SWEDISH STANDARDS INSTITUTE

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SS-EN ISO 14329:2004

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Utgåva 1

Motståndssvetsning – Mekanisk provning av svetsar – Brottyper och geometriskt måttsystem för punkt-, söm- och pressvetsar
(ISO 14329:2003)

Resistance welding – Destructive tests of welds – Failure types and geometric measurements for resistance spot, seam and projection welds
(ISO 14329:2003)

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The European Standard EN ISO 14329:2003 has the status of a Swedish Standard. This document contains the official English version of EN ISO 14329:2003.

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EUROPEAN STANDARD

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English version

Resistance welding - Destructive tests of welds - Failure types and geometric measurements for resistance spot, seam and projection welds (ISO 14329:2003)

Soudage par résistance - Essais destructifs des soudures - Types de rupture et dimensions géométriques pour les assemblages soudés par résistance par points, à la molette et par bossages (ISO 14329:2003)

Widerstandsschweißen - Zerstörende Prüfung von Schweißverbindungen - Brucharten und geometrische Messgrößen für Widerstandspunkt-, Rollennaht- und Buckelschweißungen (ISO 14329:2003)

This European Standard was approved by CEN on 5 June 2003.

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Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN ISO 14329:2003) has been prepared by Technical Committee ISO/TC 44 "Welding and allied processes" in collaboration with 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of an identical text or by endorsement, at the latest by January 2004, and conflicting national standards shall be withdrawn at the latest by January 2004.

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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

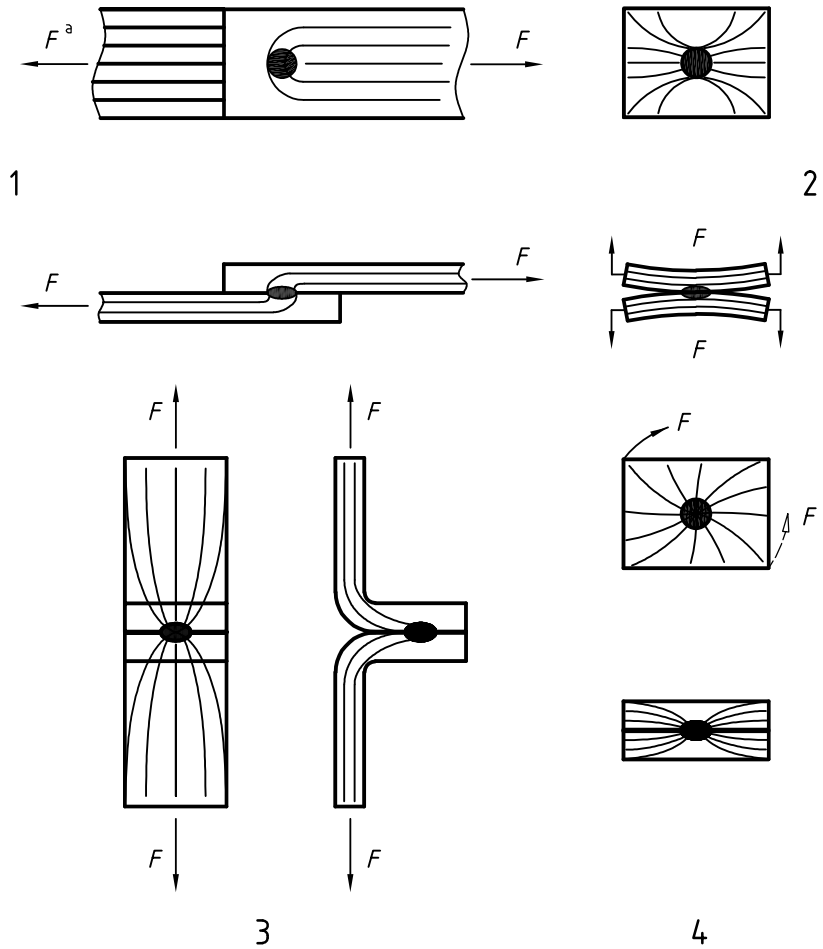
Endorsement notice

The text of ISO 14329:2003 has been approved by CEN as EN ISO 14329:2003 without any modifications.

