SLOVENSKI STANDARD
SIST EN 12890:2001

01-november-2001

Livarstvo - Modeli, modelne naprave in jedrovniki za izdelavo peščenih form in jeder

Founding - Patterns, pattern equipment and coreboxes for the production of sand moulds and sand cores

Gießereiwesen - Modelle, Modelleinrichtungen und Kernkästen zur Herstellung von Sandformen und Sandkernen

Fonderie - Modeles, outillages et boîtes à noyaux pour la production des moules et noyaux au sable

Ta slovenski standard je istoveten z: **EN 12890:2000**

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25.120.30	Livarska oprema	Moulding equipment
77.180	Oprema za metalurško industrijo	Equipment for the metallurgical industry

SIST EN 12890:2001 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 12890

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English version

Founding - Patterns, pattern equipment and coreboxes for the production of sand moulds and sand cores

Fonderie - Modèles, outillages et boîtes à noyaux pour la production des moules et noyaux au sable

Gießereiwesen - Modelle, Modelleinrichtungen und Kernkästen zur Herstellung von Sandformen und Sandkernen

This European Standard was approved by CEN on 25 December 1999.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 190, Foundry technology, 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 August 2000, and conflicting national standards shall be withdrawn at the latest by August 2000.

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.

Within its programme of work, Technical Committee CEN/TC 190 requested CEN/TC 190/WG 1.30 "Production equipment, tools, foundry auxiliaries (e.g. patterns, permanent moulds, moulding materials)" to prepare the following standard:

EN 12890
Founding – Patterns, pattern equipment and coreboxes for the production of sand moulds and sand cores

This is one of three of European Standards for foundry patterns and tools. The other standards are:

prEN 12883
Founding – Equipment for the production of lost patterns for the lost wax casting process

EN 12892
Founding – Equipment for the production of lost patterns for the lost foam casting process

Introduction

This standard is intended for purchasers, manufacturers (patternmakers) and founders. It is also intended to ensure the correct interpretation of casting and tooling drawings/numerical data and to ensure that pattern equipment will produce sand moulds and/or sand cores, suitable for use, and to assist in determining the usually undefined limits of good workmanship. This standard stresses the need for consultation between the purchaser, manufacturer (patternmaker) and founder before work commences.

The manufacture of a casting by a sand mould and/or a sand core manufacturing process requires the construction of pattern equipment.

The CEN members had a variety of national standards and specifications relating to pattern equipment. This standard brings together all the important features of these former documents.

This standard enables the parties concerned to deal more easily with the complex problems associated with the design and manufacture of pattern equipment.

This standard not only specifies the usual features of design, construction, materials, tolerances, contractions and required machining allowances but also specifies other features such as usage, classification, quality control, marking, packaging and storage.

1 Scope

This standard specifies the requirements for patterns, pattern equipment and coreboxes for the production of sand moulds and/or sand cores.

This standard does not specify equipment for the production of lost patterns, permanent moulds and die casting dies.

This standard does not specify the requirements for ancillary items used in the manufacture of pattern equipment (such as screws, dowels, etc.).

2 Normative references

This European Standard incorporates by dated or undated reference, 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 1559-1
Founding – Technical conditions of delivery – Part 1: General

EN 20286-1
ISO system of limits and fits – Part 1: Bases of tolerances, deviations and fits (ISO 286-1:1988)

ISO 1302
Technical drawings – Method of indicating surface texture

NOTE: Informative references to documents used in the preparation of this standard, and cited at the appropriate places in the text, are listed in a bibliography.

3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply:

3.1 purchaser

Person or body responsible for the ordering of the patterns, pattern equipment and coreboxes.

3.2 manufacturer (patternmaker)

Person or body responsible for the production of the patterns, pattern equipment and coreboxes.

3.3 founder

Person or body responsible for the manufacture of castings from the moulds made from patterns, pattern equipment and coreboxes supplied to it by the manufacturer (patternmaker) or the purchaser.

3.4 sand mould

Part or assembly of parts, made of heat resistant sand (such as silica sand, zircon sand, etc.), which usually forms the external surfaces of a casting and is not re-usable after pouring.

3.5 sand core

Part or assembly of parts, made of heat resistant sand (such as silica sand, zircon sand, etc.), which usually forms the inner surfaces of a casting and is not re-usable after pouring.

3.6 pattern

Model which forms part or all of a subsequent mould or core assembly.

3.7 corebox

Model which forms all of a core or part or all of a subsequent core assembly.

