Manufacture of Structural Steel Forgings for Primary Offshore Applications

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Introduction

This specification is based on the experience acquired during the design, construction, operation, and maintenance of offshore processing units and facilities, as supplemented with the experience of operating companies with topsides, fixed platforms, floating structures (e.g. TLPs, spars, etc.), and their tendons and risers. Forgings 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 forging itself. It is anticipated that geometric design for both service requirements and forging 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 in this specification. Those electing to use this specification as a reference for their needed level of performance quality should carefully consider all of these attendant issues.

Manufacture of Structural Steel Forgings for Primary Offshore Applications

1 Scope

Forgings manufactured to this specification are intended for use in the fabrication of offshore structures, marine risers, TLP tendons and pipelines, or other system components intended for application on permanent offshore structures. This specification defines the minimum requirements for manufacture, testing, and inspection of carbon and low-alloy steel forgings, including extrusions and heavy-wall seamless tubular product, grades 345 N/mm^2 to 586 N/mm^2 (50 ksi to 85 ksi) for use in primary steel applications.

Service categories A, B, and C (SCA, SCB, and SCC) reflect forging geometry and method of incorporation into the overall system, rather than levels of criticality. They may also be designated by the user (purchaser) as described in 4.4 to reflect moderately different but standardized levels of performance.

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 (including any amendments) applies.

API Recommended Practice 2Z, *Preproduction Qualification for Steel Plates for Offshore Structures*, Fourth Edition

ASME *Boiler and Pressure Vessel Code (BPVC)* [1], *Section V: Nondestructive Examination; Article 9: Visual Examination*, 2007

ASME *Boiler and Pressure Vessel Code (BPVC), Section VIII: Rules for Construction of Pressure Vessels*, 2007

ASTM A275 [2], *Standard Practice for Magnetic Particle Examination of Steel Forgings*

ASTM A370, *Standard Test Methods and Definitions for Mechanical Testing of Steel Products*

ASTM A751, *Standard Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products*

ASTM A788, *Standard Specification for Steel Forgings, General Requirements*

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

ASTM E2375, *Standard Practice for Ultrasonic Testing of Wrought Products*

ASTM E384, *Standard Test Method for Knoop and Vickers Hardness of Materials*

ASTM E709, *Standard Guide for Magnetic Particle Testing*

ASTM E1444-12, *Standard Practice for Magnetic Particle Testing*

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1 ASME International, 3 Park Avenue, New York, New York 10016-5990, www.asme.org.

2 ASTM International, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428, www.astm.org.