SAFETY & STANDARDS
Industrial Thermoprocessing Equipment (IThE)

- 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

- 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
Standardisation for IThE in Europe

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

  Common safety requirements for ITPE

- **EN 746 Part 2**: (10:2010)
  Safety requirements for combustion and fuel handling systems

  Safety requirements for generation and use of atmosphere gases

  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
Common safety requirements for ITPE

EN 746 Part 2: (10:2010)
Safety requirements for combustion and fuel handling systems

Safety requirements for generation and use of atmosphere gases

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
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.
Standardisation for IThE worldwide

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.
ISO/TC 244
Industrial furnaces and associated processing equipment

**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

**O - Member states**
- Asia: Malaysia
- Europe: Czech Rep., Finland, Spain
- South America: Columbia
- Africa: South Africa

**Liaison**
- AFECOR, CECOF, EUnited Metallurgy

Sum 18 members states => 10 from Europe
ISO/TC 244
Industrial furnaces and associated thermal processing equipment

- **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/TC 244
Industrial furnaces and associated thermal processing equipment

- **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/TC 244
Industrial furnaces and associated thermal processing equipment

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
<table>
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Standardisation for IThE worldwide

IEC / TC 27
ISO / TC 27
\textit{Industrial electroheating and electromagnetic processing}

Creation date: ?

\textbf{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

IEC/TC 27
- IEC 60519-1 General
- IEC 60519-2 resistance heating equipment
- IEC 60519-3 induction and conduction heating installations
- IEC 60519-5 plasma installations
- IEC 60519-6 industrial microwave heating equipment
- IEC 60519- ff xxxxxxx

IEV-Kapitel 841 "Industrielle Elektrowärme"

Safety requirements
but
no requirements for the electr. heating system
only
requirements for the electr. heating system