

**Petroleum and natural gas industries -
Drilling and production equipment -
Wellhead and christmas tree equipment**

Petroleum and natural gas industries - Drilling and
production equipment - Wellhead and christmas tree
equipment

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN ISO 10423:2004 sisaldab Euroopa standardi EN ISO 10423:2004 ingliskeelset teksti. Käesolev dokument on jõustatud 21.12.2004 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN ISO 10423:2004 consists of the English text of the European standard EN ISO 10423:2004. This document is endorsed on 21.12.2004 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.
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Käsitlusala: This International Standard specifies requirements and gives recommendations for the performance, dimensional and functional interchangeability, design, materials, testing, inspection, welding, marking, handling, storing, shipment, purchasing, repair and remanufacture of wellhead and christmas tree equipment for use in the petroleum and natural gas industries.	Scope: This International Standard specifies requirements and gives recommendations for the performance, dimensional and functional interchangeability, design, materials, testing, inspection, welding, marking, handling, storing, shipment, purchasing, repair and remanufacture of wellhead and christmas tree equipment for use in the petroleum and natural gas industries.
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**Petroleum and natural gas industries - Drilling and production
equipment - Wellhead and christmas tree equipment
(ISO 10423:2003)**

Industries du pétrole et du gaz naturel - Équipement de
forage et de production - Équipement pour têtes de puits et
arbre de Noël (ISO 10423:2003)

Erdöl- und Erdgasindustrie - Bohr- und Förderausrüstung -
Bohrlochkopf- und Eruptionskreuz-Ausrüstung
(ISO 10423:2003)

This European Standard was approved by CEN on 8 August 2004.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

Page

Foreword	5
Introduction	6
1 Scope	7
1.1 Purpose	7
1.2 Applicability	7
1.3 Service conditions	8
1.4 Product specification levels (PSL)	9
2 Normative references	12
3 Terms, definitions and abbreviated terms	14
3.1 Terms and definitions	14
3.2 Abbreviated terms	26
4 Design and performance — General requirements	27
4.1 Performance requirements — General	27
4.2 Service conditions	27
4.3 Design methods	29
4.4 Miscellaneous design information	33
4.5 Design documentation	34
4.6 Design review	34
4.7 Design verification	34
5 Materials — General requirements	34
5.1 General	34
5.2 Written specifications	34
5.3 Mandrel tubing and casing hangers	35
5.4 Bodies, bonnets, end and outlet connections	38
5.5 Ring gaskets	45
5.6 Test coupons (TC)	46
5.7 Qualification test coupons (QTC)	49
5.8 Heat-treating equipment qualification	52
5.9 Material qualification	52
5.10 Bullplugs and valve-removal plugs	52
5.11 Back-pressure valves	52
5.12 Pressure-boundary penetrations	52
5.13 Wear bushings	52
5.14 Hub-end connectors	52
6 Welding — General requirements	53
6.1 General	53
6.2 Non-pressure-containing weldments other than weld overlays (PSL 1 to PSL 3)	53
6.3 Pressure-containing fabrication weldments for bodies, bonnets, end and outlet connections, bullplugs, valve-removal plugs and back-pressure valves	53
6.4 Pressure-containing repair weldments for bodies, bonnets, end and outlet connections, bullplugs, valve-removal plugs and back-pressure valves	58
6.5 Weld overlay for corrosion resistance and/or hard facing and other material surface property controls	60

