



SLOVENSKI STANDARD
SIST EN ISO 13706:2006
01-julij-2006

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Petroleum, petrochemical and natural gas industries - Air-cooled heat exchangers (ISO 13706:2005)

Erdöl-, petrochemische und Erdgasindustrie - Luftgekühlte Wärmeaustauscher (ISO 13706:2005)

Industries du pétrole, de la pétrochimie et du gaz naturel - Echangeurs de chaleur refroidis a l'air (ISO 13706:2005)

Ta slovenski standard je istoveten z: EN ISO 13706:2005

ICS:

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75.180.20	Predelovalna oprema	Processing equipment

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EUROPEAN STANDARD

EN ISO 13706

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2005

ICS 75.180.20; 27.060.30

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Petroleum, petrochemical and natural gas industries - Air-cooled heat exchangers (ISO 13706:2005)

Industries du pétrole, de la pétrochimie et du gaz naturel -
Echangeurs de chaleur refroidis à l'air (ISO 13706:2005)

Erdöl- und Erdgasindustrien - Luftgekühlte Wärmetauscher
(ISO 13706:2005)

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

EN ISO 13706:2005 (E)**Foreword**

This document (EN ISO 13706:2005) has been prepared by Technical Committee ISO/TC 67 "Materials, equipment and offshore structures for petroleum and natural gas industries" in collaboration with Technical Committee CEN/TC 12 "Materials, equipment and offshore structures for petroleum 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of an identical text or by endorsement, at the latest by April 2006, and conflicting national standards shall be withdrawn at the latest by April 2006.

This document supersedes EN ISO 13706:2000.

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

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INTERNATIONAL
STANDARD

ISO
13706

Second edition
2005-10-15

**Petroleum, petrochemical and natural gas
industries — Air-cooled heat exchangers**

*Industries du pétrole, de la pétrochimie et du gaz naturel — Échangeurs
de chaleur refroidis à l'air*

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Contents

Page

Foreword.....	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions.....	2
4 General.....	4
5 Proposals.....	5
6 Documentation	5
6.1 Approval information.....	5
6.2 Final records	6
7 Design	7
7.1 Tube bundle design	7
7.2 Air-side design	19
7.3 Structural design	30
8 Materials	35
8.1 General.....	35
8.2 Headers	36
8.3 Louvres	36
8.4 Other components	36
9 Fabrication of tube bundle	37
9.1 Welding	37
9.2 Post-weld heat treatment	37
9.3 Tube-to-tubesheet joints	37
9.4 Gasket contact surfaces	39
9.5 Thread lubrication.....	39
9.6 Alignment and tolerances	39
9.7 Assembly	39
10 Inspection, examination and testing.....	41
10.1 Quality control.....	41
10.2 Pressure test	42
10.3 Shop run-in.....	42
10.4 Equipment performance testing.....	42
10.5 Nameplates.....	42
11 Preparation for shipment	42
11.1 General.....	42
11.2 Surfaces and finishes.....	43
11.3 Identification and notification.....	43
12 Supplemental requirements	43
12.1 General.....	43
12.2 Design	43
12.3 Examination.....	44
12.4 Testing	44
Annex A (informative) Recommended practices	45
Annex B (informative) Checklist, data sheets and electronic data exchange.....	49

ISO 13706:2005(E)

Annex C (informative) Winterization of air-cooled heat exchangers..... 66
Bibliography 115

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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 13706 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 6, *Processing equipment and systems*.

This second edition cancels and replaces the first edition (ISO 13706:2000), which has been technically revised.

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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 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.

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Petroleum, petrochemical and natural gas industries — Air-cooled heat exchangers

1 Scope

This International Standard gives requirements and recommendations for the design, materials, fabrication, inspection, testing and preparation for shipment of air-cooled heat exchangers for use in the petroleum and natural gas industries.

This International Standard is applicable to air-cooled heat exchangers with horizontal bundles, but the basic concepts can also be applied to other configurations.

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 76, *Rolling bearings — Static load ratings*

ISO 281, *Rolling bearings — Dynamic load ratings and rating life*

ISO 286 (all parts), *ISO system of limits and fits*

ISO 1081, *Belt drives — V-belts and V-ribbed belts, and corresponding grooved pulleys — Vocabulary*

ISO 1459, *Metallic coatings — Protection against corrosion by hot dip galvanizing — Guiding principles*

ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods*

ISO 2491, *Thin parallel keys and their corresponding keyways (Dimensions in millimetres)*

ISO 3744, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane*

ISO 4183, *Belt drives — Classical and narrow V-belts — Grooved pulleys (system based on datum width)*

ISO 4184, *Belt drives — Classical and narrow V-belts — Lengths in datum system*

ISO 5287, *Belt drives — Narrow V-belts for the automotive industry — Fatigue test*

ISO 5290, *Belt drives — Grooved pulleys for joined narrow V-belts — Groove sections 9N/J, 15N/J and 25N/J (effective system)*

ISO 8501-1, *Preparation of steel substrates before application of paints and related products — Visual assessment of surface cleanliness — Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings*

ISO 13706:2005(E)

