Pretreatment Specifications

No. 1 Wetting Oil Treatment

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, contractors, 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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Pretreatment Specifications

No. 1 Wetting Oil Treatment

1. Scope

1.1 This specification covers the procedure required for the pretreatment of structural steel surfaces by the application of wetting oil prior to painting.

2. Definition

2.1 Wetting oils are penetrating oils that oxidize and air-dry to form a solid water insoluble, protective film. Wetting Oil Treatment is a method of initially saturating the surface layer of rusty and scaled steel with wetting oil that is compatible with the priming paint, thus improving the adhesion and performance of the paint system to be applied. However, it is not intended that this pretreatment take the place of a coat of paint or eliminate the necessity of surface preparation.

3. Procedures

3.1 Wetting Oil Treatment shall consist of the following procedures:

3.1.1 Any surface cleaning required shall be done before application of the wetting oil.

3.1.2 After the required cleaning and before any paint is applied, the surface to be pretreated shall be coated with one of the following materials:

3.1.2.1 Raw linseed oil, or raw linseed oil plus metallic driers, or boiled linseed oil, thinned as necessary; the thinner used must be compatible with the priming paint specified. The volatile matter in the wetting oil shall not exceed 70 per cent by weight of the applied pretreatment and should not be less than 50 per cent by weight. Raw linseed oil shall comply with the requirements of Federal Specification TT-O-369, "Raw Linseed Oil," or A.S.T.M. Standard Specification D234-48, "Raw Linseed Oil;" boiled linseed oil shall comply with the requirements of Federal Specification TT-O-364, "Boiled Linseed Oil," or A.S.T.M. Standard Specification D260-48, "Boiled Linseed Oil." Boiled linseed oil should be used when the drying time of the applied primer is to be held to a minimum.

3.1.2.2 Proprietary penetrating or wetting oils which will oxidize and air dry to a permanent film; however, only those proprietary products which have been approved by the owner shall be used. Such proprietary products shall be applied in accordance with the manufacturer's directions if such directions are contrary to any part of this specification. Also, such proprietary products shall dry to a firm, elastic, homogeneous film within 24 hours when tested in compliance with the A.S.T.M. Tentative Method of Testing Drying Oils, designation D555-51T; no drier or other material shall be added when making the test for Dry Time.

3.2 The wetting oil shall be applied freely by brush, spray, or dauber. The actual amount used shall depend upon the amount of oil absorbed by the surface contaminants. The surface shall be saturated but an excess of oil on the surface must be avoided. After application, the wet surface shall be examined for dull spots which indicate that all oil has been absorbed into the surface; such spots shall receive an additional thin coat of oil before priming. Any excess shall be wiped from the surface if it does not drain off the surface.

3.3 Before the priming coat of paint is applied, rust, scale, or old paint which has been loosened or raised by the wetting oil shall be removed by scraping or wire-brushing. After such removal, any spots not covered by the oil shall again be treated with the wetting oil.

3.4 The wetting oil must be compatible with the primer to be applied. Synthetic vehicle paints which will not adhere over wetting oil pretreatments are considered to be noncompatible.

3.5 The primer shall be applied after the wetting oil has set to the point where the primer may be applied without any ensuing difficulty. It should be applied within 2 hours after application of the wetting oil.

4. Safety Precautions

4.1 Gasoline or benzene (benzol) shall not be used for thinning the oil; other aromatic or aliphatic solvents may be used, but the thinned wetting oil shall have a minimum flash point of 100° F.

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 specification.

A.2 Wetting Oil Treatment is intended as a pretreatment on steel which has not been completely cleaned of rust or which has cracked or porous mill scale on the surface. It is not intended to be a substitute for cleaning of the surface; furthermore, it is not intended to be used on surfaces where the wettability of the primer is adequate. The wetting oil shall be considered as a part of the first cost and shall not be considered as a separate cost of paint.

A.3 The wetting oil wets the surface contaminants (such as remaining rust, rust-scale, cracked mill scale) and forms a bond between the prime coat of paint and the underlying steel. Quick drying primers such as alkyds, phenolics, and other oleoresinous paints may thus be used over surfaces for which they are not usually suited due to their quick drying and poor wetting properties. However, some synthetic paints, which dry strictly by solvent evaporation such as vinyls, are not suited for use over wetting oils.

A.4 Where drying time is not important, raw linseed oil without driers may be used to advantage. Where faster drying is necessary, the raw linseed oil plus metallic driers or the boiled linseed oil should be used since the added drier will cause drying of the wetting oil within 24 hours; the addition of soluble driers in customary amounts to raw oil is not objectionable if properly done. Semi-drying or non-drying oils should not be used in wetting oils because of their adverse effect on drying time. Similarly, no resins should be used which will have a detrimental effect on the elasticity or durability of the wetting oil or the applied primer. In cold weather, oils should contain drier to obtain satisfactory drying.

A.5 Mineral spirits with a minimum flash point of 100° F. is generally suitable for thinning the oil except when mineral spirits is not compatible with the primer to be applied. In such a case, a thinner shall be used which is compatible and which will not have a detrimental effect on the primer, and one which will partially mix with and dissolve into the primer. Usually, the same thinner that is specified for the priming paint will be suitable for thinning the wetting oil.

A.6 It has been found advantageous to thin wetting oils greatly; the exact amount of the thinner depends upon the surface condition. For surfaces with large amounts of contaminants, 70 per cent, or even more of the wetting oil treatment should be thinner; for surfaces which do not require the extreme fluidity and wetting of such highly thinned wetting oils, 50 per cent, or perhaps less, of the mixture should be volatile thinner.

A.7 The spreading rate of the thinned wetting oil will vary from 200 to 1,000 square feet per gallon. It is important that the surface contaminants are thoroughly saturated, but that no excess of oil remains on the surface. On vertical surfaces, the oil should be applied freely and allowed to drain; on horizontal surfaces, the excess oil may require wiping off; lint-free rags or sponges should be used.

No. 1. WETTING OIL TREATMENT

A.8 Generally, the primers should be applied while the oil is still wet. The oil, however, should be allowed to dry until the primer may be applied without difficulty. This point is reached when the primers may be applied without running off the surface or cracking during drying. The surface may be tested by brushing priming paint over the surface; if the oil is still too wet, the surface will feel oily or greasy and the primers will not apply easily or form a smooth, uniform layer. The time will vary with the drying conditions, the surface, and the thinner used.

A.9 In some instances, it may be advantageous to add a slight amount of the priming paint to the wetting oil (about 10 per cent by volume). This may aid in inspecting the treated surfaces and help work rust inhibiting pigment into the porous surface.

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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American Association of State Highway Officials
American Chemical Society
American Institute of Steel Construction
American Iron and Steel Institute
American Railway Engineering Association
American Society of Civil Engineers
American Society for Testing Materials
American Water Works Association
American Zinc Institute
Association of American Railroads
Bureau of Ships, U. S. Navy
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Federation of Paint and Varnish Production Clubs
Lead Industries Association
Mellon Institute of Industrial Research
National Association of Corrosion Engineers
National Paint, Varnish and Lacquer Association
Steel Plate Fabricators Association
U. S. Bureau of Public Roads