

Performance of Non-Destructive Test - Ultrasound in Steel Forgings

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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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 08/2012) of PETROBRAS N-2315 REV. D 04/2011. 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 applies to required conditions for the performance of non-destructive test with ultrasound in steel forgings.

1.2 This Standard applies to procedures started as from the date of its edition.

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:2008](#) - Vocabulário Internacional de Metrologia (First Brazilian Edition of VIM 2008);

ABNT [NBR ISO/IEC 17024:2004](#) - Avaliação de Conformidade – Requisitos Gerais para Organismos que Realizam Certificação de Pessoas;

ABNT [NBR ISO/IEC 17025:2005](#) - Requisitos Gerais para a Competência de Laboratórios de Ensaio e Calibração;

ABNT [NBR NM ISO 9712:2007](#) - Ensaio Não Destrutivo - Qualificação e Certificação de Pessoal;

ISO [9712:2005](#) - Non-Destructive Testing - Qualification and Certification of Personnel;

ISO/IEC [17024:2003](#) - Conformity Assessment - General Requirements for Bodies Operating Certification of Persons;

ASME [BPVC Sec. V: 2010](#) - Section V - Nondestructive Examination;

ASTM [A388/A388M:2010](#) - Standard Practice for Ultrasonic Examination of Heavy Steel Forging;

BSI [BS EN 10228-3:1998](#) - Non-Destructive Testing of Steel Forgings - Part 3: Ultrasonic Testing of Ferritic or Martensitic Steel Forgings;

CEN EN 473:2008 - Qualification and Certification of Nondestructive Testing Personnel - General Principles;

DNV-OS-[F101:2007](#) - Submarine Pipeline Systems.

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

For the effects of this document, the INMETRO [VIM:2008](#) terms and definitions apply, as well as the following:

3.1

addition

insertion of a new paragraph or insertion of text within a paragraph

3.2

change

replacement of a paragraph or a partial change within it

3.3

deletion

exclusion of a paragraph or any part of it

3.4

base standard

design, manufacturing, construction and assembly standards related to the inspected equipment and supplementary standards mentioned by these

4 General conditions

4.1 The ultrasound test should be performed as recommended in the Base Standards in its specifications regarding design, manufacturing, construction and assembly for the inspected equipment, except for changes, additions and deletions mentioned in the specific conditions.

4.2 In cases where a base standard mentioned in Section 2 is not mentioned in Section 5 of the specific terms, the base standard should be applied in its entirety to the ultrasound non-destructive testing related items.

4.3 All standards concerning the project, manufacturing, construction and assembly should be supplemented by 5.1 and 5.2, for additional requirements specified therein for the ultrasound testing.

5 Specific Conditions

5.1 Qualification of Personnel

5.1.1 For services executed in Brazil, training and certification of personnel for the ultrasound testing procedure should be done by the Sistema Brasileiro de Qualificação e Certificação de Pessoal em Ensaio Não Destrutivos - ABENDI, according to ABNT [NBR NM ISO 9712:2007](#).

5.1.2 For services performed abroad, qualification and certification should be according to 5.1.1. or by independent entities in other countries, with certification by national entities in these countries in strict compliance with ISO/[IEC 17024:2003](#), and operating in accordance with ISO [9712:2006](#) or with other standards from normalization entities, as long as they comply with CEN EN 473:2008.

NOTE Self-certification systems, such as "Nondestructive Personnel Qualification and Certification ASNT SNT-TC-1A" for Level 1, 2 or 3 Instructors, in which the certification methodology is established or applied by the employer according to his own criteria, are not allowed by PETROBRAS, even if mentioned in base standards of this document.