PETROBRAS | N-2630 | REV. B | ENGLISH | 12/ 2017

HIGH THICKNESS PRIMER EPOXY PAINT

Specification

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 clauses 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 the verb forms "shall," "it is necessary...," "is required to...," "it is required that...," "is to...," "has to...," "only ... is permitted," and other equivalent expressions having an 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 the verbal form "should" and equivalent expressions such as "it is recommended that..." and "ought to..." (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 clause(s) to be revised, the proposed text, and technical/economic justification for revision. The proposals are evaluated during the work for alteration of this Standard.

CONTEC
Comissão de Normas Técnicas

SC - 14
Paintwork and Anticorrosive Coatings

Foreword

PETROBRAS Technical Standards are prepared by Working Groups – GTs (consisting of specialists from PETROBRAS and its Subsidiaries), are commented by PETROBRAS Units and PETROBRAS Subsidiaries, are approved by the Authoring Subcommittees - SCs (consisting of specialists from the same specialty, representing the various PETROBRAS Units and PETROBRAS Subsidiaries), and ratified by the CONTEC Plenary Assembly (consisting of representatives of the PETROBRAS Units and PETROBRAS 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 standard PETROBRAS N-1. For complete information about PETROBRAS Technical Standards see PETROBRAS Technical Standards Catalog.

FOREWORD

This Standard is the English version (issued in JULY/2020) of Standard PETROBRAS N-2630 REV. B DEC/2017.

1 SCOPE

1.1 This Standard establishes the characteristics, verifiable in the laboratory, required for high thickness primer epoxy paint, cured with polyamide or polyamine with a low content of organic volatiles, supplied in 2 containers, one containing the epoxy resin (component A) and the other containing the polyamide or polyamine based curing agent (component B).

1.2 This Standard is applied to specifications started as of 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.

PETROBRAS N-13 - Requisitos Técnicos para Serviços de Pintura;

PETROBRAS N-1219 - Cores;

ABNT NBR 8094 - Material Metálico Revestido e Não Revestido - Corrosão por Exposição a Névoa Salina;

ABNT NBR 8096 - Material Metálico Revestido e Não-Revestido - Corrosão por Exposição ao Dióxido de Enxofre - Método de Ensaio;

ABNT NBR 9676 - Tintas - Determinação do poder de cobertura (opacidade);

ABNT NBR 12103 - Tintas - Determinação do descaimento - Método de ensaio;

ABNT NBR 15442 - Pintura Industrial - Inspeção de recebimento de recipientes fechados;

ABNT NBR 15742 - Tintas e Vernizes - Avaliação do tempo de vida útil da mistura (pot life);

ABNT NBR 15877 - Pintura Industrial - Ensaio de aderência por tração;

ASTM D 523 - Standard Test Method for Specular Gloss;

ASTM D 562 - Standard Test Method for Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer - Type Viscometer;

ASTM D 870 - Standard Practice for Testing Water Resistance of Coatings Using Water Immersion;

ASTM D 1210 - Standard Test Method for Fineness of Dispersion of Pigment-Vehicle Systems by Hegman-Type Gage;

ASTMD D 1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes;

ASTM D 1475 - Standard Test Method For Density of Liquid Coatings, Inks, and Related Products;

ASTM D 1640 - Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings;

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ASTM D 1475 - Standard Test Method For Density of Liquid Coatings, Inks, and Related Products;

ASTM D 1640 - Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings;

ASTM D 2247- Standard Practice for Testing Water Resistance of Coatings in 100 % Relative Humidity;

ASTM D 4541- Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers;

ISO 3233-1- Paints and Varnishes - Determination of the Percentage Volume Of Non-Volatile Matter - Part 1: Method Using A Coated Test Panel To Determine Non-Volatile Matter And To Determine Dry Film Density By The Archimedes Principle;

ISO 3251- Paints, Varnishes and Plastics - Determination of Non- Volatile Matter Content;

ISO 8501-1 - Preparation of Steel Substrates Before Application of Paints and Related Products;

3 GENERAL CONDITIONS

3.1 Appearance of Components A and B

Components A and B shall be homogeneous and show no skinning and thickening in a freshly-opened can.

