

# SAFETY & STANDARDS

## Industrial Thermoprocessing Equipment (IThE)

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➤ **CEN/TC 186**

➤ **ISO/TC 244**

➤ **IEC/TC 27**

Basis of European Standardization  
on Machinery and Thermoprocessing Equipment  
is the *European New Approach from 1985*

**Technical Rules** defined in

- **compulsory Directives** with general Essential (Safety) Requirements
- **voluntary Harmonised Standards** specifying the Essential Requirement(s)

**Mandated Harmonised Standards**

referenced in the Official Journal of European Communities  
grant **Presumption of Conformity**

Objective in 1985:

**Harmonisation of 60 national Technical Rules**  
in the European Community and EFTA \*

- national standards,
- national specifications,
- national accident prevention rules,
- national codes of practice

\*identified by preparatory CECOF group

# Standardisation for IThE in Europe

## History of CEN/TC 186

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- 1987 observing development of Machinery Directive
- 1988 investigation of impact on furnace manufacturers and preparation of European standardisation by CECOF
- 1989 publication of Machinery Directive 89/392/EEC
- 1989 creation of CEN Technical Committee 186
- 1992 drafts prEN 746-1, -2, -3 for CEN-enquiry
- 1993 transitional voluntary use of Machinery Directive
- 1994 drafts prEN 746-4 to -8 for CEN-enquiry
- 1995 Machinery Directive compulsory
- 1997 publication of EN 746-1, -2, -3

**CEN / TC 186**

# CEN/TC 186: Harmonized Standards for Industrial Thermoprocessing equipment (ITPE)

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- **EN 746 Part 1: (1:1997) + A1:2009**  
**Common safety requirements for ITPE**
- **EN 746 Part 2: (10:2010)**  
**Safety requirements for combustion and fuel handling systems**
- **EN 746 Part 3: (1:1997) + A1:2009**  
**Safety requirements for generation and use of atmosphere gases**
- **EN 1547: (1:2001) + A1:2009**  
**Noise test code for ITPE**  
**including its ancillary handling equipment**
- **EN 1539: (2015)** (by CEN/TC 271)  
**Dryers and ovens, in which flammable substances are released**

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# CEN/TC 186: Standards for Industrial Thermoprocessing equipment I I

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- **EN 746 Part 4: 2000**  
Particular safety requirements for hot dip galvanising ITPE
- **EN 746 Part 5: 1999**  
Particular safety requirements for salt bath ITPE
- **(working group document EN 746-6)**  
Particular safety requirements for material melting, remelting and liquid phase maintaining ITPE
- **(working group document EN 746-7)**  
Particular safety requirements for vacuum ITPE
- **EN 746 Part 8: 2000**  
Particular safety requirements for quenching equipment



- The publishing dates of the TC 186 standard range between 1999 and 2010.
- They are harmonised standards under the scope of the machinery directive
- Why did CEN/TC 186 not update them?
  
- Over the past few years, the standardisation experts of the thermo processing sector have focused on the development of safety standards within ISO.
  - See ISO/TC 244
- Objective: Review the EN 746-series based on the existing ISO 13577-series

# ISO / TC 244

# **ISO / TC 244**

## **Industrial furnaces and associated processing equipment**

Creation date: 2008

### **Scope**

Standardization of the requirements for industrial thermoprocessing equipment (e.g. heated enclosures such as furnaces, ovens, kilns, lehrs and dryers) and associated processing equipment.

The scope includes, but is not limited to, requirements for safety, energy efficiency (including exergy), design, construction, operation, processes and quality control of processed material.



### ➤ **P - Member states**

Asia: China, India, Japan, Korea

Europe: Austria, Belgium, France, Germany, Italy, Netherlands,  
Poland, Romania, Sweden, UK (BSI)

North America: Canada, USA

Africa: Egypt

Oceania: Australia

**Sum 18 members states => 10 from Europe**

### ➤ **O - Member states**

Asia: Malaysia

Europe: Czech Rep., Finland, Spain

South America: Columbia

Africa: South Africa

### ➤ **Liaison**

ISO/TC 109, ISO/TC 161, ISO/TC 257, IEC/TC 27  
AFECOR, CECOF, EUnited Metallurgy

- **ISO 13577-1**      **General safety requirements**
  - Convenor: Kevin Carlisle, Karl Dungs Inc., USA
  - Scope: Content ~ EN 746-1
  - Status: published as ISO-Standard in 10/2012  
review in progress
  
