www.bis.gov.in

उत्पाद मैन्युअल
प्रशीतन और वातानुकूलन प्रयोजनों के लिए पिटवाँ तांबे की नलिकाएँ – विशिष्टि
IS 10773: 2025 के अनुसार

Product Manual for
Wrought Copper Tubes for Refrigeration and Air-Conditioning Purposes
According to IS 10773: 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 10773:2025
	शीर्षक **Title**	:	Wrought Copper Tubes for Refrigeration and Air-Conditioning Purposes
	संशोधनों की संख्या **No. of amendments**	:	0
2.	**नमूना दिशानिर्देश** **Sampling Guidelines**		
a)	**कच्चा माल** **Raw material**	:	No specific requirement. **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** **Sample Quantity**	:	For chemical test: 5 pcs of 5 cm length

			For tensile properties, flattening test, drift expansion test, Microscopic Examination, Hydrogen Embrittlement Test, Residue Test: 2.5m length The requirements of Non-Destructive Tests i.e. Eddy Current Test, Hydrostatic Test and Pneumatic Test shall be carried out on full length of tubes during factory testing only. Also, the requirements of Dimensions and Tolerances shall also be carried out in the factory only. **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**	:	Grade, Type of Tube (Smooth, Inner Groove/Fin), Condition, Size 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. **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 10773: 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 10773: 2025 with the following scope:		
7.	**उत्पाद का नाम Name of the product**		Wrought Copper Tubes for Refrigeration and Air-Conditioning Purposes
	Grade		Cu-OF, Cu-DLP, Cu-DHP
	Type of Tube		Smooth Tubes, Inner Groove/Fin Tubes
	Condition		Soft annealed, Light annealed, Light drawn, Hard drawn

	Size	**For smooth tubes:** Outside Diameter from …xx…mm to up to and including ….xx… mm, Wall Thickness from ….xx…mm to up to and including ….xx… mm **For Inner Groove/Fin Tubes:** Outside Diameter from …xx…mm to up to and including ….xx… mm, Bottom wall Thickness from ….xx…mm to up to and including ….xx… mm Groove/fin height…. Number of grooves/fins….. Shape of fin……

BUREAU OF INDIAN STANDARDS
Manak Bhawan, 9, Bahadur Shah Zafar Marg,
New Delhi – 110002

ANNEX-A
TO PRODUCT MANUAL FOR
Wrought Copper Tubes for Refrigeration and Air-Conditioning Purposes According to IS 10773:2025

GROUPING GUIDELINES

1) This standard covers the requirements of solid drawn (seamless) copper tubes (including inner groove/fin tubes) in straight length or coil form for air-conditioning and refrigeration purposes. This standard covers 3 grades of copper tubes namely Cu-OF, Cu-DLP, Cu-DHP.

2) Further, these tubes shall be supplied either in the soft annealed, light annealed, light drawn and hard drawn condition.

3) In view of above, it is proposed to have the following grouping guidelines for the purpose of GoL/CSoL:-

a) For smooth tubes:

Samples, covering combination of lowest and highest Outside Diameter (OD) and wall thickness of smooth tubes, from the sizes intended to be covered in the licence, shall be drawn and tested to cover all Tube sizes.

b) For Inner Groove Tubes:

Samples, covering combination of lowest and highest Outside Diameter (OD) and bottom wall thickness of inner groove tubes (irrespective of groove/fin height, shape, or number of grooves/fins), from the sizes intended to be covered in the licence, shall be drawn and tested to cover all Tube sizes. Separate samples for each variation in groove/fin height, shape and number of grooves/fins intended to be covered in the licence are not required to be drawn.

c) The samples of different sizes drawn above shall be drawn in such combination so that samples of all conditions (Soft Annealed, Light Annealed, Light Drawn & Hard Drawn), intended to be covered in the licence, are tested.

d) In addition to a), b) & c) Separate Samples for each Grade (Cu-OF, Cu-DLP, Cu-DHP) are also required to be drawn and tested.

4) Scope of licence shall be restricted based on the manufacturing and testing facilities available.

