
Polnila za plastomere - Namen, označevanje, zahteve, preskusi

Filler materials for thermoplastics - Scope, designation, requirements, tests

Schweißzusätze für thermoplastische Kunststoffe - Anwendungsbereich, Kennzeichnung, Anforderung, Prüfung

Produits d'apport pour thermoplastiques - Domaine d'application, désignation, exigences, essais

Ta slovenski standard je istoveten z: EN 12943:1999

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ICS:

25.160.20	Potrošni material pri varjenju	Welding consumables
83.080.20	Plastomeri	Thermoplastic materials

SIST EN 12943:2000**en**

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12943

November 1999

ICS 25.160.20

English version

Filler materials for thermoplastics - Scope, designation,
requirements, tests

Produits d'apport pour thermoplastiques - Domaine
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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.

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

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

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 249 "Plastics", the secretariat of which is held by IBN.

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of an identical text or by endorsement, at the latest by May 2000, and conflicting national standards shall be withdrawn at the latest by May 2000.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.

Introduction

Plastic components made from film, sheets, tubes and sections have been joined for several decades by welding with the aid of welding fillers.

This standard contains guidelines for assessing the quality of welding fillers. Optimal quality of the weld depends on the quality of the basic material and the welding fillers as well as on their processing (welding conditions) [1], [2]¹⁾.

Another factor is the weld design, i. e. the position and arrangement of the joint and the welding sequence. The basic material and the welding filler should be adapted to each other for welding. This presupposes the availability of data concerning certain material characteristics and appropriate verification of these data.

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1 Scope

Welding fillers are frequently used to join plastic components by hot gas welding. The service ability of the finished part depends largely on the suitability of the welding fillers [3]¹⁾.

This standard applies to the following thermoplastics:

Term for material	Abbreviated term according to ISO 1043-1	Moulding material specified in
Polyethylene high density	PE-HD	ISO 1872-1
Polypropylene homopolymer	PP-H	EN ISO 1873-1
Polypropylene block-copolymer	PP-B	EN ISO 1873-1
Polypropylene random-copolymer	PP-R	EN ISO 1873-1
Polyvinyl chloride normal impact	PVC-NI (PVC-U)	ISO 1163-1
Polyvinyl chloride raised impact	PVC-RI (PVC-U)	ISO 1163-1
Polyvinyl chloride high impact	PVC-HI (PVC-U)	ISO 1163-1
Polyvinyl chloride chlorinated	PVC-C	—
Polyvinyl chloride plasticized	PVC-P	ISO 2898-1
Polyvinylidene fluoride homopolymer	PVDF-H	—
Ethylene-chlorotrifluorethylene	ECTFE	—
Polyamide	PA 6	ISO 1874-1
Acrylic glass	PMMA	ISO 8257-1
Polycarbonate	PC	ISO 7391-1
Acrylonitrile butadiene styrene normal impact	ABS-NI	ISO 2580-1
Perfluoralkoxy-copolymer	PFA	—
Tetrafluorethylene/Hexafluorpropylene	FEP	—

¹⁾The figures relate to references given in annex A.1.

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 standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ISO 1043-1

Plastics – Symbols and abbreviated terms – Part 1: Basic polymers and their special characteristics

ISO 1163-1

Plastics – Unplasticized poly (vinyl chloride) (PVC-U) moulding and extrusion materials – Part 1: Designation system and basis for specifications

ISO 1872-1

Plastics – Polyethylene (PE) moulding and extrusion materials – Part 1: Designation system and basis for specifications

ISO 1874-1

Plastics – Polyamide (PA) moulding and extrusion materials – Part 1: Designation

ISO 2580-1

Plastics – Acrylonitrile/butadiene/styrene (ABS) moulding and extrusion materials – Part 1: Designation system and basis for specifications

ISO 2898-1

Plastics – Plasticized poly (vinyl chloride) (PVC-P) moulding and extrusion materials – Part 1: Designation system and basis for specifications

