SLOVENSKI STANDARD
SIST EN 1370:2012

01-februar-2012

Nadomešča:
SIST EN 12454:2000
SIST EN 1370:1997

Livarstvo - Preiskave hrapavosti površine

Founding - Examination of surface condition

Gießereiwesen - Bestimmung der Oberflächenqualität

Fonderie - Contrôle de l'état de surface

Ta slovenski standard je istoveten z: **EN 1370:2011**

ICS:

17.040.20	Lastnosti površin	Properties of surfaces
25.120.30	Livarska oprema	Moulding equipment

SIST EN 1370:2012 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

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Supersedes EN 12454:1998, EN 1370:1996

English Version

Founding - Examination of surface condition

Fonderie - Contrôle de l'état de surface

Gießereiwesen - Bewertung des Oberflächenzustandes

This European Standard was approved by CEN on 12 November 2011.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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Foreword

This document (EN 1370:2011) 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of an identical text or by endorsement, at the latest by June 2012, and conflicting national standards shall be withdrawn at the latest by June 2012.

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

This document will supersede EN 1370:1996 and EN 12454:1998.

Within its programme of work, Technical Committee CEN/TC 190 requested CEN/TC 190/WG 11 "Surface inspection" to revise the following standards:

— EN 1370:1996, *Founding — Surface roughness inspection by visual tactile comparators*

and

— EN 12454:1998, *Founding — Visual examination of surface discontinuities — Steel sand castings.*

Annex A provides details of significant technical changes between this European Standard and the previous edition.

According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The surface roughness of a casting is influenced by the manufacturing process (moulding, grinding, finishing, etc.), the moulding materials used (sand, coating, etc.), the production equipment available and the alloy cast.

Depending on the applications of the casting, the surface requirements are related to mechanical loadings, appearance, surface treatment, etc.

Since cast surfaces do not exhibit the same cyclic character as machined surfaces it is difficult to evaluate their roughness using conventional mechanical, optical, or pneumatic devices. Other optical/electronic means are now available for measuring surface roughness of cast surfaces. For the ease of use, visual tactile comparators are preferred.

Moreover, in order to take into account the irregularities on as-cast surfaces, ground surfaces or other means of finishing of castings, comparators should have relatively large dimensions[1)] in order to make them more reliable and their results repeatable and consistent.

Two sets of comparators are in widespread use:

— "BNIF 359 Recommandation technique du Bureau de Normalisation des Industries de la Fonderie. Caractérisation d'états de surface des pièces moulées - Utilisation des échantillons types de 110 × 160 mm", available from Editions Techniques des Industries de la Fonderie, 44 avenue de la Division Leclerc, 92310 Sèvres, France [1];

— "SCRATA comparators for the definition of surface quality of steel and iron castings", ASTM A 802 Shorter Set, available from Castings Technology International, Advanced Manufacturing Park, Brunel Way, Rotherham, S60 5WG, South Yorkshire, United Kingdom [2].

A third set of comparators, for precision steel castings, is also available:

— “SCRATA surface comparators for the definition of surface texture of precision steel castings”, precision set, available from Castings Technology International, Advanced Manufacturing Park, Brunel Way, Rotherham, S60 5WG, South Yorkshire, United Kingdom [3].

This European Standard also specifies 8 levels of surface imperfections based on maximum dimensions to be detected by visual examination.

The SCRATA comparators shorter set [2], can also be used for the classification of surface discontinuities on steel and iron castings.

BNIF N°359 comparators can be used for all cast metals.

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1) 100 mm × 150 mm for SCRATA comparators;
110 mm × 160 mm for BNIF comparators.

1 Scope

This European Standard specifies methods for the examination of surface condition (roughness and surface discontinuities) of castings.

This European Standard is applicable to all cast metals and all casting processes except die casting.

2 Comparators

The comparators are essentially positive replicas of actual casting surfaces: as-cast or after further fettling treatment such as shot blasted or ground.