5) During operation of licence, samples of each variety covered in the scope of licence, shall be tested in rotation, to the extent possible

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.	Test Equipment/Chemicals and Identification Numbers (Where applicable)	Tests Used in with Clause Reference
1	Spectrometer, Analytical Balance (0-200gm, LC- 0.1mg), Hot Plate, Hot Air Oven, Photometer (Absorption cell), Porcelain/Silica Crucible, Platinum Crucible, Thermometer, Filter Paper including ashless filter paper pad, Stainless steel/nickel beaker, Plastic/polyethene/SS Beaker, Pyrex beakers and other glassware	Chemical Composition, Cl.5
2	Platinum Electrodes, Plain or Perforated Sheet, Wire Gauze, Sulphuric Acid-Nitric Acid Mixture, Urea – solid, Ethanol or Methanol , Ferric Nitrate Solution, Concentrated Ammonium Hydroxide, Ammonium Sulphate Solution, Dilute Sulphuric Acid, Concentrated Nitric Acid, General Glasswares, Burner, Electrolysis Assembly, Filter Papers	Copper by the Electrolytic Method
3	All glass distillation apparatus, Concentrated Nitric Acid, Concentrated Hydrochloric Acid, Ferric Nitrate Solution, Concentrated Ammonium Hydroxide, Dilute Ammonium Hydroxide, Dilute Sulphuric Acid, Carbon Dioxide – gas, Hypophosphorus Acid, Sodium Sulphite, Sodium Hydroxide Solution, Methyl Red Indicator Solution, Dilute Hydrochloric Acid, Sodium Bicarbonate, Starch Solution, Potassium Iodide Solution, Standard Iodine Solution, Tartaric Acid Solution, Hot Plate, Filter Paper	Arsenic and Antimony by the Co-Precipitation (Iodimetric Method)
4	Dilute Sulphuric Acid, Concentrated Nitric Acid, Concentrated Hydrochloric Acid, Sodium Hypophosphite, Dilute Hydrochloric Acid, Ammonium Chloride Solution, Standard Iodine Solution, Sodium Carbonate, Starch Solution, Standard Sodium Arsenite Solution-001 N, Analytical Balance, All glass distillation apparatus, Hot Plate, Paper-pulp Pad	Arsenic by the Hypophosphite (Alternate Method) (Applicable in absence of Se and Te)
5	Concentrated Nitric Acid, Ferrous Ammonium Sulphate, Concentrated Ammonium Hydroxide, Ammonium Carbonate Solution, Dilute Ammonium Hydroxide, Dilute Sulphuric Acid, Potassium Iodide Solution, Sodium Hypophosphite Solution, Phosphoric Acid, Standard Bismuth Solution, Analytical Balance, All glass distillation apparatus, Hot Plate, Filter Paper	Bismuth by the Iodide (Photometric Method)

6	Dilute Nitric Acid, Concentrated Nitric Acid, Perchloric Acid, Hydrobromic Acid, Concentrated Ammonium Hydroxide, Ammonium Chloride Solution, Dilute Hydrochloric Acid, Starmous Chloride Solution, Mercuric Chloride Solution, Sulphuric Acid- Phosphoric Acid Mixture, odium Diphenylumine Sulphonate Indicator Solution, Standard Potassium Bichromate Solution, Ammonium Thiocyanate Solution, Standard Iron Solution, Analytical Balance, All glass distillation apparatus, Hot Plate, Filter Paper	Iron (by the Dichromate (Volumetric) Method)
7	Dilute Nitric Acid, Concentrated Nitric Acid, Perchloric Acid, Hydrobromic Acid, Concentrated Ammonium Hydroxide, Ammonium Chloride Solution, Dilute Hydrochloric Acid, Starmous Chloride Solution, Mercuric Chloride Solution, Sulphuric Acid- Phosphoric Acid Mixture, odium Diphenylamine Sulphonate Indicator Solution, Standnrd Potassium Bichromate Solution, Ammonium Thiocyanate Solution, Standard Iron Solution, Analytical Balance, All glass distillation apparatus, Hot Plate, Filter Paper, Cover Glass, Spectrophotometer	Iron (by the Ammonium Thiocyanate (Photometric) Method)
8	Platinum Electrodes, Plain or Perforated Sheet, Wire Gauze, Dilute Nitric Acid, Hydrogen Peroxide Solution, Acidified Hydrogen Sulphide Solution, Ammonium Acetate Solution, Sucrose Solution, Standard Lead Acetate Solution, Analytical Balance, Hot Plate, Electrolysis Assembly, Titration Assembly	Lead by Colorimetric Method
9	Concentrated sulphuric acid, concentrated nitric acid, Tartatic Acid Solution, Concentrated Ammonium Hydroxide, Dimethylglyoxime Solution, Analytical Balance, Hot Plate, General Glasswares	Nickel by the dimethylglyoxime (gravimetric) method
10	Concentrated Nitric Acid, Ferric Nitrate Solution, Concentrated Hydrochloric Acid, Concentrated Ammonium Hydroxide, Dilute Ammonium Hydroxide, Dilute Hydrochloric Acid, Sulphur Dioxide Solution, Rectified Spirit, Analytical Balance, Hot Plate, General Glasswares, Filter Papers, Drying Oven	Selenium by the gravimetric method
11	Tartaric Acid, Concentrated Ammonium Hydroxide, Sulphur Dioxide Solution, Hydrarine Hydrochloride Solution, Rectified Spirit, Carbon Dioxide, Analytical Balance,Hot Plate, General Glasswares, Sintered Glass Crucible, Drying Oven	Determination of tellurium by the gravimetric method
12	Concentrated Hydrochloric Acid, Dilute Nitric Acid, Ferric Nitrate Solution, Concentrated Ammonium Hydroxide, Ammonium Chloride Solution, Dilute Hydrochloric Acid, Antimony Chloride Solution, Test Lead, a roll of nickel sheet , Carbon Dioxide – gas, Potassium Iodide Solution, Starch Solution,	Determination of tin by theiodimetric method

