



उत्पाद मानुयल

वायुयानों में ग्राउंड ईंधन भरने तथा ईंधन निकालने वाले रबड़ होज तथा होज समुच्चय - विशिष्ट

IS 5797: 2022/ ISO 1825: 2017 के अनुसार

**PRODUCT MANUAL FOR
RUBBER HOSES AND HOSE ASSEMBLIES FOR AIRCRAFT GROUND FUELLING AND
DEFUELLING — SPECIFICATION ACCORDING TO IS 5797: 2022/ ISO 1825: 2017**

भारतीय मानक ब्यूरो) अनुरूपता मूल्यांकन (विनियम 2018 की स्कीम-I के तहत यह उत्पाद मानुयल प्रमाणीकरणके प्रचलन में रीति और पारदर्शिता के सुसंगत सुनिश्चित करने के लिए सभी क्षेत्रीय/शाखा कार्यालयों एवं लाइसेन्स धारियों द्वारा संदर्भ सामग्री के रूप में उपयोग किया जाएगा। बीआईएस लाइसेन्स/प्रमाण पत्र प्राप्त करने के इच्छुक भावी आवेदकों द्वारा भी इस दस्तावेज़ का उपयोग किया जा सकता है।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence 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 license/certificate.

1	उत्पाद Product	:	IS 5797: 2022/ ISO 1825: 2017
	शीर्षक Title	:	Rubber Hoses and Hose Assemblies for Aircraft Ground Fuelling and Defuelling — Specification
	संशोधन संख्या No. of Amendments	:	Nil
2	नमूनाकरण दिशा निर्देश Sampling Guidelines:		
a)	कच्चा माल Raw material	:	Manufacturer to submit declaration/undertaking in compliance to Clause 6 of IS 5797: 2022/ISO 1825:2017
b)	समूहिकरण दिशा निर्देश Grouping guidelines	:	कृपया Annex-A देखें Please refer ANNEX-A
c)	नमूने का परिमाण Sample Size	:	5 metres
3	परीक्षण उपकरणों की सूची List of Test Equipment	:	कृपया Annex-B देखें Please refer ANNEX-B
4	निरीक्षण व परीक्षण स्कीम Scheme of Inspection and Testing	:	कृपया Annex-C देखें Please refer ANNEX-C
5	एक दिन में संभावित परीक्षण Possible tests in a day :	:	i) Material and construction: Hoses and Hose assemblies ii) Internal diameter iii) Thickness iv) Concentricity

		v) Length vi) Mass per unit length of hose vii) Tensile strength viii) Elongation at break ix) Hose Dimensions (Internal diameter, Lining thickness, Cover thickness, Mass per unit length) x) Flexibility at ambient temperature xi) Flammability xii) Change in length at working pressure xiii) Proof pressure xiv) Burst pressure
6	लाइसेंस का कार्यक्षेत्र / Scope of the Licence:	
	IS 5797: 2022/ ISO 1825: 2017 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 5797: 2022/ ISO 1825: 2017 with the following scope:	
	उत्पाद का नाम Name of the product	Rubber Hoses and Hose Assemblies for Aircraft Ground Fuelling and Defuelling
	Type and Grade	i) Type B and Grade M; and/or ii) Type C and Grade Ω ; and/or iii) Type E and Grade M; and/or iv) Type F and Grade Ω
	Nominal Internal Diameter(s)	... mm up to and including ... mm (to be indicated for each type) <i>(as per provisions of Table 1 of IS 5797: 2022/ISO 1825:2017)</i>

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

ANNEX-A
GROUPING GUIDELINES

**FOR RUBBER HOSES AND HOSE ASSEMBLIES FOR AIRCRAFT GROUND FUELLING
AND DEFUELLING — SPECIFICATION ACCORDING TO IS 5797: 2022/ ISO 1825: 2017**

1. The manufacturer shall declare the Type and Grade (as per Clause 4 of IS 5797: 2022/ ISO 1825: 2017), in their application for considering grant of licence and/or change in scope of licence, which they intend to cover in the scope of the licence.
2. Following grouping guidelines shall apply for Grant of Licence (GoL) / Change in Scope of Licence (CSoL):
For considering grant of licence/inclusion, sample of each type and grade (as per Clause 4 of IS 5797: 2022/ ISO 1825: 2017) and any Nominal Internal Diameter (as per table 1 of IS 5797: 2022/ ISO 1825: 2017) may be tested to cover all the hoses being manufactured, subject to availability of testing and manufacturing facilities.
3. It shall be ensured that the firm is having all the necessary manufacturing and testing facilities for the type and grade and nominal diameter(s) to be included in the licence.
4. During the operation of licence, BO shall ensure that all the type, grade and nominal diameter(s) covered in the Licence are tested in rotation, to the extent possible.

