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BSI Standards Publication

## Industrial thermoprocessing equipment

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Part 3: Safety requirements for the generation and use of atmosphere gases

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## National foreword

This British Standard is the UK implementation of EN 746-3:2021. It supersedes BS EN 746-3:1997+A1:2009, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MCE/3/8, Thermoprocessing equipment - Safety.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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## EUROPÄISCHE NORM

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English Version

## Industrial thermoprocessing equipment - Part 3: Safety requirements for the generation and use of atmosphere gases

Équipements thermiques industriels - Partie 3 :  
Prescriptions de sécurité pour la génération et  
l'utilisation des gaz d'atmosphère

Industrielle Thermoprozessanlagen - Teil 3:  
Sicherheitsanforderungen für die Erzeugung und  
Anwendung von Schutz- und Reaktionsgasen

This European Standard was approved by CEN on 24 October 2021.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## European foreword

This document (EN 746-3:2021) has been prepared by Technical Committee CEN/TC 186 "Industrial thermoprocessing - Safety", the secretariat of which is held by DIN.

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 June 2022, and conflicting national standards shall be withdrawn at the latest by June 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 746-3:1997+A1:2009.

Based on EN 746-3:1997+A1:2009, ISO 13577-3 was developed in 2016. This ISO standard differs considerably from the original EN 746-3:1997+A1:2009. The contents of this completely renewed EN 746-3:2021 are based on ISO 13577-3:2016.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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## Introduction

This document is a type-C standard as stated in EN ISO 12100:2010.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

Industrial furnaces and associated thermo-processing equipment (TPE) generally consists of the following components:

- processing chamber (e.g. steel construction with lining and/or refractory);
- heating systems;
- protective system;
- control and instrumentation system/operator-control level.

EN 746-1:1997+A1:2009 provides the general safety requirements common to TPE. This part of the EN 746 series details in addition specific safety requirements for generation and use of protective and reactive atmosphere gases that are part of TPE as listed in the scope. These requirements establish the minimum acceptable requirements for safety functions required for various processes. Where a process is not part of the TPE, the requirements do not apply.

For example, the minimum requirements for the opening and closing of doors on a TPE does not apply to TPE that do not have doors in their design.

**NOTE** As stated in its scope, EN 746-1:1997+A1:2009 does not cover blast furnaces, converters (in steel plants), boilers and equipment not covered under EN ISO 12100.

The requirements of protective system are specified in ISO 13577-4:2014.

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If a general provision of EN 746-1:1997+A1:2009 counters provisions in this part of the EN 746 series, the provisions of this part of EN 746 take precedence.

It is assumed that TPE will only be operated and maintained by trained personnel.



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## 1 Scope

This part of the EN 746 series specifies safety requirements for generation and use of protective and reactive atmosphere gases that are part of industrial thermo-processing equipment (TPE).

The general safety requirements common to TPE are provided in EN 746-1:1997+A1:2009 (see Introduction).

This part of the EN 746 series deals with significant hazards, hazardous situations and events relevant to the generation and use of protective and reactive atmosphere gases created by thermochemical reactions and their use in TPE that are part of TPE as listed in Clause 4 and Clause 5, when used as intended and under the conditions foreseen by the manufacturer.

This part of the EN 746 series covers:

- pipework downstream of and including the manual isolating valve,
- equipment for the generation of atmosphere gases,
- additional equipment for the use of atmosphere gases in TPE,
- safety devices, and
- functional requirements for safety related control system

for the generation and use of protective and reactive atmosphere gases.

It applies to the supply of atmosphere gas, source gas, inert gas and process liquids to TPE and their removal from TPE, confined to equipment integrated in the TPE.

This part of the EN 746 series also details the anticipated significant hazards associated with atmosphere gas systems and their use in TPE and specifies the appropriate preventative measures for the reduction or elimination of these hazards.

The pressure hazard of the piping and components covered by this standard is within the maximum pressure/size relationship of group 1 as described in Annex C.

This part of the EN 746 series:

- specifies the requirements to be met to ensure the safety of persons and property during installation, commissioning, start up, operation, shutdown and maintenance,
- does not cover the relevant risks involved in the flue gas ducting system when it is not considered a part of TPE,
- is not applicable to utility supply upstream of the TPE main disconnects,
- does not apply to TPE for semi-conductor devices,
- does not apply to TPE with atmosphere, such as air and flue gas from an over stoichiometric combustion,
- does not cover the decommissioning of the TPE,
- does not cover vacuum furnaces,
- does not cover blast furnaces, converters (in steel plants), boilers and equipment not covered under EN ISO 12100:2010.