INTERNATIONAL STANDARD

ISO 14272

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2016-09-01

Resistance welding — Destructive testing of welds — Specimen dimensions and procedure for cross tension testing of resistance spot and embossed projection welds

Soudage par résistance — Essais destructifs des soudures — Dimensions des éprouvettes et mode opératoire pour l'essai de traction en croix des soudures par résistance par points et par bossages

Reference number
ISO 14272:2016(E)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/IIW, *International Institute of Welding*, Commission III.

This second edition cancels and replaces the first edition (ISO 14272:2000), which has been technically revised.

This corrected version of ISO 14272:2016 incorporates the following corrections:

— Figure 4 a) has been corrected.

Requests for official interpretations of any aspect of this International Standard should be directed to the ISO Central Secretariat, who will forward them to the IIW Secretariat for an official response.

Introduction

This edition of ISO 14272 no longer includes figures showing failure types and modes for tensile shear and cross tension testing in accordance with ISO 14329.

ISO 14272 has been revised to align it with ISO 17677-1.

Resistance welding — Destructive testing of welds — Specimen dimensions and procedure for cross tension testing of resistance spot and embossed projection welds

1 Scope

This International Standard specifies specimen dimensions and a testing procedure for the cross tension testing of spot and projection welds in overlapping sheets in any metallic material of thickness 0,5 mm to 3 mm, where the welds have a maximum diameter of $7\sqrt{t}$ (where t is the sheet thickness in mm).

The object of cross tension testing is to determine the tensile force that the test specimen can sustain.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system*

ISO 17677-1, *Resistance welding — Vocabulary — Part 1: Spot, projection and seam welding*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 17677-1 and the following apply.

3.1
cross tension strength
CTS
maximum cross tension force obtained from this test

3.2
cross tension force
force applied on test specimen during cross tension testing

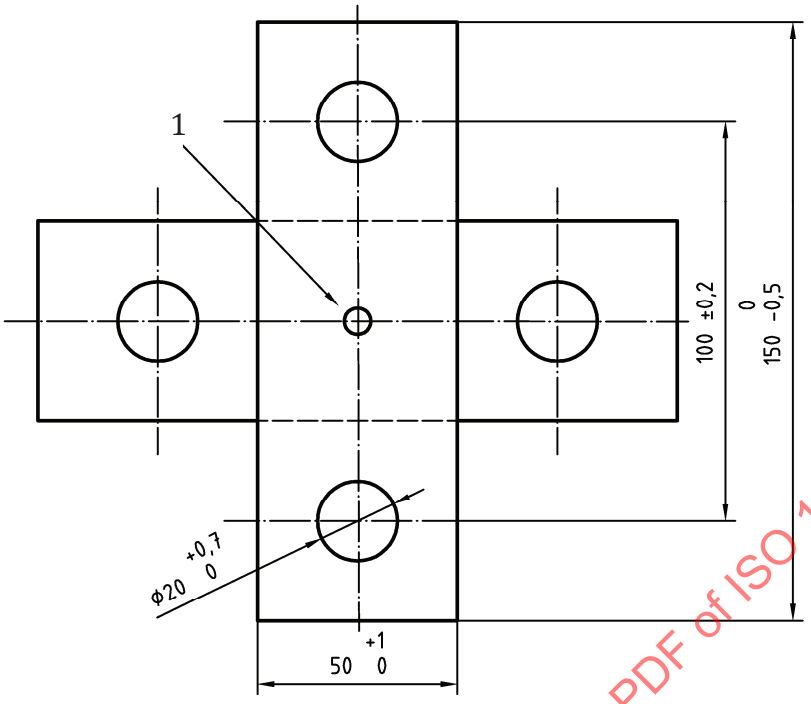
4 Test specimen

The test specimen is composed of two rectangular coupons as shown in Figure 1. If clamping bolts are used, two holes shall be drilled in each coupon. If a hydraulic clamping system is used for clamping, no holes are required.

The weld shall be centred in the test specimen with a tolerance of ±1 mm to every direction.

Figures 2 and 3 illustrate examples of a welding jig/template, which can be used for welding the two sheets together. Two punched strips are placed at right angles to each other, held in the jig, and welded together. To obtain a statistically significant average, several specimens shall be tested.

