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Petroleum and natural gas industries — Drilling and production equipment — Inspection, maintenance, repair and remanufacture of hoisting equipment

Industries du pétrole et du gaz naturel — Équipement de forage et de production — Vérification, maintenance, réparation et fabrication à partir de matériaux recyclés du matériel de levage

[Revision of first edition (ISO 13534:2000)]

ICS 75.180.10

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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 2.

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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 13534 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*.

Introduction

This International Standard is based on API RP 8B, 7th edition, March 2002 [4] and API RP 7L, 1st edition [2]. Application of this International Standard seeks to maintain the serviceability and continued use of existing hoisting and drilling equipment manufactured under API Spec 8A [3], ISO 13535, and ISO 14693.

In this International Standard, quantities expressed in the International System (SI) of units are also, where practical, expressed in United States Customary (USC) units for information.

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 the user from utilizing alternative equipment, methods or engineering solutions for individual applications. 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.

Petroleum and natural gas industries — Drilling and production equipment — Inspection, maintenance, repair and remanufacture of hoisting equipment

1 Scope

This International Standard gives guidelines and establishes requirements for inspection, maintenance, repair and remanufacture of items of hoisting and drilling equipment manufactured according to API Spec 8A [3], ISO 13535, or ISO 14693 used in drilling and production operations, in order to maintain the serviceability of this equipment.

NOTE For the purposes of this International Standard, API RP 8C is equivalent to ISO 13535.

Items of hoisting and drilling equipment covered by this International Standard are:

— crown block sheaves and bearings;

— travelling blocks and hook blocks;

— block to hook adapters;

— connectors and link adapters;

— drilling hooks;

— tubing hooks and sucker rod hooks;

— elevator links;

— casing elevators, tubing elevators, drill pipe elevators and drill collar elevators;

— sucker rod elevators;

— rotary swivel bail adapters;

— rotary swivels;

— power swivels;

— power subs;

— dead line tie down/wireline anchors;

— drill string motion compensators;

— kelly spinners;

— riser running tool components;

— wellhead running tool components;

— safety clamps (whether or not used as hoisting equipment);

— rotary tables;

— rotary bushings;

— high-pressure mud and cement hose;

— BOP handling systems

— slush pumps;

— draw works;

— casing, tubing, drill-pipe and drill-collar spiders that are designed to be installed on or above the master bushing or rotary table;

— casing, tubing, drill-pipe and drill-collar spiders that are designed to be installed inside, or partly inside, the master busing or rotary table;

— rotary slips designed for use in standard rotary bowls with a 33,333 cm per m (4 in per ft) API taper;

— manual spiders that use API rotary slips not capable of use as elevators, that are installed on or above the master bushing/rotary table;

— manual spiders that use rotary slips not having a taper of 33,333 cm per m (4 in per ft) not capable of use as elevators, that are installed on or above the master bushing/rotary table;

— rotary slips not having a taper of 33,333 cm per m (4 in per ft) for use in manual spiders;

— spring, pneumatic or hydraulic spiders with integral slips not capable of use as elevators, that are installed on or above the master bushing/rotary table;

— spring, pneumatic or hydraulic spiders with integral slips not capable of use as elevators, that are installed in or partly in the rotary table;

— manual tong.

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

ISO 13535, *Petroleum and natural gas industries —Drilling and production equipment — Hoisting equipment*

ISO 14693, *Petroleum and natural gas industries — Drilling and well-servicing equipment*

API RP 2D, *Operation and Maintenances for Offshore Cranes*[1)]

1) American Petroleum Institute; 1220 L St. N.W.; Washington, DC 20005; USA.

API RP 9B, *Application, Care, and Use of Wire Rope for Oil Field Service*

API RP 54, *Occupational Safety for Oil and Gas Well Drilling and Servicing Operations*

ASTM 106, *Standard Specification for Seamless Carbon Steel pipe for High-Temperature Service*[2)]

3 Terms, definitions, symbols, and abbreviations

3.1 Terms and definitions

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

3.1.1
critical area
highly stressed region of a primary load carrying component as defined by the manufacturer

3.1.2
expendable parts
parts normally used up or consumed in service

EXAMPLE Seals, gaskets, filters, packing, V-belts, covers, guards, breathers, drains and miscellaneous hardware and fasteners.

3.1.3
inspection
comparison of equipment conformity to predetermined standards, followed by a determination of action required

3.1.4
performance load test

test, not exceeding the rated load of the equipment, wherein a load is applied under controlled and monitored conditions to verify the function or performance of the equipment under specific conditions or in conjunction with other equipment

3.1.5
proof load test
test, at least 1,5 times the equipment rated load, wherein a load is applied under controlled and monitored conditions to verify the serviceability of equipment

3.1.6
maintenance
actions including inspection, adjustments, cleaning, lubrication, testing, and replacement of expendable parts, as necessary to maintain the serviceability of the equipment

3.1.7
manufacturer
individual or company that makes or processes equipment or material covered by this International Standard

3.1.8
owner
individual, legal entity or organization holding legal title to the equipment

2) American Society for Testing and Materials; 100 Barr Harbor Dr.; West Conshohocken, PA 19428; USA.

