

INTERNATIONAL STANDARD

ISO
13533

First edition
2001-12-01

Petroleum and natural gas industries — Drilling and production equipment — Drill- through equipment

*Industries du pétrole et du gas naturel — Équipements de forage et de
production — Équipements à travers lesquels s'effectue le forage*



Reference number
ISO 13533:2001(E)

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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

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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.

The main task of technical committees is to prepare International Standards. 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.

ISO 13533 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum and natural gas industries*, Subcommittee SC 4, *Drilling and production equipment*.

Annexes A and B form a normative part of this International Standard. Annexes C, D, E, F, G and H are for information only.

Introduction

This International Standard is based on API Specification 16A, second edition, 1 June 1998.

This International Standard is intended to provide for the availability of safe and functionally interchangeable drill-through equipment utilized in the petroleum and natural gas industry.

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.

For the convenience of users of this International Standard, annex H provides a list of those normative International Standards cited in clause 2 with national or regional standards which have been found mutually applicable in the context of the requirements in the text. The user may optionally apply the national or regional standard in the context of the requirement for which the International Standard is cited.

Petroleum and natural gas industries — Drilling and production equipment — Drill-through equipment

1 Scope

This International Standard specifies requirements for performance, design, materials, testing and inspection, welding, marking, handling, storing and shipping of drill-through equipment used for drilling for oil and gas. It also defines service conditions in terms of pressure, temperature and wellbore fluids for which the equipment will be designed.

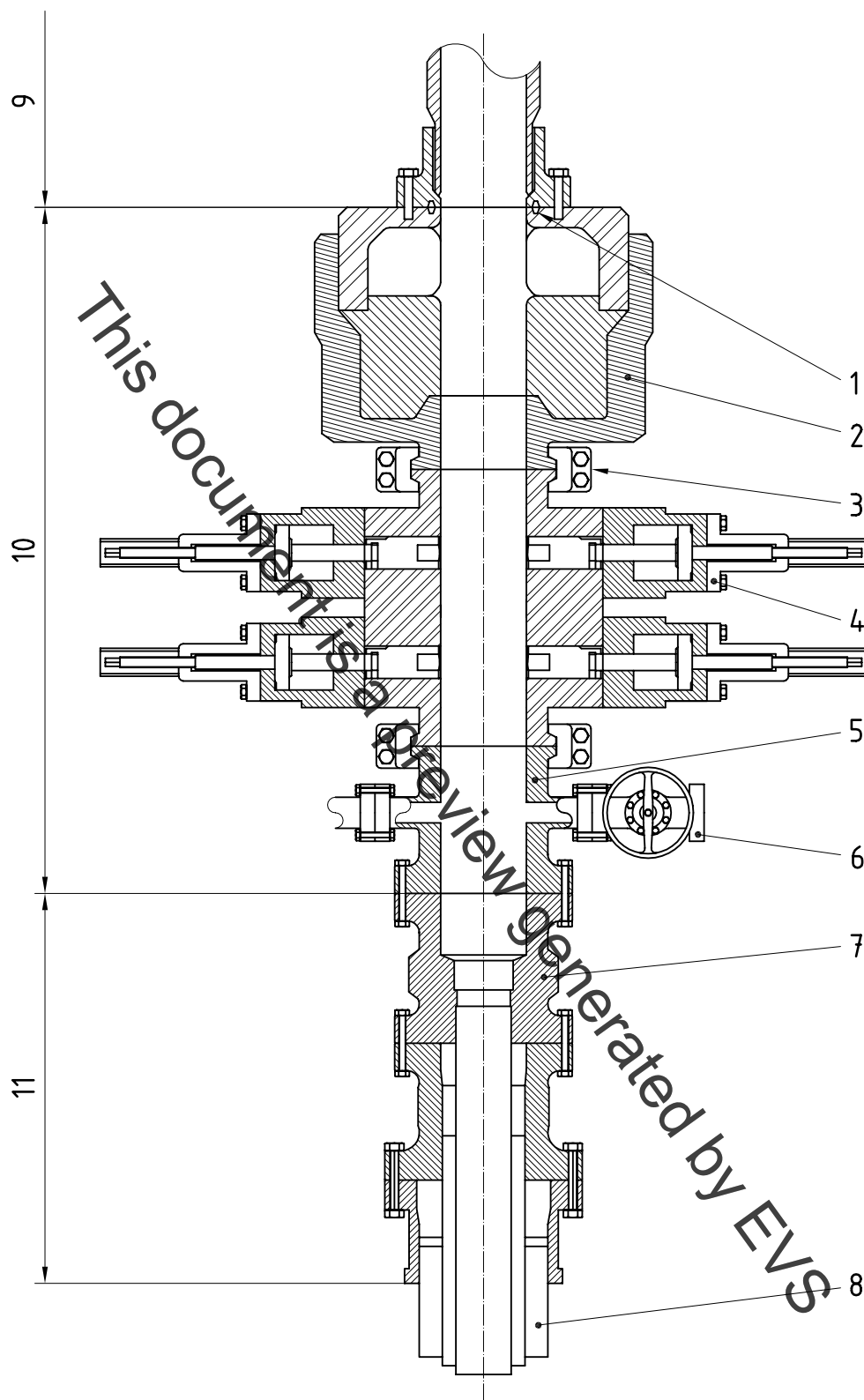
This International Standard is applicable to and establishes requirements for the following specific equipment:

