

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

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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| <p>Käesolev Eesti standard EVS-EN ISO 10423:2010 sisaldab Euroopa standardi EN ISO 10423:2009 ingliskeelset teksti.</p> <p>Standard on kinnitatud Eesti Standardikeskuse 28.02.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 15.12.2009.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p> | <p>This Estonian standard EVS-EN ISO 10423:2010 consists of the English text of the European standard EN ISO 10423:2009.</p> <p>This standard is ratified with the order of Estonian Centre for Standardisation dated 28.02.2010 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.</p> <p>Date of Availability of the European standard text 15.12.2009.</p> <p>The standard is available from Estonian standardisation organisation.</p> |
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EUROPEAN STANDARD

EN ISO 10423

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2009

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Supersedes EN ISO 10423:2004

English Version

**Petroleum and natural gas industries - Drilling and production
equipment - Wellhead and christmas tree equipment (ISO
10423:2009)**

Industries du pétrole et du gaz naturel - Équipement de
forage et de production - Équipement pour têtes de puits et
arbre de Noël (ISO 10423:2009)

Erdöl- und Erdgasindustrie - Bohr- und Förderausrüstung -
Bohrlochkopf- und Eruptionskreuz-Ausrüstung (ISO
10423:2009)

This European Standard was approved by CEN on 18 November 2009.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Foreword

This document (EN ISO 10423:2009) has been prepared by Technical Committee ISO/TC 67 "Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries" in collaboration with 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 June 2010, and conflicting national standards shall be withdrawn at the latest by June 2010.

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Endorsement notice

The text of ISO 10423:2009 has been approved by CEN as a EN ISO 10423:2009 without any modification.

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Introduction

This International Standard, which has been technically revised, is based on API Spec 6A, nineteenth edition, July 2004 and its addendums and errata, and API Spec 6AV1, first edition, February 1996 and its errata, with the intent that the twentieth edition of API Spec 6A will be identical to this International Standard.

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 that are marked with an asterisk (*) are repeated in Annex B in US Customary (USC) units with the same table number as in the main body but with the prefix B. In figures where dimensions are given only in inches, the values of surface roughness have been indicated in accordance with US draughting conventions.

It is necessary that users of this International Standard be aware that further or differing requirements can 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 can be particularly applicable where there is innovative or developing technology. Where an alternative is offered, it is the responsibility of the vendor to identify any variations from this International Standard and provide details.

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

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,
 - clamp hubs,
 - pressure boundary penetrations,
 - ring gaskets,
 - running and testing tools (see Annex H),
 - wear bushings (see Annex H).

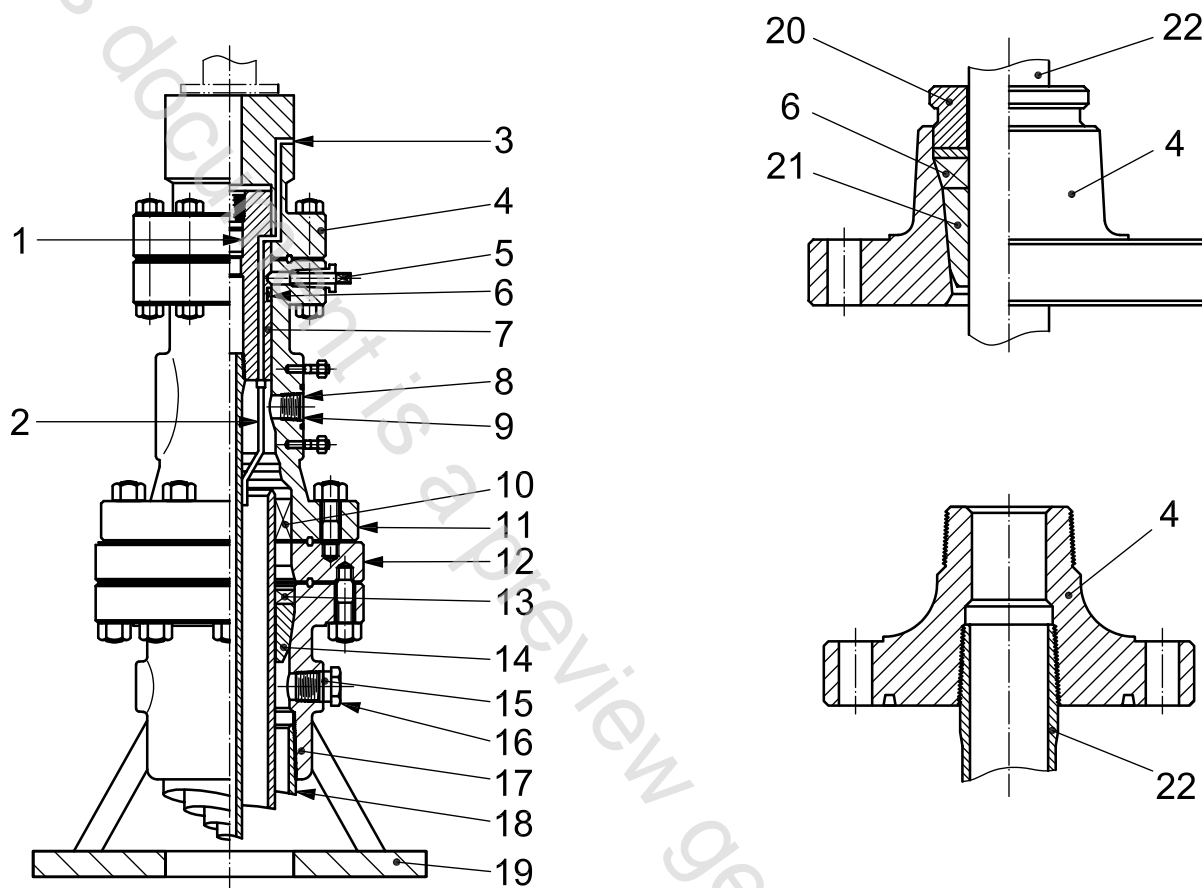
The nomenclature used in this International Standard for typical equipment is shown in Figures 1 and 2. All parts whose physical dimensions conform to the metric tables incorporated into the body of this International Standard or to the tables in USC units in Annex B are acceptable; see Introduction.

