

CONTECComissão de Normalização
Técnica**SC-14**Painting and Anticorrosive
Coatings**Metallic Structure Painting****4th Amendment**

This is the 4th Amendment to PETROBRAS N-1550 REV. E, incorporated the 3rd amendment and it is used to alter the text of the Standard in the parts indicated below:

NOTE 1 The news pages with the performed amendments are placed in its corresponding position(s).

NOTE 2 The amended pages, indicated the date of the amendment, are placed at the end of this standard, in chronological order, and shall not be used.

CONTENTS OF THE 1st AMENDMENT - 09/2011

- Subsection 4.2.1:

Amendment incorporated in the publication of this English version.

- Subsection 4.2.3:

Amendment incorporated in the publication of this English version.

CONTENTS OF THE 2nd AMENDMENT - 07/2012

- Section 2:

Inclusion of ASTM [E 11](#).

- Subsection 3.8:

Alteration of the text.

- Subsection 4.2:

Inclusion of the Note.

- Subsection 4.3:

Inclusion of the Note.

CONTENTS OF THE 3rd AMENDMENT - 02/2014

- Section 2:

Exclusion of ABNT NBR 15239.

Substitution of NACE No.5/SSPC-SP 12 by NACE [WJ-2/SSPC-SP WJ 2](#).

- Subsection 3.2:

Modification of content and exclusion of ABNT NBR 15239.

- Table 1:

Substitution of NACE No.5/SSPC-SP 12 by NACE [WJ-2/SSPC-SP WJ 2](#).

CONTENTS OF THE 4th AMENDMENT - 04/2016

- Subsection 3.9:

Inclusion of the subsection.

- Subsection 4.1.1:

Alteration of the text.

- Subsection 4.1.2:

Alteration of the text.

- Subsection 4.2.1:

Alteration of the text.

- Subsection 4.2.2:

Alteration of the text.

- Subsection 4.2.3:

Alteration of the text.

Metallic Structure Painting

Procedure

This Standard replaces and cancels its previous revision.

The CONTEC - Authoring Subcommittee provides guidance on the interpretation of this Standard when questions arise regarding its contents. The Department of PETROBRAS that uses this Standard is responsible for adopting and applying the sections, subsections and enumerates thereof.

Technical Requirement: A provision established as the most adequate and which shall be used strictly in accordance with this Standard. If a decision is taken not to follow the requirement ("non-conformity" to this Standard) it shall be based on well-founded economic and management reasons, and be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by imperative nature.

Recommended Practice: A provision that may be adopted under the conditions of this Standard, but which admits (and draws attention to) the possibility of there being a more adequate alternative (not written in this Standard) to the particular application. The alternative adopted shall be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by verbs of a nonmandatory nature. It is indicated by the expression: **[Recommended Practice]**.

Copies of the registered "non-conformities" to this Standard that may contribute to the improvement thereof shall be submitted to the CONTEC - Authoring Subcommittee.

Proposed revisions to this Standard shall be submitted to the CONTEC - Authoring Subcommittee, indicating the alphanumeric identification and revision of the Standard, the section, subsection and enumerate to be revised, the proposed text, and technical/economic justification for revision. The proposals are evaluated during the work for alteration of this Standard.

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CONTEC

Comissão de Normalização
Técnica

SC - 14

Painting and Anticorrosive
Coatings

Introduction

PETROBRAS Technical Standards are prepared by Working Groups - WG (consisting specialized of Technical Collaborators from Company and its Subsidiaries), are commented by Company Units and its Subsidiaries, are approved by the Authoring Subcommittees - SCs (consisting of technicians from the same specialty, representing the various Company Units and its Subsidiaries), and ratified by the Executive Nucleus (consisting of representatives of the Company Units and its Subsidiaries). A PETROBRAS Technical Standard is subject to revision at any time by its Authoring Subcommittee and shall be reviewed every 5 years to be revalidated, revised or cancelled. PETROBRAS Technical Standards are prepared in accordance with PETROBRAS Technical Standard [N-1](#). For complete information about PETROBRAS Technical Standards see PETROBRAS Technical Standards Catalog.

Foreword

This Standard is the English version (issued in 12/2011) of PETROBRAS N-1550 REV. E 05/2011, including its Amendment - 09/2011. In case of doubt, the Portuguese version, which is the valid document for all intents and purposes, shall be used.

1 Scope

1.1 This Standard establishes the procedure for selecting steel structure painting schemes on onshore facilities, such as:

- a) piping supports and cradles of equipments;
- b) warehouse structures;
- c) pipe-racks;
- d) floors, platforms, passageways, handrails and staircases;
- e) large-sized equipment support structures, not covered by PETROBRAS [N-2913](#).
- f) telecommunication towers.

