



SLOVENSKI STANDARD

SIST EN 12454:2000

01-april-2000

Livarstvo - Vizualna preiskava površinskih napak - Jekleni ulitki, uliti v pesek

Founding - Visual examination of surface discontinuities - Steel sand castings

Gießereiwesen - Visuelle Bestimmung von Oberflächenfehlern - Stahl-Sandgußstücke

Fonderie - Examen visuel des discontinuités de surface - Pièces en acier moulées en sable

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ICS:

17.040.20	Lastnosti površin	Properties of surfaces
77.140.80	Železni in jekleni ulitki	Iron and steel castings

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12454

May 1998

ICS 77.140.80

Descriptors: foundry engineering, steel products, cast steels, sand castings, surface properties, defect tolerances, visual examination, acceptability

English version

Founding - Visual examination of surface discontinuities - Steel
sand castings

Fonderie - Examen visuel des discontinuités de surface -
Pièces en acier moulées en sable

Gießereiwesen - Visuelle Bestimmung von
Oberflächenfehlern - Stahl-Sandgußstücke

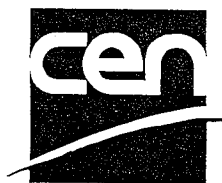
This European Standard was approved by CEN on 9 April 1998.

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.

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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 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 November 1998, and conflicting national standards shall be withdrawn at the latest by November 1998.

Within its programme of work, Technical Committee CEN/TC 190 requested CEN/TC 190/WG 4.20 "Surface inspection" to prepare the following standard:

EN 12454

Founding – Visual examination of surface discontinuities – Steel sand castings

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.

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Introduction

Agreement between the manufacturer and the purchaser on the required surface quality of steel sand castings has frequently been hindered by the absence of suitable specifications. This standard is aimed at avoiding misunderstandings arising from imprecise information at the enquiry and/or order stage.

There are two points to consider when examining the surface of a casting:

- surface roughness;
- surface discontinuities.

EN 1370 deals with surface roughness inspection.

Assessment with visual surface examination of castings is by the use of visual comparators.

1 Scope

This standard specifies the method to be used for visual examination to assess surface discontinuities of steel castings produced in conventional sand moulds. A set of visual comparators [1] comprising replicas of actual casting discontinuities forms the basis of the assessment.

This standard does not apply to steel castings made by the resin-shell, investment and other precision moulding techniques.

This standard defines several categories of discontinuities and severity levels within each of these categories.

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 1370

Founding – Surface roughness inspection by visual tactile comparators

EN 1559-1

Founding – Technical conditions of delivery – Part 1: General

prEN 1559-2

Founding – Technical conditions of delivery – Part 2: Additional requirements for steel castings

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, see annex A.

3 Description

The set of comparators [1] comprises nine categories.

For the purposes of this standard, six categories have been selected. Within these categories, 2, 3 or 4 severity levels, increasing in severity from 1 to 4, have been chosen.

NOTE: The categories not included ¹⁾ in the standard relate to surface roughness and are therefore included in EN 1370.

¹⁾ The categories not included in this standard are:

- A surface roughness: the natural surface of the casting after shot-blasting (4 severity levels);
- G surface finish: thermal dressing (4 severity levels);
- H surface finish: mechanical dressing (4 severity levels).

The selected comparator [1] series for surface discontinuities and the number of severity levels are:

- surface inclusions: non-metallic material trapped on the casting surface (4 severity levels);
- gas porosity: indications of gas at the casting surface (4 severity levels);
- laps and cold shuts: surface irregularities giving a wrinkled appearance (3 severity levels);
- scabs: slightly raised surface irregularities (2 severity levels);
- inserts: indications of chaplets or internal chills (2 severity levels);
- welds: indications of welds as welded, fully or partially removed by thermal or mechanical dressing (4 severity levels).

Table 1 gives the relationship between the severity levels in this standard and the selected comparators [1].

The different categories and severity levels of comparators are shown in table 2.

Table 1: Relationship between severity levels and the selected comparators

Categories	Severity levels			
	1	2	3	4
	Identification according to [1]			
Surface inclusions	B 1	B 2	B 4	B 5
Gas porosity	C 2	C 1	C 3	C 4
Laps and cold shuts	D 1	D 1	D 2	D 5
Scabs			E 3	E 5
Inserts			F 1	F 3
Welds	J 1	J 2	J 3	J 5
NOTE: The severity level required can be different for each category.				

Table 2: Relationship between surface roughness and detectable surface discontinuities

Categories	Minimum surface conditions increasing roughness ¹⁾			
	comparators according to [2]			
	1 S1	2 S1	3 S1	6 S1
	comparators according to [1]			
	A 1	A 2	A 3	A 4
	Detectable severity level of surface discontinuities			
Surface inclusions	1 to 4	1 to 4	4	4
Gas porosity	1 to 4	1 to 4	3 to 4	4
Laps and cold shuts	1 to 4	1 to 4	3 to 4	3 to 4
Scabs	3 to 4	3 to 4	3 to 4	3 to 4
Inserts	3 to 4	3 to 4	3 to 4	3 to 4
Welds	1 to 4	1 to 4	2 to 4	2 to 4
¹⁾ The surface roughness influences the minimum discontinuity severity level which can be assessed. For example, it is unlikely that severity level 1 surface inclusions can be detected on an A 3 surface condition.				

4 Requirements

When visual surface assessment of casting quality is required, the acceptance level shall be agreed by the time of acceptance of the order.

The order shall be subject to an agreement between the manufacturer and the purchaser in accordance with EN 1559-1 and prEN 1559-2 and shall specify at least the following points:

- the areas of the castings which are to be assessed. They shall be clearly indicated by the time of enquiry and/or acceptance of the order;
- the category and severity level required;

NOTE: By special agreement G and H categories [1] can be included in the requirements and the assessment.

- the manufacturing stage at which surfaces are to be assessed.

5 Conditions for examination

5.1 The severity level of discontinuities that are to be visually detected is critically dependant on the roughness of the surface on which they appear.

Table 2 gives the severity level that can normally be detected according to the surface roughness as defined in EN 1370.

5.2 For evaluating casting surfaces, the areas to be assessed shall be visually compared, without optical aids, with the appropriate comparators on the basis of the category and severity level.

Comparison of the comparators with the casting surface shall be made with the comparators held next to the casting under good lighting conditions, e.g. minimum 350 lx.

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

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5.3 When two or more discontinuity categories are present in any area to be assessed, each shall be assessed according to its own severity level.

5.4 The assessment shall be satisfactory if, in the required area, it is equal to or better than the stated reference comparators.

6 Recording of results of inspection

If requested by the purchaser, the manufacturer shall keep a record of the examination and provide a report.

The identification of the casting shall permit the correlation of a product with the related inspection document.

The records compiled by the manufacturer during the examination shall contain at least the following:

- identification of the casting;
- name and qualification of the person undertaking the examination;
- designated category and specified severity level for each area examined.