



Non-destructive testing of welds — Magnetic particle testing of welds — Acceptance levels

The European Standard EN 1291:1998, with the incorporation of amendment A1:2002, has the status of a British Standard

ICS 25.160.40

National foreword

This British Standard is the English language version of EN 1291:1998, including amendment A1:2002.

The start and finish of text introduced or altered by amendment is indicated in the text by tags $\boxed{A1}$ $\langle A1 \rangle$. Tags indicating changes to CEN text carry the number of the amendment. For example, text altered by CEN amendment A1 is indicated by $\boxed{A1}$ $\langle A1 \rangle$.

As agreed by CEN/TC 121/SC 5 resolution 134/2000 and in accordance with amendment A1:2002, the term “examination” has been replaced by “testing” throughout the document.

The UK participation in its preparation was entrusted to Technical Committee WEE/46, Non-destructive examination, which has the responsibility to:

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 6, an inside back cover and a back cover.

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English version

Non-destructive testing of welds — Magnetic particle testing of welds — Acceptance levels

(includes amendment A1:2002)

Contrôle non destructif des assemblages soudés —
Contrôle par magnétoscopie des soudures —
Niveaux d'acceptation
(inclut l'amendement A1:2002)

Zerstörungsfreie Prüfung von
Schweißverbindungen —
Magnetpulverprüfung von Schweißverbindungen —
Zulässigkeitsgrenzen
(enthält Änderung A1:2002)

This European Standard was approved by CEN on 26 January 1998 and amendment A1 was approved by CEN on 28 April 2002.

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CEN

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

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Ref. No. EN 1291:1998 + A1:2002 E

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 121, Welding, the secretariat of which is held by DS.

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of an identical text or by endorsement, at the latest by August 1998, and conflicting national standards shall be withdrawn at the latest by August 1998.

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).

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.

Foreword to amendment A1

This document EN 1291:1998/A1:2002 has been prepared by Technical Committee CEN/TC 121, Welding, the Secretariat of which is held by DS.

This amendment to the European Standard EN 1291:1998 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2002, and conflicting national standards shall be withdrawn at the latest by November 2002.

This document 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 document.

Annex A is informative.

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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1 Scope

This European Standard specifies acceptance levels for indications from imperfections in ferromagnetic steel welds detected by magnetic particle testing.

The acceptance levels are primarily intended for use during manufacture testing, but where appropriate they can be used for in service inspection.

The acceptance levels in this standard are based on detection capabilities that can be expected when using techniques specified in EN 1290 and parameters recommended in Annex A. The acceptance levels can be related to welding standards, application standards, specifications or codes. Such a relationship is shown in EN 12062 for EN 25817.

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 1290, *Non-destructive testing of welds — Magnetic particle testing of welds*.

prEN 1330-1, *Non-destructive testing — Terminology — Part 1: General terms*.

prEN 1330-2, *Non-destructive testing — Terminology — Part 2: Terms common to the non-destructive testing methods*.

EN 12062, *Non-destructive testing of welds — General rules for metallic materials*.

EN 25817, *Arc-welded joints in steels — Guidance on quality levels for imperfections*. (ISO 5817:1992).

3 Definitions

For the purposes of this standard, in addition with those given in prEN 1330-1, prEN 1330-2 and W.I. 138027 (*Non-destructive testing — Terminology — Part 7: Terms used in magnetic particle testing*)¹⁾, the following definitions apply:

3.1

linear indication

indication having a length greater than three times its width

3.2

non-linear indication

indication having a length less than, or equal to three times its width

4 Testing parameters

Many parameters, either individually or in combination, will affect the ability of a technique to detect imperfections of a given size and orientation with respect to the condition of the test surface.

Detection of small imperfections is highly dependent on the surface condition of the weld and the detection media used. Examples of the application of these parameters to give a high probability of detection are given in Annex A.

¹⁾ In preparation.

5 Acceptance levels

5.1 General

The width of the test surface shall include the weld metal and the adjacent parent metal up to a distance of 10 mm on each side.

Acceptance levels prescribed for linear indications are those corresponding to the evaluation level. Indications lower than this shall not be taken into account. Normally, acceptable indications shall not be recorded.

Local grinding may be used to improve the classification of all or just part of a test surface, when it is required to work to a higher detection limit than that expected by the existing weld surface condition.

5.2 Grouped indications

Any adjacent indications separated by less than the major dimension of the smaller shall be assessed as a single, continuous indication.

Grouped indications shall be evaluated in accordance with application standards.

5.3 Removal of imperfections

Where the product specification permits, local grinding may be used to reduce or remove imperfections which are the cause of unacceptable indications. $\overline{A_1}$ All such areas shall be re-tested and evaluated with the same magnetic system and technique. $\overline{A_1}$

$\overline{A_1}$ Acceptance levels are given in Table 1. $\overline{A_1}$

Table 1 — Acceptance levels for indications

Dimensions in millimetres

Type of indication	Acceptance level ¹⁾		
	1	2	3
Linear indication <i>l</i> = length of indication	$l \leq 1,5$	$l \leq 3$	$l \leq 6$
Non-linear indication <i>d</i> = major axis dimension	$d \leq 2$	$d \leq 3$	$d \leq 4$

¹⁾ Acceptance levels 2 and 3 may be specified with a suffix "X" which denotes that all linear indications detected shall be assessed to level 1. However, the probability of detection of indications smaller than those denoted by the original acceptance level can be low.

Annex A (informative)

Recommended testing parameters

Recommended testing parameters for reliable detection of small imperfections are given in Table A.1. The surfaces are in the as welded condition. It can be necessary to improve the surface condition e.g. by abrasive paper or local grinding to permit accurate interpretation of indications. The detection media are given in order of preference.

Table A.1 — Recommended testing parameters

Acceptance level	Surface condition	Detection media
1	Fine surface ¹⁾	Fluorescent or colour contrast with contrast aid
2	Smooth surface ²⁾	Fluorescent or colour contrast with contrast aid
3	General surface ³⁾	Colour contrast with contrast aid or fluorescent
¹⁾ Fine surface	The weld cap and parent material offering smooth clean surfaces with negligible undercut, rippling and spatter. The surface finish is typical of welds, made by automatic TIG-welding; submerged arc welding (fully mechanized) and manual metal arc welding with iron powder electrodes.	
²⁾ Smooth surface	The weld cap and parent material offering reasonably smooth surfaces with minimal undercut, rippling and spatter. The surface finish is typical of welds made by manual metal arc welding vertical downwards and MAG-welding using argon gas for the capping runs.	
³⁾ General surface	The weld cap and parent material in the as welded condition. The surface finish is typical of welds made by manual metal arc welding or MAG-welding in any position.	

Annex ZA (informative)**Clauses of this European Standard addressing essential requirements or other provisions of EU directives**

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 97/23/EC of the European Parliament and the Council of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipment.

WARNING Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

The following clauses of this standard as detailed in Table ZA.1 and Table ZA.2, are likely to support requirements of the Directives 97/23/EC, and 87/404/EEC.

Compliance with these clauses of this standard provides one with means of conforming with the specific essential requirements of the Directives concerned and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Directive 97/23/EC

Clauses/subclauses of this European Standard	Essential requirements of Directive 97/23/EC	Qualifying remarks/notes
All	Annex I, 3.1.2	Non-destructive tests

Table ZA.2 — Correspondence between this European Standard and Directive 87/404/EEC

Clauses/subclauses of this European Standard	Essential requirements of Directive 87/404/EEC	Qualifying remarks/notes
All	Annex I, 3.2	Welds on pressurized parts

Annex ZA

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