Recommended Practice for Ultrasonic and Magnetic Examination of Offshore Structural Fabrication and Guidelines for Qualification of Technicians

API RECOMMENDED PRACTICE 2X
FOURTH EDITION, APRIL 2004

REAFFIRMED, OCTOBER 2010

AMERICAN PETROLEUM INSTITUTE

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Upstream Segment

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FOREWORD

This recommended practice is under the jurisdiction of the API subcommittee on Offshore Structures.

Changes between this edition and the 3rd edition have been marked with "change bars" in the margin.

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1 Scope

This recommended practice (RP) for nondestructive examination (NDE) of offshore structural fabrication and guidelines for qualification of personnel contains guidance on NDE methods which have evolved from fabrication experience with offshore structures. These methods are commonly used and have found acceptance due to their reliable detection of discontinuities. The five NDE methods routinely used in offshore structural fabrication are visual (VT), penetrant (PT), magnetic particle (MT), radiography (RT), and ultrasonic (UT) examinations. This recommended practice primarily addresses the MT and UT methods. Guidance on VT, PT and RT is incorporated by reference to ANSI/AWS D1.1. Further recommendations are offered for determining the qualifications of personnel using MT and UT techniques. Recommendations are also offered for the integration of these techniques into a general quality control program. The interrelationship between joint design, the significance of defects in welds, and the ability of NDE personnel to detect critical-size defects is also discussed.

THIS DOCUMENT IS NEITHER A CODE NOR A SPECIFICATION AND SHOULD NOT BE UTILIZED AS SUCH BY THE OPERATOR.

2 References

The applicable editions of non-API standards referenced herein are as follows. Only the latest editions of these standards should be considered applicable, unless otherwise stated.

API

RP 2A-LRFD	*Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms—Load and Resistance Factor Design*
RP 2A-WSD	*Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms Working Stress Design*

ANSI[1]/AWS[2]

A3.0	*Standard Welding Terms and Definitions*
D1.1	*Structural Welding Code—Steel*
B1.10	*Guide for the Nondestructive Inspection of Welds*
B1.11	*Guide for the Visual Inspection of Welds*

ASNT[3]

SNT-TC-1A	*Recommended Practice for Qualification and Certification of NDE Personnel*

ASTM[4]

A 435/A 435M	*Straight-Beam Ultrasonic Examination of Steel Plates*
A 578/A 578M	*Straight-Beam Ultrasonic Examination of Plain and Clad Steel Plates for Special Applications*
E 587	*Standard Practice for Ultrasonic Angle-Beam Examination by the Contact Method*
E 709	*Standard Guide for Magnetic Particle Examination*
E 1444	*Standard Practice for Magnetic Particle Examination*

3 Definitions

The welding terminology used herein is defined in the American Welding Society publication A3.0. Relevant ultrasonic terminology is defined in the Glossary section, Appendix E, of this document. Other definitions of interest are tabulated in the following. For the purpose of this standard, the following definitions apply:

3.1 acceptance criteria: Limit of shape, size, and position of discontinuities acceptable within the context of the specific design requirements.

3.2 agency personnel: Personnel employed and trained by an independent organization, offered to the Operator on a contract basis, for assisting in the construction inspection.

3.3 certification: Written testimony of qualification.

3.4 designer: The person, firm, corporation, or other organization employed by the Operator during fabrication and installation with responsibility for examining all details of fabrication to ensure compliance with construction specifications.

3.5 inspector: The individual representing the Operator during fabrication and installation with responsibility for examining all details of fabrication to ensure compliance with construction specifications.

3.6 NDE examination: An examination of materials and fabrication by qualified personnel responsible to the inspector using equipment for the purpose of locating and sizing discontinuities in materials or welds and reporting

[1]America National Standards Institute, 11 West 42nd Street, New York, New York 10036.

[2]American Welding Society, 550 N.W. LeJeune Road, Miami, Florida 33135.

[3]American Society of Nondestructive Testing, Inc., 1711 Arlington Lane, P.O. Box 28518, Columbus, Ohio 43228-0518, www.asnt.org.

[4]ASTM International, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428-2959, www.astm.org.