ISO 7391-1

Plastics – Polycarbonate (PC) moulding and extrusion materials – Part 1: Designation system and basis for specifications

ISO 8257-1

Plastics – Poly (methyl metacrylate) (PMMA) moulding and extrusion materials – Part 1: Designation system and basis for specifications

EN 10204

Metallic products – Types of inspection documents

EN ISO 291

Plastics – Standard atmospheres for conditioning and testing (ISO 291 : 1997)

EN ISO 1873-1

Plastics – Polypropylene (PP) moulding and extrusion materials – Part 1: Designation system and basis for specifications (ISO 1873-1 : 1995)

3 Designation

The designation is intended to facilitate the choice and application of welding fillers by the processor thus contributing to reliable welding quality.

The designation includes:

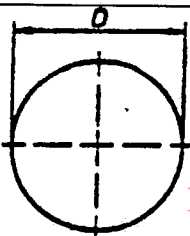
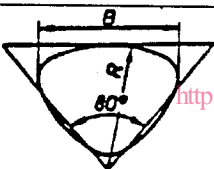
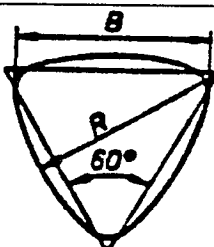
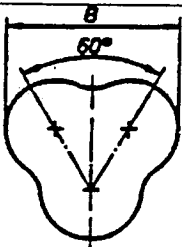
- the EN designation of this European Standard: EN 12943;
- the ISO designation of the moulding components used;
- the code for the supply form (table 2);
- year, month of the production term and
- the manufacturer's code.

Table 1 - Examples of designations

ISO designation of moulding compound	Supply form code	Manufacturer (A, B, C, D), Production number (W, X, Y, Z)
ISO 1163-1 PVC-U-EP, 076-09-28	Round 3	A, X
ISO 1872-1 PE-EACH, 45 T 006	Triangular 80-6	B, Y
EN ISO 1873-1 PP-H, ECH, 95 T 006	Trilobate 60-5	D, W
ISO 1872-1 PE-EACH, 45 T 006	Granulate	C, Z

The manufacturer is responsible for the application and design of the designation. In the absence of an ISO-designation and for special products the manufacturer and the customer may agree an analogous designation.

Table 2 - Standard sections

Section Shape	Nominal ⁾	Deviation ⁾	Code for delivery form
	D = 2,0 D = 3,0 D = 4,0 D = 5,0	± 0,2 ± 0,2 ± 0,2 ± 0,2	Round 2 Round 3 Round 4 Round 5
 R = B Edges rounded	B = 5,0 B = 6,0 B = 7,0 B = 8,0	± 0,3 ± 0,3 ± 0,3 ± 0,3	Triangular 80-5 Triangular 80-6 Triangular 80-7 Triangular 80-8
 R ≥ B Edges rounded	B = 5,0 B = 6,0 B = 7,0 B = 8,0	± 0,3 ± 0,3 ± 0,3 ± 0,3	Triangular 60-5 Triangular 60-6 Triangular 60-7 Triangular 60-8
 Transition points rounded	B = 5,0 B = 6,0	± 0,3 ± 0,3	Trilobate 60-5 Trilobate 60-6
⁾ Measured in "mm" Deviating form, sizes and deviations are to be agreed between producer and customer.			

4 Requirements

4.1 Moulding compound

Unless otherwise agreed moulding compounds in accordance with ISO (see clause 2) shall be used in the production of welding fillers. Materials of unknown composition are not permissible. The welding filler shall possess the characteristic properties given in the relevant ISO and EN standards for semi-products.

Granulates shall be dry and free of loose and adherent contaminations.

4.2 Supply form and dimensions

Welding fillers are moulding compounds (granulates) and sections. The standard-sections are classified as round wires or rods and section wires of rods according to cross-section.

