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Soft soldering fluxes — Test methods —

Part 13:

Determination of flux spattering

Flux de brasage tendre — Méthodes d'essai —

Partie 13: Détermination des projections de flux



Reference number
ISO 9455-13:1996(E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 9455-13 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 12, *Soldering and brazing materials*.

ISO 9455 consists of the following parts under the general title *Soft soldering fluxes — Test methods*:

- *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 and detection of halide (excluding fluoride) content*
- *Part 8: Determination of zinc content*
- *Part 9: Determination of ammonia content*
- *Part 10: Flux efficacy tests, solder spread method*

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- *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 tests, wetting balance method*
- *Part 17: Surface insulation resistance, comb test and electrochemical migration test of flux residues.*

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Soft soldering fluxes — Test methods —

Part 13:

Determination of flux spattering

1 Scope

This part of ISO 9455 describes a method for estimating the tendency of a flux to spatter in use. It is a qualitative (comparative) method and is only applicable to liquid fluxes, as defined in ISO 9454-1.

The method is not applicable to flux cored solder wire, or to solder pastes.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 9455. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 9455 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3574:1986, *Cold-reduced carbon steel sheet of commercial and drawing qualities*.

ISO 9453:1990, *Soft solder alloys — Chemical compositions and forms*.

ISO 9454-1:1990, *Soft soldering fluxes — Classification and requirements — Part 1: Classification, labelling and packaging*.

3 Principle

A measured amount of the liquid flux under test is placed on a specimen plate of sheet steel. The plate is heated on a solder bath and the plate examined visually for evidence of spattering of the flux.

4 Apparatus and materials

Usual laboratory apparatus and, in particular, the following.

4.1 Solder bath, of rectangular cross-section, approximately 150 mm × 100 mm, containing at least 4 kg of tin-lead solder (such as ISO 9453, grade S-Sn63Pb37) having a liquidus less than 200 °C. The depth of the solder shall be such that the liquid surface of the solder is not greater than 5 mm from the bath rim. The bath shall be capable of being maintained at a temperature of (400 ± 10) °C.

4.2 Specimen plates, cut from 1 mm thick unalloyed steel sheet, deep drawing quality, conforming to ISO 3574. The plates are to be cut to size, such that the length and width are 10 mm larger than the corresponding dimensions of the solder bath (4.1).

4.3 Silicon carbide cloth, 180 grade.

5 Procedure

Adjust the temperature of the solder in the solder bath (4.1) to $(400 \pm 10) ^\circ\text{C}$. Ensure that the level of the solder in the bath is $4 \text{ mm} \pm 1 \text{ mm}$ below the level of the rim of the bath.

Carry out the following procedure on three specimen plates (4.2).

Using the silicon carbide cloth (4.3), clean the surface of each specimen plate immediately before testing in order to remove all oxidation and contamination from the steel.

By means of a fine graduated pipette, transfer $(0,1 \pm 0,01)$ ml of the liquid test flux to the centre of one of the specimen plates.

Immediately after application of the flux, carefully place the specimen plate, flux upwards, on the rim of the solder bath, such that it covers the rim completely. During these operations, ensure that the solder bath is located in still air conditions.

Remove the plate after 3 min and examine it visually for evidence of spattering.

Repeat this procedure for each of the two remaining specimen plates, whilst maintaining the solder bath temperature at $(400 \pm 10) ^\circ\text{C}$.

6 Expression of results

The average result obtained from the three tests is assessed, compared with figure 1, and reported as either "no spattering" or "spattering occurs". Alternatively, a reference flux of known satisfactory performance may be subjected to the same procedure as described in clause 5, and the average spattering rating of the test flux reported as "equal to", "better than" or "worse than" the average for the reference flux.

7 Test report

The test report shall include the following information:

- the identification of the flux test sample;
- the test method used (i.e. reference to this part of ISO 9455);
- the results obtained from the test, either in absolute terms, or by comparison with a reference flux, the details of which should be given;
- any unusual features noted in the test;
- details of any operation not specified in the method, or any optional operation which may have influenced the result.