ANNEX – B
LIST OF TEST EQUIPMENT

**FOR RUBBER HOSES AND HOSE ASSEMBLIES FOR AIRCRAFT GROUND FUELLING
AND DEFUELLING — SPECIFICATION ACCORDING TO IS 5797: 2022/ ISO 1825 : 2017**

Major test equipment required to test as per the Indian Standard

Sl. No	Tests used in with Clause Reference	Test Equipment
1	Hose assemblies, Cl. 6.2	Insulation resistance measuring instrument having a nominal open-circuit voltage of 500 V d.c., Ohmmeter with a capacity of $10^{12} \Omega/10^{10} \Omega$ and sufficiently accurate to determine the resistance to within $\pm 10\%$, 4.5 V battery, 4 V(0.3 A) test lamp, conductive silver lacquer or colloidal graphite or conductive liquid(consisting of anhydrous polyethylene glycol, water, wetting agent and potassium chloride), Outer electrode: a copper sheet-metal band of standard width 25 mm clamped around the outer hose wall, inner electrode, conditioning chamber,
7	Tensile strength, Cl. 8.1, Table 4	Dies and cutters, Thickness gauge, Cone gauge, Tensile Testing Machine, Test rig for ring test pieces
8	Elongation at break, Cl. 8.1, Table 4	Dies and cutters, Thickness gauge, Cone gauge, Tensile Testing Machine, Test rig for ring test pieces
9	Change in volume (swelling) in fuel, Cl. 8.1, Table 4	Method A – Glass vessel of flange type with glass lid, having a ground surface where it seals to the vessel flange and clamped by suitable means OR Method B – Glass vessel with stopper or lid OR Method C – Glass vessel with reflux condenser. OR Method D – Pressure vessel with hermetically closed lid, OR Method E – Apparatus for testing one surface only which holds the test piece in contact with the liquid(as per Fig 2 of ISO 1817:2022
10	Fuel-soluble matter Cl. 8.1, Table 4	Equipment for cutting the hose, Glass flask, hemispherical glass dish, water bath, air oven, analytical balance, liquid B as specified in ISO 1817:2015
11	Cold embrittlement Cl. 8.1, Table 4	Apparatus as per Figure B.1 of IS 5797:2022, Dewar vessel, coolant
12	Abrasion resistance Cl. 8.1, Table 4	Abrasion Machine, Abrasive sheet, Hollow drill, Balance(LC ± 1 mg.), Standard reference compounds
13	Ageing a) Tensile strength change b) Elongation at break change Cl. 8.1, Table 4	<u>Apparatus as per ISO 188</u> Ageing Oven equipped with Flow meter and Digital temperature controller <u>Apparatus as per ISO 37</u>

