Outside base, minimum of two inches up from bottom (pad) surface.

5.6 PAINTING PIECE PARTS

5.6.1. Small parts are hung on the paint line. They are primed with the waterborne acrylic primer to a wet film thickness of 4 mils. (Dry film thickness of 1.5 mils). The dry time is 20 to 30 minutes prior to the application of the initial color coat of waterborne acrylic enamel. The initial color coat is applied to a wet film thickness of 4 mils (dry film thickness of 1.5 mils) with a dry time of 20 to 30 minutes. Recoating can be done anytime after the part is dry.

5.6.2. For piece parts that are completely finished prior to installation on the transformer, a second color coat is applied to a wet film thickness of 4 mils (dry film thickness of 1.5 mils) with a dry time of 20 to 30 minutes. The finished piece parts will have a minimum dry film thickness of 4.5 mils of paint and primer.

5.7 ASSEMBLY & STEAM CLEANING

Shot blast-cleaned covers, cabinets, enclosures, and other accessory items are welded on in the assembly stage of the transformer. The exterior of the transformer is steam cleaned of any excessive marks, dirt, oil, and/or grime accumulated during assembly. Weld slag, welding wire tips, and any other such residual is removed using a disk sander. The initial paint coat is lightly hand

sanded to assure adhesion of the topcoat. Undercoating of compartment parts is applied. The unit is air dried and prepared for final assembly.

5.8 FINAL ASSEMBLY & PRIMING

After cleaning, the remaining shot blasted, bare metal surfaces are primed. Steam cleaned bare metal areas typically should not stand longer than 72 hours prior to priming. After 72 hours, if the metal shows any visible signs of rust or corrosion, then reblast as needed.

The waterborne acrylic primer is applied with an airless spray to a wet film thickness of 4 mils (dry film thickness of 1.5 mils) over any bare metal areas. The dry time is 20 to 30 minutes prior to the application of the color coats.

REFER TO SECTION 4.0 RE: RADIATORS.

5.9 FINAL WATERBORNE ACRYLIC ENAMEL TOPCOAT

The primed and newly primed areas receive a waterborne acrylic enamel topcoat, applied with an airless spray, to a wet film thickness of 4 mils. (Dry film thickness of 1.5 mils). Dry time is 20 to 30 minutes. Recoating can be done anytime after the topcoat is dry. The final topcoat will be applied over the whole transformer to a wet film thickness of 4 mils. (Dry film thickness of 1.5 mils). The final topcoat is applied to the entire assembly including the previously painted tank structure. Dry time is 20 to 30 minutes. Bolt on parts which have been finish coated on the paint line are installed. Non-corrosive material (hinges, bolts, etc.) are not required to be painted but are normally painted for cosmetic purposes. Plastic protective washers will be used on compartment door bolts to keep the painted surfaces from sticking together.

The finished transformer must dry for a minimum of 18 hours prior to shipping. Touch up paint used on places where two painted surfaces touch need to dry a minimum of 18 hours prior to shipping.

The finished transformer will have a minimum dry film thickness of 4.5 mils of paint and primer.

6.0 STANDARD WATERBORNE EPOXY PAINT FINISH

6.1 HANDLING WATERBORNE EPOXY PAINT

The waterborne epoxy primer and topcoat consists of two components, which are mixed by volume, one part of component "A" and one part of component "B".

The following steps must be followed to ensure the correct mixing of the epoxy primer and topcoat.

- a) Thoroughly mix each component for a minimum of 2 minutes on the paint shaker.
- b) Pour component A into a clean pail for mixing.

c) Add component B to component A and mechanically agitate (using a drill and mixing paddle) for a minimum of 5 minutes, ensuring that both components are thoroughly mixed together.

Once the paint is mixed, it can be used immediately and has a pot life of six (6) hours. THE PAINT SHOULD NOT BE THINNED. However, the instructions on the paint can say the paint can be mixed with up to 5% water if needed for application purposes. Any cleanup of paint equipment can be done with warm water within one hour, or after one hour use MEK.

The epoxy primer or topcoat should only be applied when the air, surface, and paint temperatures are above 50°F and the surface temperature is at least 5°F above dew point.

NOTE: the curing time is retarded when the air temperature is below 60°F.

6.2 SHOTBLASTING

Use paragraph 5.2.

6.3 PRIMING

Excessive identification chalk marks from shotblasting, dye penetrant from weld checking, minor surface rust, dust and/or grit shall be removed prior to priming.

