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Petroleum and natural gas industries — Aluminium alloy pipe for use as tubing for wells

Industries du pétrole et du gaz naturel — Tubes en alliage d'aluminium utilisés comme tubes de production dans les puits

ICS 75.180.10; 77.150.10

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ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

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Foreword

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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 13085 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*.

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Introduction

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 manufacturer 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 manufacturer should identify any variations from this International Standard and provide details.

This International Standard includes requirements of various natures. These are identified by the use of certain verbal forms:

— "shall" is used to indicate that a provision is mandatory;

— "should" is used to indicate that a provision is not mandatory, but recommended as good practice;

— "may" is used to indicate that a provision is optional.

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Petroleum and natural gas industries — Aluminium alloy pipe for use as tubing for wells

1 Scope

This International Standard specifies the technical delivery condition, manufacturing process, material requirements, configuration and dimensions, and verification and inspection procedures for aluminium alloy pipes for use as tubing for wells in petroleum and natural gas industries.

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 6892, *Metallic materials — Tensile testing*

ISO 11961, *Petroleum and natural gas industries — Steel drill pipe*

ASTM G1, *Standard practice for preparing, cleaning, and evaluating corrosion test specimens*

ASTM G44, *Standard practice for exposure of metals and alloys by alternate immersion in neutral 3.5 % sodium chloride solution*

ASTM B 917, *Standard practice for heat treatment of aluminium-alloy castings from all processes*

NACE TM 0177, *Laboratory testing of metals for resistance to sulphide stress cracking in hydrogen sulphide (H_2S) environments*

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3 Terms, definitions and symbols

3.1 Terms and definitions

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

3.1.1
defect
imperfection of sufficient magnitude to warrant rejection of the product based on the stipulations of this International Standard

NOTE Rejection will be based on the provisions of this International Standard.

3.1.2
heat
the metal produced by a single cycle of a batch melting process

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3.1.3
imperfection
discontinuity or irregularity in the product detected by methods outlined in this International Standard

NOTE Imperfections are detected by methods outlined in this International Standard.

3.1.4
lot
those lengths of pipe with the same specified dimensions and grade which are heat treated as part of a continuous operation (or batch), and which are of a single heat, or from different heats that are grouped according to a documented procedure which will ensure that the appropriate requirements of this International Standard are met

NOTE The documented procedure will ensure that the appropriate requirements of this International Standard are met.

3.1.5
manufacturer
firm, company or corporation responsible for marking the product

NOTE Marking by the manufacturer warrants that the product conforms to this International Standard, and it is the manufacturer who is responsible for compliance with all of its applicable provisions.

3.1.6
pipe mill
firm, company or corporation that operates pipe making facilities

3.1.7
seamless pipe
wrought tubular product made without a welded seam, manufactured by hot working and, if necessary, by subsequently cold finishing of the tubular product to produce the desired shape, dimensions and properties

3.1.8
tubing
pipe placed within a well and serving to produce well fluids or to inject fluids

3.2 Symbols

D pipe body outside diameter

D_1 outside diameter of upset end

d pipe body inside diameter

L_p pipe length (the distance between the pipe ends)

f test factor

m_1 mass of the specimen before the test

m_2 mass of the specimen after the test

p standard hydrostatic test pressure

S surface area of the specimen

t wall thickness of pipe body

t_t test time

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t_u wall thickness of upset end

V_k corrosion rate

Y_{min} specified minimum yield strength for the pipe body

4 Information to be supplied by purchaser

4.1 In placing orders for aluminium alloy tubing, the purchaser shall specify the following on the purchase order:

a) reference to this International Standard (i.e. “ISO 13085”);

b) quantity;

c) tubing delivery condition (see 5.4);

d) outside diameter (see Table 3);

e) wall thickness (see Table 3);

f) material group (see Table 1);

g) length (see Table 2);

h) delivery date and shipping instruction;

i) inspection by purchaser (see Annex A).

4.2 The purchaser should also state on the purchase order requirements concerning the following stipulations, which are optional with the purchaser.

a) pipe coatings (see 7.9);

b) non-destructive inspection (see 10.4);

c) leak proof test (see 8.3);

d) aluminium alloy name (see Table 1).

5 Process of manufacture and delivery condition

5.1 General

Tubing furnished to this International Standard shall be made by the seamless process.

5.2 Heat treatment

Tubing shall be heat treated by solution heat treatment followed by artificial or natural aging. The aluminium pipe shall not be subjected to cold working after the final heat treatment process, except for that which is incidental to normal straightening or threading operations.

The temperature and time requirements for the solution and aging heat treatment cycles shall be determined in accordance with the manufacturer's documented practice. Actual furnace temperatures and transfer timing shall be documented in order to verify that each heat treatment lot meets the manufacturer’s documented requirements.

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