		Dies and cutters, Thickness gauge, Cone gauge, Tensile Testing Machine, Test rig for ring test pieces
14	Internal diameter, Cl. 7.1 and Cl. 8.2, Table 5	Vernier Calipers, Internal Diameter Gauge, Micrometer
15	Thickness and Lining thickness, Cl. 7.2 and Cl. 8.2, Table 5	Vernier Slide Calipers, Micrometer or dial gauge or optical magnifier, optical magnifying glass
16	Cover thickness, Cl. 8.2, Table 5	Vernier Slide Calipers, Micrometer or dial gauge or optical magnifier, optical magnifying glass
17	Concentricity, Cl. 7.3 and Cl. 8.2, Table 5	Mandrel, dial indicator gauge or micrometer with a rounded anvil or Vernier slid calipers, thickness caliper dial gauge
18	Length tolerances, Cl. 8.2, Table 5	Vernier Slide Calipers, Micrometer or dial gauge or optical magnifier, optical magnifying glass
19	Adhesion between components (dry), Cl. 8.2, Table 5	Equipment for cutting the hose, Air oven, Liquid B as specified in ISO 1817:2015
20	Fuel contamination, Cl. 8.2, Table 5	Glass plug, Liquid B as specified in ISO 1817:2015, Air oven
21	Fuel discolouration, Cl. 8.2, Table 5	Glass plug, Liquid B as specified in ISO 1817:2015, Air oven
22	Ozone resistance, Cl. 8.2, Table 5	Ozone cabinet with apparatus for generating ozone, monitoring and controlling the ozone concentration, Test piece holder(as shown in Figure 1 of ISO 7236), Test piece holder(as shown in Figure 2 of ISO 7236)
23	Flexibility at ambient and low temperature, Cl. 8.2, Table 5	Test Drum, aviation kerosene, cold chamber
24	Crush recovery (type F only) a) After 1 min b) After 10 min Cl. 8.2, Table 5	Compression-testing machine, Two metal plates each 80 mm wide, Tensile-testing machine, Compression cage, Conditioning chamber, Micrometer/Thickness gauge
25	Cyclic kinking (types B and C only), Cl. 8.2, Table 5	Liquid B as specified in ISO 1817:2015, Conditioning chamber, Equipment for cutting the hose
26	Flammability, Cl. 8.2, Table 5	Liquid F as specified in ISO 1817:2015, Bunsen burner, apparatus as specified in Fig. I.1 of IS 5797:2022
27	Change in length at working pressure, Cl. 8.2, Table 5	kerosene or clean water, pressure bar
28	Proof pressure, Cl. 8.2, Table 5	kerosene or clean water, pressure bar
29	Burst pressure, Cl. 8.2, Table 5	kerosene or clean water, pressure bar

30	Vacuum test, Cl. 8.2, Table 5	Calliper gauge, metal ball of a diameter as specified in Table K.1
31	Electrical properties Cl. 8.2, Table 5	two low-resistance electrical bonding wires, reinforcement plies, 4.5 V battery and a 3.5V, 0.3A test bulb

This is an indicative list and may not be taken as being exhaustive

ANNEX C
SCHEME OF INSPECTION AND TESTING
**FOR RUBBER HOSES AND HOSE ASSEMBLIES FOR AIRCRAFT GROUND FUELLING
AND DEFUELLING — SPECIFICATION ACCORDING TO IS 5797: 2022/ ISO 1825 : 2017**

- 1. LABORATORY** - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.
 - 1.1** The manufacturer shall prepare and implement a calibration plan for the test equipments.
- 2. TEST RECORDS** – The manufacturer shall maintain test records for the tests carried out to establish conformity.
- 3. PACKING AND MARKING** – The Standard Mark, as given in the Schedule of the licence, shall be printed on the container or the label applied to it, provided always that the product so marked conform to requirements of the specification.
 - 3.1 Marking** - The information as mentioned under clause 11.1 of IS 5797: 2022, shall be legibly and indelibly marked on each hose. The couplings of hose assemblies shall be legibly and indelibly marked with the information as mentioned under clause 11.2 of IS 5797: 2022. In addition, the following shall be incorporated on each hose:
 - (i) BIS Licence No. CM/L --.
 - (ii) BIS website details i.e. — "For details of BIS certification please visit www.bis.gov.in".
- 4. CONTROL UNIT** – For the purpose of this scheme, all the rubber hoses manufactured from a rubber compound masticated and vulcanized at a time shall constitute a control unit
 - 4.1** The batch shall be considered fit for the purpose of marking if sample taken from control unit and tested as in Table 1 is found to conform to the relevant requirements of the specification.
 - 4.2** In case the sample fails to conform to any of the requirements as laid down in the specification, the entire material in the batch shall be considered as unfit for the application of the Certification Mark of the Bureau. The batch could, however, be reprocessed and then retested for compliance with the specification.
- 5. TEST CERTIFICATE/TEST REPORT** - For each consignment of BIS Certified material conforming to IS 5797:2022 there shall be a test certificate/test report which shall contain the information and the corresponding test results (as per provisions of clause 12 of IS 5797:2022)
- 6. LEVELS OF CONTROL** - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.
 - 6.1** All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark.
- 7. REJECTIONS** – 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 (LEVELS OF CONTROL)
(Para 5 of Scheme of Inspection and Testing)

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or)S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause Reference	IS				
Material and construction							
6.1	Hoses	6.1	IS 5797: 2022/ ISO 1825: 2017	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.		
6.2	Hose assemblies	9	IS 5797 : 2022/ ISO 1825: 2017	R	-do-		
Dimensions and tolerances							
7.1	Internal diameters	---	ISO 4671	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.		
7.2	Thickness	---	ISO 4671	R	-do-		
7.3	Concentricity	---	ISO 4671	R	-do-		

