

Forged structural steel

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Norwegian Technology Centre
Oscarsgt. 20, Postbox 7072 Majorstua
N-0306 Oslo
NORWAY

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Telephone: + 47 22 59 01 00
Fax: + 47 22 59 01 29
Email: norsok@nts.no
Website: www.nts.no/norsok



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Foreword

The NORSOK standards are developed by the Norwegian petroleum industry to ensure adequate safety, value adding and cost effectiveness for existing and future petroleum industry developments.

The NORSOK standards are prepared to complement available international standards and fill the broad needs of the Norwegian petroleum industry. Where relevant NORSOK standards will be used to provide the Norwegian industry input to the international standardisation process. Subject to development and publication of international standards, the relevant NORSOK standard will be withdrawn.

These standards are developed according to the consensus principle generally applicable for most standards work and according to established procedures defined in NORSOK A-001

The preparation and publication of the NORSOK standards is supported by OLF (The Norwegian Oil Industry Association) and TBL (Federation of Norwegian Manufacturing Industries). NORSOK standards are administered and issued by NTS (Norwegian Technology Centre).

Introduction

This standard is based on former company specifications and experience from deliveries and operation.

1 Scope

This Standard defines the requirements for qualification of forges and the technical delivery requirements for forged structural steel components for use in offshore structures where Steel Quality Level I or II is required.

2 Normative references

The following standards include provisions which, through reference in this text, constitute provisions of this NORSOK standard. Latest issue of the references shall be used unless otherwise agreed. Other recognised standards may be used provided it can be shown that they meet or exceed the requirements of the standards referenced below.

ASME V, Article 2.	Radiographic Examination
ASME V, Article 7	Magnetic Particle Examination
ASME VIII, div.1, appendix 6	Methods For Magnetic Particle Examination
ASME VIII, div.1, appendix 7	Methods For Radiographic Examination
ASME VIII, div.1, appendix 8	Methods For Liquid Penetrant Examination
ASTM A 388	Standard Practice For Ultrasonic Examination Of Heavy Steel Forgings
ASTM E 112	Standard Test Method for Determining Average Grain Size
ASTM E 165	Standard Test Method For Liquid Penetrant Examination.
ASTM E 709	Standard Practice For Magnetic Particle Examination
BS 7448	Fracture mechanics toughness tests
EN - 473 / Nordtest	Qualification of NDE operators
ISO 148	Steel – Charpy impact test (V-notch)
ISO 2632	Roughness Comparison Specimens, Cast Surfaces
ISO 6892	Metallic material – Tensile testing at ambient temperature
ISO 9001	Quality management systems - Requirements (ISO 9001:2000)
EN 10204	Metallic materials – Types of inspection documents
EN 10225 (Aug. 2001)	Weldable structural steels for fixed offshore structures – Technical delivery conditions

3 Abbreviations

NDT	Non Destructive Testing
PWHT	Post Weld Heat Treatment
FATT	Fracture Appearance Transition Temperatures
CTOD	Crack Tip Opening Displacement

4 Qualification

The purchaser may accept the forge's qualification based on general information described in 4.1 combined with a verification or audit at the forgemasters premises.

However, depending on the criticality and complexity of the forging and the experience of the forge, the purchaser may require the forge to perform a qualification as described in 4.2.

4.1 General

4.1.1 Basis for qualification of steel forges

The basis for qualification:

- Documented knowledge and previous experience with the material and the manufacturing.
- Manufacturing facilities and equipment.
- Established manufacturing procedures covering all important manufacturing steps from melting to finished products.
- Manufacturers quality system, which shall fulfil the requirements of ISO 9001 or equivalent.
- Results of representative testing in compliance with this standard.