



SLOVENSKI STANDARD SIST EN ISO 13703:2001

01-junij-2001

Petroleum and natural gas industries - Design and installation of piping systems on offshore production platforms (ISO 13703:2000)

Petroleum and natural gas industries - Design and installation of piping systems on offshore production platforms (ISO 13703:2000)

Erdöl- und Erdgasindustrien - Auslegung und Verlegung von Rohrleitungssystemen auf Offshore-Förderplattformen (ISO 13703:2000)

Industries du pétrole et du gaz naturel - Conception et installation de systèmes de tuyauterie sur les plates-formes de production en mer (ISO 13703:2000)

<https://standards.iteh.ai/catalog/standards/sist/3377986f-3769-46e0-a256-1ea20074fa34/sist-en-iso-13703-2001>

Ta slovenski standard je istoveten z: EN ISO 13703:2000

ICS:

75.180.10	Oprema za raziskovanje in odkopavanje	Exploratory and extraction equipment
-----------	---------------------------------------	--------------------------------------

SIST EN ISO 13703:2001

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 13703:2001](#)

<https://standards.iteh.ai/catalog/standards/sist/33779f6f-3769-46e0-a256-1ea20074fa34/sist-en-iso-13703-2001>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 13703

December 2000

ICS 75.180.10

English version

**Petroleum and natural gas industries - Design and installation of
piping systems on offshore production platforms (ISO
13703:2000)**

Industries du pétrole et du gaz naturel - Conception et
installation de systèmes de tuyauterie sur les plates-formes
de production en mer (ISO 13703:2000)

Erdöl- und Erdgasindustrien - Auslegung und Verlegung
von Rohrleitungssystemen auf Offshore-Förderplattformen
(ISO 13703:2000)

This European Standard was approved by CEN on 9 December 2000.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

<https://standards.iteh.ai/catalog/standards/sist/3377916f-3769-46e0-a256-1ea20074fa34/sist-en-iso-13703-2001>



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

CORRECTED 2002-07-24

Foreword

This document (ISO 13703:2000) has been prepared by Technical Committee ISO/TC 67 "Materials, equipment and offshore structures for petroleum and natural gas industries" in collaboration with Technical Committee CEN/TC 12 "Materials, equipment and offshore structures for petroleum and natural gas industries", the secretariat of which is held by AFNOR.

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 June 2001, and conflicting national standards shall be withdrawn at the latest by June 2001.

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

Endorsement notice

The text of the International Standard ISO 13703:2000 has been approved by CEN as a European Standard without any modifications.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN ISO 13703:2001
<https://standards.iteh.ai/catalog/standards/sist/33779f6f-3769-46e0-a256-1ea20074fa34/sist-en-iso-13703-2001>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 13703:2001](#)

<https://standards.iteh.ai/catalog/standards/sist/33779f6f-3769-46e0-a256-1ea20074fa34/sist-en-iso-13703-2001>

INTERNATIONAL
STANDARD

ISO
13703

First edition
2000-12-15

**Petroleum and natural gas industries —
Design and installation of piping systems
on offshore production platforms**

*Industries du pétrole et du gaz naturel — Conception et installation de
systèmes de tuyauterie sur les plates-formes de production en mer*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 13703:2001](https://standards.iteh.ai/catalog/standards/sist/33779f6f-3769-46e0-a256-1ea20074fa34/sist-en-iso-13703-2001)

<https://standards.iteh.ai/catalog/standards/sist/33779f6f-3769-46e0-a256-1ea20074fa34/sist-en-iso-13703-2001>



Reference number
ISO 13703:2000(E)

© ISO 2000

ISO 13703:2000(E)**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN ISO 13703:2001](https://standards.iteh.ai/catalog/standards/sist/33779f6f-3769-46e0-a256-1ea20074fa34/sist-en-iso-13703-2001)

<https://standards.iteh.ai/catalog/standards/sist/33779f6f-3769-46e0-a256-1ea20074fa34/sist-en-iso-13703-2001>

© ISO 2000

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

Contents

Page

Foreword.....	v
Introduction.....	vi
1 Scope	1
2 Normative references	1
3 Terms, definitions, symbols and abbreviated terms.....	2
3.1 Terms and definitions	2
3.2 Symbols and abbreviated terms	4
4 General considerations	6
4.1 Materials	6
4.2 Code of pressure piping	7
4.3 Demarcation between systems with different pressure ratings	7
4.4 Corrosion considerations	9
5 Piping design	10
5.1 Pipe material grades.....	10
5.2 Sizing criteria — General	12
5.3 Sizing methods for liquid lines.....	12
5.4 Sizing criteria for single-phase gas lines.....	19
5.5 Sizing criteria for gas/liquid two-phase lines.....	23
5.6 Pipe wall thicknesses.....	26
5.7 Joint connections	30
5.8 Expansion and flexibility.....	31
5.9 Start-up provisions.....	32
6 Selection of valves	32
6.1 General.....	32
6.2 Types of valves	33
6.3 Fire resistance of valves	35
6.4 Valve sizing	35
6.5 Valve pressure and temperature ratings.....	36
6.6 Valve materials.....	37
7 Fittings and flanges	37
7.1 General.....	37
7.2 Welded fittings	38
7.3 Screwed fittings	38
7.4 Branch connections	38
7.5 Flanges	39
7.6 Proprietary connectors	41
7.7 Special requirements for sulfide stress-cracking service.....	41
7.8 Erosion prevention	41
8 Design considerations for particular piping systems.....	41
8.1 General.....	41
8.2 Wellhead accessory items	41
8.3 Flowline and flowline accessories	42
8.4 Production manifolds.....	45
8.5 Process vessel piping.....	45
8.6 Utility systems.....	47
8.7 Heating fluid and glycol systems.....	48
8.8 Pressure relief and disposal systems	48
8.9 Drain systems	50

