SLOVENSKI STANDARD
SIST EN 10208-2:1998

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Jeklene cevi za cevovode za prenos plinastih in tekočih goriv - Tehnični dobavni pogoji - 2. del: Cevi razreda zahtevnosti B

Steel pipes for pipelines for combustible fluids - Technical delivery conditions - Part 2: Pipes of requirement class B

Stahlrohre für Rohrleitungen für brennbare Medien - Technische Lieferbedingungen - Teil 2: Rohre der Anforderungsklasse B

Tubes en acier pour conduites de fluides combustibles - Conditions techniques de livraison - Partie 2: Tubes de la classe de prescription B

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75.200	Oprema za skladiščenje nafte, naftnih proizvodov in zemeljskega plina	Petroleum products and natural gas handling equipment
77.140.75	Jeklene cevi in cevni profili za posebne namene	Steel pipes and tubes for specific use

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EUROPEAN STANDARD

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Descriptors: steel tubes, pressure pipes, fluid pipelines, fuels, classifications, designation, delivery, manufacturing, chemical composition, mechanical properties, dimensions, dimensional tolerances, tests, acceptance, marking

English version

Steel pipes for pipelines for combustible fluids - Technical delivery conditions - Part 2: Pipes of requirement class B

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Stahlrohre für Rohrleitungen für brennbare Medien - Technische Lieferbedingungen - Teil 2: Rohre der Anforderungsklasse B

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart,36 B-1050 Brussels

Contents

Foreword

This European Standard has been prepared by Technical Committee ECISS/TC 29 "Steel tubes and fittings for steel tubes", the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 1996, and conflicting national standards shall be withdrawn at the latest by December 1996.

The differences between EN 10208-2 and ISO 3183-2 [1] are mainly restricted to the following:

- normative references (see clause 2);
- this European Standard uses steel numbers in accordance with EN 10027-2 (see table 1);
- basis of the calculation of hydrostatic test pressure (minimum wall thickness; ISO 3183-2 offers the use of the specified wall thickness by agreement);
- this European Standard uses the standardized code numbers and terms of EURONORM 168 for the structure and the content of inspection documents.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

In the preparation of this European Standard the competent committee was unanimous in seeking to avoid specifying the quality of line pipe to be used for a particular application. However, the committee recognized that there are several broad quality levels commonly used, and has differentiated between these quality levels as follows:

Firstly, the committee recognized the need to provide a basic quality level broadly similar to that specified in the main part of ANSI/API 5L [2]. This is designated requirement class A and considered in EN 10208 Part 1.

Secondly, many purchasers impose requirements additional to the basic standard, for instance concerning toughness and non-destructive testing. This approach is common, for example, for transmission pipelines. Such enhanced requirements are addressed in requirement class B and considered in this Part 2 of EN 10208.

Thirdly, there are certain particularly demanding applications where very stringent requirements on quality and testing are imposed. Such requirements are reflected in requirement class C and considered in EN 10208 Part 3.

The Charpy energy requirements for this Part 2 of EN 10208 have been derived from established data to avoid long running shear fracture in pipelines transporting lean, dry natural gas in accordance with EPRG recommendations [3]. It is the responsibility of the designer to decide whether these energy requirements suffice for the intended application. For example, rich gas or two-phase fluids may require enhanced properties.

For pipes of requirement class B, a weld efficiency factor of 1,0 can be used in design calculations, due to the conditions specified for the manufacture of the pipes and for the testing of the welds.

The selection of the requirement class depends on many factors. The properties of the fluid to be conveyed, the service conditions, design code and any statutory requirements should all be taken into consideration. Therefore this standard gives no detailed guidelines. It is the ultimate responsibility of the user to select the appropriate requirement class for the intended application.

NOTE: This European Standard combines a wide range of product types, dimensions and technical restrictions. In some areas of application, the absence of a single European pipeline design standard has resulted in differing national regulations imposing conflicting requirements on the users, thus making technical harmonization difficult.