The sections are supplied as coils, on bobbins or as fixed lengths. In line with the conventional welding nozzels and/or guide elements for hot gas and extrusion welding, the sections listed in table 2 are mainly used in order to achieve the welding confirmation specified in the relevant standards [1, 4, 5]¹⁾.

Other sections are also commercially available, with manufacturers and customers at liberty to agree the requirements in respect of dimensions and supply form.

4.3 As delivered condition

The surface and cross-sections of the welding fillers shall be free from cavities, non homogeneous points and impurities. Any coloration shall be uniform throughout. Depending on the method of production, sections shall have a uniformly smooth surface, sharp-edged grooves being impermissible. Irregularities as regards the section dimensions are permitted within the tolerances listed in table 2.

When sections are tested in accordance with 5.3.2 their dimensions may vary only in accordance with the limits laid down in table 3. Furthermore, neither the surface nor the cross-section may differ significantly from the initial state.

Table 3 - Testing by hot storage
(circulating air kiln, storage time 1 h)

Material	Storage temperature °C, ± 2	Change in length ± %
ABS-NI	125	5
PA 6	160	2
PC	190	2
PE-HD	120	2
PE-LD	100	2
PP-H, PP-B	150	2
PP-R	140	2
PMMA	160	2
PVC-U	140	5
PVC-P	100	7
PVC-C	150	10 ¹⁾
PVDF-H	160	2
ECTFE	230	2
PFA	290	2
FEP	240	2
¹⁾ According to the present state of the art.		

¹⁾ The figures relate to references given in Annex A.1.

5 Test

5.1 Moulding compound

The moulding compounds used to manufacture the sections shall possess the properties laid down in the relevant ISO standards. If other properties characterize the moulding compounds the required characteristic values shall be agreed by the manufacturer and the customer.

5.2 Supply form and dimensions of the section shapes

The dimensions and tolerances listed in table 2 shall be examined under standard conditions (EN ISO 291) 23/50 class 2. From section length of not less than 5 m, 10 specimens of 100 mm each in length shall be taken in a distributed manner and the dimensions determined to an accuracy of 0,1 mm.

5.3 Supply condition

5.3.1 Section shapes

5.3.1.1 Appearance

The surface and characteristics of the welding fillers shall be examined visually under normal conditions (eye, light). For assessing the sections a length of not less than 5 m, and 10 cross-sections are required.

5.3.1.2 Determination of shrinkage after heating

From a section length of not less than 5 m, 10 specimens each with a length of 110 mm shall be taken in a distributed manner. The specimens shall be marked at 100 mm. The initial length, L_0 , shall be measured on the marked places with an accuracy of 0,1 mm after conditioning of the specimens in accordance with EN ISO 291, 23/50 class 2. The specimens shall be placed in an oven with air circulation. The temperatures and duration of tests are shown in table 2.

After removal of the test specimen from the oven and conditioning in accordance with EN ISO 291, the length shall be measured at the marked places.

The shrinkage, ΔL , shall be calculated after the equation (1):

$$\Delta L = 100 \times (L - L_0) / L_0 \quad (1)$$

Where:

- ΔL shrinkage after heating, in percent;
- L_0 initial length before heating, in millimetres;
- L length after heating, in millimetres.

The arithmetic average shall be calculated of all ΔL for all specimens.

5.3.2 Granulates

The granulates have to be checked with regard to cleanliness by a visual control (eye) on a light underground. For assessment one shall take granulates out of a just opened bundle.

6 Delivery and packaging

Welding fillers shall be supplied in dust and waterresistant packaging. The packages shall be such as to keep out dirt and damage and give appropriate transportation and storage.

The bundles shall be clearly designated in accordance with clause 3.

7 Certification

If so agreed the manufacturer shall submit certificates on materials tested in accordance with EN 10204 in order to prove the requirements have been satisfied.

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