1.2 This Standard is applied to procedures started after its date of issuance.

1.3 This Standard contains Technical Requirements and Recommended Practices.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document applies (including amendments).

PETROBRAS [N-9](#) - Treatment of Steel Surfaces by Abrasive Blasting and Water Jetting;

PETROBRAS [N-13](#) - Technical Requirements for Paintwork;

PETROBRAS [N-1021](#) - Pintura de Superfícies Galvanizadas, Ligas Ferrosas e não Ferrosas, Materiais Compósitos e Poliméricos;

PETROBRAS [N-1277](#) - Polyamide Zinc Epoxy Base Paint;

PETROBRAS [N-2288](#) - Tinta de Fundo Epoxi Pigmentada com Alumínio;

PETROBRAS [N-2628](#) - High Thickness Epoxy Polyamide Paint;

PETROBRAS [N-2630](#) - High Thickness Epoxy Zinc Phosphate Paint;

PETROBRAS [N-2677](#) - Polyurethane Acrylic Paint;

PETROBRAS [N-2680](#) - Surface Tolerant Solvent Free Epoxy Paint for Wet Surfaces;

PETROBRAS [N-2913](#) - Revestimentos Anticorrosivos para Tanque, Esfera, Cilindro de Armazenamento e Vaso de Pressão;

ABNT [NBR 14847](#) - Inspeção de Serviços de Pintura em Superfícies Metálicas Procedimento;

ABNT [NBR 15158](#) - Limpeza de Superfícies de Aço por Compostos Químicos;

ABNT [NBR 15185](#) - Inspeção de Superfícies para Pintura Industrial;

ISO [8501-1](#) - Preparation of Steel Substrates Before Application of Paints and Related Products;

ASTM [E 11](#) - Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves;

NACE [SSPC SP 11](#) - Power Tool Cleaning to Bare Metal;

NACE [WJ-2/SSPC-SP WJ 2](#) - Joint Surface Preparation Standard Waterjet Cleaning of Metals-Very Thorough Cleaning (WJ-2) Item No. 21155.

NOTE For documents referred in this Standard and for which only the Portuguese version is available, the PETROBRAS department that uses this Standard should be consulted for any information required for the specific application.

3 General Conditions

3.1 Shop primer, when existing, shall be immediately removed before applying painting schemes set forth in this Standard.

3.2 In case that it is not possible to carry out abrasive blasting or water jetting, PETROBRAS [N-9](#), the surface preparation shall be performed by means of mechanical rotary tools according to [SSPC-SP11](#). In case of touch ups on maintenance paintwork, use epoxy primer pigmented with aluminum, according to PETROBRAS [N-2288](#).

NOTE Pay close attention to the compatibility between the paints used for the touch up with those used previously.

3.3 The time interval for application of any paint over another one already applied shall be that required by the previous paint for recoating. For external coatings, if exceeded the maximum repainting intervals, the recommendations established in PETROBRAS [N-13](#) shall be followed.

3.4 Before preparing the surface to be painted, the entire surface shall be visually inspected, in accordance with ABNT [NBR 14847](#) and ABNT [NBR 15185](#). Identify spots showing traces of oil, grease, fat, soil, sand, salt, welding wastes and other contaminants. The degree of corrosion of the surface (A, B, C or D), in accordance with ISO [8501-1](#), as well as the points where the painting, if any, is damaged.

3.5 In any of the paint systems specified in this Standard, the surface to be painted shall undergo a physical and chemical cleaning process, according to ABNT [NBR 15158](#), only on the regions where traces of oil, grease, fat and other contaminants were found during the inspection. The surface treatment procedure shall be in accordance with Table 1.

NOTE Water jetting shall only be used in maintenance services. For new construction, the water jetting is permitted only if combined with abrasives.

Table 1 - Surface Treatment Method

Specific conditions	Finish grade for abrasive blasting (ISO 8501-1)	Finish grade for water jetting (NACE WJ-2/SSPC-SP WJ 2)
1 and 2	Sa 2 1/2 (minimum)	WJ-2 (minimum)

3.6 During application of the paint systems, the recommendations of PETROBRAS [N-13](#) shall be followed.

3.7 For painting galvanized surfaces, ferrous and non-ferrous alloys, composite and polymeric materials, use the procedure in PETROBRAS [N-1021](#).