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

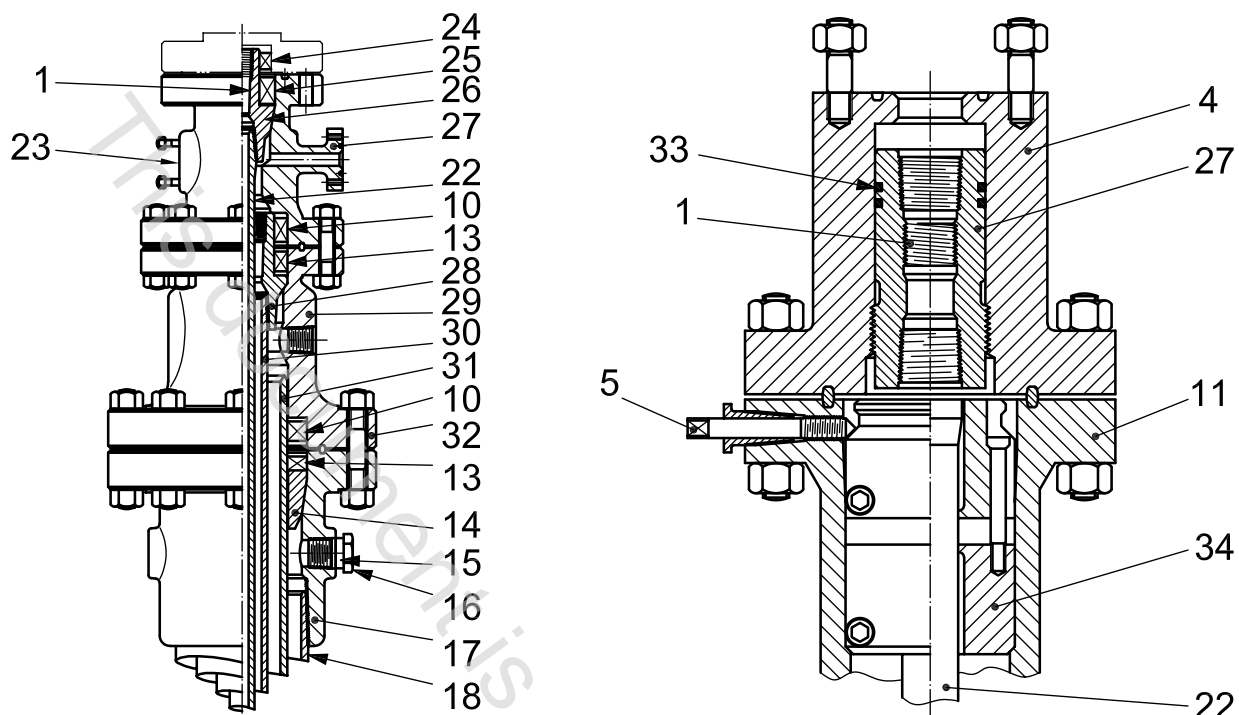
This International Standard establishes requirements for five product specification levels (PSLs): PSL 1, 2, 3, 3G and 4. These five PSL designations define different levels of technical quality requirements. Annex A provides guidelines (not requirements) for selecting an acceptable PSL.