ISO 13703:2000(E)

8.10	Bridge piping between platforms	50
8.11	Risers	50
8.12	Sampling valves	51
9	Considerations of related items	51
9.1	General	51
9.2	Layout	51
9.3	Elevations	51
9.4	Piping supports	51
9.5	Other corrosion considerations	51
9.6	Thermal insulation	54
9.7	Noise	56
9.8	Pipe, valves and fittings tables	56
9.9	Inspection, maintenance, repair and modification	56
10	Installation and quality control	56
10.1	General	56
10.2	Welding	56
10.3	Pressure testing	57
10.4	Test record	58
Annex A (informative)	Example problems	59
Annex B (informative)	Examples of pipe, valves and fittings tables	71
Annex C (informative)	Acceptable butt-welded joint design for unequal wall thicknesses	74
Bibliography	76

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 13703:2001](https://standards.iteh.ai/catalog/standards/sist/33779f6f-3769-46e0-a256-1ea20074fa34/sist-en-iso-13703-2001)

<https://standards.iteh.ai/catalog/standards/sist/33779f6f-3769-46e0-a256-1ea20074fa34/sist-en-iso-13703-2001>

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 13703 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum and natural gas industries*, Subcommittee SC 6, *Processing equipment and systems*.

Annexes A, B and C of this International Standard are for information only.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 13703:2001](https://standards.iteh.ai/catalog/standards/sist/33779f6f-3769-46e0-a256-1ea20074fa34/sist-en-iso-13703-2001)

<https://standards.iteh.ai/catalog/standards/sist/33779f6f-3769-46e0-a256-1ea20074fa34/sist-en-iso-13703-2001>

ISO 13703:2000(E)

Introduction

This International Standard is based on API RP 14E, 5th edition, October 1991.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN ISO 13703:2001](https://standards.iteh.ai/catalog/standards/sist/33779f6f-3769-46e0-a256-1ea20074fa34/sist-en-iso-13703-2001)

<https://standards.iteh.ai/catalog/standards/sist/33779f6f-3769-46e0-a256-1ea20074fa34/sist-en-iso-13703-2001>

Petroleum and natural gas industries — Design and installation of piping systems on offshore production platforms

1 Scope

This International Standard specifies minimum requirements and gives guidance for the design and installation of new piping systems on production platforms located offshore for the petroleum and natural gas industries. It covers piping systems up to 69 000 kPa (ga) maximum, within temperature range limits for the materials meeting the requirements of ASME B31.3.

NOTE For applications outside these pressure and temperature ranges, this International Standard may be used but special consideration should be given to material properties.

Annex A gives some worked examples for solving piping design problems.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 13623, *Petroleum and natural gas industries — Pipeline transportation systems.*

API RP 520-2¹⁾, *Recommended practice for design and installation of pressure-relieving systems in refineries — Part 2.*

ASME²⁾, *Boiler and pressure vessel code: Section VIII: Pressure vessels, Division 1.*

ASME B 31.3, *Process piping.*

NACE MR0175³⁾, *Sulfide stress cracking resistant metallic materials for oil field equipment.*

NACE TM0177, *Laboratory testing of metals for resistance to specific forms of environmental cracking in H₂S environments.*

NACE TM0284, *Evaluation of pipeline and pressure vessel steels for resistance to hydrogen-induced cracking.*

1) American Petroleum Institute, 1220 L Street, N.W., Washington, DC 20005-4070, U.S.A.

2) American Society of Mechanical Engineers, 345 East 47th Street, New York, N.Y. 10017, U.S.A.

3) National Association of Corrosion Engineers, P.O. Box 218340, Houston, Texas 77218-8340, U.S.A.

ISO 13703:2000(E)

3 Terms, definitions, symbols and abbreviated terms

For the purposes of this International Standard, the following terms, definitions, symbols and abbreviated terms apply.

3.1 Terms and definitions

3.1.1

chloride stress-corrosion cracking service

service in which the process stream contains water and chlorides in a sufficient concentration, and at a high enough temperature, to induce stress-corrosion cracking of susceptible materials

NOTE Other constituents present, such as oxygen (O₂), may contribute to such chloride stress-corrosion cracking.

