

**Tööstuslikud termotöötlusseadmed. Osa 5:
Eriohutusnõuded soolavanni
termotöötlusseadmetikule**

Industrial thermoprocessing equipment - Part 5:
Particular safety requirements for salt bath
thermoprocessing equipment

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 746-5:2001 sisaldab Euroopa standardi EN 746-5:2000 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 16.02.2001 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 746-5:2001 consists of the English text of the European standard EN 746-5:2000.</p> <p>This document is endorsed on 16.02.2001 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala:</p> <p>This part of EN 746 gives the specific hazards and safety requirements for the melting and use of molten salt that shall be provided by the manufacturer for Salt Bath Industrial Thermoprocessing Equipment, whether it is used as an independent unit or an integrated part of a plant. The limits of the equipment will include any transportation equipment which is located wholly or partially in the bath.</p>	<p>Scope:</p> <p>This part of EN 746 gives the specific hazards and safety requirements for the melting and use of molten salt that shall be provided by the manufacturer for Salt Bath Industrial Thermoprocessing Equipment, whether it is used as an independent unit or an integrated part of a plant. The limits of the equipment will include any transportation equipment which is located wholly or partially in the bath.</p>
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English version

Industrial thermoprocessing equipment

Part 5: Particular safety requirements for salt bath thermoprocessing equipment

Equipements thermiques industriels –
Partie 5: Prescriptions particulières
de sécurité pour les équipements
thermiques à bain de sel

Industrielle Thermoprozessanlagen –
Teil 5: Besondere Sicherheitsanforde-
rungen an Salzbad-Wärmebehand-
lungseinrichtungen und -anlagen

This European Standard was approved by CEN on 1999-11-22.

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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FOREWORD

This European Standard 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 March 2001, and conflicting national standards shall be withdrawn at the latest by March 2001.

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

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

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

The working group that drafted this Part of EN 746 comprised experts from the following countries: France, Germany, Italy, Sweden and United Kingdom.

This standard forms one part of a series safety standards covering Industrial Thermoprocessing Equipment.

The full list of parts of EN 746 is given below:

EN 746 Industrial Thermoprocessing Equipment

- Part 1: Common Safety Requirements for Industrial Thermoprocessing Equipment
- Part 2: Safety Requirements for Combustion and Fuel Handling Systems
- Part 3: Safety Requirements for the Generation and Use of Atmosphere gases
- Part 4: Particular Safety Requirements for Hot Dip Galvanising Thermoprocessing Equipment
- Part 5: Particular Safety Requirements for Salt Bath Thermoprocessing Equipment
- Part 6: Particular Safety Requirements for Material Melting, Remelting and Liquid Phase Maintaining Thermoprocessing Equipment
- Part 7: Particular Safety Requirements for Vacuum Thermoprocessing Equipment
- Part 8: Particular Safety Requirements for Quenching Equipment

An assessment of the foreseeable risks arising from the use of the equipment was carried out when this standard was prepared.

The annexes A and ZA are informative.

0 INTRODUCTION

The EN 746-1 General Safety Requirements contains the common safety provisions and devices for all types of industrial thermoprocessing equipment. This part of the standard details in addition those extra safety requirements which need special attention against the equipment listed in the scope.

This European Standard is a type C standard as defined in EN 292:1991.

The extent to which hazards are covered is indicated in the scope of this standard.

1 SCOPE

This part of EN 746 gives the specific hazards and safety requirements for the melting and use of molten salt that shall be provided by the manufacturer for Salt Bath Industrial Thermoprocessing Equipment, whether it is used as an independent unit or an integrated part of a plant. The limits of the equipment will include any transportation equipment which is located wholly or partially in the bath.

This part of EN 746 does not cover the handling, storage, transport, disposal, transfer or regeneration of the salts and processed material outside the limits of the equipment.

This part of EN 746 applies not only to the normal operation of the equipment but also to the safety of personnel and property when foreseeable faults occur.

Examples of salt bath furnace set-ups are shown in Fig. 1, Fig. 2, Fig. 3 and Fig. 4.

NOTE: There are many variations in the design of salt bath equipment. Only three examples of the various types are given in this text.

2 NORMATIVE REFERENCES

This European Standard incorporates by dated or undated references, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 166	Personal eye-protection - Specifications
EN 292-1:1991	Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology
EN 292-2:1991	Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles and specifications

EN 345	Specification for safety footwear for professional use
EN 346	Specification for protective footwear for professional use
EN 469	Protective clothing for firefighters - Requirements and test methods for protective clothing for firefighting
EN 531	Protective clothing for industrial workers exposed to heat (excluding fire fighters' and welders' clothing)
EN 563	Safety of machinery - Temperatures of touchable surfaces - Ergonomics data to establish temperature limit values for hot surfaces
EN 614-1	Safety of machinery - Ergonomic design principles - Part 1: Terminology and general principles
EN 746-1:1997	Industrial Thermoprocessing Equipment - Part 1: Common Safety Requirements for Industrial Thermoprocessing Equipment
EN 746-2:1997	Industrial Thermoprocessing Equipment - Part 2: Safety Requirements for Combustion and Fuel Handling Systems
EN 746-8:2000	Industrial Thermoprocessing Equipment – Part 8: Particular Safety Requirements for Quenching Equipment
EN 953	Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards
EN 954-1	Safety of machinery - Safety related parts of control systems - Part 1: General principles for design
prEN 1005-2:1998	Safety of machinery - Human physical performance Part 2: Manual handling of machinery and component parts of machinery
prEN 1005-3:1998	Safety of machinery - Human physical performance - Part 3: Recommended force limits for machinery operation
EN 1070	Safety of machinery - Terminology
EN 1093-4	Safety of machinery - Evaluation of the emission of airborne hazardous substances - Part 4: Capture efficiency of an exhaust system - Tracer method
EN 10095	Heat resisting steels and alloys

EN 61310-1 Safety of machinery - Indication, marking and actuation -
Part 1: Requirements for visual, auditory and tactile signals
(IEC 61310-1:1995)

3 **DEFINITIONS**

For the purposes of this standard the definitions given in EN 1070 apply.

Additional definitions specifically needed for this part of this standard are added below:

3.1 **Salt bath thermoprocessing equipment**

Equipment which melts and/or contains various molten salt or salt mixtures into which workpieces are partially or fully immersed for a predetermined time interval in order to modify the structure and/or the physical properties of the workpiece, or in which salt is circulated as a heat transfer system.

The equipment includes the unit for melting salt plus that handling equipment used immediately in the vicinity to treat either single or multiple components:

This equipment may include for example:

- mechanical handling systems;
- heating systems;
- cooling systems;
- environmental control systems;
- electrical and control systems;
- systems to cover ergonomic requirements and
- washing and agitating systems.

3.2 **Components**

Workpieces or any other object immersed in the salt bath.

4 **LIST OF HAZARDS**

An assessment of the foreseeable risks arising from the use of the industrial thermoprocessing equipment has been carried out when this standard was elaborated.

The clause has been condensed into a table (see table 1). It summarises those areas which require consideration by the manufacturer. For ease of reference the table indicates the need for safety features or instructions in columns. The table shall only be used in conjunction with clauses 5 and 7 where further detail is given.

Table 1 shows the Hazard, Hazardous Situation, Preventative Measures and the Verification Means (as pointed out in clause 6) identified for the equipment type described in this part to this standard.