- a) ram blowout preventers;
- b) ram blocks, packers and top seals;
- c) annular blowout preventers;
- d) annular packing units;
- e) hydraulic connectors;
- f) drilling spools;
- g) adapters;
- h) loose connections;
- i) clamps.

Dimensional interchangeability is limited to end and outlet connections.

Typical equipment defined by this International Standard is shown in Figures 1 and 2; recommendations for failure reporting are outlined in annex F.

This International Standard does not apply to field use or field testing of drill-through equipment.



Key

- | | | | |
|---|------------------------|----|-----------------------------------|
| 1 | Ring gaskets ISO 10423 | 7 | Wellhead |
| 2 | Annular BOP | 8 | Casing |
| 3 | Clamp | 9 | End and outlet connections |
| 4 | Ram BOP | 10 | Drill-through equipment ISO 13533 |
| 5 | Drilling spool | 11 | Wellhead equipment ISO 10423 |
| 6 | Valve ISO 10423 | | |

Figure 1 — Typical surface drill-through equipment

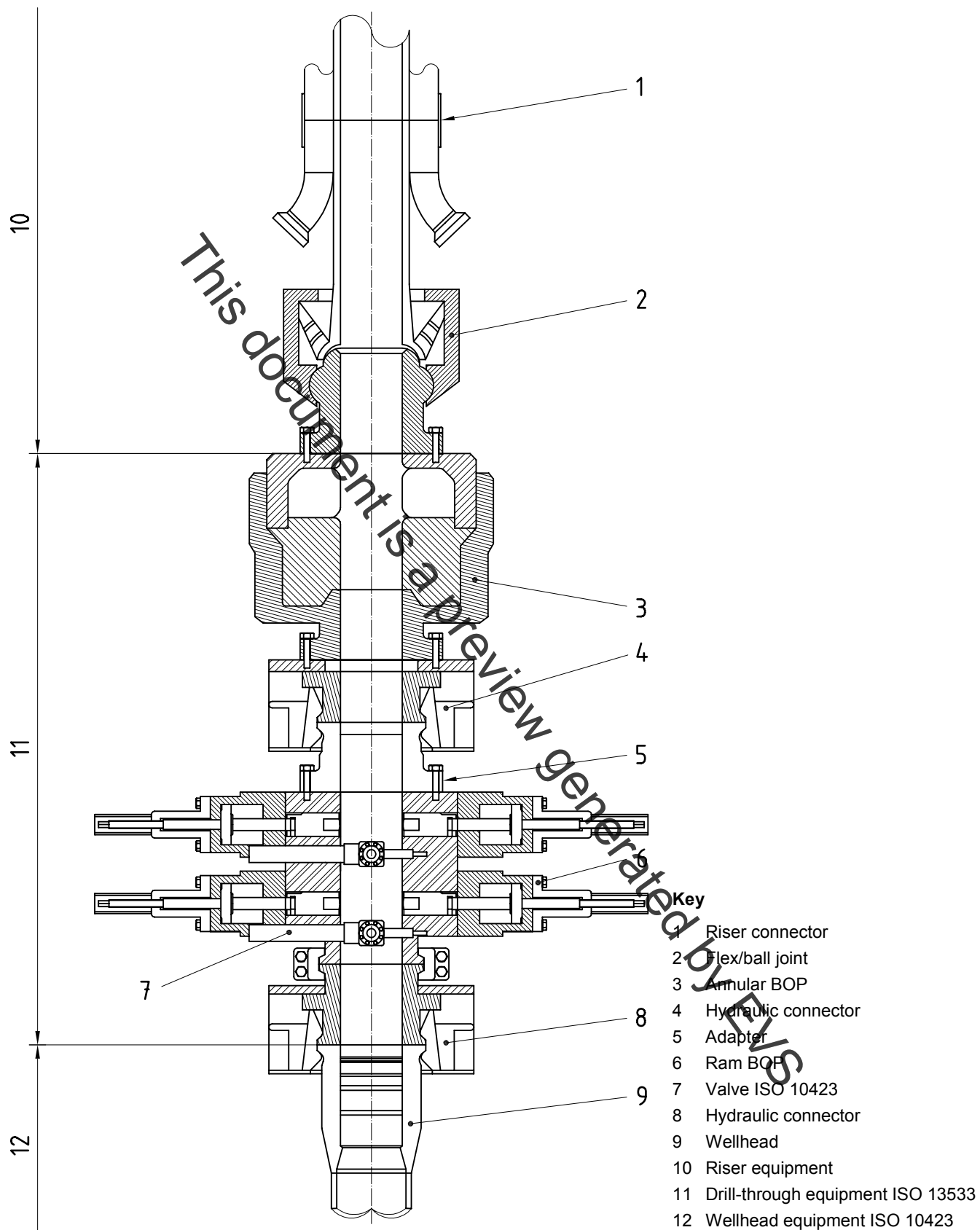


Figure 2 — Typical subsea drill-through equipment

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 IEC and ISO maintain registers of currently valid International Standards.

ISO 2859-1:1989, *Sampling procedures for inspection by attributes — Part 1: Sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection*

ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method*

ISO 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method*

ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)*

ISO 6892, *Metallic materials — Tensile testing at ambient temperature*

ISO 10423:2001, *Petroleum and natural gas industries — Drilling and production equipment — Wellhead and christmas tree equipment*

ISO 11961:1996, *Petroleum and natural gas industries — Steel pipes for use as drill pipe — Specification*

ISO 13665, *Seamless and welded steel tubes for pressure purposes — Magnetic particle inspection of the tube body for the detection of surface imperfections*

API Bulletin 6AF, *Capabilities of API flanges under combinations of load*

ASME Boiler and Pressure Vessel Code Section V, Article 5, *UT Examination Methods for Materials and Fabrication*

ASME Boiler and Pressure Vessel Code Section VIII, Division 1, Appendix 4, *Rounded Indication Charts Acceptance Standard for Radiographically Determined Rounded Indications in Welds*

ASME Boiler and Pressure Vessel Code Section VIII, Division 2, Pressure Vessel — Alternate Rules, Appendix 4, *Design Based on Stress Analysis*

ASME Boiler and Pressure Vessel Code Section VIII, Division 2, Pressure Vessel — Alternate Rules, Appendix 6, *Experimental Stress Analysis*

ASME Boiler and Pressure Vessel Code Section IX, Articles I, II, III and IV