7	Quality control	63
7.1	General	63
7.2	Measuring and testing equipment	63
7.3	Quality control personnel qualifications	64
7.4	Quality control requirements	64
7.5	Quality control records requirements	101
8	Equipment marking	106
8.1	Marking requirements	106
8.2	Wellhead equipment	108
8.3	Connectors and fittings	108
8.4	Casing and tubing hangers	108
8.5	Valves and chokes	109
8.6	Loose connectors [flanged, threaded, other end connectors (OEC) and welded]	110
8.7	Other equipment	110
8.8	Studs and nuts	111
8.9	Christmas trees	111
8.10	Valve-removal plugs	111
8.11	Bullplugs	111
8.12	Back-pressure valves	112
9	Storing and shipping	112
9.1	Draining after testing	112
9.2	Rust prevention	112
9.3	Sealing surface protection	112
9.4	Assembly and maintenance instructions	112
9.5	Ring gaskets	112
9.6	Age control of non-metallic materials	112
10	Equipment-specific requirements	113
10.1	Flanged end and outlet connections	113
10.2	Threaded end and outlet connections	146
10.3	Studs and nuts	152
10.4	Ring gaskets	154
10.5	Valves	160
10.6	Casing and tubing heads	175
10.7	Casing and tubing hangers	180
10.8	Tubing-head adapters	185
10.9	Chokes	187
10.10	Tees and crosses	190
10.11	Test and gauge connections for 103,5 MPa and 138,0 MPa (15 000 psi and 20 000 psi) equipment	195
10.12	Fluid sampling devices	195
10.13	Christmas trees	198
10.14	Cross-over connectors	198
10.15	Adapter and spacer spools	203
10.16	Actuators	204
10.17	Lock screws, alignment pins and retainer screw packing mechanisms	208
10.18	Other end connectors (OECs)	209
10.19	Top connectors	210
10.20	Surface and underwater safety valves and actuators	211
10.21	Bullplugs	216
10.22	Valve-removal plugs	219
10.23	Other pressure-boundary penetrations	219
10.24	Back-pressure valves	220
11	Repair and remanufacture	220

Annex A (informative) Purchasing guidelines	221
Annex B (informative) US Customary unit tables and data for this International Standard	240
Annex C (informative) Method of calculating stud bolt lengths for type 6B and 6BX flanges	295
Annex D (informative) Recommended flange bolt torque	297
Annex E (informative) Recommended weld groove design dimensions	301
Annex F (informative) Performance verification procedures	305
Annex G (informative) Design and rating of equipment for use at elevated temperatures	339
Annex H (normative) Design and manufacture of surface wellhead running, retrieving and testing tools, clean-out tools and wear bushings	342
Annex I (normative) Performance verification procedures for surface safety valves and underwater safety valves	347
Annex J (normative) Repair and remanufacture requirements	355
Annex K (informative) Recommended specifications for top connectors for christmas trees	368
Annex L (normative) Specifications for valve-removal preparations and valve-removal plugs	383
Annex M (informative) List of tables and figures.....	399
Bibliography.....	409
Annex ZA (normative).....	410

Foreword

The text of ISO 10423:2003 has been prepared by Technical Committee ISO/TC 67 "Materials, equipment and offshore structures for petroleum and natural gas industries" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 10423:2004 by Technical Committee CEN/TC 12 "Materials, equipment and offshore structures for petroleum, petrochemical 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 March 2005, and conflicting national standards shall be withdrawn at the latest by March 2005.

This document supersedes EN ISO 10423:2001.

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

Endorsement notice

The text of ISO 10423:2003 has been approved by CEN as EN ISO 10423:2004 without any modifications.

NOTE Normative references to International Standards are listed in annex ZA (normative).

Introduction

This International Standard is based on API Spec 6A, seventeenth edition, February 1996, its errata and supplement, and API Spec 6AV1, first edition, February 1996.

The contents of API Spec 14D (upon which ISO 10433 was based) and API Recommended Practice 14H (upon which ISO 10419 was based) have been incorporated in API Spec 6A, seventeenth edition.

The International System of units (SI) is used in this International Standard. However, nominal sizes are shown as fractions in the inch system.

The fractions and their decimal equivalents are equal and interchangeable. Metric conversions and inch dimensions in this International Standard are based on the original fractional inch designs. Functional dimensions have been converted into the metric system to ensure interchangeability of products manufactured in metric or inch systems (see also Annex B).

Tables referenced in the main body of this International Standard which are marked with an asterisk are repeated in Annex B in US Customary units with the same table number as in the main body but with the prefix B. In figures where dimensions are only given in inches, the values of surface roughness have been indicated in accordance with US draughting conventions. See also Annex M for listings of tables and figures.