Dimensions in millimetres

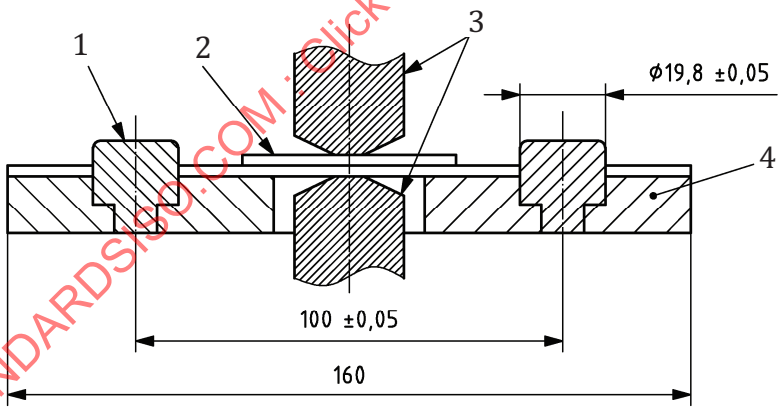


Key

1 weld

Figure 1 — Test specimen for cross tension test

Dimensions in millimetres

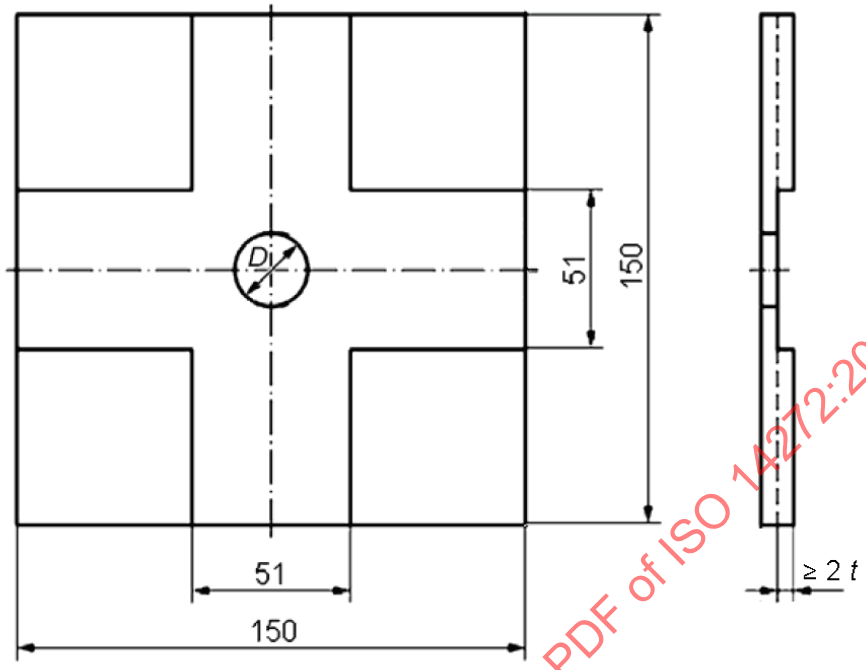


Key

1 locator pin
2 test specimen
3 welding electrode
4 insulation material

Figure 2 — Example of a welding jig for welding cross tension test specimens with holes

Dimensions in millimetres



Key

D hole diameter

t sheet thickness

NOTE For specimens without holes (clamping bolts), the hole diameter and thickness of the welding jig/template can be determined in accordance with the electrode configuration.

Figure 3 — Example of a welding jig for welding cross tension test specimens without holes

5 Test equipment and testing procedure

For test specimens with holes and clamping bolts, the assembled specimen shall be held in clamps as shown in Figure 4. For test specimens without holes a hydraulic clamping system, as shown in Figure 5, can be used in place of the testing clamps illustrated in Figure 4.

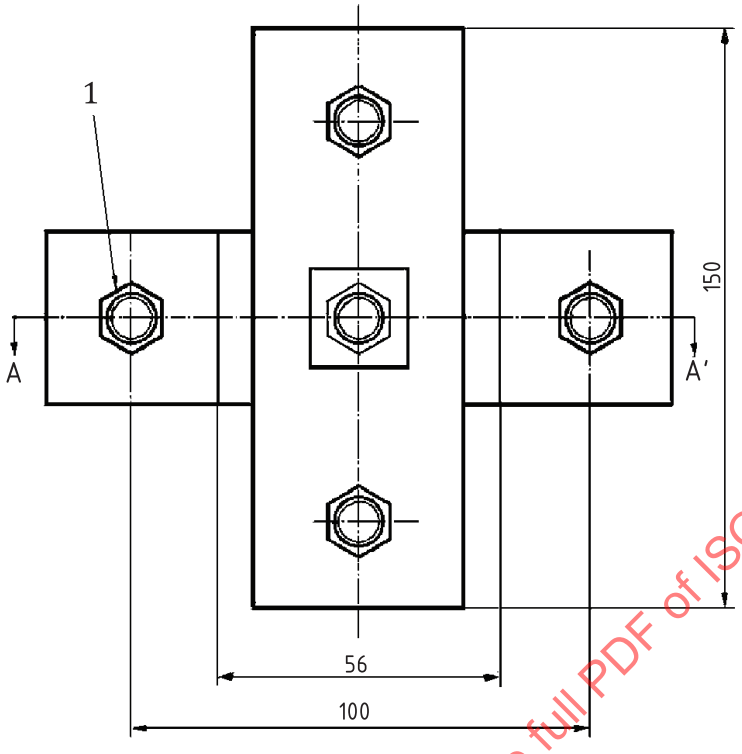
After clamping, the test specimen shall be pulled apart using a tensile testing machine, which satisfies the requirements of ISO 7500-1. The measurement accuracy of force shall be equal or less than ±1 %.

