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उत्पाद मैनुअल
टाँका तार – ठोस और फ्लक्स कोर्ड – विशिष्टि
IS 1921: 2025 के अनुसार

Product Manual for
Solder Wire-Solid and Flux Cored-Specification
According to IS 1921: 2025

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम, 2018 की योजना- I के तहत प्रमाणन के संचालन में एकरूपता और पारदर्शिता के लिए इस उत्पाद मैनुअल का उपयोग सभी क्षेत्रीय / शाखा कार्यालयों और लाइसेंसधारियों द्वारा संदर्भ सामग्री के रूप में किया जाएगा। दस्तावेज़ का उपयोग बीआईएस प्रमाणन प्राप्त करने के इच्छुक संभावित आवेदकों द्वारा भी किया जा सकता है।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure uniformity of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification.

1.	भारतीय मानक संख्या IS No.	:	IS 1921:2025
	शीर्षक Title	:	Solder Wire-Solid and Flux Cored - Specification
	संशोधनों की संख्या No. of amendments	:	0
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	As per Clause 5, Refined non-ferrous metals shall be used for manufacture of soft solder alloys. This clause is for the guidance purposes only. Note: This section indicates the requirements for raw material (if specified in the IS) for which compliance is to be established during Grant of Licence/Change in Scope of Licence/Factory Surveillance
b)	समूहीकरण दिशानिर्देश Grouping Guidelines	:	Please refer Annex-A
c)	नमूने का परिमाण	:	One Reel/Coil

	Sample Quantity	Note: This section indicates the quantity of the sample of the product and/or the raw material (if applicable), required to be sent to the laboratory for testing, for the purpose of Grant of Licence/Change in Scope of Licence/ Factory Surveillance (in case of market surveillance, effort may be made to procure the required quantity of product sample, as far as possible since raw material sample may not be available in market)
d)	परीक्षण अनुरोध में घोषित किए जाने वाले पैरामीटर Parameters to be Declared in Test Request	Solder Alloy Designation, Flux Composition, Flux Type, Nominal Outer Diameter, Flux Percentage or Flux Content Note: Apart from the above, any other requirements/parameters may also be declared as per the standard, as applicable.
3.	परीक्षण उपकरणों की सूची List of Test Equipment	Please refer to Annex- B
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	Please refer to Annex- C
5.	एक दिन में संभावित परीक्षण Possible tests in a day	
	All Tests can be carried out in a day except test requirement for Flux Activity Classification as per Table 7 (Copper Mirror Test, Copper Plate Corrosion Test, SIR & ECM). Note: This section is for the guidance of BIS Certification Officers/Technical Auditors of BIS Authorized Outside Surveillance Agencies (OSAs) during factory inspection to provide ready reference regarding the tests which can be witnessed during the inspection in the factory by the officer/auditor.	
6.	लाइसेंस का दायरा /Scope of the Licence:	
	IS 21: 2025 के अनुसार मानक मुहर का उपयोग करने के लिए लाइसेंस निम्नलिखित कार्यक्षेत्र के लिए प्रदान किया जाता है □Licence is granted to use Standard Mark as per IS 21: 2025 with the following scope:	
7.	उत्पाद का नाम Name of the product	Solder Wire-Solid and Flux Cored
	Solder Alloy Designation	Sn63Pb37, Sn63Pb37E, Sn60Pb40 etc. as per IS 193
	Flux Composition	Rosin (RO)(colophony or modified colophony), resin (RE), organic (OR), and inorganic (IN)
	Flux Type	L0, L1, M0, M1, H0, H1
	Dimensions (Outer Nominal Diameter)	mm up to and including.....mm
	Optional Test	With or Without “spread test, electrochemical migration resistance (ECM) test and halogen content test (Optional Test)”

ANNEX-A
TO PRODUCT MANUAL FOR
Solder Wire-Solid and Flux Cored
According to IS 1921:2025