3.8 pattern equipment

All the components which make up all the necessary pieces to ensure the correct manufacture of a mould.

3.9 quality class

Classification system which enables the parties concerned with the manufacture and use of patterns, pattern equipment and coreboxes to be aware of their properties (such as fitness for purpose, quality and life time).

3.10 contract review

Analysis and/or check of the order details carried out by the parties concerned, both before and during the processing of the order.

3.11 core print

Projection either attached to a pattern to form recesses in the mould or attached to a core at points where cores are to be supported.

3.12 required machining allowance (RMA)

Additional material deliberately added to certain surfaces of patterns, pattern equipment and coreboxes which is removed, partially or wholly, from the casting during subsequent machining.

3.13 contraction

Dimensional factor deliberately built into patterns, pattern equipment and coreboxes during manufacture to take account of the change(s) in dimension(s) that may take place when the casting is made.

3.14 taper

Slope or angle deliberately given to certain pattern or corebox surfaces to aid the stripping of the pattern from the mould or the core from the corebox.

NOTE: Taper is sometimes referred to as draft or draft angle.

3.15 clearance

Space deliberately built into certain pattern or corebox surfaces to aid the assembly of the mould and/or core.

4 Order information and delivery conditions

4.1 General

This clause details the technical order information and delivery condition requirements to be agreed between the purchaser and the manufacturer (patternmaker).

The patterns, pattern equipment and coreboxes can be ordered either by the purchaser or by the founder. If the purchaser is not the founder, it shall be a requirement that there is consultation between the purchaser and the founder.

As applicable, there shall have been an agreement made and an exchange of information carried out between the purchaser, the manufacturer (patternmaker) and the founder by the time of the acceptance of the order, to ensure a full understanding of the respective requirements of the parties concerned.

NOTE: The production of castings requires the use of patterns and/or coreboxes. The starting point in their manufacture is the drawing/numerical data of the as-cast casting and/or the machined part as agreed with the purchaser who can:

– either order the castings and pattern equipment together from the founder who can sub-contract the pattern equipment manufacture to a patternmaker;

– or order the castings from the founder and the patterns, pattern equipment and coreboxes from the manufacturer (patternmaker) separately.

4.2 Points to be agreed

The following points, as applicable, shall have been agreed by the time of the acceptance of the order:

– cast material(s) and its (their) identification;

– moulding and/or coremaking techniques;

– dimensional tolerances;

– mould and core joint lines;

– pattern equipment identification;

– pattern surface coating;

– contractions;

– clearances;

– tapers;

– required machining allowances;

– pattern material(s);

– pattern material quality class(es);

– extent and type of quality inspection;

– protection and packaging for transportation and storage.

4.3 Mandatory information

The enquiry and order shall include information on:

a) designation of material to be cast (symbol and/or number);

b) number of castings to be produced;

c) number of sets of pattern equipment to be supplied;

d) delivery time;

e) relevant drawing(s) or numerical data;

f) quality class(es) required;

g) inspection(s) and documentation required;

and, as applicable:

h) specification of the pattern and/or corebox materials to be used;

i) moulding joint(s);

j) sizes and positions of gates and risers required;

k) contractions to be used;

l) type of protection and packaging;

NOTE: Transport arrangements can be included.

m) repair and refurbishment;

n) storage arrangement;

o) approval procedure;

p) any other requirements.

5 Classification

Patterns, pattern equipment and coreboxes shall be classified in accordance with the quality classes given in Table 1.

NOTE: In Table 1, reference is made to Tables 2 to 6 in which the applicability of the material is specified (see also annex A).

6 Specifications

6.1 General

Drawings/numerical data, design and specifications shall be in accordance with the requirements of EN 1559-1, as applicable.

The quality class of patterns, pattern equipment and coreboxes shall be stated on the order (see Tables 2 to 6).

6.2 Designation

The designation of the quality class on the drawings and other relevant documents shall contain the following:

– the number of this European Standard (EN 12890);

– the quality class.

EXAMPLE:
EN 12890 – H3

7 Manufacturing requirements

7.1 Materials

Unless otherwise agreed, patterns, pattern equipment and coreboxes shall be made of one or more of the material types shown in Table 1.

7.2 Manufacture

Unless otherwise agreed, patterns, pattern equipment and coreboxes shall be manufactured in accordance with the requirements detailed in Tables 2 to 6, as applicable. By agreement between the parties concerned, parts of the patterns, pattern equipment and coreboxes can be manufactured of other materials and to other quality classes than those specified in Table 1.