Users of this International Standard should be aware that further or differing requirements may be needed for individual applications. This International Standard is not intended to inhibit a vendor from offering, or the purchaser from accepting, alternative equipment or engineering solutions for the individual application. This may be particularly applicable where there is innovative or developing technology. Where an alternative is offered, the vendor should identify any variations from this International Standard and provide details.

1 Scope

1.1 Purpose

This International Standard specifies requirements and gives recommendations for the performance, dimensional and functional interchangeability, design, materials, testing, inspection, welding, marking, handling, storing, shipment, purchasing, repair and remanufacture of wellhead and christmas tree equipment for use in the petroleum and natural gas industries.

This International Standard does not apply to field use, field testing or field repair of wellhead and christmas tree equipment.

1.2 Applicability

This International Standard is applicable to the following specific equipment.

a) Wellhead equipment:

- casing head housings;
- casing head spools;
- tubing head spools;
- cross-over spools;
- multi-stage head housings and spools.

b) Connectors and fittings:

- cross-over connectors;
- tubing head adapters;
- top connectors;
- tees and crosses;
- fluid-sampling devices;
- adapter and spacer spools.

c) Casing and tubing hangers:

- mandrel hangers;

- slip hangers.
- d) Valves and chokes:
 - single valves;
 - multiple valves;
 - actuated valves;
 - valves prepared for actuators;
 - check valves;
 - chokes;
 - surface and underwater safety valves and actuators;
 - back-pressure valves.
- e) Loose connectors [flanged, threaded, other end connectors (OEC), and welded]:
 - weld neck connectors;
 - blind connectors;
 - threaded connectors;
 - adapter and spacer connectors;
 - bullplugs;
 - valve-removal plugs.
- f) Other equipment:
 - actuators;
 - hubs;
 - pressure boundary penetrations;
 - ring gaskets;
 - running and testing tools (in Annex H);
 - wear bushings (in Annex H).

The nomenclature used in this International Standard for typical equipment is shown in Figure 1 and Figure 2. All parts whose physical dimensions conform to the metric tables incorporated into the body of this International Standard or to the US Customary units tables in Annex B are acceptable (see Introduction).

1.3 Service conditions

This International Standard defines service conditions, in terms of pressure, temperature and material class for the well-bore constituents, and operating conditions.

1.4 Product specification levels (PSL)

This International Standard establishes requirements for five product specification levels. These five PSL designations define different levels of technical quality requirements. Annex A provides guidelines (not requirements) for selecting an acceptable PSL.