3.1.2

choke

device specifically intended to restrict the flow rate of fluids

3.1.3

corrosion-erosion

eroding away of a protective film of corrosion product by the action of the process stream, exposing fresh metal which then corrodes

NOTE Extremely high metal mass loss can occur under these conditions.

3.1.4

corrosive gas

gas which, when dissolved in water or other liquid, causes corrosion of metal

NOTE Corrosive gases usually contain hydrogen sulfide (H₂S), carbon dioxide (CO₂) and/or oxygen (O₂).

3.1.5

corrosive hydrocarbon service

service in which the process stream contains water or brine and carbon dioxide (CO₂), hydrogen sulfide (H₂S), oxygen (O₂) or other corrosive agents under conditions which cause corrosion of metal

3.1.6

expansion bellows

corrugated piping device designed to absorb expansion and contraction

3.1.7

expansion bend

piping configuration designed to absorb expansion and contraction

3.1.8

flowline

piping that carries well fluid from wellhead to manifold or first process vessel

3.1.9

flow regime

flow condition of a multi-phase process stream

EXAMPLES Slug flow, mist flow or stratified flow.

3.1.10

fluid

gas, vapour, liquid or combinations thereof

3.1.11**header**

part of a manifold that directs fluid to a specific process system

See Figures 5 and 6.

3.1.12**hydrocarbon wettability**

ability of the process stream to form a protective hydrocarbon film on metal surfaces

3.1.13**manifold**

assembly of pipe, valves and fittings by which fluid from one or more sources is selectively directed to various process systems

3.1.14**nipple**

section of threaded or socket-welded pipe, shorter than 300 mm, used as an appurtenance

3.1.15**nominal pipe size****nominal size****NPS****DN**

designation of size in inches which is common to all components in a piping system other than those components designated by outside diameter

NOTE Nominal pipe size is designated by the letters NPS (when relating to inches) or DN (when relating to millimetres) followed by a number; it is a convenient number for reference purposes and it is normally only loosely related to manufacturing dimensions.

[SIST EN ISO 13703:2001](https://standards.iteh.ai/catalog/standards/sist/33779f6f-3769-46e0-a256-1ea20074fa34/sist-en-iso-13703-2001)

3.1.16**non-corrosive hydrocarbon service**

service in which the process stream conditions do not cause significant metal mass loss, selective attack, chloride stress-corrosion cracking or sulfide stress-cracking

3.1.17**normal conditions**

absolute pressure of 101,325 kPa and temperature of 0 °C

3.1.18**platform piping**

any piping intended to contain or transport fluid on a platform

3.1.19**pressure rating**

number relating to the pressure for which a system is suitable

NOTE The number may relate directly to the rated working pressure (e.g. ISO 10423 [1] pressure rating 13,8 MPa and API pressure rating 2 000 psi) or may have a more indirect correlation (e.g. ASME class 300).

3.1.20**pressure sensor**

device designed to detect a predetermined pressure

3.1.21**process component**

single functional piece of production equipment and associated piping

EXAMPLES Pressure vessel, heater, pump, etc.

ISO 13703:2000(E)**3.1.22****riser**

vertical portion of a pipeline (including the bottom bend) arriving on or departing from a platform

3.1.23**shutdown valve**

automatically-operated valve used for isolating a process component or process system

3.1.24**sulfide stress-cracking service**

service in which the process stream contains water or brine and contains a sufficient concentration of hydrogen sulfide (H_2S) to induce sulfide stress-cracking of susceptible materials

3.1.25**wellhead pressure**

maximum shut-in surface pressure that may exist in a well

3.2 Symbols and abbreviated terms**3.2.1 Symbols**

<i>A</i>	minimum pipe cross-sectional flow area required per unit volume flowrate, expressed in square millimetres per cubic metre per hour ($mm^2/m^3/h$)
<i>B</i>	mean coefficient of thermal expansion at operating temperatures normally encountered, expressed in millimetres per kelvin (mm/K)
<i>C</i>	empirical constant, dimensionless
<i>C_e</i>	sum of corrosion, mechanical strength and thread allowance, expressed in millimetres (mm)
<i>C_v</i>	valve coefficient, dimensionless

NOTE 1 This value is equal to the water flowrate in US gpm at 60 °F required to generate a pressure drop of 1 psi (US Customary units only are used in this instance to maintain alignment with other published data).

<i>D_i</i>	pipe inside diameter, expressed in metres (m)
<i>D_o</i>	pipe outside diameter, expressed in millimetres (mm)
<i>d_i</i>	pipe inside diameter, expressed in millimetres (mm)
<i>d_g</i>	gas relative density (air = 1), dimensionless
<i>d_L</i>	liquid relative density (water = 1), dimensionless
<i>E</i>	longitudinal weld joint factor, dimensionless
<i>E_m</i>	modulus of elasticity of piping material in the cold condition, expressed in newtons per square millimetre (N/mm^2)
<i>f</i>	Moody friction factor, dimensionless
<i>g</i>	gravitational constant, expressed in metres per second per second (m/s^2)
<i>h_a</i>	acceleration head, expressed in metres (m) of liquid
<i>h_f</i>	friction head, expressed in metres (m) of liquid