Consequently, it may be necessary to amend certain requirements of this European Standard to satisfy various national design codes. However, this European Standard shall be the basic reference document. Such amendments should be specified at the time of enquiry and order. (See clause 5 and the note to 8.2.3.3.1).

1 Scope

1.1 This European Standard EN 10208-2 specifies the technical delivery conditions for unalloyed and alloyed (except stainless) seamless and welded steel pipes. It includes quality and testing requirements higher than those specified in EN 10208 Part 1. EN 10208-2 applies for pipes which are normally used for the transmission of combustible fluids. The maximum allowable operating pressure is given in the corresponding design code.

NOTE: This European Standard does not apply for cast steel pipe.

Other parts of this European Standard are:

- EN 10208-1 Steel pipes for pipelines for combustible fluids - Technical delivery conditions - Part 1: Pipes of requirement class A

- EN 10208-3 Steel pipes for pipelines for combustible fluids - Technical delivery conditions - Part 3: Pipes of requirement class C

1.2 In addition to the requirements of this European Standard the general technical delivery conditions specified in EN 10021 apply.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

The requirements of this European Standard rule when they differ from those in the standards and documents referred to below:

CR 10260	Designation systems for steel; Additional symbols for steel names (CEN Report)
EN 473	Qualification and certification of NDT personnel - General principles
EN 10002-1	Metallic materials - Tensile testing - Part 1: Method of test (at ambient temperature)

EN 10002-1	Metallic materials - Tensile testing - Part 1: Method of test (at ambient temperature)
EN 10003-1	Metallic materials - Hardness test - Brinell - Part 1: Test method
EN 10020	Definition and classification of grades of steel
EN 10021	General technical delivery conditions for steel and iron products
EN 10027-1	Designation systems for steel, Part 1: Steel names, principal symbols
EN 10027-2	Designation systems for steel, Part 2: Numerical system
EN 10045-1	Metallic materials - Charpy impact tests; Part 1: Test method
EN 10052	Vocabulary of heat treatment terms for ferrous products
EN 10079	Definition of steel products
EN 10109-1	Metallic materials - Hardness test - Rockwell - Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)
EN 10204	Metallic products - Types of inspection documents
EN 10233	Metallic materials - Tube - Flattening test
EN ISO 9001	Quality systems - Model for quality assurance in design/development, production, installation and servicing (ISO 9001: 1994)
EN ISO 9002	Quality systems - Model for quality assurance in production, installation and servicing (ISO 9002: 1994)
ENV 10220	Seamless and welded steel tubes - Dimensions and masses per unit length
EURONORM 168[1)]	Iron and steel products- Inspection documents - Contents
IC 2[2)]	Weldable fine-grained structural steels; Recommendations for processing, in particular for welding

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1) Until this EURONORM is transformed into an European Standard it can either be implemented or the corresponding national standard shall be agreed at the time of enquiry order.

2) Information Circular of the European Committee for Iron and Steel Standardization (ECISS), published by the members of CEN.