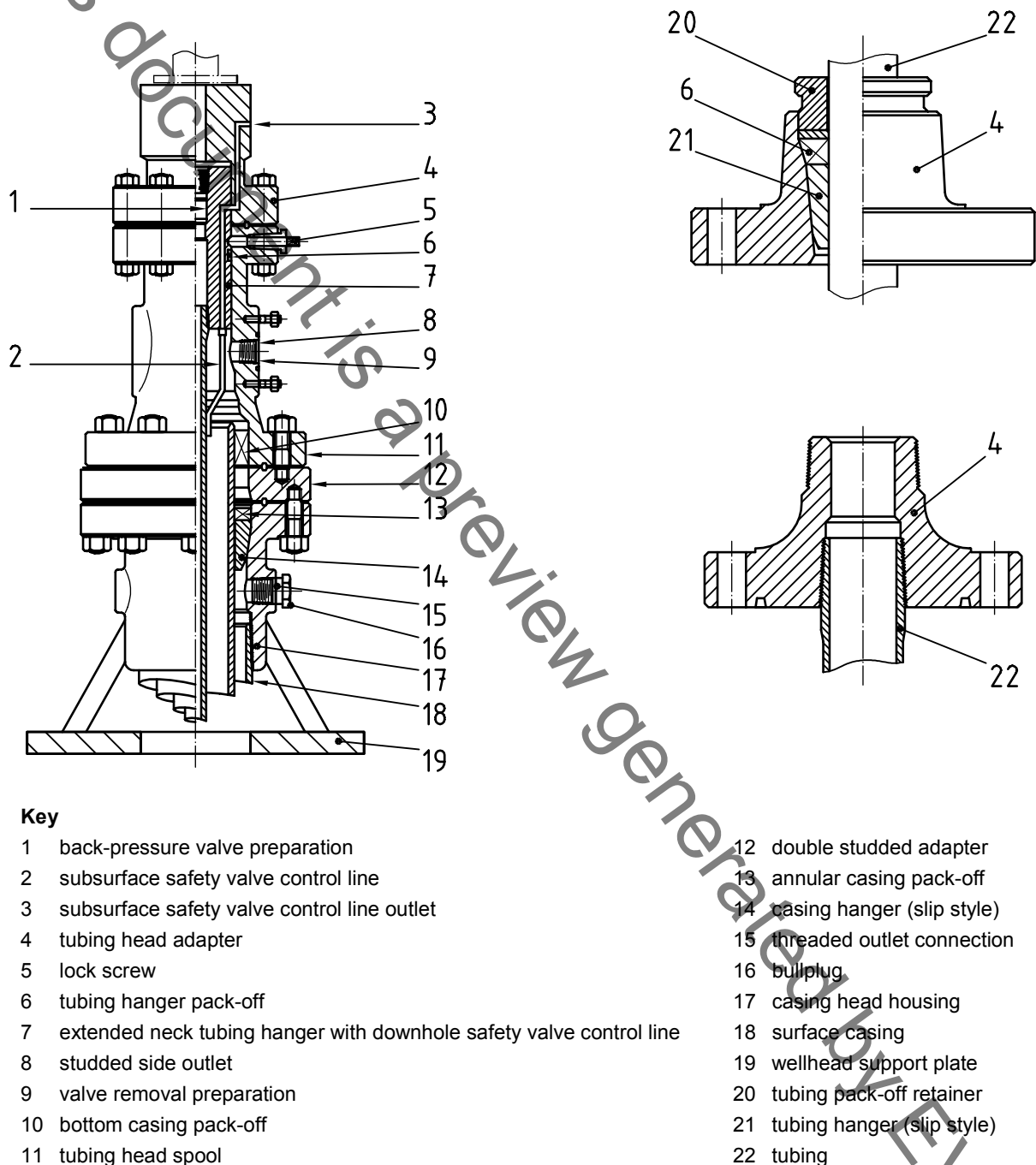
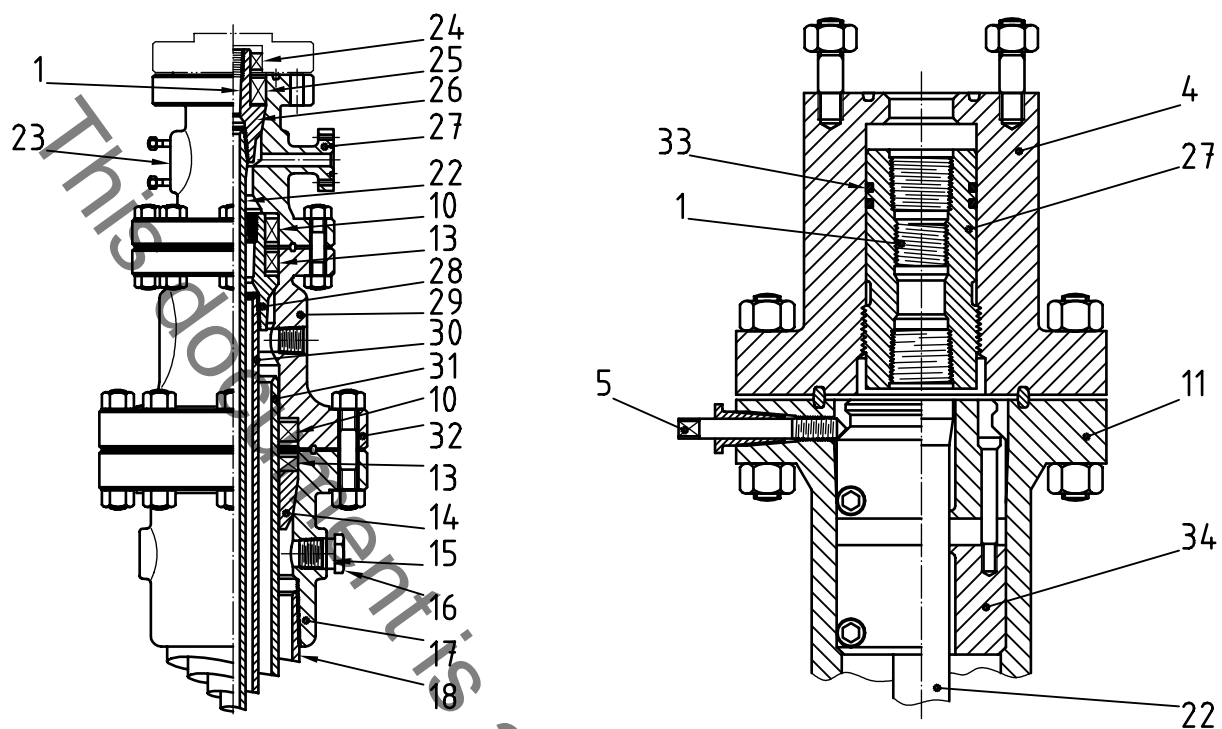