3.2 Packaging

3.2.1 Containers shall be straight circular cylindrical in shape.

3.2.2 For sealing packaging, any material capable of causing degradation or contamination of the paint shall not be used.

3.3 Conditions and Filling of Containers

3.3.1 The containers holding the components of high thickness primer epoxy paint shall be in good conditions and duly labeled or marked on the side, in accordance with the requirements of this Standard and standard ABNT NBR 15442.

3.3.2 The containers shall contain at least the quantity mentioned in the respective indicated information.

3.4 Storage Stability

3.4.1 Components A and B shall demonstrate stability during storage in a closed container at a temperature below 40 °C, ensuring their use for at least 12 months from the date of manufacture.

3.4.2 This period of use may be extended for 2 additional periods of 6 months, through repetition and prior approval of the tests performed at the time of supply, in accordance with standard PETROBRAS N-13. **[Recommended Practice]**

3.5 Dilution

When necessary, the high thickness primer epoxy paint may be diluted according to the manufacturer's instructions in order to facilitate its application. **[Recommended Practice]**

3.6 Marking

The label or body of the containers shall bear at least the following information:

a) standard PETROBRAS N-2630;
b) high thickness primer epoxy paint;
c) identification of components: A or B;
d) thinner to be used;
e) quantity contained in container, in L and in kg;
f) manufacturer's name and address;
g) lot number or identifying signal;
h) product expiration date;
i) mixing ratio by mass and volume.

3.7 Color

The high thickness primer epoxy paint shall be supplied in white (0095), light gray (0065) and iron oxide (1733) in accordance with standard PETROBRAS N-1219.

4 SPECIFIC CONDITIONS

4.1 Requirements for Components A and B

4.1.1 Components A and B shall be homogeneous. Should they show any evidence of settling, it shall be capable of being easily homogenized (manually).

4.2 Requirements for the Ready-to-Apply Product

4.2.1 The requirements for the ready-to-apply product, with components A and B duly mixed, are set out in TABLE 1.

TABLE 1 - CHARACTERISTICS OF THE READY-TO-APPLY PRODUCT (WITH COMPONENTS A AND B MIXED)

Tests	Dry Film Thickness (μm)	Requirements		Standards to be Used
		Min.	Max.	
Density, g/cm^3	-	-	1.6	ASTM D 1475
Solids by Mass, %	-	85	-	ISO 3251
Solids by Volume, %	-	80	-	ISO 3233-1
Dry to Touch, time in h	140-160	-	3	ASTM D 1640
Dry to Recoat, time in h	140-160	16	48	ASTM D 1640
Dry Through, time in h	140-160	-	16	ASTM D 1640
Pot Life of Mixture, h	-	2	-	ABNT NBR 15742
Fineness of Grind, μm	-	-	50	ASTM D 1210
Consistency (UK)	-	-	110	ASTM D 562
Sagging, μm	-	250	-	ABNT NBR 12103
Hiding Power:				
- white (0095);	-	-	20	ABNT NBR 9676
- light gray (0065);	-	-	15	ABNT NBR 9676
- iron oxide (1733).	-	-	10	ABNT NBR 9676

4.2.2 The final product, which is obtained after mixing the 2 paint components, shall show a uniform consistency.

4.3 Dry Film Characteristics

The dry film characteristics are established in TABLE 2 and in items 4.3.1 to 4.3.3.