3.1.9
primary load
axial load to which the equipment is subjected in operation

3.1.10
primary load carrying component
component of the equipment through which the primary load is carried

3.1.11
remanufacture
action performed on equipment that involves a special process or re-machining

3.1.12
repair
action performed on equipment that involves replacement of parts, other than expendable parts, but excludes remanufacture

3.1.13
serviceability
condition of a piece of equipment at any point in time that affects the ability of the equipment to perform its function(s) as intended

3.1.14
special process
operation that can change or affect the mechanical properties, including toughness, of the materials used in equipment

3.1.15
testing
action carried out on a piece of equipment to ensure that it can perform a required function

3.1.16
user
individual or company that uses equipment or material, or implements standards

3.2 Symbols

C	coupling length
H_S	vertical height of standpipe
L_H	length of hose
L_t	length of hose travel
R	minimum radius of bending hose
S	0,3 m (1 ft) allowance for hose length tolerance and contraction when internal pressure is applied (see ISO 14693, 9.10.5)
Z	height, from the top of the derrick floor to the end of hose at the swivel when the swivel is in its lowest drilling position

3.3 Abbreviated terms

MT	magnetic particle testing
NDT	non-destructive testing

PSL product specification level

PT liquid penetrant testing

RT radiographic testing

UT ultrasonic testing

4 General principle

4.1 Procedure

4.1.1 General

Users/owners of hoisting and drilling equipment shall establish written procedures for inspection, maintenance, repair and remanufacture of each item of equipment.

4.1.2 Procedure development

4.1.2.1 User/owner and manufacturer joint procedure development

The user/owner and manufacturer should jointly develop and update inspection, maintenance, repair and remanufacture procedures consistent with equipment application, loading, work environment, usage, and operational conditions.

These factors may change as a result of new technology, product improvements or fundamental changes in service conditions.

Where necessary the user/owner should consult the manufacturer for advice and comment on these procedures.

The user/owner shall consult the manufacturer on all aspects of remanufacture.

4.1.2.2 User/owner procedure development

If the manufacturer of the equipment no longer exists or is unable for any reason to provide suitable recommendations, the user/owner shall develop documented inspection, maintenance, repair and remanufacture procedures consistent with widely accepted industry practices, taking into account equipment application, loading, work environment, usage, and operational conditions.

4.1.2.3 Parts and tooling

NDT, maintenance, and dismantling equipment shall be properly selected and adapted to the parts to be inspected and maintained.

4.2 Personnel qualification

4.2.1 NDT personnel qualification levels

4.2.1.1 Qualification

Inspectors shall be aware of the type of equipment to be evaluated and the NDT methods to apply.

The users/owners shall verify that the NDT inspector has the following information:

— assembly drawings and drawings identifying critical areas;

— rejection criteria.

In addition, the users/owners may provide the history of grinding or remanufacture, if available.

In the absence of critical area drawings, all areas of primary load carrying components shall be considered critical.

These data shall be used by the inspector to adapt the inspection procedure.

4.2.1.2 Certification

The NDT inspector shall be certified in accordance with ISO 9712 or by other recognized NDT certification programmes or standards.

NOTE For the purposes of this International Standard, ISO 9712 is equivalent to ASNT SNT-TC-1A [4].

4.2.2 Welding personnel qualification levels

Welders shall be qualified to a recognized standard.

5 Inspection and maintenance

5.1 General

5.1.1 Criteria

Inspection and maintenance are closely linked. Inspection and maintenance actions may be initiated based on, but not limited to, one or more of the following criteria:

— specific time intervals;

— measurable wear limits;

— manufacturer’s recommendations regarding maintenance;

— load cycle accumulation;

— non-performance of equipment;

— environment;

— experience (history);

— regulatory requirements.

5.1.2 Safety considerations

Operators shall review safety considerations applicable to the site where the maintenance activity is performed.

5.2 Maintenance

5.2.1 General

Maintenance of equipment consists of actions such as adjustments, cleaning, lubrication, and replacement of expendable parts. The complexity of these activities and the safety risks involved shall be considered in the assignment of appropriate resources such as facilities, equipment and qualified personnel.

5.2.2 Procedures

In addition to the procedures developed in accordance with 4.1, the manufacturer should define any special tools, materials, measuring and inspection equipment, and personnel qualifications necessary to perform the maintenance. The manufacturer should also specify those procedures that should be performed solely by the manufacturer, either within the manufacturer's facility or within another approved facility.

5.2.3 Periodic maintenance schedules

The user/owner of the equipment shall develop schedules of maintenance based on experience and the following factors:

— environment;

— load cycles;

— regulatory requirements;

— operating time;

— manufacturer’s instructions regarding maintenance;

— testing;

— repairs;

— remanufacture.

Long-term planning shall be adjusted in order not to interfere unnecessarily with the running operations.

5.3 Inspection

5.3.1 General

The existence of cracks can indicate severe deterioration and impending failure. Their detection, identification and evaluation require accurate inspection methods.

Prompt attention is then required to remove the equipment from service immediately or to provide appropriate service and/or repair.

Caution shall be exercised to take into account the increased susceptibility to brittle fracture of many steels when operating at low temperatures.

If any manufacturing defects are discovered, they should be reported to the manufacturer or supplier.