ISO 1027	Radiographic image quality indicators for non-destructive testing - Principles and identification
ISO 2566-1	Steel - Conversion of elongation values - Part 1: Carbon and low alloy steels
ISO/DIS 14284[3)]	Steel and iron - Sampling and preparation of samples for the determination of chemical composition
prEN 910[3)]	Welding - Welded butt joints in metallic materials - Bend test
prEN 10246-3[3)]	Non-destructive testing of steel tubes - Part 3: Automatic eddy current testing of seamless and welded (except submerged arc-welded) steel tubes for the detection of imperfections
prEN 10246-5[3)]	Non-destructive testing of steel tubes - Part 5: Automatic full peripheral magnetic transducer/flux leakage testing of seamless and welded (except submerged arc-welded) ferromagnetic steel tubes for the detection of longitudinal imperfections
prEN 10246-7[3)]	Non-destructive testing of steel tubes - Part 7: Automatic full peripheral ultrasonic testing of seamless and welded (except submerged arc-welded) steel tubes for the detection of longitudinal imperfections
prEN 10246-8[3)]	Non-destructive testing of steel tubes - Part 8: Automatic ultrasonic testing of the weld seam of electric resistance and induction welded steel tubes for the detection of longitudinal imperfections
prEN 10246-9[3)]	Non-destructive testing of steel tubes - Part 9: Automatic ultrasonic testing of the weld seam of submerged arc-welded steel tubes for the detection of longitudinal and/or transverse imperfections
prEN 10246-10[3)]	Non-destructive testing of steel tubes - Part 10: Radiographic testing of the weld seam of submerged arc-welded steel tubes for the detection of imperfections
prEN 10246-14[3)]	Non-destructive testing of steel tubes - Part 14: Automatic ultrasonic testing of seamless and welded (except submerged arc-welded) steel tubes for the detection of laminar imperfections

3) In preparation; until this document is published as European Standard the corresponding national standard should be agreed at the time of enquiry and order.

prEN 10246-15[3)]	Non-destructive testing of steel tubes - Part 15: Automatic ultrasonic testing of strip/plate used in the manufacture of welded steel tubes for the detection of laminar imperfections
prEN 10246-16[3)]	Non-destructive testing of steel tubes - Part 16: Automatic ultrasonic testing of the areas adjacent to the weld seam of welded steel tubes for the detection of laminar imperfections
prEN 10246-17[3)]	Non-destructive testing of steel tubes - Part 17: Ultrasonic testing of tube ends of seamless and welded steel tubes for the detection of laminar imperfections
prEN 10256[3)]	Non-destructive testing of steel tubes - Qualification and competence of level 1 and level 2 NDT personnel
prEN 10274	Metallic materials - Drop weight tear test
prEN ISO 377[3)]	Steel and steel products - Location of samples and test pieces for mechanical testing

3 Definitions

3.1 General

For the purpose of this European Standard the definitions in 3.2 to 3.4 shall apply when additional to or differing from those given for the

- classification of steels in EN 10020;
- definition of steel products in EN 10079;
- heat treatment in EN 10052 and
- for types of sampling procedures, inspection and inspection documents in prEN ISO 377, EN 10021 and EN 10204.

3.2 Types of pipes and welds

3.2.1 Seamless (S) pipe

The tubular product is manufactured in a hot forming process which may be followed by sizing (see 6.5) or cold finishing (see 3.3.4) to produce the desired dimensions.

3.2.2 High frequency welded (HFW) pipe

The tubular product is manufactured by forming from strip and welding the abutting edges without addition of filler metal. The longitudinal seam is generated by high frequency current applied by induction or conduction.

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3) See page 8

NOTE: High frequency implies in this European Standard a frequency of at least 100 kHz.

3.2.3 Submerged arc-welded (SAW) pipe

The tubular product is manufactured by forming from strip or plate and welding the abutting edges by addition of filler metal. The pipe having a longitudinal (SAWL) or helical (SAWH) seam is produced by the automatic submerged arc process (but see also 6.3). At least one pass is made on the inside and at least one pass on the outside of the pipe. An intermittent or continuous single pass tack weld made by the gas metal arc-welding process is permitted.

3.2.4 Combination gas metal arc and submerged arc-welded (COW) pipe

The tubular product is manufactured by forming from strip or plate and welding the abutting edges by addition of filler metal. The pipe having one longitudinal (COWL) or one helical (COWH) seam is produced by a combination of gas metal arc welding and submerged arc-welding. The gas metal arc-welding process is continuous and first, followed by the automatic submerged arc-welding process with at least one pass on the inside and at least one pass on the outside of the pipe.

3.2.5 Strip end weld

A weld that joins strip ends together.

