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Petroleum, petrochemical and natural gas industries — Calculation of heater-tube thickness in petroleum refineries

Industries du pétrole, de la pétrochimie et du gaz naturel — Calcul de l'épaisseur des tubes de fours de raffineries de pétrole

Reference number
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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 67, *Oil and gas industries including lower carbon energy,* Subcommittee SC 6, *Processing equipment and systems,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 12, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement)

This third edition cancels and replaces the second edition (ISO 13704:2007), which has been technically revised. It also incorporates the Technical Corrigendum ISO 13704:2007/Cor 1:2008.

This document supplements API Std 530, 7th edition (2015) including addendum 1 and addendum 2.

The technical requirements of ISO 13704 and API Std 530 used to be identical. In the meantime API Std 530 has been technically revised as API 530, 7th edition (2015) with addendums 1 and 2. The purpose of this edition of ISO 13704 is to bring it up to date, by referencing the current edition of API Std 530 and including supplementary content.

The main changes are as follows:

— the allowable stress values of some of the materials which have been amended in accordance with the latest WRC bulletin 541, 3rd edition, August 2020.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Petroleum, petrochemical and natural gas industries — Calculation of heater-tube thickness in petroleum refineries

1 Scope

This document specifies the requirements for the procedures and design criteria used for calculating the required wall thickness of new tubes and associated component fittings for petroleum, petrochemical and natural gas industries. These procedures are appropriate for designing tubes for service in both corrosive and non-corrosive applications. These procedures have been developed specifically for the design of refinery and related process-fired heater tubes (direct-fired, heat-absorbing tubes within enclosures). These procedures are not intended to be used for the design of external piping.

This document does not give recommendations for tube retirement thickness. A technique for estimating the life remaining for a heater tube is described

This document is a supplement to API 530, 7th edition (2015) including addendum 1 and addendum 2, the requirements of which are applicable with the exceptions specified in this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 13445 (all parts), *Unfired pressure vessels*

API Std 530, 7th edition (2015), *Calculation of Heater-tube Thickness in Petroleum Refineries*

API Std 530, *Addendum 1, Addendum to Calculation of Heater-tube Thickness in Petroleum Refineries, Seventh Edition* (2019)

API Std 530, *Addendum 2, Addendum to Calculation of Heater-tube Thickness in Petroleum Refineries, Seventh Edition* (2021)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in API 530, 7th edition (2015) apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Supplements to API 530, 7th edition (2015)

4.1 General requirements

The requirements specified in API 530, 7th edition (2015) shall apply, with the exception specified in 4.2.

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4.2 Limitations for design procedures

The requirement specified in API 530, 7th edition (2015), 4.2.8 shall apply, with the following exceptions:

For the purpose of this provision, the EN 13445 series shall be used in place of ASME BPVC, Section VIII, Division 1.

This subclause relates to heater-tubes under external pressure.

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