	Standard Potassium Iodate Solution, General Glasswares, Analytical Balance, Hot Plate, Filter Paper	
13	Concentrated Nitric Acid, Potassium Permanganate Solution, Ammonium Nitrite Solution, Ammonium Nitrate, Ammonium Molybdate Solution, Potassium Nitrate Wash Solution, Phenolphthalein I n d i c a t o r S o l u t i o n, Sodium Hydroxide Solution, Standard Hydrochloric Acid Solution, Analytical Balance, Erlynmeyer flask, Other General Glass Wares, Hot Plate, Filter Paper, Titration Assembly	Determination of phosphorus by alkalimetric method
14	Universal Tensile Testing Machine with extensometer	Tensile Properties, Cl. 8.1
15	Flattening Test Machine, Vernier Caliper, Filing or Chamfering Equipment	Flattening Test, Cl.8.2
16	Variable Speed Pressure UTM, Conical Mandrels with angles 30 degree, 45 degree, 60 degree etc	Drift Expanding Test, Cl. 8.3
17	Eddy Current Tester with all assemblies	Eddy Current Test, Cl. 10.1
18	Hydrostatic Test Equipment, Pressure Gauge	Hydrostatic Test, Cl. 10.2
19	Pneumatic Test Equipment, Pressure Gauge	Pneumatic Test, Cl. 10.3
20	Metallurgical Microscope (Magnification-100X), Sample Polishing Machines, Etchant	Microscopic Examination, Cl. 10.4
21	Oven/Furnace capable of achieving temperatures of the range 900 deg Celsius and creating an atmosphere of Hydrogen, Sample Preparation Facilities, Water Bath for Quenching, Metallurgical Microscope (200x), Etchant, Sample Polishing Machine	Hydrogen Embrittlement Test, Cl. 10.5
22	Carbon Tertrachloride or any other suitable solvent, Flask, Aspirator or Vacuum Pump, Weighed Container (crucible, evaporating dish or beaker), Hot Plate or Sand Bath, Drying Oven (100-110ºC), Dessicator, Analytical Balance	Residue Test or Cleanliness Test, Cl. 11
23	Micrometer, Vernier Caliper, Steel Tape, Straight Edge, Cord, Flat Table	Dimensions and Tolerances, Cl. 9

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 during operation of BIS licence, manufacturers will implement a Quality Assurance Plan (QAP) 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 (QAP) defining the control unit (i.e. lot/batch etc.), the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and declare the arrangement for testing i.e. whether in-house or subcontracting/sharing for each applicable test and submit the same to BIS Branch Office for information. The manufacturer shall comply with the QAP and maintain test records in accordance with para 2.1.

1.3 RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT:

1.3.1 For the guidance of manufacturers, the recommended definition of control unit is: For the purpose of this scheme, all copper tubes of the same type (smooth, inner groove/fin), size, condition, grade and manufactured from the same cast of raw material on the same line in one go shall constitute a 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. Manufacturer has the discretion of declaring their own levels of control or accept the levels of control given in this document.

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.