GROUPING GUIDELINES

1. IS 1921:2025 covers requirements of solid and flux cored solder wire.
2. The requirement of chemical composition of Solder Alloy include both lead-containing and lead-free grades as specified in IS 193. The Solder Alloy shall conform to the appropriate alloy composition given in IS 193, or IS 5479, or any other composition as mutually agreed between the purchaser and the supplier.
3. IS 193 covers 31 lead-containing alloys grouped into 10 categories based on their main alloying elements and 31 grades of lead-free solder grouped into 21 categories. IS 5479 covers 5 grades of soft solder and 4 grades of hard solder. Additionally, the standard allows for the use of other alloys, provided they meet the impurity limits specified in the standard.
4. Alloy designation, as specified in Table 2 & 3 of IS 193 have been grouped based upon the major alloying elements. Further, Alloy designation as specified in Table 1A and Table 1B of IS 5479 based on Alloying element composition.
5. This Standard also covers fluxes based on four compositions: Rosin (RO) (colophony or modified colophony), resin (RE), organic (OR), and inorganic (IN).
6. The following grouping guidelines shall apply in case of Grant of Licence (GoL)/Change in Scope of Licence (CSoL):

(a) Solid Solder Wire:

One sample of solid solder wire of each Group (as specified in IS 193) or each grades (as specified in IS 5479) of the lowest size and highest size shall be tested to cover the sizes within that group, in the scope of licence.

(b) Flux Cored Solder Wire:

One sample of Flux cored solder wire of each Group (as specified in IS 193) or each grades (as specified in IS 5479) and each Flux Composition (RO, RE, OR and IN) of the lowest size and highest size shall be tested to cover the sizes within that group, in the scope of licence.

- 7) If a sample is drawn and tested for Flux Cored Solder Wire for a particular alloy designation/grade, the corresponding Solid Solder Wire of the same alloy designation/grade shall also be included in the scope of the licence.
- 8) This standard also prescribed certain optional tests, which include spread test, electrochemical migration resistance (ECM) test and halogen content test. If the sample drawn and tested for Optional tests, the scope of the licence may be specified either with or without the inclusion of the Optional Test.
- 9) However, it shall be ensured that the firm is having all the necessary manufacturing and testing facilities for the manufacture and testing of the varieties to be included in the licence
- 10) During the operation of licence, BO shall ensure that all the varieties covered in the license are drawn for independent testing on rotation over a period of time.

ANNEX – B

LIST OF TEST EQUIPMENTS
(INDICATIVE LIST, FOR GUIDANCE ONLY)

Major test equipment required to test as per requirements of Indian Standard.

Sl. No.	Tests Used in with Clause Reference	Test Equipment/Chemicals and Identification Numbers (Where applicable)
1	Chemical Composition of Solder Alloy Cl 6.2	<u>Instrumental methods</u> Instruments such as Optical emission spectrometer, Milling machine Chemical Methods (as per IS 998 various parts), e.g. Tin by Iodometric method - IS 998 (Part 1): Analytical Balance, Burner/Hot Plate, Apparatus for reduction of tin, Std. laboratory glass ware, equipment and reagents, Concentrated sulphuric acid, potassium bisulphate, conc. Hydrochloric acid, nickel/iron, starch, carbon dioxide gas, standard potassium iodate solution Antimony by Potassium Bromate Titration method – IS 998 (Part 1) Analytical Balance, Burner/Hot Plate , Std. laboratory glass ware, equipment and reagents, Concentrated sulphuric acid, potassium bisulphate, conc. Hydrochloric acid, methyl orange indicator, sodium sulphite, Standard Potassium Bromate Solution Iron and Copper by Photometric method – IS 998 (Part 2) Analytical Balance, Burner/Hot Plate , Photometric instrument, Std. laboratory glass ware, equipment and reagents, hydrobromic acid, bromine, perchloric acid, test-lead, anhydrous sodium acetate, acetic acid, hydroxylamine hydrochloride solution, orthophenanthroline solution, std, iron solution, phosphoric acid, copper solution Arsenic by photometric method – IS 998 (Part 2) Analytical Balance, Burner/Hot Plate, All glass distillation apparatus, Photometric instrument, Std. laboratory glass ware, equipment and reagents, conc.

