

Cast structural steel

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Standards Norway
Strandveien 18, P.O. Box 242
N-1326 Lysaker
NORWAY

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Telephone: + 47 67 83 86 00
Fax: + 47 67 83 86 01
Email: petroleum@standard.no
Website: www.standard.no/petroleum



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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 petroleum industry developments and operations. Furthermore, NORSOK standards are, as far as possible, intended to replace oil company specifications and serve as references in the authorities' regulations.

The NORSOK standards are normally based on recognised international standards, adding the provisions deemed necessary to 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 Subject to development and publication of international standards, the relevant NORSOK standard will be withdrawn.

The NORSOK 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 NORSOK standards are prepared and published with support by The Norwegian Oil Industry Association (OLF), The Federation of Norwegian Industry, Norwegian Shipowners' Association and The Petroleum Safety Authority Norway.

NORSOK standards are administered and published by Standards Norway.

Introduction

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

1 Scope

This NORSOK standard defines the requirements for qualification of foundries and the technical delivery requirements for cast structural steel for use in offshore structures where steel quality level I or II is required.

2 Normative and informative references

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

2.1 Normative references

ASME V, Article 5,	Ultrasonic Examination Methods For Materials And Fabrication
ASME V, Article 7,	Magnetic Particle Examination
ASTM A609,	Standard Practice For Castings, Carbon, Low-Alloy And Martensitic Stainless Steel, Ultrasonic Examination Thereof
ASTM A991,	Standard Test Method for Conducting Temperature Uniformity Surveys of Furnaces Used to Heat treat Steel products
ASTM E112,	Standard Test Method for Determining Average Grain Size
ASTM E45,	Standard Test Methods for Determining the Inclusion Content of Steel
ASTM E125 – 80,	Standard Reference Photographs For Magnetic Particle Indications On Ferrous Castings
ASTM E446,	Reference Radiographs For Steel Castings Up To 51 mm In Thickness
ASTM E186,	Reference Radiographs For Heavy-Walled (51 to 112 mm) Steel Castings
ASTM E280,	Reference Radiographs For Heavy-Walled (112 to 305 mm) Steel Castings
EN 287-1,	Qualification test of welders – Fusion welding – Part 1: Steels
EN 473/Nordtest/ASNT,	Qualification of NDT operators
EN 10204,	Metallic products – Types of inspection documents
EN 10225,	Weldable structural steels for fixed offshore structures – Technical delivery conditions
ISO148,	Steel – Charpy impact test (V-notch)
ISO 6892,	Metallic material – Tensile testing at ambient temperature
ISO 8062,	Castings – System of dimensional tolerances and machining allowances
ISO 9001,	Quality management systems – Requirements
ISO 10423,	Petroleum and natural gas industries – Drilling and production equipment – Wellhead and Christmas tree equipment
ISO 15607,	Specification and qualification of welding procedures for metallic materials – General rules
ISO 15609-1,	Specification and qualification of welding procedures for metallic materials – Welding procedure specification – Part 1: Arc welding
ISO 15614-1,	Specification and qualification of welding procedures for metallic materials – Welding procedure test – Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys
ISO/IEC 17025,	General requirements for the competence of testing and calibration laboratories
MSS-SP 55,	Visual Inspection Guide For Steel Castings
NORSOK M-101,	Structural steel fabrication
Recommandation Technique No. 359-01 du Bureau de Normalisation des Industries de la Fonderie (BNIF),	

2.2 Informative references

None

3 Terms, definitions and abbreviations

For the purposes of this NORSOK standard, the following terms, definitions and abbreviations apply.

3.1 Terms and definitions

3.1.1

can

verbal form used for statements of possibility and capability, whether material, physical or casual

3.1.2

may

verbal form used to indicate a course of action permissible within the limits of this NORSOK standard

3.1.3

shall

verbal form used to indicate requirements strictly to be followed in order to conform to this NORSOK standard and from which no deviation is permitted, unless accepted by all involved parties

3.1.4

should

verbal form used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required

3.2 Abbreviations

ACCP	ASNT Central Certification Program
AOD	argon oxygen decarburisation
ASME	American Society Mechanical Engineers Standard
ASNT	American Society for Non-destructive Testing
ASTM	American Society for Testing and Materials
BS	British Standard
CTOD	crack tip opening displacement
EN	European Standard
FATT	fracture appearance transition temperatures
HAZ	heat affected zone
IEC	International Electrotechnical Commission
IIW	International Institute of Welding
ISO	International Organization for Standardization
MT	magnetic particle testing
NDT	non-destructive testing
PWHT	post weld heat treatment
RT	radiographic testing
VAD	vacuum argon decarburisation
VODC	vacuum oxygen decarburisation converter
UT	Ultrasonic testing

4 Qualification

4.1 General

The purchaser may accept the foundry's qualification based on general information described in 4.2-4.4 combined with a verification or audit at the foundry.

However, depending on the criticality and complexity of the casting and the experience of the foundry, the purchaser may require the foundry to perform a qualification as described in 4.5.