- **ISO 13577-2**      **Safety requirements for combustion and fuel handlings systems**
  - Convenor: Martin Wicker, Elster GmbH, Germany
  - Scope: Content ~ EN 746-2 without solid fuel firing
  - Status: published as ISO-Standard in 05/2012
  
- **ISO 13577-3**      **Safety requirements for atmospheric gases**
  - Convenor: Wolfram Schmid, BGHM, Germany
  - Scope: Content ~ EN 746-3
  - Status: published as ISO-Standard in 12/2016



- **ISO 13574**      **Vocabulary**
  - ➔ Convenor:      Dr. Beneke, VDMA e. V., Germany
  - ➔ Scope:          Definition in English  
Translation in French, German, Polish, Spanish  
Translation in Japanese, Korean, Chinese, ...
  - ➔ Status:          published as ISO-Standard in 2015
  
- **ISO 13577-4**      **Protective systems**
  - ➔ Convenor:      Kevin Carlisle, Karl Dungs, Inc., USA
  - ➔ Scope:          Safety requirements for controlling equipment for ITPE  
keywords: SIL- or PL- Level, „traditional“ wiring
  - ➔ Status:          published as ISO-Standard in 2014
  - ➔ Advice:          This standard has to be used for all types of ITPE  
(Electr. heated furnace are included)

### ➤ **ISO 13579**      **Method of measuring energy balance and calculating energy efficiency**

- Convenor              Morihiko Imada, Chugai Ro and JISC, Japan
- Scope:                Methods for calculating the Energy use and - efficiency for IPTE
  - ISO 13579 - 1              General methodology (74 pages)
  - ISO 13579 - 2              Reheating furnace for steel (29 pages)
  - ISO 13579 - 3              Batch type aluminum melting furnace (31 pages)
  - ISO 13579 - 4              Controlled atmosphere furnace (28 pages)
  - ISO 13579 - 4              Controlled atmosphere furnace (28 pages)
- Status:                published as ISO-Standard in January 2012
  - ISO/DIS 13579 - 11              Evaluation of various kind of efficiency (74 pages)
- Status:                DIS registered in 2016

**Transfer the requirements of  
ISO 13577-serie  
into EN 746-serie**



# Transfer ISO 13577-serie into EN 746-serie



➔ ISO 13577-1	General	➔	EN 746-1
➔ ISO 13577-2	Combustion (gas & oil)	➔	EN 746-2
➔ ISO 13577-3	Atmospheric gases	➔	EN 746-3
➔ ISO 13577-4	Protective systems	➔	EN 746-11
➔ ISO 13574	Vocabulary	➔	EN ISO 13574
	Combustion (solid)	➔	EN 746-12

# IEC / TC 27

# **ISO / TC 27**

## **Industrial electroheating and electromagnetic processing**

Creation date: ?

### **Scope**

Standardization in the field of industrial equipment and installations intended for electroheating, electromagnetic processing of materials and electroheat based treatment technologies

- IEC 60050-841 International Electrotechnical Vocabulary Part 841: Industrial electroheat
- IEC 60519-1 General requirements
- IEC 60519-2 Particular safety requirements for resistance heating equipment
- IEC 60519-3 Particular safety requirements for induction and conduction heating and induction melting installations
- IEC 60519-4 Particular safety requirements for arc furnace installations
- IEC 60519-5 Specifications for safety in plasma installations
- IEC 60519-6 Specifications for safety in industrial microwave heating equipment
- IEC 60519-ff XXXX

# ISO/TC 244 ↔ IEC/TC 27



## ISO/TC 244

- ISO 13574 Vocabulary

- ISO 13577-1 General

- ISO 13577-4 Protective systems

- ISO 13577-3 Atmospheric gases

- Heating

- Combustion

- ISO 13577-2 Combustion

- Electr. Heating

## IEC/TC 27

↔ IEV-Kapitel 841 „Industrielle Elektrowärme“

- IEC 60519-1

- IEC 60519-2

IEC 60519-3

- IEC 60519-5

- IEC 60519-6

- IEC 60519- ff

General

resistance heating equipment

induction and conduction heating  
installations

plasma installations

industrial microwave heating  
equipment

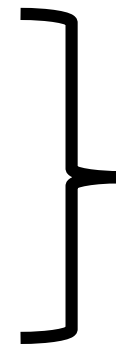
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Safety requirements

but

no requirements for the  
electr. heating system



only

requirements for the  
electr. heating system