		Sulphuric acid, conc. Hydrochloric acid, conc. Nitric acid, dil. Sulphuric acid, ammonium molybdate-hydrazine sulphate solution ammonium molybdate solution, hydrazine sulphate solution, std. arsenic solution
2	Flux Percentage or Flux Content CI 7.3	As specified in Annexure-G of IS 1921:2025 Degreasing Solvent, Balance — having an accuracy of ± 0.001 g, Porcelain Crucible — capacity 30 ml, Crucible or Beaker Tongs/Holder, Hot plate capable of being set to $50\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ above the liquidus temperature of solder sample alloy, Tissues or Wipe Cloth, Glycerol, Glass Beaker — pyrex or heat resistant borosilicate glass, 100 ml to 150 ml
3	Acid Value CI 7.4	As specified in Annexure-D of IS 1921:2025 <u>By Potentiometric</u> Millivoltmeter or pH Meter, Glass Electrode, Saturated Calomel, or Silver Chloride/ Silver, Electrode, Magnetic, or Mechanical, Stirrer — with variable speed drive, Automated Titration System with Evaluating Processor Unit, <u>Visual Titration Methods</u> Reagent- Ethanol, Anhydrous, Neutralized with Potassium Hydroxide, Toluene, Neutralized with Potassium Hydroxide, Ethanol/Toluene Mixture, Propan-2-ol, neutralized with potassium Hydroxide, Potassium Hydroxide Solution — 0.1 mol/l in alcohol, Phenolphthalein Indicator Solution, ordinary laboratory apparatus
4	Flux Residue Dryness/Tackiness CI 7.5	As specified in Annexure-H of IS 1921:2025 Solder Bath, Cupping Device, Tongs, or Other Suitable Mechanical Device, Soft Brush, Ordinary Laboratory Apparatus, Drying Oven — suitable for use at $(60 \pm 2)\text{ }^{\circ}\text{C}$ and $(110 \pm 2)\text{ }^{\circ}\text{C}$ Reagent- Acid Cleaning Solution, Degreasing Solvent, Powdered Chalk or Powder Talc, Copper Sheet of Thickness of $(0.50 \pm 0.05)\text{ mm}$, Acetone
5	Spread Test (Optional) CI 7.6	As specified in Annexure-J of IS 1921:2025

		Solder Bath, Drying Oven — capable of setting and maintaining at a temperature of $150\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$., Tongs or other Suitable Mechanical Device, Scrubber, Spatula, Micrometer, Observation Device such as Planimeter or a Microscope, Glass Apparatuses or Equivalent Apparatuses, Abrasive Paper, Chemical Balance or Electronic Force Balance — having a sensitivity of 0.000 1 g or 0.001 g
6	Halogen content Test (Optional) CI 7.7	As specified in Annexure-K of IS 1921:2025 <u>Visual Titration (Method A)</u> Ordinary laboratory apparatus, Analytical balance capable of reading to 0.001 g, Pipettes, Burettes, 100 ml beakers, 125 ml separatory funnel, 125 ml Erlenmeyer flasks, 1000 ml volumetric flasks, 0.1 N silver nitrate, standardized, 1 M (1 mol/l) sodium hydroxide, 0.2 M (0.2 mol/l) nitric acid, 1 M (1 mol/l) potassium chromate, 0.03 M (0.03 mol/l) phenolphthalein solution (reagent grade), Chloroform (reagent grade), Deionized water. <u>Potentiometric Titration Method (Method B)</u> Potentiometric titrator, millivolt meter, pH meter, automatic potentiometric titrator, Electrodes, Magnetic stirrer, Drying oven, Chemical balance or electronic force balance having accuracy of 0.000 1 g, Volumetric pipette and volumetric flask Propan-2-ol, Silver nitrate solution, standardized (0.05 mol/l)
7	Dimension and Tolerances CI 8	As specified in Annexure-F of IS 1921:2025 Micrometer or by measuring instruments equivalent or superior thereto in precision, to the nearest 0.01 mm
8	Copper Mirror Test Table 7	As specified in Annexure-M of IS 1921:2025 Temperature/Humidity Oven, humidity gauge having a ± 2 percent accuracy or better, vacuum deposition system or the means to procure glass test panels having a copper mirror coating, Glass Slides, Glass Dropper or Micro Syringe or Micropipette,
9	Corrosion (Copper plate corrosion test) Table 7	As specified in Annexure-N of IS 1921:2025 Solder Bath, Humidity Chamber, Cupping device, Drying Oven (Air Circulating) — suitable for use at $(60 \pm 2)\text{ }^{\circ}\text{C}$, Low-Power Stereomicroscope, Tongs or other Suitable Mechanical Device, Analytical Balance — capable of weighing 0.001 g

