Pretreatment Specifications

No. 3 Basic Zinc Chromate-Vinyl Butyral Washcoat

Approved as Tentative, March 26, 1953
Steel Structures Painting Council
4400 Fifth Avenue
Pittsburgh 13, Pa.

This publication is one of a series of

PRETREATMENT SPECIFICATIONS

The purpose of these pretreatment specifications is to establish current good practice in the pretreating of structural steel surfaces prior to painting. They were prepared and revised in collaboration with many representatives of various steel fabricators, erectors, constructors, railroads, highway departments, consulting engineers, paint manufacturers, commercial cleaning and painting contractors, manufacturers of pretreatments, and other organizations concerned with the cleaning and painting of steel. It is intended that these specifications be included in contracts by reference to their title and number. Any suggestions for improvement or other correspondence should be addressed to the Secretary, Steel Structures Painting Council.

These specifications have been prepared by the Research Committee and approved for publication by the Executive Committee of the Steel Structures Painting Council. The membership of the Research Committee that prepared these specifications is as follows:

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Published by

STEEL STRUCTURES PAINTING COUNCIL

4400 Fifth Avenue

Pittsburgh 13, Pa.

Price, Twenty-five Cents, each

Specifications 1 to 6 — Sixty Cents, per set

Steel Structures Painting Council Pretreatment Specifications

No. 3 Basic Zinc Chromate-Vinyl Butryal Washcoat

1. Scope

1.1 This specification covers the procedures required for the basic zinc chromate-vinyl butyral washcoat pretreatment of structural steel surfaces prior to painting.

2. Definition

2.1 Basic Zinc Chromate-Vinyl Butyral Washcoat (sometimes referred to as wash primer) is a pretreatment for metals which reacts with the metal and at the same time forms a protective vinyl film which contains an inhibitive pigment to help prevent rusting. This washcoat is supplied as two components which are mixed together just prior to use. The base contains an alcohol solution of polyvinyl butyral resin pigmented with basic zinc chromate. The diluent contains an alcohol solution of phosphoric acid which reacts with the vinyl resin, the pigment, and the steel.

2.2 It is intended that this pretreatment be used primarily on clean steel free of rust and scale or on galvanized metal; but it may be used, when specified, on steel with tightly adherent mill scale or very slight amounts of rust.

3. Procedures

3.1 Basic Zinc Chromate-Vinyl Butyral Washcoat pretreatment shall consist of the following sequence of operations:

3.1.1 Specified surface preparations shall be completed first. Any dust or dirt shall be removed from the surface. Oil and grease shall be removed from the surface by methods provided in SSPC-Sp 1-63T, "Solvent Cleaning."

3.1.2 As soon as practicable and before rusting of the surface occurs, the surface shall be pretreated with material which meets the following specifications: MIL-C-15328A dated 17 March 1952, or Bureau of Ships Formula 117.

3.1.3 Four volumes of base shall be mixed with one volume of diluent as follows: First break up the pigment settled in the base with a wooden paddle, mechanical stirrer, or mixer, and mix to distribute the pigment evenly throughout the base. After the base is thoroughly mixed, slowly pour one volume of the diluent into four volumes of the base with constant agitation. Do not pour off the liquid which has separated from the pigment and then add the diluent to the settled pigment to aid mixing. Material which is not mixed properly may gel and be unfit for use. The washcoat base shall be mixed with the diluent in quantities which will be applied within six to eight hours after mixing. The pretreatment is most effective when freshly mixed. Storage periods in excess of eight hours may make the mixed material useless.

3.1.4 Apply the washcoat pretreatment by spraying or brushing. Spraying is generally the preferred method, but brushing may be desirable over rough or poorly prepared steel. Roller coating may be used only if specified. Paint brushes should be clean and dry, or wetted with alcoholic solvents. The washcoat should be strained before spraying. When spraying avoid excess air pressure or liquid pressure.

3.2 Apply to a dried film thickness of 0.3 to 0.5 mils which is usually obtained at a spreading rate of about 250 to 300 square feet per gallon. Note that at this thickness, which should not be exceeded, the base metal will show through the washcoat as evidenced by uneven coloring. This is the normal appearance; do not attempt to apply washcoat so as to obtain complete hiding.

3.3 When sprayed, the washcoat must be deposited on the surface wet; if dusting is encountered, move the gun closer to the surface; if already within six

inches of the surface, decrease atomizing air pressure or increase the liquid pressure, or add thinner.

3.4 Under adverse conditions, thinning may be necessary. Add up to 20 per cent by volume of isopropanol or butanol. Normally, the washcoat will spray as mixed.

3.5 When spot treating, cover only spots free of old paint. Overlap or complete coverage of old paints is not harmful provided adherence of the washcoat to the old paint is satisfactory and the old paint is not lifted.

