

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

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ICS 75.180.20

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EUROPEAN STANDARD

EN ISO 13704

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2007

ICS 75.180.20

English Version

**Petroleum, petrochemical and natural gas industries -
Calculation of heater-tube thickness in petroleum refineries (ISO
13704:2007)**

Industries du pétrole, de la pétrochimie et du gaz naturel -
Calcul de l'épaisseur des tubes de fours de raffineries de
pétrole (ISO 13704:2007)

Erdöl- und Erdgasindustrie - Berechnung der Wanddicke
von Heizrohren in Erdölraffinerien (ISO 13704:2007)

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN ISO 13704:2007) 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, petrochemical 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of an identical text or by endorsement, at the latest by May 2008, and conflicting national standards shall be withdrawn at the latest by May 2008.

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Endorsement notice

The text of ISO 13704:2007 has been approved by CEN as a EN ISO 13704:2007 without any modification.

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1 Scope

This International Standard specifies the requirements and gives recommendations for the procedures and design criteria used for calculating the required wall thickness of new tubes and associated component fittings for petroleum-refinery heaters. 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 International Standard does not give recommendations for tube retirement thickness; Annex A describes a technique for estimating the life remaining for a heater tube.

2 Terms and definitions

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

2.1

actual inside diameter

D_i

inside diameter of a new tube

NOTE The actual inside diameter is used to calculate the tube skin temperature in Annex B and the thermal stress in Annex C.

2.2

component fitting

fitting connected to the fired heater tubes

EXAMPLES Return bends, elbows, reducers.

NOTE 1 There is a distinction between standard component fittings and specially designed component fittings; see 4.9.

NOTE 2 Typical material specifications for standard component fittings are ASTM A 234, ASTM A 403 and ASTM B 366.

2.3

corrosion allowance

δ_{CA}

additional material thickness added to allow for material loss during the design life of the component

2.4

design life

t_{DL}

operating time used as a basis for tube design

NOTE The design life is not necessarily the same as the retirement or replacement life.