The cross tension force shall be measured during testing. The cross tension strength shall be determined from the maximum force value. All tests shall be carried out at room temperature.

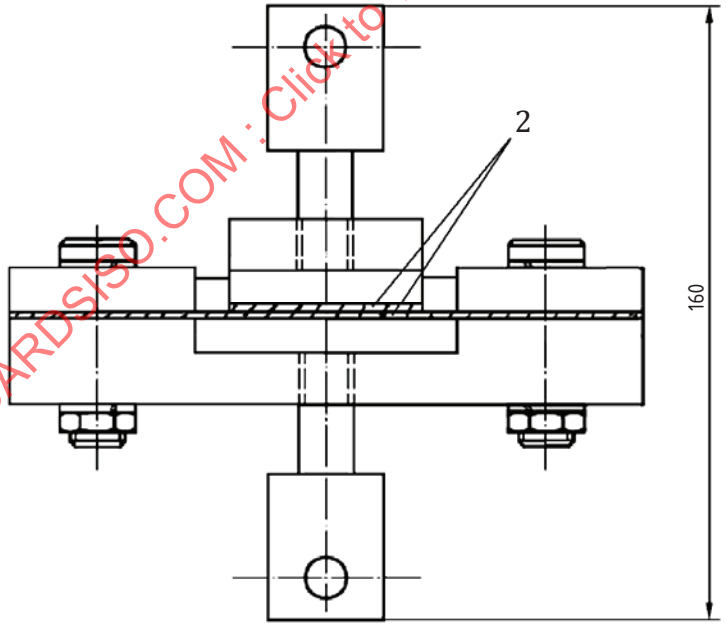
The cross tension strength values obtained in accordance with this test shall be recorded, including type of failure mode and weld diameter for each weld in accordance with ISO 17677-1. See also Clause 6.

A load-displacement diagram shall be created to give information about the deformation of the test specimen. An example of such a diagram is shown in Figure 6.