7.3 Contractions

Unless otherwise specified, the reference values for linear casting contractions given in annex B shall apply.

NOTE 1: The contractions and contraction ranges in certain castings can differ from the values given in annex B and can vary across the three axes of the casting. Therefore it is recommended that there is consultation between the manufacturer (patternmaker) and the founder.

NOTE 2: The casting design can often lead to distortion or initiate defects on solidification. Therefore it is recommended that there is consultation between the parties concerned to make provision for these possibilities before deciding upon the construction and shape of the patterns, pattern equipment and coreboxes.

7.4 Tapers

Unless otherwise specified, the tapers given in Table 7 shall be used.

NOTE: Reference can also be made to ISO 8062:1994.

7.5 Clearances

Closing, covering and mould assembly clearances shall be agreed between the manufacturer (patternmaker) and the founder.

NOTE: Further information on clearances is given in Figures 1 to 3.

7.6 Required machining allowances (RMA)

Any required machining allowance (RMA) to be added to the patterns, pattern equipment and coreboxes shall be agreed between the parties concerned (see clause 4).

NOTE: Guidance on the choice of required machining allowances (RMA) is given in ISO 8062:1994.

7.7 Dimensional tolerances

Dimensional tolerances shall be in accordance with the values given in Tables 2 to 4 for each quality class of pattern material, unless otherwise agreed by the time of acceptance of the order.

7.8 Surface coating

As applicable, the surfaces of patterns, pattern equipment and coreboxes shall be coated to provide for their protection and/or identification in accordance with the agreement made between the parties concerned (see clause 4).

When a surface coating is specified, the materials used in the moulding/coremaking process and the surface coating shall be compatible.

Unless otherwise agreed, the requirements detailed in Table 8 shall apply.

NOTE: It is normal practice for the manufacturer (patternmaker) to protect the surfaces of the patterns, pattern equipment and coreboxes and at the same time identify the various functional surfaces with a colour coding arrangement.

8 Quality control

As applicable, the manufacturer (patternmaker) shall maintain written evidence that he has carried out the following quality control procedures before, during and after the manufacture of the equipment:

a) pre-production planning;

b) contract review;

c) dimensional inspection and completion of dimension sheets;

d) identification;

e) jig/fixture inspection;

f) jig location point inspection.

NOTE: It is recommended that the manufacturer (patternmaker) operates a third party quality assurance system such as that specified in either EN ISO 9001, EN ISO 9002 or EN ISO 9003 or any other system.

9 Usage

9.1 General

The materials used and the processing and handling employed in the manufacture and use of patterns, pattern equipment and coreboxes shall meet the appropriate environmental and safety requirements.

NOTE: The lifetime of patterns, pattern equipment and coreboxes depends upon the quality class and the conditions of use and of storage.

9.2 Identification

9.2.1 Identification of the patterns, pattern equipment and coreboxes

All parts of the patterns, pattern equipment and coreboxes shall be durably and legibly marked and identified in accordance with either the drawing(s) or the agreement made between the parties concerned (see clause 4).

NOTE 1: The following list of possible identifying details is given for information only:

- drawing number;
- part number;
- purchaser identity;
- date or date code;
- pattern and corebox identity;
- material specifications;
- other references.

NOTE 2: It is recommended that the parts of the patterns, pattern equipment and coreboxes are individually

- identified to show a sequence, for example:
  - different identities of similar patterns on one pattern plate or of similar cores in one corebox;
  - mould assembly sequence;
  - core assembly sequence.

9.2.2 Identification of the casting

The location of the agreed identification shall be such that any subsequent operation does not remove the casting identity details, unless an agreement to the contrary has been made between the parties concerned (see clause 4).

9.3 Modifications

Modifications to patterns, pattern equipment and coreboxes during or after their manufacture shall be carried out only after an agreement has been made between the parties concerned. Such agreements shall be included in the documentation concerned with the contract review (see clause 8).

9.4 Repair and refurbishment

The responsibility for the repair and/or refurbishment of the equipment shall be agreed between the parties concerned (see clause 4).

NOTE 1: The need for repair and/or refurbishment can arise normally through the production process and repetitive use of the equipment or through damage in handling and transportation.

The requirement to re-approve the equipment after repair and/or refurbishment shall be agreed between the parties concerned (see clause 4).

NOTE 2: The requirement to re-approve the equipment after repair and/or refurbishment depends upon the degree and nature of that repair and/or refurbishment.

9.5 Protection and packaging for transportation and storage

Protection and packaging for transportation and storage shall be agreed between the parties concerned (see clause 4).