Resistance welding — Destructive tests of welds — Failure types and geometric measurements for resistance spot, seam and projection welds

1 Scope

This International Standard specifies the definitions of the geometric measurements and fracture types to be used in relation to the testing of resistance spot, projection and seam welds in which different loading configurations cause different stress distributions in the weld (see Figure 1). The aim of these definitions is to give a base for all other related standards.



Key

1 shear testing
2 cross tension testing
3 peel testing
4 torsion testing

a Testing load

Figure 1 — Schematic illustrations showing stress distribution depending on direction of the testing load

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1 Failure modes of specimens and components

2.1.1
interface failure
fracture through the weld nugget between the sheets at the place of the interface

See Figure 2.

2.1.2
partial plug failure
fracture in which a combination of plug and interface failures are present

See Figure 3.

2.1.3
plug
metal pulled from one sheet remaining attached to the surface of the other after testing

See Figure 3.

2.1.4
plug failure
fracture in the base metal, the heat affected zone (HAZ) or in the nugget leaving a lug

See Figure 3.

2.1.5
solid phase weld
pressure weld without a fused zone

See Figure 5 d).

2.2 Measurements made on broken test specimens (Figures 2, 3 and 4)

2.2.1
asymmetrical welds
elongated or oval welds

NOTE Diameters "d_1" and "d_2" should be measured along the two main axes and reported separately (see Figure 3).

2.2.2
weld diameter
d
⟨interface failure⟩ mean of the minimum and the maximum diameters of the fused zone measured at the interface omitting the corona bond area

See Figure 2.

2.2.3
weld diameter
d
⟨partial plug failure⟩ mean of the diameter of the fused zone measured at the interface, omitting the corona bond area, and the maximum diameter of the plug segment

See Figure 3.

2.2.4
weld diameter
d
⟨plug failure⟩ mean of the minimum and maximum diameters of the plug measured at the base of the plug

See Figure 3.

2.2.5
minimum width of resistance seam weld
w
⟨plug failure⟩ width of the weld plugs measured at the base of the plug

See Figure 4.

2.2.6
minimum width of resistance seam weld
w
⟨interface failure⟩ width of the nugget in the plane of the interface at right angles to the longitudinal axis of the seam

2.3 Measurements made on sections taken from the weld

2.3.1
brazed zone
⟨welding of metallic coated sheets⟩ area over which the bond is formed between the coatings only

See Figure 5c).

2.3.2
brazed zone diameter
d_{sb}
diameter of the brazed zone measured in the plane of the interface between the joined pieces

NOTE The mean value should be used [see Figure 5c)].

2.3.3
corona bond diameter
d_c
diameter of the area surrounding the nugget of a spot or projection weld at the faying surfaces in which solid phase bonding only has occurred

See Figure 2.

NOTE The mean value should be used, if possible [see Figures 5a) and 5b)].

2.3.4
distance between nugget centres of seam welds
a
distance between the centres of two adjacent nuggets

See Figure 6.

NOTE The position of the nugget centre normally corresponds with the position of maximum nugget penetration.

2.3.5
distance of the minimum nugget penetration of seam welds
b
distance between two minimum nugget penetrations

See Figure 6.

NOTE The distance cannot be observed in every seam weld.

2.3.6
electrode indentation depth
e_u, e_l
maximum depth of the indentation of the electrode measured in the direction of the electrode force

See Figure 5a).

2.3.7
electrode indentation diameter
d_{eu}, d_{el}
diameters of the depression on the exterior surfaces of the work pieces

See Figure 5a).

NOTE The mean value should be used.

2.3.8
elongated welds
same as asymmetrical welds

See 2.2.1 and Figure 3.

NOTE Two sections in the major axis should be used to determine nugget width and length, nugget penetration, electrode indentation, and sheet separation as individual figures referred to the axis.

2.3.9
heat affected zone diameter
d_{HAZ}
diameter of the heat affected structure measured on a macro- or microsection

See Figures 5a) and b).

2.3.10
heat affected zone penetration
$p_{HAZ\ u}$, $p_{HAZ\ l}$
penetration of the heat affected zone in the thickness direction in each sheet

See Figure 5a).

2.3.11
maximum nugget penetration of seam welds
p_{max}
maximum penetration in the thickness direction expressed as a percentage of the combined thickness

See Figure 6.