

Metal Alloys and Metals - Identification by Magnet and Spot Tests

Test Method

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.

"This Standard is exclusive property of Petróleo Brasileiro S. A. - PETROBRAS, internal application and PETROBRAS Subsidiaries and shall be used by its suppliers of goods and services under contracts or similar under the conditions established in Bidding, Contract, Agreement or similar.

The use of this Standard by other companies / organizations / government agencies and individuals is the sole responsibility of the users.."

CONTEC

Comissão de Normalização
Técnica

SC - 27

Non-Destructive Testing

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 11/2013) of PETROBRAS N-1591 REV. G 08/2013. 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 provides test method for identification of metals and metal alloys most frequently used in oil and petrochemical industry by means of magnet and chemical reactions that may be electrolytically accelerated.

NOTE The identification of metals and metal alloys by this Standard is appropriate for annealed or normalized metals. Metals with superficial thermal treatment, temper or changes due to service conditions (such as: carbonizing, decarbonizing, chemical unbalancing, diffusion) may change the single chemical attack (QS) or electrolytic polarization (PE) test result.

1.2 This Standard is applicable to metal and metal alloy identification tests after its issue date.

1.3 This Standard contains only Technical Requirements.

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.

INMETRO [VIM:2012](#) - Vocabulário Internacional de Metrologia: Conceitos Fundamentais e Gerais e Termos Associados (Edição Luso-Brasileira);

ABNT [NBR 16137:2013](#) - Ensaios Não Destrutivos - Teste por Pontos - Identificação de Materiais;

ABNT [NBR 15693:2013](#) - Ensaios Não Destrutivos - Teste por Pontos - Identificação de Metais e Ligas Metálicas;

ISO IEC [17024:2012](#) - Conformity Assessment - General Requirements for Bodies Operating Certification of Persons.

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 Terms and Definitions

Terms and definitions shall be in accordance with INMETRO [VIM: 2012](#) and those below are adopted:

3.1

Addition

Addition of a new paragraph or a text to a paragraph

3.2

Alteration

Replacement of an entire paragraph or modification of part of it

3.3**Suppression**

Omission of the paragraph or part of it

3.4**Base Standard**

Assembly, construction, manufacturing and design standards relating to the inspected equipment item, and complementary standards mentioned by them

4 General Conditions

4.1 When a standard referenced to in Section 2 is not mentioned in Section 5, it shall be fully applied.

4.2 For the base standards in Section 2 regarding personnel qualification and procedure qualification, it is necessary to add 5.1 and 5.2 of this Standard, in order to complement them about the requirements specified therein for metal alloy and metal identification by magnet and spot tests.

5 Specific Conditions**5.1 Personnel Qualification**

5.1.1 The personnel qualification and certification to perform metal and metal alloy identification by magnet and spot tests shall be performed by PETROBRAS/ETM-CORP/ST/SEQUI-ETCM certification system.

5.1.2 For inspections performed abroad, qualification and certification shall be made as established in 5.1.1 or by independent international entities, accredited by national bodies in their respective countries, which shall be meet the requirements of ISO IEC [17024:2012](#), and, in this case, it shall be approval by PETROBRAS.

5.2 Procedure Qualification

5.2.1 The procedure and record of results shall be in accordance with ABNT [NBR 16137:2013](#).

5.2.2 The procedure shall be evaluated, checking its compatibility with its application, this step is a require to qualification.

5.3 Alteration, Addition and Suppression of ABNT [NBR 15693:2013](#)

Add: the metal standards used in testing shall a have chemical analysis certificate, so as to prove their composition.

INDEX OF REVISIONS

REV. A, B, C and D

There is no index of revisions.

REV. E

Affected Parts	Description of Alteration
All	Revised

REV. F

Affected Parts	Description of Alteration
All	Revised

REV. G

Affected Parts	Description of Alteration
All	Revised

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