Key

- | | | | |
|----|-----------------------------------------------------------------------|----|----------------------------|
| 1 | back-pressure valve preparation | 12 | double-studded adapter |
| 2 | subsurface safety valve control line | 13 | annular casing pack-off |
| 3 | subsurface safety valve control line outlet | 14 | casing hanger (slip style) |
| 4 | tubing-head adapter | 15 | threaded outlet connection |
| 5 | lock screw | 16 | bullplug |
| 6 | tubing hanger pack-off | 17 | casing-head housing |
| 7 | extended neck tubing hanger with subsurface safety valve control line | 18 | surface casing |
| 8 | studded side outlet | 19 | wellhead support plate |
| 9 | valve-removal preparation | 20 | tubing pack-off retainer |
| 10 | bottom casing pack-off | 21 | tubing hanger (slip style) |
| 11 | tubing-head spool | 22 | tubing |

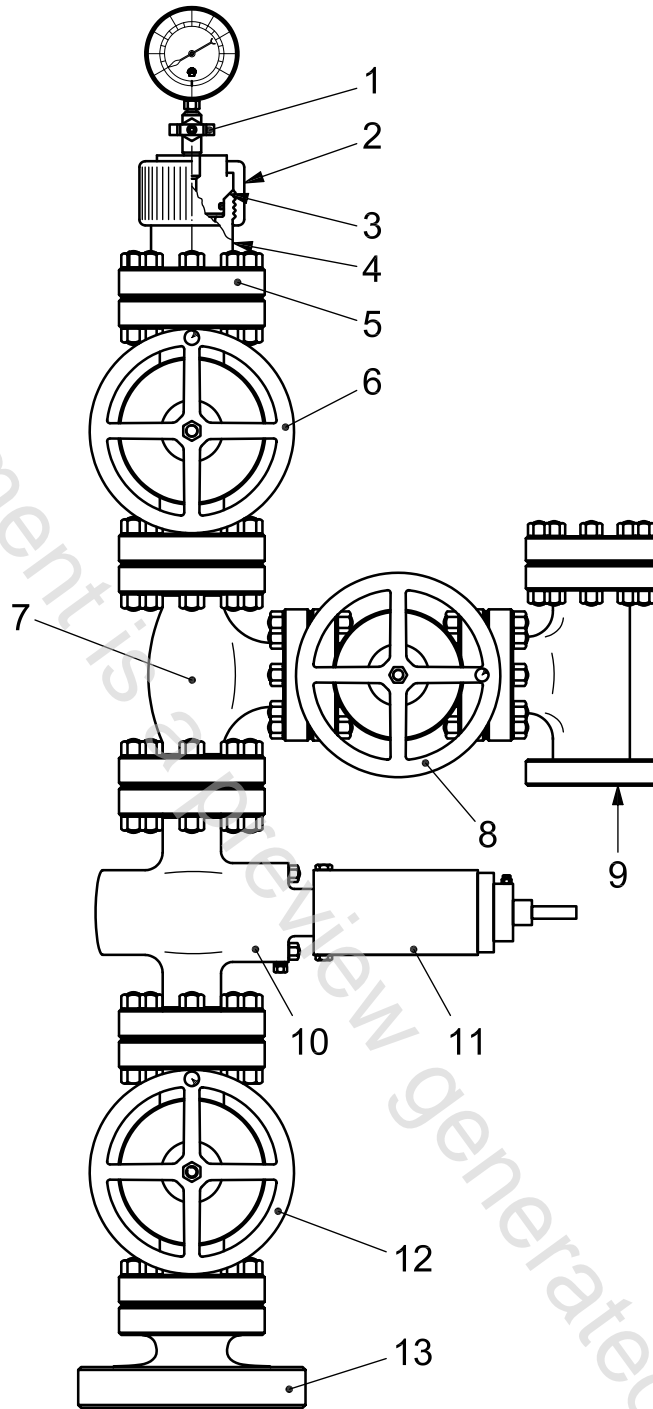
Figure 1 — Typical wellhead assembly nomenclature (continued)



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



Key

- | | |
|-----------------------|-----------------------------------|
| 1 gauge valve | 8 wing valve (manual or actuated) |
| 2 bonnet nut | 9 choke |
| 3 blanking plug | 10 surface safety valve |
| 4 body | 11 actuator |
| 5 top connector | 12 master valve |
| 6 swab or crown valve | 13 tubing-head adapter |
| 7 tee | |

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 31-0, *Quantities and units — Part 0: General principles*

ISO 148 (all parts), *Metallic materials — Charpy pendulum impact test*

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 6506 (all parts), *Metallic materials — Brinell hardness test*