Tank compartments, and any bolt on accessory items are primed within 72 hours after shot blasting. Enclosures and items to be welded on the tank or left as bare metal. Areas on the tank requiring welding are masked off prior to priming to provide a clean surface for the weld.

The waterborne epoxy primer is applied with an airless spray to a wet film thickness of 8 mils. (Dry film thickness of 3 mils.). The dry time before recoating is 16 hours.

6.4 INITIAL COLOR COAT

6.4.1 The primed tanks, compartments and any bolt or accessory items have an initial color coat of waterborne epoxy topcoat applied with an airless spray to a wet film thickness of 5 mils. (Dry film thickness of 2 mils.). Dry time before recoating is 16 hours.

6.4.2 There is a twelve (12) hour minimum dry time required between the initial color coat application and the start of the Tanking process.

6.5 UNDERCOATING, IF REQUIRED

Use paragraph 5.5.

6.6 PAINTING PIECE PARTS

- 6.6.1 Small parts are hung on the paint line. They are primed with the waterborne epoxy primer to a wet film thickness of 8 mils. (Dry film thickness of 3 mils). The dry time prior to the application of the initial color coat is 16 hours. The initial waterborne epoxy topcoat is applied to a wet film thickness of 5 mils. (Dry film thickness of 2 mils). The dry time before recoating is 16 hours.
- 6.6.2 For piece parts that are completely finished prior to installation on the transformer, a second waterborne epoxy topcoat is applied to a wet film thickness of 5 mils. (Dry film thickness of 2 mils). The dry time prior to installation of the piece parts is 12 hours. The finished piece parts will have a minimum dry film thickness of 7 mils of paint and primer.

6.7 ASSEMBLY STEAM CLEANING

Use paragraph 5.7.

6.8 FINAL ASSEMBLY AND PRIMING

After cleaning, the remaining shot blasted, bare metal surfaces are primed. Steam cleaned bare metal areas typically should not stand longer than 72 hours prior to priming. After 72 hours, if the metal shows any visible signs of rust or corrosion, then reblast as needed.

The waterborne epoxy primer is applied with an airless spray to a wet film thickness of 8 mils (dry film thickness of 3 mils) over any bare metal areas. The dry time prior to application of the color coat is 16 hours.

REFER TO SECTION 4.0 RE: RADIATORS.

6.9 FINAL WATERBORNE EPOXY TOPCOAT

The primed and newly primed areas receive a waterborne epoxy topcoat, applied with an airless spray to a wet film thickness of 5 mils. (dry film thickness of 2 mils.). The dry time before recoating is 16 hours. The final topcoat will be applied over the whole transformer to a wet film thickness of 5 mils. (Dry film thickness of 2 mils). The final topcoat is applied to the entire assembly including the previously painted tank structure. The dry time is 12 hours before bolt on parts which have been finish coated on the paint line are installed.

Non-corrosive material (hinges, bolts, etc.) are not required to be painted but are normally painted for cosmetic purposes. Plastic protective washers will be used on compartment door bolts to keep the painted surfaces from sticking together.

The finished transformer must dry for a minimum of 18 hours prior to shipping. Touch up paint used on places where two painted surfaces touch need to dry a minimum of 18 hours prior to shipping.

The finished transformer will have a minimum dry film thickness of 7 mils of paint and primer.

7.0 FORCE CURE PROCEDURE

Waterborne epoxy primer on tank or parts requires a 16 hour cure time under normal conditions. Pittsburgh Paint has advised that a force cure is an acceptable method of circumventing the normal cure time. Within a 2 to 4 hour dry time after the primer is applied, put the tank or parts in a 120 degree F oven for 30 minutes. If you wait longer than the 4 hours, you have to wait the full 16 hours. This method has also been used successfully for force curing acrylic enamel, except the 2 to 4 hour window does not apply, (for example, when re-painting small parts needed for a transformer prior to shipment in order to circumvent the 18 hour dry time for those parts).