3.8 If necessary to confer anti-slip properties to the finish coat, paints containing quartz crystals or other materials specified by the paint manufacturer may be used, with particle size between 2 mm (sieve 10) and 4 mm (sieve 5), according to ASTM [E 11](#). **[Recommended Practice]**

3.9 The paint application by means of roller is only permitted for painting floors, platforms, passageways, handrails and staircases

4 Specific Conditions

4.1 Condition 1

Environment: dry or humid, with or without salinity, containing or not containing gases derived from sulfur.

4.1.1 Primer

Apply a coat of high-thickness zinc phosphate epoxy paint, PETROBRAS [N-2630](#), by means of a roller, brush or airless gun. The minimum dry film thickness shall be 100 µm. The time interval for application of the finish paint shall be, at least, 16 hours, but not more than 48 hours.

4.1.2 Finish Paint

Apply a coat of acrylic polyurethane paint (PETROBRAS [N-2677](#)) by means of a roller, brush or airless gun, with a dry film thickness of 70 µm.

4.2 Condition 2

Highly aggressive environment, subject to acid or alkaline vapors and marine atmospheres (coast line).

NOTE Applicable to particularly aggressive atmospheres, located up to 500 m of the coast or in areas with the occurrence of strong winds, mainly from the sea to the coast, having noticed the presence of sand and/or high salinity of air (saline fog). The surface shall be cleaned with fresh water between coats, under a pressure between 1 000 psi and 3 000 psi.

4.2.1 Primer

Apply a coat of polyamide zinc epoxy base paint, PETROBRAS [N-1277](#), by means of roller, brush or airless gun (with mechanical agitation), with a minimum dry film thickness of 50 µm. The time interval for applying the intermediate paint shall be at least 16 hours and 48 hours at most.

4.2.2 Intermediate Paint

Apply a coat of high thickness epoxy polyamide paint, PETROBRAS [N-2628](#), by means of roller, brush or airless gun, with minimum dry film thickness of 200 µm. The time interval for applying the finish paint shall be at least 16 hours and 48 hours at most.

4.2.3 Finish Paint

Apply a coat of acrylic polyurethane paint, PETROBRAS [N-2677](#), by means of a roller, brush or airless gun, with a minimum dry film thickness of 70 µm.

4.3 Condition 3

Metallic Structure with fire proofing coating.

Before applying the fire proofing coating, the metallic structure shall be blasted to grade Sa 2 1/2 and applied a coat of 150 µm of surface tolerant solvent free epoxy paint for wet surfaces, PETROBRAS [N-2680](#). The time interval for applying the fire proofing coating shall be the same as required for repainting of the anticorrosive coating (PETROBRAS [N-2680](#)).

NOTE In case of using intumescent epoxy paint with anticorrosive properties, it is not necessary to apply the paint PETROBRAS [N-2680](#). **[Recommended Practice]**

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3.6 During application of the paint systems, the recommendations of PETROBRAS [N-13](#) shall be followed.

3.7 For painting galvanized surfaces, ferrous and non-ferrous alloys, composite and polymeric materials, use the procedure in PETROBRAS [N-1021](#).

3.8 If necessary to confer anti-slip properties to the finish coat, paints containing quartz crystals or other materials specified by the paint manufacturer may be used, with particle size between 2 mm (sieve 10) and 4 mm (sieve 5), according to ASTM [E 11](#). **[Recommended Practice]**

4 Specific Conditions

4.1 Condition 1

Environment: dry or humid, with or without salinity, containing or not containing gases derived from sulfur.

4.1.1 Primer

Apply a coat of high-thickness zinc phosphate epoxy paint, PETROBRAS [N-2630](#), by means of a roller, brush or gun (conventional or airless). The minimum dry film thickness shall be 100 µm. The time interval for application of the finish paint shall be, at least, 16 hours, but not more than 48 hours.

4.1.2 Finish Paint

Apply a coat of acrylic polyurethane paint (PETROBRAS [N-2677](#)) by means of a conventional or airless gun, with a dry film thickness of 70 µm.

4.2 Condition 2

Highly aggressive environment, subject to acid or alkaline vapors and marine atmospheres (coast line).

NOTE Applicable to particularly aggressive atmospheres, located up to 500 m of the coast or in areas with the occurrence of strong winds, mainly from the sea to the coast, having noticed the presence of sand and/or high salinity of air (saline fog). The surface shall be cleaned with fresh water between coats, under a pressure between 1 000 psi and 3 000 psi.

4.2.1 Primer

Apply a coat of polyamide zinc epoxy base paint,, PETROBRAS [N-1277](#), by means of conventional gun (with mechanical agitation) or airless gun (with mechanical agitation), with a minimum dry film thickness of 50 µm. The time interval between the intermediate paint and the finish paint shall be at least 16 hours and 48 hours at most.