ISO 6507 (all parts), *Metallic materials — Vickers hardness test*

ISO 6508 (all parts), *Metallic materials — Rockwell hardness test*

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

ISO 9712, *Non-destructive testing — Qualification and certification of personnel*

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

ISO 10424-1:2004, *Petroleum and natural gas industries — Rotary drilling equipment — Part 1: Rotary drill stem elements*

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, line pipe and drill stem elements*

ISO 15156 (all parts), *Petroleum and natural gas industries — Materials for use in H₂S-containing environments in oil and gas production*

NOTE In this International Standard, ISO 15156 (all parts) and NACE MR0175 provide the same technical result for a particular provision. In the running text the provision is written in the form "ISO 15156 (NACE MR0175; see Clause 2)".

ISO 18265, *Metallic materials — Conversion of hardness values*

API¹⁾ Spec 5B, *Specification for Threading, Gauging and Thread Inspection of Casing, Tubing, and Line Pipe Threads*

API Spec 6AV1, *Specification for Verification Test of Wellhead Surface Safety Valves and Underwater Safety Valves for Offshore Service*

API Spec 7:2001, *Specification for Rotary Drill Stem Elements*

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

API RP 14F, *Design, Installation, and Maintenance of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class 1, Division 1 and Division 2 Locations*

ASME²⁾ B1.1, *Unified Inch Screw Threads (UN and UNR Thread Form)*

ASME B1.2, *Gages and Gaging for Unified Inch Screw Threads*

ASME B1.3, *Screw Thread Gaging Systems for Acceptability: Inch and Metric Screw Threads (UN, UNR, UNJ, M, and MJ)*

ASME B1.5, *ACME Screw Threads*

ASME B1.20.1, *Pipe Threads, General Purpose (Inch)*

ASME Boiler and Pressure Vessel Code:2004 with 2005 and 2006 addenda, Section V, *Nondestructive Examination*

ASME Boiler and Pressure Vessel Code:2004 with 2005 and 2006 addenda, Section VIII, Division 1, *Rules for Construction of Pressure Vessels*

ASME Boiler and Pressure Vessel Code:2004 with 2005 and 2006 addenda, Section VIII, Division 2, *Alternative Rules*

ASME Boiler and Pressure Vessel Code:2004 with 2005 and 2006 addenda, Section IX, *Welding and Brazing Qualifications*

ASNT³⁾ SNT-TC-1A, *Non-Destructive Testing*

ASTM⁴⁾ A193/A193M, *Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications*

ASTM A194/A194M, *Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both*

ASTM A320/A320M, *Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for Low-Temperature Service*

ASTM A370, *Standard Test Methods and Definitions for Mechanical Testing of Steel Products*

ASTM A388/A388M, *Standard Practice for Ultrasonic Examination of Heavy Steel Forgings*

ASTM A453/A453M, *Standard Specification for High-Temperature Bolting Materials, with Expansion Coefficients Comparable to Austenitic Stainless Steels*

ASTM A703/A703M-08a, *Standard Specification for Steel Castings, General Requirements, for Pressure-Containing Parts*

ASTM D395, *Standard Test Methods for Rubber Property — Compression Set*

ASTM D412, *Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers — Tension*

ASTM D471, *Standard Test Method for Rubber Property — Effect of Liquids*

ASTM D1414, *Standard Test Methods for Rubber O-Rings*

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

3) American Society for Nondestructive 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 D1415, *Standard Test Method for Rubber Property — International Hardness*

ASTM D1418, *Standard Practice for Rubber and Rubber Latices — Nomenclature*

ASTM D2240, *Standard Test Method for Rubber Property — Durometer Hardness*

ASTM E10, *Standard Test Method for Brinell Hardness of Metallic Materials*

ASTM E18, *Standard Test Methods for Rockwell Hardness of Metallic Materials*

ASTM E92, *Standard Test Method for Vickers Hardness of Metallic Materials*

ASTM E94, *Standard Guide for Radiographic Examination*

ASTM E140, *Standard Hardness Conversion Tables for Metals — Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness and Scleroscope Hardness*

ASTM E165, *Standard Practice for Liquid Penetrant Examination for General Industry*

ASTM E428, *Standard Practice for Fabrication and Control of Metal, Other than Aluminum, Reference Blocks Used in Ultrasonic Testing*

ASTM E709, *Standard Guide for Magnetic Particle Testing*

ASTM E747, *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*

MSS⁶⁾ SP-55, *Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components — Visual Method for Evaluation of Surface Irregularities*

SAE⁷⁾ AMS-H-6875, *Heat treatment of steel raw materials*

SAE 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 for purposes of non-destructive examination that can be viewed by direct line of sight

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

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

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

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