ISO 9563, *Belt drives — Electrical conductivity of antistatic endless synchronous belts — Characteristics and test method*

AGMA 6001¹⁾, *Design and selection of components for enclosed gear drives*

AGMA 6010, *Standard for spur, helical, herringbone and bevel enclosed drives*

ASME PTC 30²⁾, *Air cooled heat exchangers*

ICC³⁾, *International Building Code*

3 Terms and definitions

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

3.1**bank**

one or more items arranged in a continuous structure

3.2**bare tube surface**

total area of the outside surfaces of the tubes, based on the length measured between the outside faces of the header tubesheets

3.3**bay**

one or more tube bundles, serviced by two or more fans, including the structure, plenum and other attendant equipment

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NOTE Figure 1 shows typical bay arrangements <https://standards.iteh.ai/catalog/standards/sist/38d410a6-7751-4b11-9e49-3004d7dd6cfl/sist-en-iso-13706-2006>

3.4**finned surface**

⟨of a tube⟩ total area of the outside surface exposed to air

3.5**forced-draught exchanger**

exchanger designed with the tube bundles located on the discharge side of the fan

3.6**induced-draught exchanger**

exchanger designed with the tube bundles located on the suction side of the fan

3.7**item**

one or more tube bundles for an individual service

3.8**item number**

purchaser's identification number for an item

1) American Gear Manufacturers' Association, 1500 King Street, Suite 201, Alexandria, VA 22314, USA.

2) American Society of Mechanical Engineers, Three Park Avenue, New York, NY 10016-5990, USA.

3) International Code Council Foundation, 10624 Indian Woods Drive, Cincinnati, OH 45242, USA.

3.9**pressure design code**

recognized pressure vessel standard specified or agreed by the purchaser

EXAMPLE ASME Section VIII.

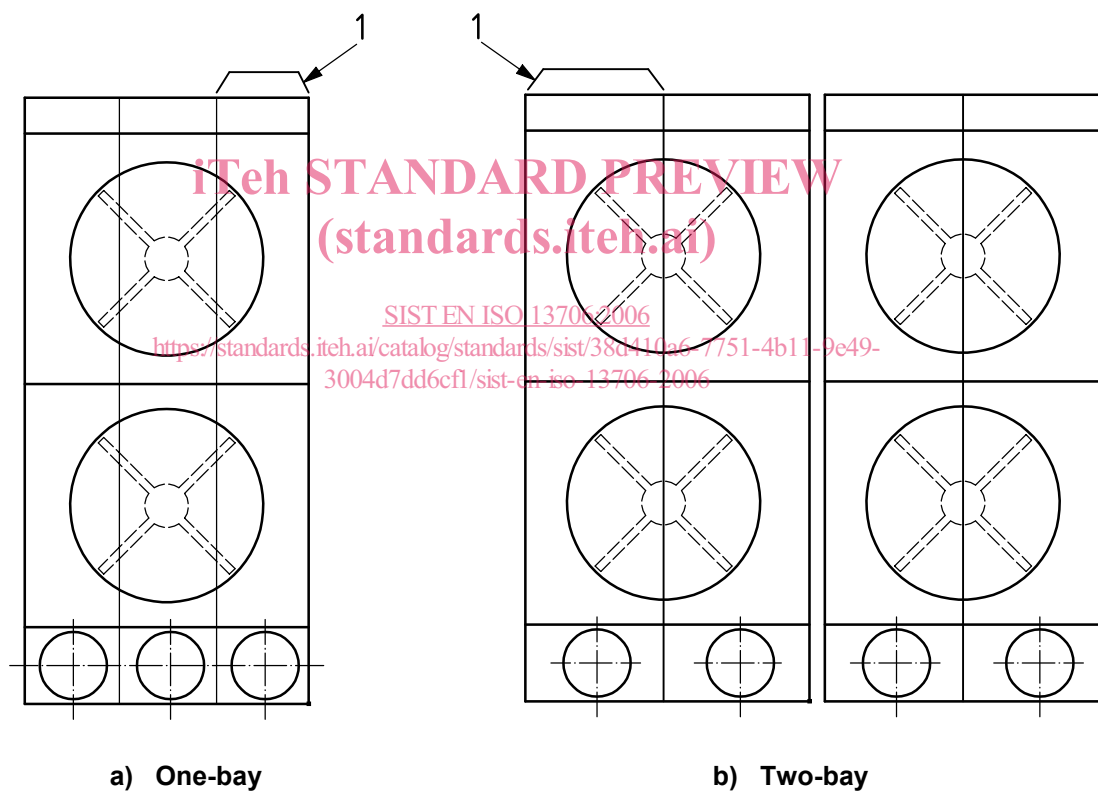
3.10**structural code**

recognized structural standard specified or agreed by the purchaser

EXAMPLES AISC M011 and AISC S302.

3.11**tube bundle**

assembly of headers, tubes and frames

**Key**

1 tube bundle

Figure 1 — Typical bay arrangements

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4 General

- 4.1 The pressure design code shall be specified or agreed by the purchaser.

Pressure components shall comply with the pressure design code and the supplemental requirements given in this International Standard.

