Manufacture of Structural Steel Castings for Primary Offshore Applications

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Upstream Segment

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Foreword

This specification is based on the experience acquired during the design, construction, operation and maintenance of offshore processing units and permanent facilities, as supplemented with the experience of operating companies with topsides, fixed platforms, floating structures (e.g. TLPs, spars, and the like), and their tendons and risers. Castings in these applications tend to be limited production components, with relatively few replications, and receive more intense scrutiny than routine mass production runs.

Where appropriate, this specification is based on, or reference is made to, international, regional, national and industry standards.

This is a manufacturing specification for the casting itself. It is anticipated that geometric design for both service requirements and casting feasibility will have been agreed collectively between the contractor, manufacturer, and purchaser before this specification is invoked. Attendant issues regarding system reliability, geometric design, incorporation into the overall construction, operation, and maintenance are not addressed here. Those electing to use this specification as a reference for their needed level of performance quality should carefully consider all these attendant issues.

When contractors or manufacturers/suppliers use this specification they should be solely responsible for the quality of work and the attainment of the required design and engineering standards. In particular, for those requirements not specifically covered, the purchaser will expect them to follow those design and engineering practices which will achieve the same level of integrity as reflected in their best production. If in doubt, the contractor or manufacturer/ supplier should, without detracting from his own responsibility, consult the purchaser or its technical advisor.

The purchaser may then negotiate with the authorities concerned with the object of obtaining agreement to follow this specification as closely as possible.

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Suggested revisions are invited and should be submitted to the Standards Department, API, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001, standards@api.org.

Contents

Page

Introduction

This specification defines the minimum requirements for manufacture, testing, and inspection of carbon and low-alloy steel castings Grades 345 to 586 N/mm^2 (50 ksi to 85 ksi) for use in primary steel applications in the fabrication of offshore structures, manufacture of marine mechanical, or riser, tendon, or other equipment intended for application on permanent offshore structures, or for components thereof.

Service categories (A, B, and C), as defined in 4.4, reflect casting geometry and method of incorporation into the overall system. They may also be designated by the user (purchaser) to reflect moderately different but standardized levels of performance.

Manufacture of Structural Steel Castings for Primary Offshore Applications

1 Scope

Castings manufactured to this specification are intended for use in the fabrication of offshore structures, manufacture of critical marine or mechanical or other system components intended for application on permanent offshore structures, or for components used in the construction of offshore tendons, risers and pipelines.

If national and/or local regulations exist in which some of the requirements may be more stringent than in this specification the contractor shall determine which of the requirements are more stringent and which combination of requirements will be acceptable with respect to safety, environmental, economic, and legal aspects. In all cases, the contractor shall inform the purchaser of any deviation from the requirements of this specification which is considered to be necessary in order to comply with national and/or local regulations.

2 Normative References

The following referenced documents are indispensable in the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ASME *Boiler and Pressure Vessel Code* (*BPVC*) [1], *Section V: Nondestructive Examination; Section VIII: Pressure Vessels; Section IX: Welding and Brazing Qualifications*

ASNT SNT-TC-1A [2], *Recommended Practice, Personnel Qualification and Certification in Nondestructive Testing*

ASTM A609:1991 [3], *Standard Practice for Castings, Carbon, Low-Alloy, and Martensitic Stainless Steel, Ultrasonic Examination Thereof*

ASTM A703:2008, *Standard Specification for Steel Castings, General Requirements, for Pressure-Containing Parts*

ASTM E10, *Standard Test Method for Brinell Hardness of Metallic Materials*

ASTM E23, *Standard Test Methods for Notched Bar Impact Testing of Metallic Materials*

ASTM E92, *Standard Test Method for Vickers Hardness of Metallic Materials*

ASTM E110, *Standard Test Method for Indentation Hardness of Metallic Materials by Portable Hardness Testers*

AWS A4.3 [4], *Standard Methods for Determination of the Diffusible Hydrogen Content of Martensitic, Bainitic, and Ferritic Steel Weld Metal Produced by Arc Welding*

AWS A5.01, *Filler Metal Procurement Guidelines*

AWS D1.1:2008, *Structural Welding Code—Steel*

BSI BS 2M 54 [5], *Specification for Temperature Control in the Heat Treatment of Metals*

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1 ASME International, 3 Park Avenue, New York, New York 10016-5990, www.asme.org.
2 American Society for Nondestructive Testing, 1711 Arlingate Lane, P.O. Box 28518, Columbus, Ohio 43228, www.asnt.org.
3 ASTM International, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428, www.astm.org.
4 American Welding Society, 550 NW LeJeune Road, Miami, Florida 33126, www.aws.org.
5 British Standards Institution, Chiswick High Road, London, W4 4AL, United Kingdom, www.bsi-global.com.