4.2.2 Intermediate Paint

Apply a coat of high thickness epoxy polyamide paint, PETROBRAS [N-2628](#), by means of airless gun, with minimum dry film thickness of 200 µm.

4.2.3 Finish Paint

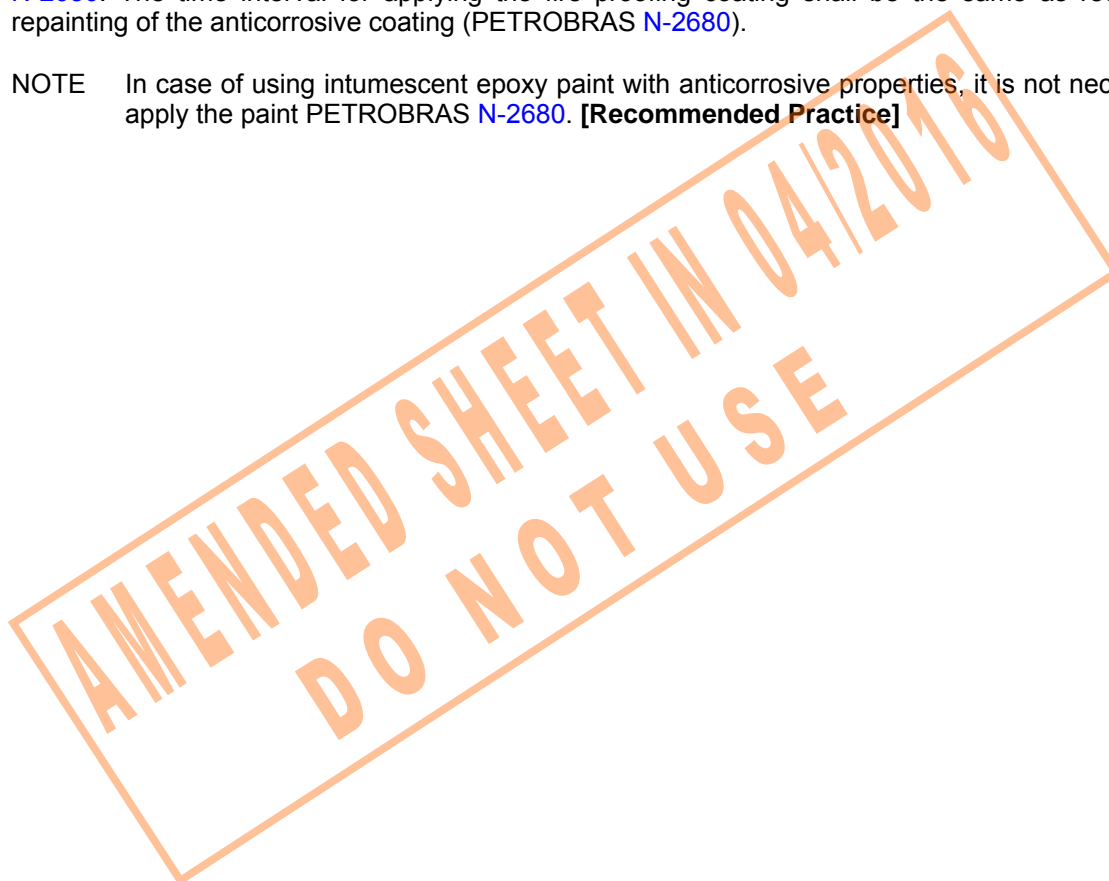
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4.3 Condition 3

Metallic Structure with fire proofing coating.

Before applying the fire proofing coating, the metallic structure shall be blasted to grade Sa 2 1/2 and applied a coat of 150 µm of surface tolerant solvent free epoxy paint for wet surfaces, PETROBRAS [N-2680](#). The time interval for applying the fire proofing coating shall be the same as required for repainting of the anticorrosive coating (PETROBRAS [N-2680](#)).

NOTE In case of using intumescent epoxy paint with anticorrosive properties, it is not necessary to apply the paint PETROBRAS [N-2680](#). **[Recommended Practice]**



ABNT [NBR 15239](#) - Tratamento de Superfícies de Aço com Ferramentas Manuais e Mecânicas;

ISO [8501-1](#) - Preparation of Steel Substrates Before Application of Paints and Related Products;

ASTM [E 11](#) - Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves;

NACE [SSPC SP 11](#) - Power Tool Cleaning to Bare Metal;

NACE [No. 5/SSPC-SP 12](#) - Surface Preparation and Cleaning of Steel and Other Hard Materials by High and Ultrahigh-Pressure Water Jetting Prior to Recoating.