3.6 Washcoat that cannot be used within a maximum of eight hours after mixing with diluent shall not be used.

3.7 Use denatured or isopropyl alcohol to clean equipment or to remove deposits of excess washcoat.

3.8 Paint may be applied as soon as the washcoat is dry—usually one half to one hour, although a longer drying period is more desirable.

3.9 It is intended that this pretreatment be applied over clean, dry steel; however, a slightly damp surface may be painted over without harm. If the surface is excessively wet, the vinyl butyral resin will be thrown out of solution and form a gel, or the dried film will turn white, become brittle and lack adhesion to the steel.

3.10 This pretreatment is not intended for use as a shop coat for steel and it should be coated with the prime coat of paint before exposure. However, it may provide temporary protection for normal outdoor exposures of several weeks provided it is not exposed to very humid conditions or water does not collect on its surface.

4. Safety Precautions

4.1 Washcoat primers contain highly volatile and flammable solvents. The usual safety precautions in handling flammable solvents should be observed. Toxic hazards to personnel must be kept in mind when working in closed spaces.

5. Inspection

5.1 All work under this specification shall be subject to inspection by the owner or his representative. All parts of the work shall be accessible to the inspector. The contractor shall correct such work as is found defective under the specifications. If the contractor does not agree with the inspector, the arbitration or settlement procedure established in the contract, if any, shall be followed. If no arbitration or settlement procedure is established, the procedure specified by the American Arbitration Association shall be used.

Appendix

A.1 SCOPE. The recommendations contained in this appendix are believed to represent current good practice, but are not to be considered as requirements of the specifications.

A.2 This pretreatment should not be considered as a coat of paint. It is intended for use over clean, dry, descaled steel; however, it does not work well over phosphate treated steel, and should not be used over paint or wetting oils. While it must be used on bare metal for best results, it has shown merit when used as a pretreatment over slightly rusted surfaces or mill scale when compared to conventional paint systems without the pretreatment over the same type of surface.

A.3 This pretreatment may be used to bond conventional paints to galvanized surfaces or stainless steel. Solvent cleaning of such surfaces, even though apparently clean, is advisable before applying the pretreatment.

A.4 Almost all paints will adhere well to this pretreatment; exceptions are certain types of vinyl paints and some lacquers; these coatings may require an intermediate or bonding coat. Paints containing alcohol or ketone solvents generally show best bonding.

A.5 This pretreatment may be used to inhibit rusting under cold-applied asphalt and coal tar coatings, or other coatings of low permeability and little or no rust inhibiting capacity.

A.6 Basic zinc chromate pigment in this pretreatment has a tendency to settle hard in the container; to avoid difficulty in dispersing settled pigment, fresh material should be used, and the oldest material always used first.

A.7 Detailed composition and physical properties of the washcoat are covered in the quoted specifications. A summary of the composition is as follows:

No. 8. BASIC ZINC CHROMATE—VINYL BUTYRAL WASHCOAT

Pigment Base	
Polyvinyl butyral resin....	9.0% by weight
Basic zinc chromate.....	8.6
Magnesium silicate.....	1.3
Lampblack.....	0.1
Butyl alcohol, normal....	20.0
Ethyl alcohol.....	61.0
	100.0

Acid diluent	
85% Phosphoric acid.....	12.0% by weight
Water (maximum).....	16.1
Ethyl alcohol.....	66.9
	100.0

An equal volume of isopropyl alcohol (99%) may be substituted for the ethyl alcohol. One volume of acid diluent is mixed with four volumes of pigmented base just prior to use. The mixed material should weigh about 7.8 pounds per gallon and should contain about 10.4 per cent by volume of nonvolatile matter.

A.8 Drying time naturally varies with the drying conditions; however, the washcoat should normally dry to handle in 15 to 30 minutes, and dry for recoating in one half to one hour.

A.9 Butyl alcohol (butanol) may be added to reduce blushing during high humidity application.

STEEL STRUCTURES PAINTING COUNCIL

PURPOSES

1. To review the art of cleaning and painting steel structures through literature surveys, conferences and other means, to determine and outline the best methods developed up to the present time.
2. To issue, if found feasible, a code or specification covering practical and economical methods of surface preparation and painting steel structures, based on the present knowledge of the membership of the Council.
3. To perform in its own organization, or by engaging outside individuals or organizations, further research to reduce or prevent the corrosion of steel structures by surface preparation and by the application of coatings, paint and other materials and to determine the initial and annual costs thereof.
4. To issue from time to time recommendations intended to further improve, and to make more effective and more economical the protection of steel structures; such recommendation to be made available to specification and code writing committees.

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National Association of Corrosion Engineers
National Paint, Varnish and Lacquer Association
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