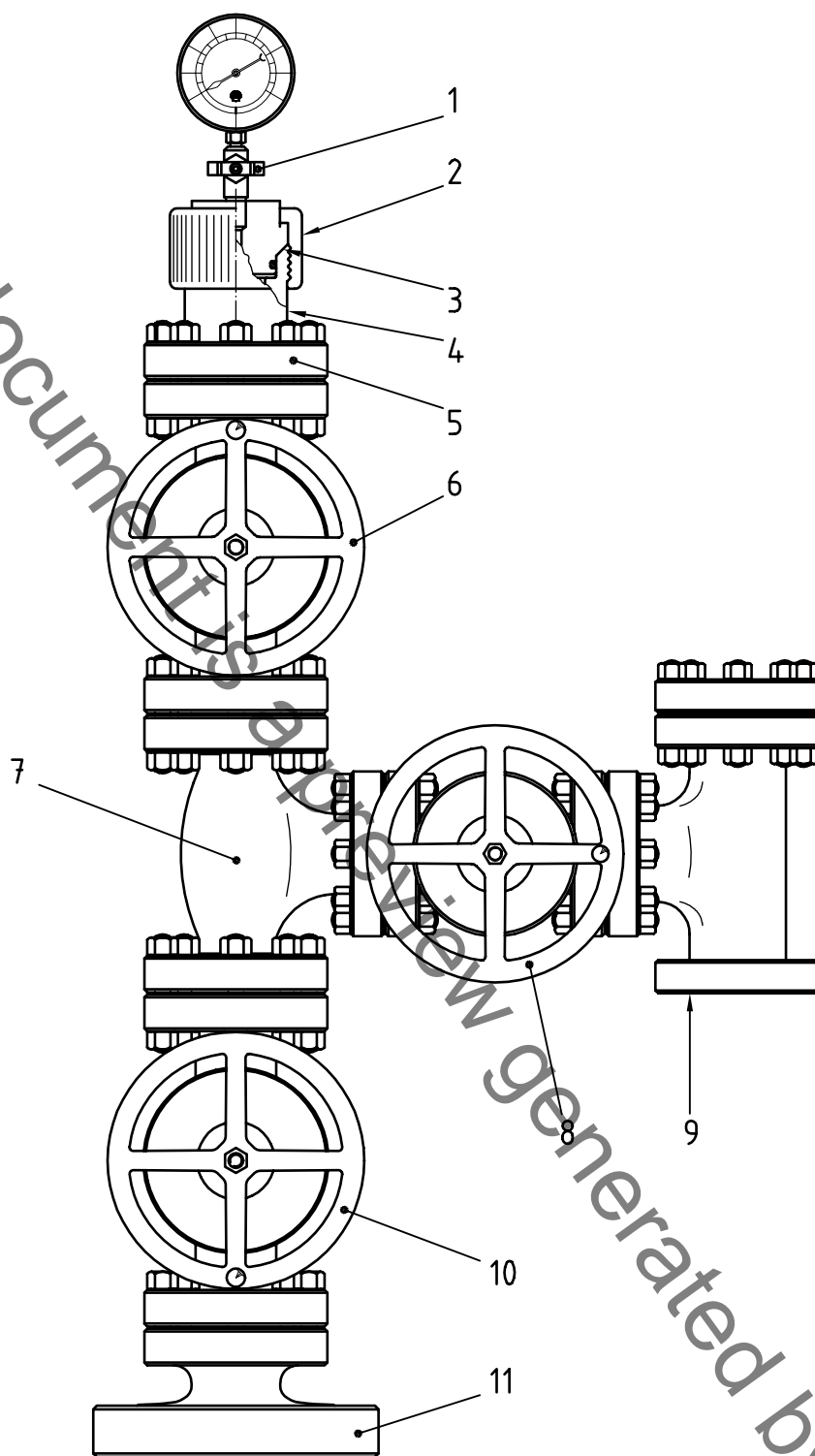
Figure 1 — Typical wellhead assembly nomenclature