7.4	Length	7.4	IS 5797: 2022/ ISO 1825: 2017	R	-do-		
7.5	Mass per unit length of hose	7.5	IS 5797: 2022/ ISO 1825: 2017	R	-do-		
Physical Properties (Finished hoses and hose assemblies)							
Hose Dimensions							
Cl. 8.2, Table 5	Internal diameter	---	ISO 4671	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.		
Cl. 8.2, Table 5	Lining thickness	---	ISO 4671	R	-do-		
Cl. 8.2, Table 5	Cover thickness	---	ISO 4671	R	-do-		
Cl. 8.2, Table 5	Length tolerances	---	ISO 4671	R	-do-		
Cl. 8.2, Table 5	Mass per unit length	Table 3	IS 5797: 2022/ ISO 1825: 2017	R	-do-		
Physical Properties (Rubber compounds)							
Cl. 8.1, Table 4	Tensile strength	---	ISO 37	R	One	Once in a week	
Cl. 8.1, Table 4	Elongation at break	---	ISO 37	R	One	Once in a week	
Cl. 8.1, Table 4	Change in volume (swelling) in fuel	8.3	ISO 1817: 2015	R	One	Once in a week	
Cl. 8.1, Table 4	Fuel-soluble matter	Annex-A	IS 5797: 2022/ ISO	R	One	Once in a week	

			1825: 2017				
Cl. 8.1, Table 4	Cold embrittlement	Annex-B	IS 5797: 2022/ ISO 1825: 2017	R	One	Once in a month	
Cl. 8.1, Table 4	Abrasion resistance	---	ISO 4649: 2010 (method A)	R	One	Once in a month	
Cl. 8.1, Table 4	Ageing a) Tensile strength change b) Elongation at break change.	---	ISO 188 a) ISO 37 b) ISO 37	R	One	Once in a week	
Hose tests							
Cl. 8.2, Table 5	Adhesion between components (dry)	Annex-C	IS 5797: 2022/ ISO 1825: 2017	R	One	Once in a week	
Cl. 8.2, Table 5	Fuel contamination	Annex-D	IS 5797: 2022/ ISO 1825: 2017	R	One	Once in a month	
Cl. 8.2, Table 5	Fuel discoloration	Annex-D	IS 5797: 2022/ ISO 1825: 2017	R	One	Once in a month	
Cl. 8.2, Table 5	Ozone resistance	--	ISO 7326	S	One	Every 6 months	Also, at the time of change in composition/ material
Cl. 8.2, Table 5	Flexibility at ambient temperature	Annex-E	IS 5797: 2022/ ISO 1825: 2017	R	One	Every control unit	
	Flexibility at low temperature	Annex-F		S		Every 6 months	

Cl. 8.2, Table 5	Crush recovery (type F only) a) After 1 min b) After 10 min	Annex-G	IS 5797: 2022/ ISO 1825: 2017	S	One	Every 6 months	
Cl. 8.2, Table 5	Cyclic kinking (types B and C only)	Annex-H	IS 5797: 2022/ ISO 1825: 2017	S	One	Every 6 months	
Cl. 8.2, Table 5	Flammability	Annex-I	IS 5797 : 2022/ ISO 1825: 2017	R	One	Every control unit	
Cl. 8.2, Table 5	Change in length at working pressure	Annex-I	IS 5797: 2022/ ISO 1825: 2017	R	One	Every control unit	
Cl. 8.2, Table 5	Proof pressure	Annex-J	IS 5797: 2022/ ISO 1825: 2017	R	Each hose		
Cl. 8.2, Table 5	Burst pressure	Annex-J	IS 5797: 2022/ ISO 1825: 2017	R	One	Once in a month	
Cl. 8.2, Table 5	Vacuum test	Annex-K	IS 5797: 2022/ ISO 1825: 2017	S	One	Every 6 months	
Cl. 8.2, Table 5	Electrical properties	9.1 and 9.2	IS 5797: 2022/ ISO 1825: 2017	R	One	Once in a week	

Note-1: Whether test equipment is required or sub-contracting is permitted in column 2 shall be decided by the Bureau and shall be mandatory. Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empaneled by the Bureau.

Note-2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for the approval by BO Head.