8.0 APPROVED PAINT MATERIALS

WATERBORNE ACRYLIC PRIMER:

Pittsburgh Paint # 90-712 DTM Waterborne Primer (White)
Tech. Data Sheet # T.D. 266
MSDS Ref. # E0008686

UNDERCOAT:

Pittsburgh Paint Pittguard All Weather 2 part DTR Epoxy Mastic Coating:
Part # 97-948 GRAY for Part A, Part # 97-949 CATALYST for Part B
Tech. Data Sheet # T.D. 302
MSDS Ref. # 97M 10/22/97 (T) 0809

WATERBORNE ACRYLIC ENAMEL TOP COAT:

Pittsburgh Paint DTM Waterborne Acrylic Satin Finish Enamel Paint:
Base # 90-477 for PMG plus tint for PMG
Tech. Data Sheet # T.D. 265
MSDS Ref. # E0008675 (Padmount Green)

WATERBORNE EPOXY PRIMER:

Pittsburgh Paint Aquapon WB Waterborne Epoxy Primer:
Part # 98-46 for Part A, Part # 98-99 for Part B
Tech. Data Sheet # T.D. 268
MSDS Ref. # 11/19/96 (T) 0809

WATERBORNE EPOXY TOPCOAT:

Pittsburgh Paint Aquapon WB Waterborne Epoxy Topcoat:
Part # 98-51 or 98-56 for Part A, Part # 98-100 for Part B
Tech. Data Sheet # T.D. 267
MSDS Ref. # 11/19/96 (T) 0809

9.0 APPENDIX "A" - CHART FOR WATERBORNE ACRYLIC PAINT FINISH PROCEDURE STEPS, MILLAGE AND DRY TIMES AT 77 DEGREES F AMBIENT TEMP

PROCEDURE STEP	COATING DESCRIPTION	TIME TO NEXT STEP
BLAST	BARE METAL	LESS THAN 72 HOURS
PRIME	4 MILS WET / 1.5 MILS DRY	20 TO 30 MINUTES
FIRST COLOR COAT	4 MILS WET / 1.5 MILS DRY	20 TO 30 MINUTES
UNDERCOAT, IF REQUIRED INSTALLED	7-10 MILS WET/5-7 MILS DRY	8 HOURS MINIMUM DRY TIME AT77F BEFORE RADS
--	--	8 HOURS MINIMUM DRY TIME AT77F BEFORE TANKING
TANKING	--	--
TESTING	--	--
COVER WELD	--	--
STEAM CLEAN	--	--
PRIME	4 MILS WET / 1.5 MILS DRY	20 TO 30 MINUTES
FIRST COLOR COAT NEWLY PRIMED SURFACES	4 MILS WET / 1.5 MILS DRY	20 TO 30 MINUTES
FINAL COLOR COAT	4 MILS WET / 1.5 MILS DRY	20 TO 30 MINUTES
TOUCH UP PAINT	--	20 TO 30 MINUTES
FINISHED UNIT	4.5 MILS MINIMUM DRY FILM PAINT & PRIMER	--
--	--	18 HOURS MINIMUM DRY TIME BEFORE SHIPMENT

NOTE: REFER TO SECTION 4.0 RE: RADIATORS.

10.0 APPENDIX "B" CHART FOR WATERBORNE EPOXY PAINT FINISH PROCEDURE STEPS, MILLAGE AND DRY TIMES AT 77 DEGREES F AMBIENT TEMP

PROCEDURE STEP	COATING DESCRIPTION	TIME TO NEXT STEP
BLAST	BARE METAL	LESS THAN 72 HOURS
PRIME	8 MILS WET / 3 MILS DRY	16 HOURS
FIRST COLOR COAT	5.5 MILS WET / 2 MILS DRY	16 HOURS
UNDERCOAT IF REQUIRED INSTALLED	7-10 MILS WET/ 5-7 MILS DRY	8 HOURS MINIMUM DRY TIME AT77F BEFORE RADS
--	--	8 HOURS MINIMUM DRY TIME AT77F BEFORE TANKING
TANKING	--	--
TESTING	--	--
COVER WELD	--	--
STEAM CLEAN	--	--
PRIME	8 MILS WET / 2 MILS DRY	16 HOURS
FIRST COLOR COAT NEWLY PRIMED SURFACES	5.5 MILS WET / 2 MILS DRY	16 HOURS
FINISH COLOR COAT	5.5 MILS WET / 2 MILS DRY	16 HOURS
TOUCH UP PAINT	--	16 HOURS
FINISHED UNIT	7 MILS MINIMUM DRY FILM PAINT & PRIMER	--
--	--	18 HOURS MINIMUM DRY TIME BEFORE SHIPMENT

NOTE: REFER TO SECTION 4.0 RE: RADIATORS.