		Ammonium Peroxodisulfate Solution, Sulphuric Acid, 5 Percent (by Volume) Solution, Neutral Organic Solvent for Degreasing, Copper Sheet, Solder Wire or Pellets
10	Halides Contents Table 7	As specified in Annexure-K and P of IS 1921:2025 In addition to test equipment specified in Sr. No. 6 above- Six pieces of silver chromate test paper 51 mm × 51 mm., 250 ml of reagent grade (highly pure, without contamination) propan-2-ol., Six Glass Microscope Slides
11	Surface insulation resistance (SIR) & Electrochemical Migration (ECM)- Optional test Table 7	As specified in Annexure-Q and R of IS 1921:2025 Drying Oven — suitable for use at up to 120 °C ± 3 °C, Solder Bath, Hotplate, Humidity Chamber, Insulation-Resistance Meter, Coaxial Cable, Spatula or Squeegee, Tongs or other Proper Jigs, Soft Brush, Scalpel, Analytical Balance, Soldering Iron Propan-2-ol, Cleaning Solvent, Flux Cored Solder for Wiring Low Profile Container, Insulated Wire or Cable, Connector, Test Coupon, Wave Solder System, Static Bath, High-Resistance Measurement System, Resistor Verification Coupon, Test Coupon Fixing Device, Soxhlet Extraction Apparatus, Camera, Backlight Panel
12	Flux Extraction Procedure and Determination of Mass Of Flux For Flux Cored Solder Wire Table 5	As specified in Annexure-A of IS 1921:2025 Reagent- Acetone [reagent (lab) grade], Propan-2-ol [reagent (lab) grade] Laboratory balance — with an accuracy of 0.001 g, Scalpel, Soxhlet extraction apparatus, Drying oven — suitable for use at (100 ± 5) °C
13	Flux Solids Content/Non-Volatile Matter Content Test Table 5	As specified in Annexure-L of IS 1921:2025 A Circulating Air Drying Oven — capable of maintaining (50 ± 5) °C to 85 ± 5 °C, Analytical Balance — capable of weighing 0.001 g, Glass Pipettes, Glass Petri Dishes, Silica Gel Desiccant, or Equivalent.

Note: The above is an indicative list for the purpose of guidance only

ANNEX- C SCHEME OF INSPECTION AND TESTING

1. QUALITY ASSURANCE PLAN

1.1 It is expected that manufacturers (licensees/applicants) will implement a Quality Assurance Plan i.e. a plan of regular testing and in-process controls, designed to ensure that the product bearing the Standard Mark conforms to all requirements of the Indian Standard.

1.2 The manufacturers shall define a Quality Assurance Plan defining the control unit (i.e. lot/batch etc.) and the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and submit the same to BIS Branch Office for information. The manufacturer shall comply with the same and maintain test records in accordance with para 2.4.

1.3 RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT:

1.3.1 For the guidance of manufacturers, the recommended definition of control unit is: All quantity of Solid and flux cored solder wire of the same solder alloy designation, flux type & composition (core material), and size manufactured from the same raw materials under similar conditions in a day shall be taken as one control unit.

1.3.2 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in **Table 1**.

1.3.3 The manufacturer shall ensure inspection and testing as per the Quality Assurance Plan submitted by them on the whole production of the factory which is covered by this plan. Alternatively, the manufacturer has the option of adherence to the quality plan as per levels of control recommended in column 3 of Table 1.

1.4 However, all manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard.

2. ENSURING COMPLIANCE THROUGH TESTING- It is expected that manufacturers (licensees/applicants) will establish a suitably equipped and staffed in house laboratory (In house testing facility) for testing at least those parameters of the Indian Standard which require routine testing for ensuring quality of the product. This includes in-process controls as may be defined and put in place by the manufacturer and testing parameters/requirements which can only be performed in the factory.

2.1 For the guidance of manufacturers, Table 1 giving the recommended levels of control is given below. Column 2 of Table 1 indicates routine tests where test equipment is required in house as “R” or other tests which can be subcontracted as “S”. Subcontracting is permitted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.2 For MSME manufacturers, the requirement of maintaining a laboratory/in-house testing facility for routine tests (indicated as “R” in Column 2 of Table 1) is also optional.