Full size photographs of the comparators can be used to assist in making a rapid evaluation of the overall roughness of the comparators. These can give preliminary information for the appropriate selection of a moulding or finishing process.

It is emphasized however that the comparators, and not the photographs, shall be used to form the basis of an agreement between the manufacturer and the purchaser.

An overview and a comparison of the different categories and levels of the three sets of comparators are given in Tables 1, 2 and 4.

3 Requirements

3.1 General

When examination of surface conditions is required, the following shall be agreed by the time of ordering:

- the category and severity level required. More than one severity level can be specified for different surfaces of the same casting. This shall be clearly indicated on the drawing;
- any types of discontinuities which are unacceptable;
- the areas of the castings which are to be examined; these shall be clearly indicated on the drawing;
- number of castings to be examined;
- the manufacturing stage at which surfaces are to be examined.

NOTE 1 Guidelines for the specification of acceptance criteria for surface condition of iron castings are given in EN 1559-3 [4].

NOTE 2 General principles for visual examination are described in EN 13018 [5].

The examination shall be performed by trained personnel with satisfactory visual acuity.

3.2 Surface roughness examination

3.2.1 General

The methods detailed in this European Standard shall only apply to the surfaces of castings and the percentage or number of castings to be checked.

These conditions shall be subject of an agreement between the manufacturer and the purchaser by the time of ordering.

This information enables the manufacturer to assess the additional inspections and operations involved.

Table 1 — BNIF and SCRATA surface roughness and dressing comparators [1] [2]

Roughness	Ra (µm) For guidance only	Moulding			Mechanical dressing			Thermal dressing		
		BNIF [1]	SCRATA [2]	Corres-ponding process	BNIF [1]	SCRATA [2]	Corres-ponding process	BNIF [1]	SCRATA [2]	Corres-ponding process
Smoothest	0,8				2/0S2		Very fine grinding			
	1,6	3/0S1	—	Investment	1/0S2		Fine grinding			
	3,2	2/0S1	—		1S2		Medium grinding			
	6,3	1/0S1	—	Shell resins	2S2		Medium-coarse grinding			
		1S1	A1		3S2					
	12,5	2S1	A2	Green sand and cold setting small-medium castings	4S2		Coarse grinding			Fine thermal cutting
		3S1	A3		5S2	H1			G1	
		4S1	—	Green sand and cold setting medium-large castings		H3	Very coarse grinding	1S3	G2	
	25	5S1	—			H4				
		6S1	A4	Moulding for large castings		H5		2S3	G3	Coarse thermal cutting
		7S1	—					3S3	G5	
Roughest	50	8S1	A5					4S3		

Table 2 — SCRATA surface comparators for the definition of surface texture of precision steel castings [3] [6]

Moulding process	**Roughness** Smoothest ← → Roughest
Resin shell process	V1, V2, V3
Lost polystyrene process	W1, W2, W3
Shaw process	X1, X2, X3
Lost-wax process	Y1, Y2
Fettled/grinded surfaces	Z1, Z2, Z3

3.2.2 Surface roughness examination by visual tactile comparators

To evaluate casting roughness, the areas indicated on the drawing shall be compared without optical aids, but with the appropriate visual tactile comparators of the category and level involved.

Comparison between the appropriate comparator and the casting surface shall be made with the comparators held next to the casting under sufficient conditions of lighting.

NOTE When the surface to be checked is significantly smaller than the surface of a comparator, an agreement on the method to be used should be made between the manufacturer and the purchaser.

The outcome of the comparison is satisfactory if, in the area under consideration, the roughness corresponds to that of the comparator or, if it is generally smoother.

3.2.3 Surface roughness examination by contact (stylus) instruments or non contact (optical) instruments

If one of these methods is to be used, it shall be subject of an agreement between the manufacturer and the purchaser by the time of ordering.

The following shall be agreed:

— method to be used;

— area(s) to be examined;

— scanning dimensions;

— surface profile parameters to be measured;

— required values (minimum, maximum) for these parameters.