NOTE: For documents referred in this Standard and for which only the Portuguese version is available, the PETROBRAS department that uses this Standard should be consulted for any information required for the specific application.

3 General Conditions

3.1 Shop primer, when existing, shall be immediately removed before applying painting schemes set forth in this Standard.

3.2 For touching up existing painting, the original system shall be repeated. In case that it is not possible to carry out abrasive blasting or water jetting, PETROBRAS [N-9](#), the surface preparation shall be performed, preferably, by means of mechanical rotary tools according to [SSPC-SP11](#) or mechanical treatment to levels St 2 or St 3 of ABNT [NBR 15239](#). In case of touch ups on maintenance paintwork, use epoxy primer pigmented with aluminum, according to PETROBRAS [N-2288](#).

NOTE Pay close attention to the compatibility between the paints used for the touch up with those used previously.

3.3 The time interval for application of any paint over another one already applied shall be that required by the previous paint for recoating. For external coatings, if exceeded the maximum repainting intervals, the recommendations established in PETROBRAS [N-13](#) shall be followed.

3.4 Before preparing the surface to be painted, the entire surface shall be visually inspected, in accordance with ABNT [NBR 14847](#) and ABNT [NBR 15185](#). Identify spots showing traces of oil, grease, fat, soil, sand, salt, welding wastes and other contaminants. The degree of corrosion of the surface (A, B, C or D), in accordance with ISO [8501-1](#), as well as the points where the painting, if any, is damaged.

3.5 In any of the paint systems specified in this Standard, the surface to be painted shall undergo a physical and chemical cleaning process, according to ABNT [NBR 15158](#), only on the regions where traces of oil, grease, fat and other contaminants were found during the inspection. The surface treatment procedure shall be in accordance with Table 1.

NOTE Water jetting shall only be used in maintenance services. For new construction, the water jetting is permitted only if combined with abrasives.

Table 1 - Surface Treatment Method

Specific conditions	Finish grade for abrasive blasting (ISO 8501-1)	Finish grade for water jetting (NACE No. 5/SSPC-SP 12)
1 and 2	Sa 2 1/2 (minimum)	WJ-2 (minimum)

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3.6 During application of the paint systems, the recommendations of PETROBRAS [N-13](#) shall be followed.

3.7 For painting galvanized surfaces, ferrous and non-ferrous alloys, composite and polymeric materials, use the procedure in PETROBRAS [N-1021](#).

3.8 If necessary to confer anti-slip properties to the finish coat, paints containing quartz crystals or other materials specified by the paint manufacturer may be used, in order to produce a friction coefficient on the finished surface of at least 0,5. **[Recommended Practice]**

4 Specific Conditions

4.1 Condition 1

Environment: dry or humid, with or without salinity, containing or not containing gases derived from sulfur.

4.1.1 Primer

Apply a coat of high-thickness zinc phosphate epoxy paint, PETROBRAS [N-2630](#), by means of a roller, brush or gun (conventional or airless). The minimum dry film thickness shall be 100 µm. The time interval for application of the finish paint shall be, at least, 16 hours, but not more than 48 hours.

4.1.2 Finish Paint

Apply a coat of acrylic polyurethane paint (PETROBRAS [N-2677](#)) by means of a conventional or airless gun, with a dry film thickness of 70 µm.

4.2 Condition 2

Highly aggressive environment, subject to acid or alkaline vapors and marine atmospheres (coast line).

4.2.1 Primer

Apply a coat of polyamide zinc epoxy base paint, PETROBRAS [N-1277](#), by means of conventional gun (with mechanical agitation) or airless gun (with mechanical agitation), with a minimum dry film thickness of 50 µm. The time interval between the intermediate paint and the finish paint shall be at least 16 hours and 48 hours at most.

4.2.2 Intermediate Paint

Apply a coat of high thickness epoxy polyamide paint, PETROBRAS [N-2628](#), by means of airless gun, with minimum dry film thickness of 200 µm.

4.2.3 Finish Paint

Apply a coat of acrylic polyurethane paint, PETROBRAS [N-2677](#), by means of a brush, roller or conventional gun, with a minimum dry film thickness of 70 µm.

4.3 Condition 3

Metallic Structure with fire proofing coating.

Before applying the fire proofing coating, the metallic structure shall be blasted to grade Sa 2 1/2 and applied a coat of 150 µm of surface tolerant solvent free epoxy paint for wet surfaces, PETROBRAS [N-2680](#). The time interval for applying the fire proofing coating shall be the same as required for repainting of the anticorrosive coating (PETROBRAS [N-2680](#)).

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