TABLE 2 - DRY FILM CHARACTERISTICS

Tests	Dry Film Thickness (μm)	Requirements		Standards to be Used
		Min.	Max.	
Adhesion, MPa (CSt3)	140 - 160	10	-	ABNT NBR 15877, Annex 2 or ASTM D 4541, Methods D and E – Equipment Type IV or Type V
Adhesion, MPa (Sa 2 ½)	140 - 160	15	-	ABNT NBR 15877, Annex 2 or ASTM D 4541, Methods D and E – Equipment Type IV or Type V
Gloss, UB	140-160	-	50	ASTM D 523
Salt Spray Resistance, h	280 - 320	1 500	-	ABNT NBR 8094
Resistance at 100 % Relative Humidity, h	280 - 320	1 500	-	ASTM D 2247
SO_2 Resistance, (2.0 L), cycles	280 - 320	5	-	ABNT NBR 8096
Salt Water Immersion Resistance (3.5 % NaCl), at 40 ºC, h	280 - 320	1 500	-	ASTM D 1308
Distilled Water Immersion Resistance, 40 ºC, h	280 - 320	1 500	-	ASTM D 870
Xylene Immersion Resistance, h	280 - 320	1 000	-	ASTM D 1308
Methyl Isobutyl Ketone Immersion Resistance, h	280 - 320	1	-	ASTM D 1308
40 % NaOH Immersion Resistance at 25 ºC, h	280 - 320	1 500	-	ASTM D 1308

4.3.1 When observing the panels, blisters or corrosion points shall not be found on the surface, neither shall penetration in the notch exceeding 2 mm be observed after 1 500 hours of salt spray testing have elapsed.

4.3.2 There shall be no corrosion points or blistering on the film after the respective time periods established for the following tests have elapsed: resistance to 100 % relative humidity, SO_2 resistance, distilled water immersion resistance, salt water immersion resistance and NaOH immersion resistance. Alteration in the film color after the SO_2 exposure and immersion and 100 % relative humidity tests is admitted.

4.3.3 After the immersion tests, with regard to resistance to xylene and methyl isobutyl ketone solvents, no blistering on the film or alteration in the color of the solvent used in the test shall be observed.

5 INSPECTION

5.1 Visual Inspection

Check if the conditions indicated in items 3.1, 3.2, 3.3 and 3.6 have been fulfilled and reject items supplied in disagreement therewith.

5.2 Tests

5.2.1 The tests to be performed are those contained in TABLES 1 and 2.

5.2.2 For the performance of the tests indicated in TABLES 1 and 2, the described in items from 5.2.2.1 to 5.2.2.7 conditions shall be observed.

5.2.2.1 Paint is to be applied on the test panels at least 15 minutes after mixing and homogenizing the components.

5.2.2.2 For the adhesion test the paint shall be applied directly on the AISI-1020 carbon steel plate, with a C rust grade, in accordance with standard ISO 8501-1. Surface preparation shall be performed by mechanical cleaning until grade CSt 3 or abrasive blasting until grade CSa 2 ½, according to ISO 8501-1. The anchor profile shall be 50 μm to 100 μm. The panels shall be washed with running water (fresh and clean) and a nylon brush, before and after the treatment. Plate dimensions shall be 150 mm x 80 mm, and at least 4.0 mm in thickness.

5.2.2.3 For the other tests, paint shall be applied directly on the AISI-1020 carbon steel plate. Surface preparation shall be performed by abrasive blasting to near white metal (minimum), grade Sa 2 1/2 of standard ISO 8501-1. The anchor profile shall be 50 μm to 100 μm. Plate dimensions shall be 150 mm x 80 mm and at least 2.0 mm thick.

5.2.2.4 The tests in TABLE 2 shall be performed 10 days after paint is applied on the panels. During this period, the panels shall be kept at a temperature of (25 ± 2) °C and a relative humidity of (60 ± 5) %.

5.2.2.5 Panels should be painted by means of a gun. **[Recommended Practice]**

5.2.2.6 For the salt spray resistance test, a single notch shall be made at the center of the specimen, parallel to its largest dimension and 30 mm away from the top and bottom edges.

5.2.2.7 The edges of the test panels shall be suitably protected in order to prevent the premature appearance of a corrosive process at those points.

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