Key

- | | | | |
|----|----------------------------------|----|-----------------------------|
| 23 | studded side outlet connection | 29 | casing head spool |
| 24 | extended neck tubing hanger seal | 30 | inner casing |
| 25 | annular tubing hanger seal | 31 | intermediate casing |
| 26 | tubing hanger mandrel | 32 | flanged end connection |
| 27 | flanged outlet connection | 33 | tubing hanger mandrel seals |
| 28 | casing hanger mandrel | 34 | wrap-around hanger pack-off |

Figure 1 — Typical wellhead assembly nomenclature (continued)

**Key**

- | | |
|-----------------------|------------------------|
| 1 gauge valve | 7 tee |
| 2 bonnet nut | 8 wing valve |
| 3 blanking plug | 9 choke |
| 4 body | 10 master valve |
| 5 top connector | 11 tubing head adapter |
| 6 swab or crown valve | |

Figure 2 — Typical christmas tree nomenclature

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.

ISO 2859-1:1999, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 10414-1, *Petroleum and natural gas industries — Field testing of drilling fluids — Part 1: Water-based fluids*

ISO 10422:1993, *Petroleum and natural gas industries — Threading, gauging, and thread inspection of casing, tubing and line pipe threads — Specification*

ISO 11960, *Petroleum and natural gas industries — Steel pipes for use as casing or tubing for wells*

ISO 13533, *Petroleum and natural gas industries — Drilling and production equipment — Drill-through equipment*

ISO 13628-4, *Petroleum and natural gas industries — Design and operation of subsea production systems — Part 4: Subsea wellhead and tree equipment*

ISO 13678, *Petroleum and natural gas industries — Evaluation and testing of thread compounds for use with casing, tubing and line pipe*

API¹⁾ Spec 7:1997, *Specification for rotary drill stem elements*

API RP 14F, *Recommended practice for design and installation of electrical systems for fixed and floating offshore petroleum production facilities for unclassified and class 1, division 1 and division 2 locations*

ASME²⁾ B1.1, *Unified inch screw threads*

ASME B1.2, *Gages and gaging for unified inch screw threads*

ASME B1.20.1, *Pipe threads, general purpose (inch)*

ASME Boiler and Pressure Vessel Code:1998, Section V, *Non destructive examination*

ASME Boiler and Pressure Vessel Code:1998, Section VIII, Division 1, *Rules for construction of pressure vessels*

ASME Boiler and Pressure Vessel Code:1998, Section VIII, Division 2, *Alternative rules for construction of pressure vessels*

ASME Boiler and Pressure Vessel Code:1998, Section IX, *Welding and brazing qualifications*

ASNT³⁾ SNT-TC-1A, *Personnel qualifications and certification in non destructive testing*

ASTM⁴⁾ A 193/A 193M, *Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service*

1) American Petroleum Institute, 1220 L Street North West, Washington, D.C. 20005, USA.

