SLOVENSKI STANDARD
oSIST prEN ISO 9455-15:2016

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Talila za mehko spajkanje - Preskusne metode - 15. del: Korozijski preskus bakra (ISO/DIS 9455-15:2016)

Soft soldering fluxes - Test methods - Part 15: Copper corrosion test (ISO/DIS 9455-15:2016)

Flussmittel zum Weichlöten - Prüfverfahren - Teil 15: Kupferkorrosionsprüfung (ISO/DIS 9455-15:2016)

Flux de brasage tendre - Méthodes d'essai - Partie 15: Essai de corrosion du cuivre (ISO/DIS 9455-15:2016)

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ICS:

25.160.50	Trdo in mehko lotanje	Brazing and soldering
77.060	Korozija kovin	Corrosion of metals

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Soft soldering fluxes — Test methods —

Part 15:
Copper corrosion test

Flux de brasage tendre — Méthodes d'essai —

Partie 15: Essai de corrosion du cuivre

ICS: 25.160.50

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 44/SC 12.

This second edition cancels and replaces the first edition which has been technically revised.

ISO 9455 consists of the following parts.

— *Part 1: Determination of non-volatile matter, gravimetric method*

— *Part 2: Determination of non-volatile matter, ebulliometric method*

— *Part 3: Determination of acid value, potentiometric and visual titration methods*

— *Part 5: Copper mirror test*

— *Part 6: Determination of halide (excluding fluoride) content*

— *Part 8: Determination of zinc content*

— *Part 9: Determination of ammonia content*

— *Part 10: Flux efficacy test, solder spread method*

— *Part 11: Solubility of flux residues*

— *Part 12: Steel tube corrosion test*

— *Part 13: Determination of flux spattering*

— *Part 14: Assessment of tackiness of flux residues*

— *Part 15: Copper corrosion test*

— *Part 16: Flux efficacy test, wetting balance method*

— *Part 17: Surface insulation resistance comb test and electrochemical migration test of flux residues*

Annex A of this part of ISO 9455 is for information only.

Soft soldering fluxes — Test methods —

Part 15: Copper corrosion test

1 Scope

This part of ISO 9455 specifies a qualitative method for determination of the corrosive properties of flux residues on a copper substrate, when subjected to controlled environmental conditions. The test is applicable to type 1 fluxes, as defined in ISO 9454-1.

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 197-1, *Copper and copper alloys — Terms and definitions — Part 1: Materials*

ISO 9453, *Soft solder alloys — Chemical compositions and forms*

ISO 9454-1, *Soft soldering fluxes — Classification and requirements — Part 1: Classification, labelling and packaging*

ISO 9455-1, *Soft soldering fluxes — Test methods — Part 1: Determination of non-volatile matter, gravimetric method*

ISO 9455-2, *Soft soldering fluxes — Test methods — Part 2: Determination of non-volatile matter, ebulliometric method*

IEC 68-2-3:1969, *Environmental testing — Part 2: Tests — Test Ca: Damp heat, steady state*

3 Principle

A pellet of solder is melted in contact with the flux to be tested on a test piece of copper sheet. The test piece is then exposed to a controlled temperature/humidity environment and the resulting corrosion of the copper, if any, is assessed using a low-power microscope.

4 Reagents and materials

Only reagents of recognized analytical quality and only distilled, or deionized water shall be used.

4.1 Ammonium peroxodisulfate solution, prepared as follows.

Dissolve 250 g of ammonium peroxodisulfate [$(NH_4)_2S_2O_8$] in water and add cautiously 5 ml of sulphuric acid (density 1,84 g/ml). Mix, cool, dilute to 1 litre and mix. This solution shall be freshly prepared before use.

4.2 Sulfuric acid, 5 % (by volume) solution.

Add cautiously, with stirring, 50 ml of sulfuric acid (density 1,84 g/ml) to 400 ml of water and mix. Cool, dilute to 1 litre and mix well.

4.3 Degreasing solvent, such as acetone or petroleum ether.

4.4 0,5 mm thick copper sheet, phosphorus deoxidized, complying with ISO 197-1.

4.5 Solder wire or pellets, complying with ISO 9453, Sn63Pb37, Sn60Pb40,Sn96,5Ag3Cu0,5 or any other solder alloy as agreed between the user and the supplier.

5 Apparatus

Usual laboratory apparatus and, in particular, the following.

5.1 Solder bath

Heat solder pot so that solder bath stabilizes at (235 ± 5) °C in the case of Sn63Pb37 and Sn60Pb40 alloy, or at (255 ± 3) °C for Sn96,5Ag3Cu0,5, or at (35 ± 3) °C higher than the liquidus temperature of any other solder alloy as agreed between the user and the supplier. For solder alloys except Sn63Pb37 and Sn60Pb40, the temperature of the solder pot may be approximately 40 °C higher than the liquid temperature of each alloy.