Dimensions in millimetres



a) Top view



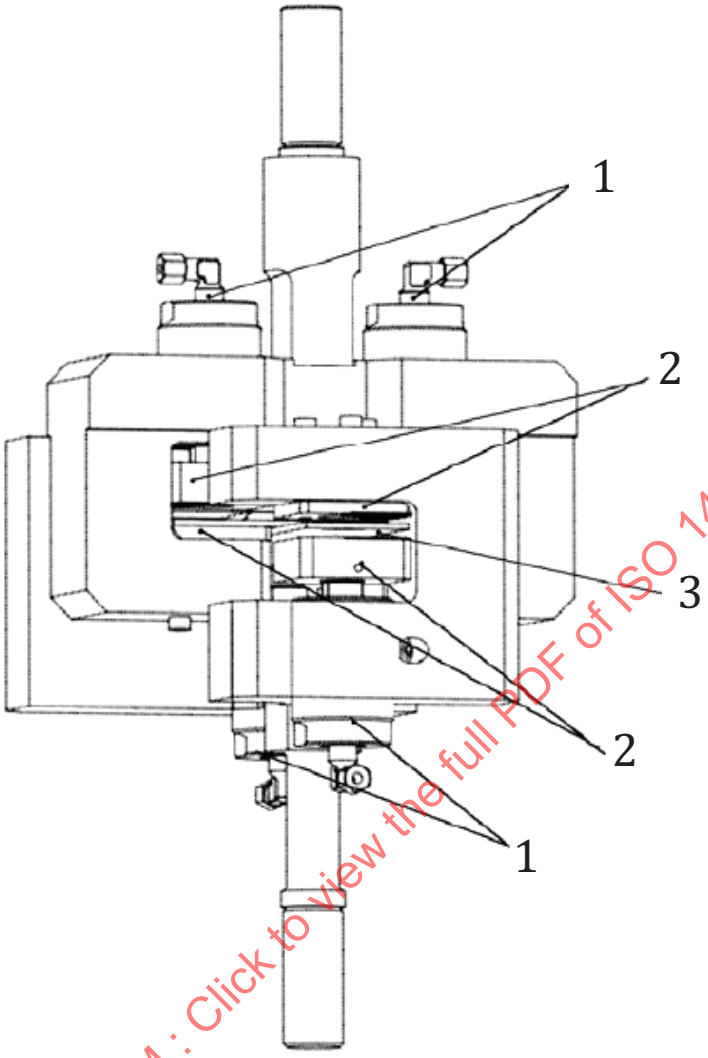
b) A-A' cross section

Key

1 clamping bolt M18 × 43LG

2 test specimen

Figure 4 — Example of testing clamps for test specimen with holes

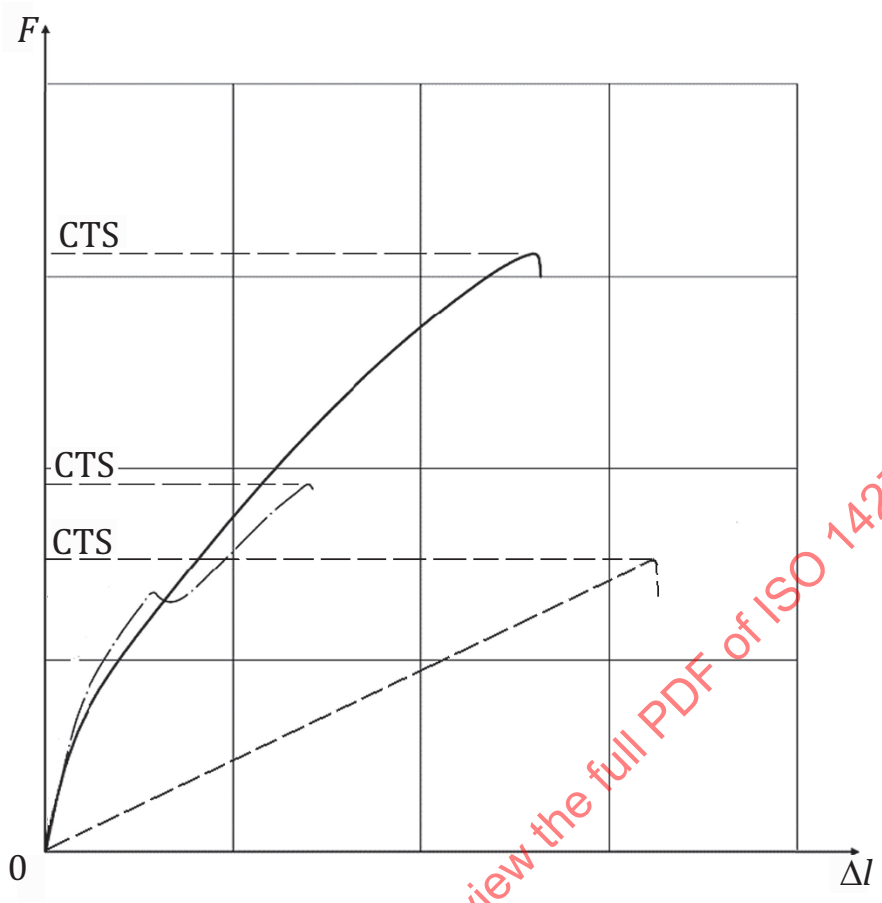


Key

1 hydraulic cylinders
2 dies to clamp test specimen
3 test specimen

NOTE Test specimens are inserted from the opposite side. An exploded view of a clamping device can be seen in Annex A.

Figure 5 — Example of a testing device with hydraulic clamps



Key

CTS cross tension strength

F force/load

Δ*l* crosshead displacement

Figure 6 — Examples of load — Displacement curve of spot welded joints (Not to scale)

6 Test report

The test report shall contain at least the following information:

a) a reference to this International Standard, i.e. ISO 14272:2016;

b) the welding process used;

c) the welding conditions and equipment;

d) the material and its condition;

e) the dimensions of the test specimens;

f) individual values, mean value and standard deviation of the cross tension strength in kN;

g) failure description (plug failure, interfacial failure, etc.);

h) individual values, mean value and standard deviation of the weld diameter;

i) special remarks, if any.

Annex A
(informative)

Exploded view of a hydraulic clamping device

An exploded view of a hydraulic clamping device as shown in Figure 5 is given in Figure A.1.

The device consists basically of four hydraulic cylinders, four fixed dies, four moveable dies, two frame pieces, two shafts and screws.

Triangle surface treatments are applied to a part of each die surface, on the contact side to test specimen, to avoid slippage of the test specimen during tensile testing.