ASTM A 193:1999, *Specification for Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service*

ASTM A 320:1999, *Specification for Alloy Steel Bolting Materials for Low Temperature Service*

ASTM A 370:1997, *Test Methods and Definitions for Mechanical Testing of Steel Products*

ASTM A 453:1999, *Specification for Bolting Materials, High Temperature, 50 to 120 ksi Yield Strength, with Expansion Coefficients Comparable to Austenitic Steels*

ASTM D 395:1998, *Standard Test Methods for Rubber Property — Compression Set*

ASTM D 412:1998, *Test Methods for Vulcanized Rubber, Thermoplastic Rubbers and Thermoplastic Elastomers*

ASTM D 471:1998, *Standard Test Method for Rubber Property — Effect of Liquids*

ASTM D 1414:1994, *Standard Test Methods for Rubber O-Rings*

ASTM D 1415:1994, *Standard Test Method for Rubber Property — International Hardness*

ASTM D 1418:1999, *Standard Practice for Rubber and Rubber Lattices — Nomenclature*

ASTM D 2240:1997, *Test Method for Rubber Property — Durometer Hardness*

ASTM E 94:1993, *Standard Guide for Radiographic Testing*

ASTM E 140:1999, *Hardness Conversion Tables for Metals*

ASTM E 165:1995, *Standard Test Method for Liquid Penetrant Examination*

ASTM E 569:1997, *Standard Practice for Acoustic Emission Monitoring of Structures During Controlled Simulation*

ASTM E 747:1997, *Standard Practice for Design, Manufacture, and Material Grouping Classification of Wire Image Quality Indicators (IQI) used for Radiography*

ASNT-SNT-TC-1A:1992, *Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing*

NACE MR0175–2000, *Sulfide Stress Cracking Resistant Metallic Materials for Oilfield Equipment*

SAE AMS-H-6875A:1998, *Heat Treatment of Steel Raw Materials*

3 Terms and definitions

For the purpose of this International Standard, the following terms and definitions apply.

3.1

acceptance criteria

defined limits placed on characteristics of materials, products or service

3.2

adapter

pressure-containing piece of equipment having end connections of different nominal size designation and/or pressure rating

3.3

annular blowout preventer

blowout preventer that uses a shaped elastomeric sealing element to seal the space between the tubular and the wellbore or an open hole

3.4

blind connection

end or outlet connection with no centre bore, used to completely close off a connection

3.5

blind-shear ram

closing and sealing component in a ram blowout preventer that first shears the tubular in the wellbore and then seals off the bore or acts as a blind ram if there is no tubular in the wellbore

3.6

blind ram

closing and sealing component in a ram blowout preventer that seals the open wellbore