5.2 Humidity chamber, conforming to the temperature and humidity requirements of IEC 68-2-3, test Ca.

5.3 Cupping device (e.g. an Erichsen cupping machine or equivalent cupping device).

The device shall be fitted with a 27 mm diameter die and a 20 mm diameter steel ball (see Figure 1).

5.4 Drying oven (air circulating), suitable for use at (60 ± 2)°C.

5.5 Low-power stereomicroscope, capable of x20 magnification, equipped with quartz-halogen illumination.

5.6 Tongs, or other suitable mechanical device, to lift the test piece from the surface of the molten solder bath.

6 Preparation of tests pieces

From a sheet of copper 0,5 mm thick (4.4), cut square test pieces each 50 mm x 50 mm.

Clamp each of the test pieces, in turn, centrally onto the 27 mm diameter die of the cupping device (5.3). Using the 20 mm diameter steel ball, make a 3 mm deep depression in the centre of each test piece by forcing the ball into the die (see Figure 1). One corner of the test piece may be bent up to facilitate handling with the tongs (5.6).

Immediately before use, pretreat the test pieces in accordance with the following sequence of operations a) to h), ensuring that clean tongs (5.6) are used for handling.

a) Degrease the test pieces with a suitable neutral organic solvent (4.3).

b) Immerse the test pieces in sulfuric acid solution (4.2) at (65 ± 5) °C for 1 min to remove the tarnish film.

c) Immerse the test pieces in the ammonium peroxodisulfate solution (4.1) at 20 °C to 25 °C for 1 min to etch the surface uniformly.

d) Wash the test pieces under running tap water for a maximum of 5 s.

e) Immerse the test pieces in sulfuric acid solution (4.2) at a temperature not greater than 25 °C for 1 min.

f) Wash the test pieces under running water for about 5 s and rinse in distilled or deionized water. Immerse immediately in the degreasing solvent (4.3).

g) Allow the test pieces to dry in clean air.

h) Use the test pieces immediately or after a maximum storage period of up to 60 min in a closed container.

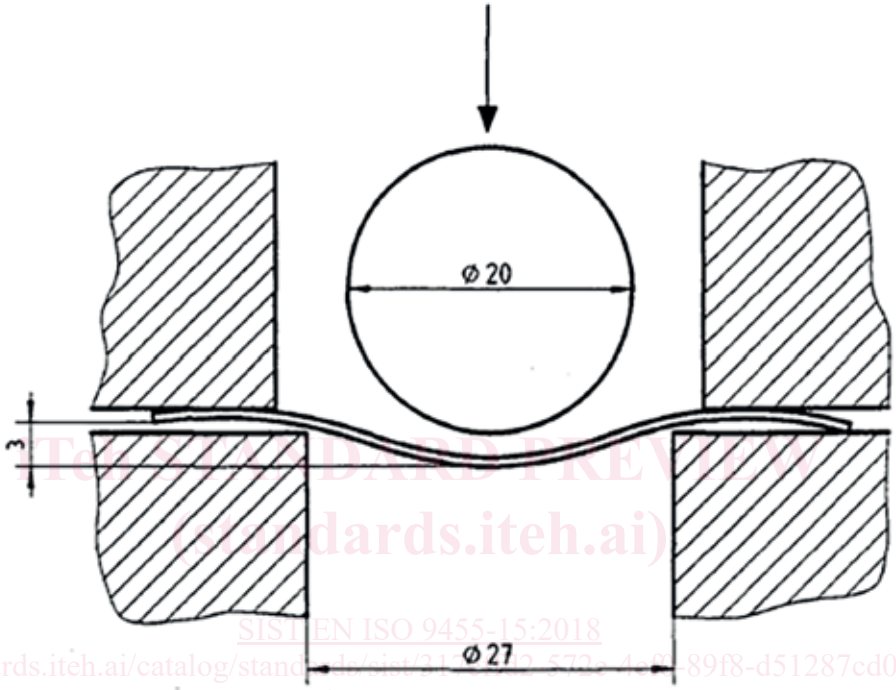

Figure 1 — Dimensions of penetrator, die and blank-holder

7 Procedure

7.1 General

Select three cleaned copper test pieces (Clause 6), one of which will serve as the blank. Follow the procedures in 7.2 to 7.6 on the three test pieces. Omitting the procedures in 7.4 in the case of the blank.

7.2 Fluxing the test pieces

7.2.1 For solid, paste and liquid flux samples

Weigh (1,00 ± 0,05) g of the solder wire or pellets (4.5), previously degreased with a neutral organic solvent (4.3), and transfer to the centre of the depression in one of the test pieces (7.1).

NOTE This may conveniently be done, if wire is used, by forming the wire into a small flat coil.

Repeat for the other two test pieces (7.1).