2.2.1 MSME manufacturers may utilize common cluster based facilities as per guidelines for the utilization of cluster based test facilities by MSMEs or the provisions of Sharing of testing facilities or get testing done

from BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.3 Large Scale manufacturers shall maintain an in-house laboratory equipped at least with test facilities for routine tests (indicated as “R” in Column 2 of Table 1), where different tests given in the specification shall be carried out in accordance with the method given in the specification. They shall also implement a calibration plan for the in-house test equipment.

2.3.1 Alternatively, in lieu of an in-house laboratory, large scale manufacturers can also utilize the provisions of Sharing of testing facilities as per the Guidelines for Grant of Licence available on BIS website www.bis.gov.in. (Under Conformity Assessment>Product Certification Process). Even for subcontracted tests, provisions for sharing of testing facilities can be utilized.

2.4 TEST RECORDS- The manufacturers maintaining an in-house laboratory or utilizing common cluster based facilities or shared test facilities shall maintain test records for the tests carried out to establish conformity. For the tests being subcontracted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025, test reports issued by the laboratories shall be available for inspection by BIS.

3. PACKING AND MARKING - The Standard Mark as given in the Schedule of the license and Licence Number (i.e. CM/L...) shall be suitably incorporated on each Package, coil or reel of solid and flux cored solder wire and on the test certificate issued along with each consignment, provided always that the product thus marked and packed conforms to all the requirement of the specification.

3.1 Packing and Marking shall be done as per the Indian Standard.

3.2 Additional Marking requirements: The material shall also be marked with the following additional requirement on each Package, coil or reel:

- a) “For BIS certification details please visit www.bis.gov.in”
- b) Any other requirement not specified in the Indian Standard

5. REJECTION - All the production which conforms to the Indian Standard and covered under the scope of this licence shall be marked with the Standard Mark. Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

TABLE 1
(ONLY FOR GUIDANCE PURPOSE)

(1)				(2)	(3)		(4)
TEST DETAILS					LEVELS OF CONTROL		REMARKS
Clause	Requirements	Test Method		Test equipment requirement R: required (or) S:Sub-contracting permitted	No. of Samples	Frequency	
		Clause	Reference				
6.2	Chemical Composition of Solder Alloy		Relevant parts of IS 998 or any other established instrumental/wet chemical methods as agreed between the purchaser and the supplier	R	One	Each control unit	--
7	Flux						
(i)	Flux Percentage or Flux Content	7.3 and Annex-G	IS 1921:2025	R	One	Each control unit	—
(ii)	Acid Value	7.4 and Annex-D	IS 1921:2025	R	One	Each control unit	—
(iii)	Flux Residue Dryness/Tackiness	7.5 and Annex-H	IS 1921:2025	R	One	Each control unit	—
(iv)	Spread Test (Optional)	7.6 and Annexure-J	IS 1921:2025	As per agreement between purchaser and supplier.			
(v)	Halogen Content Test (optional)	7.7 and Annex-K	IS 1921:2025	As per agreement between purchaser and supplier.			

Table 7	Flux Activity						
(i)	Copper Mirror Test	Annex-M	IS 1921:2025	R	One	Each control unit	—
(ii)	Corrosion(Copper Plate Corrosion Test)	Annex-N	IS 1921:2025	R	One	Each control unit	—
(iii)	Halide Content Test	Annex- K & P	IS 1921:2025	R	One	Each control unit	—
(iv)	Surface insulation resistance (SIR)	Annex- Q & R	IS 1921:2025	R	One	Each control unit	—
(v)	Electrochemical Migration (ECM)- Optional test	Annex- Q & R	IS 1921:2025	As per agreement between purchaser and supplier.			
7.1	General Characteristics of Flux of Flux Cored Solder Wire	7.1.2	IS 1921:2025	R	Manufacturers shall maintain adequate inspection/in process controls to ensure conformity to the requirements		—
8	Dimensions and tolerances	8 and Annexure-F	IS 1921:2025	R	Firm to have adequate in process controls to check compliance of this parameter as per the tolerances given in the Indian Standard. However, appropriate records shall be maintained by the manufacturer for evidence of conformity		—