INTERNATIONAL STANDARD

ISO 18278-3

First edition
2017-08

Resistance welding — Weldability —

Part 3: Evaluation procedures for weldability in spot weld bonding

Soudage par résistance — Soudabilité —

Partie 3: Méthodes d'évaluation de l'aptitude au soudocollage par points

Reference number
ISO 18278-3:2017(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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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 6, *Resistance welding and allied mechanical joining*.

A list of all parts in the ISO 18278 series can be found on the ISO website.

Requests for official interpretations of any aspect of this document should be directed to the Secretariat of ISO/TC 44/SC 6 via your national standards body. A complete listing of these bodies can be found at www.iso.org.

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Introduction

This document describes procedures for evaluating the weldability of weld bonding using the resistance spot welding process by determining the welding current range and electrode life.

These procedures can be used to evaluate the following:

a) the effect of electrode material, shape, dimensions and electrode cooling;

b) the effect of material types and thicknesses and coatings being welded;

c) the effect of welding conditions;

d) the effect of welding equipment;

e) the effect of adhesive on welding.

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Resistance welding — Weldability —

Part 3:
Evaluation procedures for weldability in spot weld bonding

1 Scope

This document specifies procedures for the determination of the acceptable welding current range and the electrode life for spot weld bonding using resistance spot welding with adhesive bonding.

This document is applicable for the evaluation of the weldability of prepared assemblies of uncoated and coated metal sheets with individual thicknesses from 0,4 mm to 6,0 mm.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 669, *Resistance welding — Resistance welding equipment — Mechanical and electrical requirements*

ISO 5182, *Resistance welding — Materials for electrodes and ancillary equipment*

ISO 5821, *Resistance welding — Spot welding electrode caps*

ISO 14373, *Resistance welding — Procedure for spot welding of uncoated and coated low carbon steels*

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

ISO 18278-1:2015, *Resistance welding — Weldability — Part 1: General requirements for the evaluation of weldability for resistance spot, seam and projection welding of metallic materials*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 669, ISO 14373, ISO 17677-1 and ISO 18278-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
spot weld bonding
resistance spot welding through an adhesive or sealant

3.2
substrate
material upon the surface of which an adhesive is spread for weld bonding

3.3
prepared assembly
set of components (substrates and adhesives) positioned prior to welding

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3.4
wearing sheet
sheet which is used to produce electrode wear through continuous spot welding

4 Weld bonding equipment

4.1 General

Methods to characterize resistance welding equipment can be found in ISO 669.

The mass and friction of the movable electrode assembly can be determined in accordance with ISO 18278-1.

4.2 Adhesive dispensing equipment

The adhesive dispensing equipment shall be defined by agreement between the contracting parties.

4.3 Storage chamber

The storage chamber shall have a temperature regulation system that is sufficient to maintain the properties of the adhesive or sealant, as required by the manufacturer of the adhesive or sealant.

4.4 Electrodes

The electrode materials shall be as defined in ISO 5182. Their geometry shall be defined according to ISO 5821.

4.5 Welding current

The type of welding current used (alternating current or direct current) shall be specified before testing and recorded. Constant current control settings shall be used.

When using AC resistance welding equipment, it shall be set so that welding current is not less than 30 % of R.M.S. value at full conduction angle.

4.6 Mechanical settings

The mechanical settings shall be chosen to limit the impact of the electrode meeting the sheet.

To limit the impact of the electrode an electrode approach speed of 0,15 m/s is recommended and/or the peak force should be less than 150 % of the nominal electrode force.

The machine squeeze time should be of sufficient duration to overcome electrode bounce effects and machine inertia so as to allow the electrode force to build up to the required value before the welding current is initiated.

4.7 Measurement of parameters

4.7.1 Temperature

The ambient temperature shall be measured.

4.7.2 Amount of adhesive applied

Measurement of the amount of adhesive applied shall be carried out as defined by the contracting parties.

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