

CONTEC

Comissão de Normalização
Técnica

SC-14

Painting and Anticorrosive
Coatings

**PRIMER EPOXY PAINT PIGMENTED WITH
ALUMINUM**

Revalidation

Revalidated in 12/2022.

PRIMER EPOXY PAINT PIGMENTED WITH ALUMINUM

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.

CONTEC

Comissão de Normas
Técnicas

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.

SC - 14

Paintwork and Anticorrosive
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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 07/2020) of Standard PETROBRAS N-2288 REV. E DEC/2017.

1 SCOPE

1.1 This Standard establishes the characteristics, verifiable in the laboratory, required for primer epoxy paint pigmented with aluminum, supplied in 2 containers, one containing the epoxy resin and the aluminum paste (component A) and the other containing the 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;

ABNT [NBR 8094](#) - Material Metálico Revestido e Não Revestido - Corrosão por Exposição a Névoa Salina;

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;

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

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

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 2369](#) - Standard Test Method for Volatile Content of Coatings;

ASTM [D 4541](#)- Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers;

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

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 primer epoxy paint pigmented with aluminum 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](#).

3.5 Dilution

When necessary, the primer epoxy paint pigmented with aluminum 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-2288;
- b) epoxy paint for no blaster surfaces;
- 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.

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

Tests	Dry Film Thickness (μm)	Requirements		Standards to be Used
		Min.	Max.	
Density, g/cm^3	-	1,20	1,40	ASTM D 1475
Solids by Mass, %	-	80	-	ASTM D 2369
Solids by Volume, %	-	70	-	ISO 3233-1
Hard Dry time, h	120 to 130	-	16	ASTM D 1640
Dry to Recoat, time in h	120 to 130	16	48	ASTM D 1640
Pot Life of Mixture, h	-	3	-	ABNT NBR 15742
Consistency (UK)	-	80	130	ASTM D 562
Sagging, μm (Dry Film)	-	150	-	ABNT NBR 12103

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 (St3)	120 to 130	10	-	ABNT NBR 15877 , Annex 2 or ASTM D 4541 , Methods D and E – Equipment Type IV or Type V
Adhesion, MPa (SP-11)	120 to 130	12	-	ABNT NBR 15877 , Annex 2 or ASTM D 4541 , Methods D and E – Equipment Type IV or Type V
Salt Spray Resistance, h	240 to 260	1 500	-	ABNT NBR 8094
Resistance at 100 % Relative Humidity, h	240 to 260	1 500	-	ASTM D 2247

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 1500 hours of teste established for the following tests have elapsed: resistance to 100 % relative humidity.

4.3.3 After the respective times established for the salt spray resistance tests and for the resistance to 100% relative humidity have passed, remove the panels and let them dry for 24 hours at room temperature. Proceed with a new tensile strength test according to ABNT NBR 15877 or ASTM D4541. The value obtained must not be less than 6.0 MPa.

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 up to grade CSt 3 or by mechanical-rotatives tools up to grade SP-11, as per ISO 8501-1 and SSPC SP-11, respectively. The panels shall be washed with running water (fresh and clean) and a nylon brush, before and after the treatment. The anchor profile shall be 50 μm to 100 μm . 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, with rust grade C, as per ISO 8501-1. Surface preparation shall be performed by mechanical-rotatives tools up to grade SP-11 of SSPC SP-11. The panels must be washed with running water (fresh and clean) and nylon brush, before and after treatment. The anchor profile shall be 50 μm to 100 μm . Plate dimensions shall be 150 mm x 80 mm and at least 4.0 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 $(25 \pm 2) ^\circ\text{C}$ and a relative humidity of $(60 \pm 5) \%$.

5.2.2.5 The panels should preferably be painted by brush..

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.

REV. A, B e C

There is no index of revisions.

REV. D

Affected Parts	Description of Alteration
	Confirmed

REV. E

[illegible]