



**International  
Standard**

**ISO 9455-18**

**Soft soldering fluxes — Test  
methods —**

Part 18:

**Cleanliness of soldered printed  
circuit assemblies before and/or  
after cleaning**

**First edition  
2024-08**

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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 document 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](http://www.iso.org/directives)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

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For an explanation of 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 [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 12, *Soldering materials*.

A list of all parts in the ISO 9455 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html). Official interpretations of ISO/TC 44 documents, where they exist, are available from this page: <https://committee.iso.org/sites/tc44/home/interpretation.html>.

# Soft soldering fluxes — Test methods —

## Part 18:

# Cleanliness of soldered printed circuit assemblies before and/or after cleaning

## 1 Scope

This document specifies test methods for the cleanliness of soldered printed circuit assemblies before and/or after soldering and cleaning. The test is applicable to all fluxes as defined in ISO 9454-1.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

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

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

### 3.1

#### flux residue

flux components remaining around the soldering area after reflow

### 3.2

#### white residue

flux components remaining around the soldering area after cleaning

## 4 Principle

Test sample before and/or after cleaning the soldered printed circuit assemblies is prepared without contamination. Then, the test sample is tested by the flow chart given in [Figure 1](#). The test methods are detailed in [Table 1](#).

The first step is to check for the presence or absence of flux residue on the PCB by microscope and/or SEM.

Next step is identification and/or reliability test of the flux residue. Identification of flux residue is carried out by SEM/EDX and/or FT-IR. Reliability tests are carried out by ionic contamination tester (Ref. ROSE test) and/or SIR and/or dielectric property test. This second step tests are optional, where users can select the test methods to meet user's requirements. An example of test methods and test results of cleanliness of the soldered printed circuit boards before and/or after cleaning is provided in [Annex A](#). An example for a FT-IR analysis is shown in [Annex B](#).

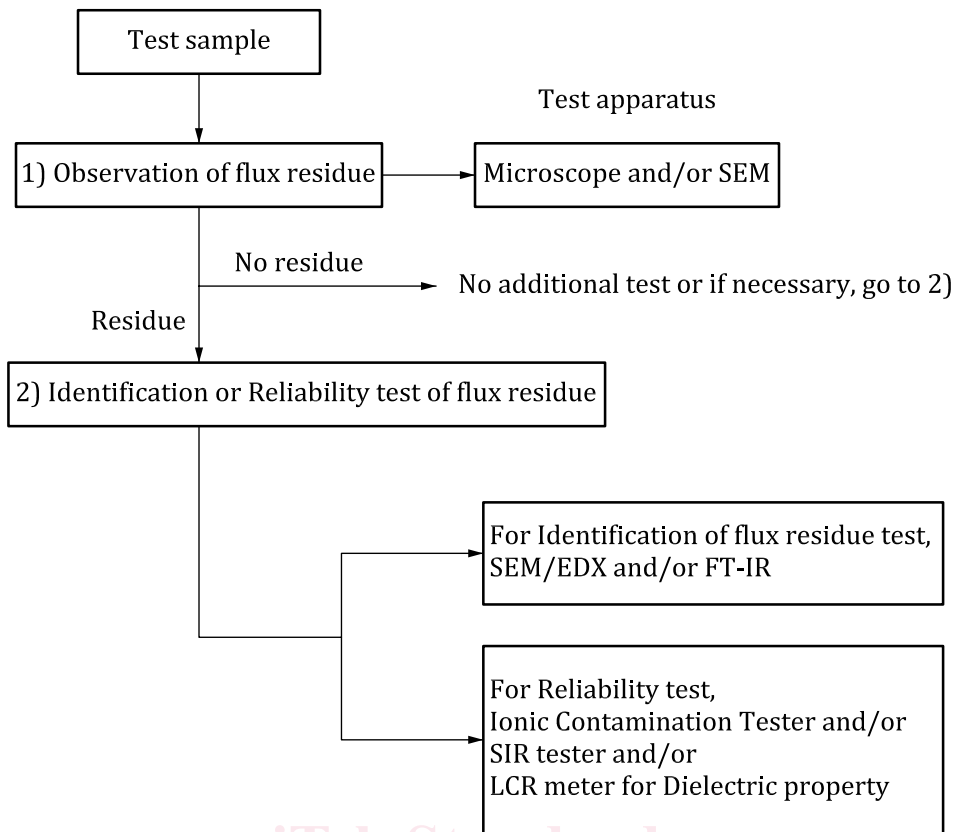


Figure 1 — Flowchart of test methods of cleanliness of the soldered printed circuit assemblies before and/or after cleaning

Table 1 — Test methods of cleanliness of the soldered printed circuit assemblies

Step	Test item	Test apparatus	Details
1	Observation of flux residue	Microscope	Observation of flux residue
		SEM	Usually more detectable than Microscope Qualitative test of the flux residue determining organic or inorganic residue
2	Identification of flux residue	SEM/EDX	Determination of residual element, for example, C, O, Cl, Br, Sn, Ag . . . and mapping of each element
		FT-IR	Functional group, for example, -COOH, -NH, et al.
	Reliability test Ionic residue	Ionic contamination tester	Electrical conductivity of the extract by mixture of IPA and DI water
	Reliability test SIR	SIR tester	Surface insulation resistance test of flux residue
	Reliability test Dielectric property	LCR meter	Dielectric property of flux residue

## 5 Reagents and cleaning solvent

In the test, use only reagents of recognized analytical grade or higher.

Cleaning solvent as recommended by manufacturer or supplier.

NOTE Cleaning solvent to be used can vary with the flux composition.