2) ASME International, 345 East 47th Street, New York, NY 10017-2392, USA.

3) American Society for Non destructive Testing, 4153 Arlingate Plaza, Columbus, OH 43228-0518, USA.

4) American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, USA.

- ASTM A 194/A 194M, *Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both*
- ASTM A 320/A 320M, *Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for Low-Temperature Service*
- ASTM A 370, *Standard Test Methods and Definitions for Mechanical Testing of Steel Products*
- ASTM A 388/A 388M, *Standard Practice for Ultrasonic Examination of Heavy Steel Forgings*
- ASTM A 453/A 453 M, *Standard Specification for High-Temperature Bolting Materials, With Expansion Coefficients Comparable to Austenitic Stainless Steels*
- ASTM A 703/A 703M:1999, *Standard Specification for Steel Castings, General Requirements, for Pressure-Containing Parts*
- ASTM D 395, *Standard Test Methods for Rubber Property — Compression Set*
- ASTM D 412, *Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers — Tension*
- ASTM D 471, *Standard Test Method for Rubber Property — Effect of Liquids*
- ASTM D 1414, *Standard Test Methods for Rubber O-Rings*
- ASTM D 1415, *Standard Test Method for Rubber Property — International Hardness*
- ASTM D 1418, *Standard Practice for Rubber and Rubber Latexes — Nomenclature*
- ASTM D 2240, *Standard Test Method for Rubber Property — Durometer Hardness*
- ASTM E 10, *Standard Test Method for Brinell Hardness of Metallic Materials*
- ASTM E 18, *Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials*
- ASTM E 92, *Standard Test Method for Vickers Hardness of Metallic Materials*
- ASTM E 94, *Standard Guide for Radiographic Examination*
- ASTM E 140, *Standard Hardness Conversion Tables for Metals — Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness and Scleroscope Hardness*
- ASTM E 165, *Standard Test Method for Liquid Penetrant Examination*
- ASTM E 428, *Standard Practice for Fabrication and Control of Steel Reference Blocks Used in Ultrasonic Examination*
- ASTM E 709, *Standard Guide for Magnetic Particle Examination*
- ASTM E 747, *Standard Practice for Design, Manufacture and Material Grouping Classification of Wire Image Quality Indicators (IQI) Used for Radiology*
- EN⁵⁾ 473, *Non-destructive testing — Qualification and certification of NDT personnel — General principles*

5) European Committee for Standardization, rue de Stassart 36, Brussels B-1050, Belgium.

MSS⁶⁾ SP-55, *Quality standard for steel castings for valves, flanges and fittings and other piping components, visual method for evaluation of surface irregularities*

NACE⁷⁾ MR 0175:1999, *Standard material requirements — Sulfide stress cracking resistant metallic materials for oilfield equipment*

SAE⁸⁾ AS 568A:1974, *Aerospace size standard for O-rings*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1 acceptance criteria

defined limits placed on characteristics of materials, products or services

3.1.2 accessible wetted surface

wetted surface which can be viewed, for purposes of non-destructive examination, by direct line of sight

NOTE This excludes test ports, control line ports, lockdown screw holes and other penetrations of these types.

3.1.3 actuator

mechanism for the remote or automatic operation of a valve or choke

3.1.4 adapter

pressure-containing piece of equipment having end connections of different nominal sizes and/or pressure ratings, used to connect other pieces of equipment of different nominal sizes and/or pressure ratings

3.1.5 annular packoff

mechanism that seals off annular pressure between the outside diameter of a suspended tubular member or hanger and the inside diameter of the head or spool through which the tubular member passes or hanger is suspended

3.1.6 as-shipped condition

condition of the product or equipment when it is ready for shipment

3.1.7 back-pressure valve

unidirectional or bidirectional check valve that is installed through the christmas tree, into the tubing hanger, and prevents well fluids from flowing out of the well

6) Manufacturers Standardization Society of the Valve & Fittings Industry, 127 Park Street, N.E., Vienna, VA 22180, USA.

7) NACE, P.O. Box 218340, Houston, TX 77218, USA.

8) SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, USA.