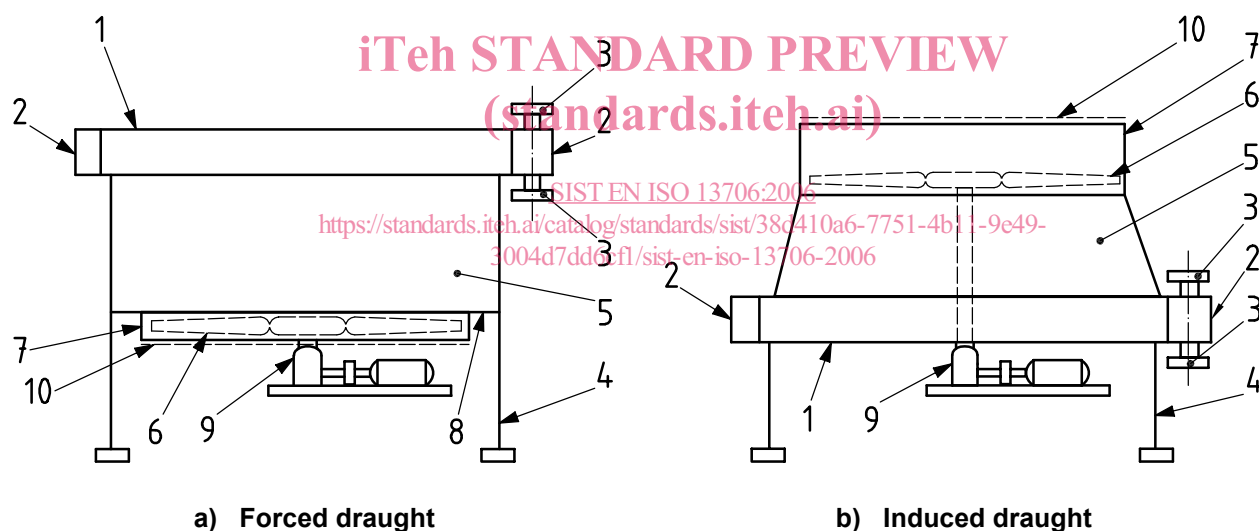
NOTE A bullet (●) at the beginning of a subclause indicates a requirement for the purchaser to make a decision or provide information (see checklist in Annex B).

4.2 The air-cooled heat exchanger shall be either a forced-draught exchanger or an induced-draught exchanger and shall include the components shown in Figure 2 and any auxiliaries such as ladders, walkways and platforms.

4.3 Annex A, which may be consulted if required, includes for information some recommended mechanical and design details. Annex A also includes precautions for consideration when specifying certain design aspects, including temperature limitations, type of extended surface, tube support methods, type of air-cooled heat exchanger, materials of gasket construction and operational considerations such as walkway access.

- 4.4 The vendor shall comply with the applicable local regulations specified by the purchaser.

4.5 In this International Standard, where practical, US Customary units are included in brackets for information.



Key

1	tube bundle	6	fan
2	header	7	fan ring
3	nozzle	8	fan deck
4	supporting column	9	drive assembly
5	plenum	10	fan guard

Figure 2 — Typical components of an air-cooled heat exchanger

5 Proposals

- 5.1 The vendor's proposal shall include a completed data sheet for each item (see example in Annex B).
- 5.2 A proposal drawing shall be furnished which shows the major dimensions in plan and elevation, and the nozzle sizes and their orientation.
- 5.3 The proposal shall state whether vertically mounted electric motors shall be shaft up or shaft down.
- 5.4 The proposal shall fully define the extent of shop assembly and include a general description of the components to be assembled in the field.
- 5.5 Any proposal for a design that is not fully described in this International Standard shall include additional drawings sufficient to describe the details of construction.
- 5.6 The proposal shall include a detailed description of any exceptions to the specified requirements.
- 5.7 The proposal shall include noise data. The proposal shall include a noise data sheet (see example in Annex B) if specified by the purchaser.
- 5.8 The proposal shall include fan performance characteristic curves with the design point marked on the curves.
- 5.9 The proposal shall include details of the method used to secure the fin ends, see 7.1.11.7.

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6 Documentation

6.1 Approval information

- 6.1.1 For each item number, the vendor shall produce documents which include the following information. The purchaser shall specify which documents shall be submitted and which of them shall be subject to approval:
 - a) purchaser's item number, the service, the project name and location, the purchaser's order number and the vendor's shop order number;
 - b) design pressure, maximum allowable working pressure, test pressure, maximum and minimum design temperature, and corrosion allowance;
 - c) any applicable codes and purchase specifications of the purchaser;
 - d) material specifications and grades for all pressure parts;
 - e) overall dimensions;
 - f) dimensions and locations of supports and sizes of holding-down bolts;
 - g) nozzle size, rating, facing, location, projection beyond header surface, allowable loadings (forces and moments) and direction of flow;
 - h) drive mount details;
 - i) masses of the tube bundle, the exchanger empty and full of water, and the mass of the heaviest component or combination of components intended by the vendor to be handled in a single lift;
 - j) column reactions for each load type listed in 7.3.3;