2. ENSURING COMPLIANCE THROUGH TESTING- manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard for which they may have in-house test facilities. However, there is no obligation to maintain in-house laboratory. Licensee may use alternative arrangements for tests of the production as per the declared QAP. Various alternatives are available for operation of BIS certification as given below and the relevant guidelines for availing such relaxations by the manufacturers, as amended from time to time, are to be referred:

i) Shared testing resources like common facility,
ii) Cluster based testing facility,
iii) Sub-contracting to outside laboratories which may either be:
    a) BIS recognised/empanelled laboratories, or
    b) Any accredited laboratory as per ISO/IEC 17025

2.1 TEST RECORDS- The manufacturers shall maintain test records for the tests carried out (either in-house or at a sub-contracted or at shared test facility) to establish conformity of the product to the Standard for operation of licence. For the tests being subcontracted or

conducted at a shared test facility, test results issued by the laboratories or test facilities, shall be made 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 incorporated legibly and indelibly on each box/package containing the tubes and on the test certificate accompanied along with each consignment provided always that the material so marked conforms to each requirement of the specification.

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

3.2 Additional Marking requirements: Additionally, the following shall also be marked on each box/package of the material:

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

4. TEST CERTIFICATE – For each consignment of BIS Certified material conforming to IS 10773:2025 there shall be a test certificate which shall contain the Standard Mark, the cast/Control Unit number and the corresponding test results (as given in Annexure-I enclosed).

5. REJECTION - 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

(Recommended Levels of Control by BIS- For Guidance Only)

(1)				(3)		(4)
TEST DETAILS				**LEVELS OF CONTROL**		**REMARKS**
Clause	**Requirements**	**Test Method**		**No. of Samples**	**Frequency**	
		Clause	**Reference**			
6	Manufacture	6.1 to 6.4	IS 10773	Manufacture shall exercise adequate in-process controls to ensure that the tubes are manufactured in accordance with the provisions of the specification		
7	Freedom from defects	7	IS 10773	Manufacturer shall exercise adequate in-process controls to ensure that the material remains free from harmful defects.		
9	Dimensions and Tolerance	9.1 to 9.4 Table 3, 4,5,6,7 & 8	IS 10773	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		
5	Chemical Composition	5.1, 5.2 Table 1	IS 10773 IS 440 or any other established instrumental/chemical method	One	Each Heat/Cast	In case the material procured from outside for manufacture of tubes is ISI marked and is received with test certificate, no further testing is required
8	**Mechanical Properties**					
8.1	Tensile Test	Table 2	IS 10773 IS 1608 (Part 1)	One	Each Control Unit	—
8.2	Flattening Test	8.2.1, 8.2.2	IS 10773 IS 2328	One	Each Control Unit	—
8.3	Drift Expanding Test	8.3.1 8.3.2	IS 10773 IS 2335	One	Each Control Unit	—
10	**Non-Destructive Test**					
10.1	Eddy Current Test	10.1 10.1.1	IS 10773 IS 11612	Each Tube	Each Tube	—

10.2	Hydrostatic Test	10.2	IS 10773	One	Each Control Unit	__
10.3	Pneumatic Test	10.3	IS 10773	One	Each Control Unit	__
10.4	Microscopic Examination	10.4	IS 10773 IS 18829	One	Each Control Unit	__
10.5	Hydrogen Embrittlement Test	10.5	IS 10773 IS 6243	One	Once in 6 months	This test is only applicable to Cu-OF grade tubes
11	Residue Test or Cleanliness Test	11.1 to 11.3	IS 10773	One	Once in 3 months	__

ISI Mark With IS No. and CM/L no.

Annexure-I
(Para 4 of the Scheme of Inspection and Testing)
XYZ COMPANY
(Registered office Address and works address)

Test Certificate for Wrought Copper Tubes for Refrigeration and Air-Conditioning Purposes According to IS 10773:2025

TEST CERTIFICATE NO._____

To M/s_____ Dated_____

We certified that the material described below fully conforms to IS 10773:2025. Chemical composition and Mechanical properties of the product as tested in accordance with the Scheme of Inspection and Testing contained in the BIS Certification Marks LicenceNo.CM/L_____are as indicated below against each order No.

(PLEASE REFER TO IS 10773:2025 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. & Date	Grade & Condition	Size & Tolerances	Control Unit No.	Qty. (in tonnes)	**Chemical Composition (in %)**									**Mechanical Properties**				**Non-Destructive Test**						**Remark**
					Cu	Sn	Pb	Fe	As	Al	Ni	Zn	P	Tensile Strength	Elongation (%)	Flattening Test	Drift Expanding Test	Eddy-Current Test	Hydrostatic Test	Pneumatic Test	Microscopic Examination	Hydrogen embrittlement	Residue Test	

Remarks
Wagon No.
Truck No.

FOR XYZ COMPANY

(It is suggested that size A4 paper be used for this test Certificate)