3.2.6 Jointer

Two pieces of pipe joined together by a circumferential weld.

3.2.7 Pipe body

For welded pipe the entire pipe excluding the weld(s) and heat affected zone(s); for seamless pipe the entire pipe.

3.3 Treatment condition

3.3.1 Normalizing forming

A forming process in which the final deformation is carried out within a certain temperature range leading to a material condition equivalent to that obtained after normalizing so that the specified values of the mechanical properties are retained even after normalizing.

The abbreviated form of this delivery condition is N.

3.3.2 Thermomechanical forming

A forming process in which the final deformation is carried out in a certain temperature range leading to a material condition with certain properties which cannot be achieved or repeated by heat treatment alone. Subsequent heating above 580 °C may lower the strength values.

The abbreviated form of this delivery condition is M.

NOTE 1: Thermomechanical forming leading to the delivery condition M may include processes of increased cooling rates without or with tempering including self-tempering but excluding definitively direct quenching and quenching and tempering.

NOTE 2: As a consequence of lower carbon content and carbon equivalent values material in the delivery condition M has improved weldability properties.

3.3.3 Quenching and tempering

A heat treatment consisting of quench hardening followed by tempering. Quench hardening implies austenitization followed by cooling, under conditions such that austenite transforms more or less completely into martensite and possibly into bainite. Tempering implies heating to a specific temperature ($< Ac_1$) one or more times or holding at this temperature, followed by cooling at an appropriate rate so that the structure is modified and the specified properties are achieved.

The abbreviated form of this delivery condition is Q.

3.3.4 Cold forming and cold finishing

In this context cold forming is a process by which a flat product is formed to a pipe without heating. Cold finishing is a cold working operation (normally cold drawing) with a permanent strain greater than 1,5 %, which differentiates it from sizing operations specified in 6.5.

3.4 Imperfections and defects

3.4.1 Imperfections are irregularities in the wall or on the pipe surfaces detectable by methods described in this European Standard. Imperfections with a size and/or population density that are within the acceptance criteria defined in this European Standard are considered to have no practical implication on the intended use of the product.

3.4.2 Defects are imperfections with a size and/or population density that are greater than the acceptance criteria defined in this European Standard. Defects are considered to adversely affect or limit the intended use of the product.

3.5 Agreement

Unless otherwise indicated "by agreement" means "by agreement between manufacturer and purchaser at the time of enquiry and order".

3.6 Margin symbols

The following symbols are used in the margin of pages or tables for indicating optional delivery conditions:

M Mandatory agreement (see 5.2.a);

U Unless otherwise agreed left to the discretion of the manufacturer (see 5.2.b);

O Optional agreement(see 5.2.c).

4 Classification and designation

4.1 Classification

The steels specified in this European Standard are non-alloy quality or alloy special steels. Their classification in accordance with EN 10020 is indicated in table 1.

4.2 Designation

The steels specified in this European Standard are designated with steel names and steel numbers. Their designation in accordance with EN 10027-1, EN 10027-2 and CR 10260 is given in table 1.

NOTE: A comparison of the basic steel names with those specified in ANSI/API 5L [2] using the basis of minimum yield strength values, is given in annex A.

Table 1: Classification and designation of the steels

Heat treatment condition	Steel class in accordance with EN 10020	Steel name	Steel number
Normalized or normalizing formed	non-alloy quality steel	L245NB	1.0457
		L290NB	1.0484
		L360NB	1.0582
	alloy special steel	L415NB	1.8972
Quenched and tempered	alloy special steel	L360QB	1.8948
		L415QB	1.8947
		L450QB	1.8952
		L485QB	1.8955
		L555QB	1.8957
Thermomechanically rolled	non-alloy quality steel	L245MB	1.0418
		L290MB	1.0429
		L360MB	1.0578
	alloy special steel	L415MB	1.8973
		L450MB	1.8975
		L485MB	1.8977
		L555MB	1.8978