



उत्पाद मैनुअल

ईंधन तेल - विशिष्टि

IS 1593:2018 के अनुसार

PRODUCT MANUAL
FOR FUEL OIL - SPECIFICATION
ACCORDING TO IS 1593:2018

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.	मानक संख्या IS No.	:	IS 1593 : 2018
	शीर्षक Title	:	ईंधन तेल-विशिष्टि Fuel Oils – Specification
	संशोधनों की संख्या No. of amendments	:	Nil
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	Composition of fuel oil in accordance with cl.4.1 to be declared by manufacturer/supplier 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 to Annex-A
c)	नमूने का परिमाण Sample Quantity	:	2 litres 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)
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 except Total Sediment test, Cl.4.4 (Thermal ageing procedure) 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:		
	“Licence is granted to use Standard Mark as per IS 1593 with the following scope:		
	Name of the product	Fuel oil	
	Varieties/Type/Grades etc.	Grade LV; Grade MV1; Grade MV2; Grade HV	
	Optional requirements	Nil	

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN,9, BAHADUR SHAH ZAFAR MARG,
NEW DELHI-110002

ANNEX-A

GROUPING GUIDELINES

1. Each viscosity grade intended to be covered in the scope of the licence is to be tested.
2. Scope of licence shall be restricted based on the manufacturing and testing facilities available.
3. 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)

Sl. No.	Tests Used In With Clause Reference	Test Equipment/Chemical
1	Cl 4.2 Pour point [IS 1448 (P10/Sec 2)]	Apparatus for pour point including Flat bottomed cylindrical jar; thermometers; cork; water tight cylindrical metal jacket, flat bottomed; disc of cork; rubber gasket; cooling baths; water bath, timing device, sodium chloride
2	Cl 4.3 Asphalt content [IS 1448 (P 22)/ ASTM D 6560 / IP 143]	Apparatus for refluxing including Ground glass joints; condenser; reflux extractor; conical flasks; stopper; evaporating vessel; filter funnel; timing device; oven, 100 to 110°C; graduated cylinders 50 ml & 100ml; stirring rods; cooling vessel; high speed non-aerated mixer; toluene; heptane; ammonium peroxydisulphate in concentrated sulphuric acid
3	Cl 4.4 Total sediments [ISO 10307 (Section 1 and 2) / ASTM D 4870]	toluene; heptane; Filtration apparatus including steam coils attached, suitably supported, above a vacuum flask; temperature measuring devices upto 200°C; stirring rods; oven, 100 to 110°C; glass beakers; watch glasses or petridishes; magnetic stirrer/hot plate; steam generator; vacuum source; vacuum gauge; glass fibre filters; high speed mixer of 400rpm; cooling vessel/desiccator; graduated syringe/wash bottle; forceps; ageing bath (oil bath); air condenser; stoppers; microburette; spatula; hexadecane distribution funnel; portable warm air blower; hexadecane(cetane);
4	Cl 4.5 Spot test [ASTM D 4740]	Chromatographic filter paper/whatman 2 paper; support for filter paper; oven; reference spot sheet; conical flask; heating bath/hot plate; temperature measuring device
5	Cl 4.6, Table 1, Sl no i) Acidity, inorganic [ASTM D974 /IP 139]	Potassium hydroxide; Toluene; propane-2-ol; burette; conical flask; analytical balance, potassium acid phthalate, phenolphthalein , p-naphtolbenzein, methyl orange indicator indicators
6	Cl 4.6, Table 1, Sl no ii) Ash [IS 1448(P 4/Sec1)]	Evaporating dish, 50ml to 150ml; muffle furnace 775 ± 25 °C; cooling vessel/dessicator; analytical balance; high speed mixer/mechanical shaker; Bunsen burner; Toluene; propane-2-ol; filter paper;
7	Cl 4.6, Table 1, Sl no iii) Carbon residue [IS 1448(P 122)/ISO	Porcelain crucible; skidmore iron crucible; spun sheet iron crucible with cover; wire-support

	10370]	triangle; circular sheet-iron hood; Insulator, consisting of a ceramic heat-resistant block, refractive ring or hollow sheet-metal box; Bunsen burner; cooling vessel/desiccator; OR Nitrogen gas; glass sample vials; dropper/rod; sample vial holder; Oven with thermocouple range of 450 °C to 550 °C; analytical balance; cooling vessel/desiccator;
8	Cl 4.6, Table 1, Sl no iv) Gross calorific value[IS 1448 (P 6)/IS 1448(P 7)]	Calorimeter bomb of capacity 325 ±25 ml; calorimeter vessel; fuel cups; Ignition system; thermometers; oxygen charging equipment; oxygen; ignition wire; firing cotton; sodium hydroxide solution; benzoic acid; cellulose adhesive tape; methyl purple indicator; methyl red solution OR Calculation method(P 7)
9	Cl 4.6, Table 1, Sl no v) Density at 15°C kg/m ³ or Relative density at 15.6/15.6°C[IS 1448(P 16)/ IS 1448(P 32)]	Hydrometer cylinders; hydrometers(as per cl.5.2); constant temperature bath; thermometer (-1 to 38°C & -20 to 102°C); stirring rod; OR Capillary-stoppered pycnometer; Graduated bicapillary pycnometer; Constant-temperature water bath; Bath thermometer; Pycnometer holder; weighing balance
10	Cl 4.6, Table 1, Sl no vi) Flash point (Pensky Martens (closed) [IS 1448(P 21)]	Flash point apparatus; Temperature measuring devices; Barometer, absolute pressure reading, accuracy of ±0.5 kPa, and with a resolution of 0.1 kPa; Heating bath or oven; glass rod
11	Cl 4.6, Table 1, Sl no vii) Kinematic viscosity[IS 1448(P 25/Sec 1)]	Chromic acid; toluene/xylene; Acetone; deionized or distilled water; Glass capillary viscometer; Certified viscosity reference standards; Viscometer holder; Temperature-controlled bath; temperature measuring device; timer;
12	Cl 4.6, Table 1, Sl no viii) Sediments[IS 1448(P 30)]	Toluene; Extraction apparatus; Extraction (Erlenmayer) flask, 1litre; Condenser; Extraction thimble; thimble basket; water cup; heater/hot plate; analytical balance; non-aerating mixer; Oven; cooling vessel/dessicator; thermometer
14	Cl 4.6, Table 1, Sl no ix) Total Sulphur[IS 1448(P 33)/ISO 8754]	High Pressure Decomposition Device; Oxygen Charging Equipment; Sample cup, platinum; Firing Wire; ignition circuit; muffle furnace; barium chloride solution; bromine water; hydrochloric acid (R D 1.18); Oxygen at 40 bar; sodium carbonate solution; liquid paraffin; cotton wicking nylon sewing thread; filter paper, ashless; OR White oil; primary standard for sulphur; Dibenzothiophene; Dibutylsulfide; Thionaphthene

		(benzothiophene); Certified reference materials; Energy-dispersive X-ray fluorescence analyser; Source of X-ray excitation, with significant X-ray flux at energies above 2,5 keV; Removable sample cup; X-ray detector; filters; signal-conditioning electronics; display/printer; analytical balance; non-aerating mixer; 100ml conical flasks;
15	Cl 4.6, Table 1, Sl no x) Water content [IS 1448(P 40)/ISO 3733]	Xylene/toluene; petroleum distillate solvent; paraffinic solvent(iso-solvent); Dean and Stark apparatus (glass or metal still, a heater, a reflux condenser, and a graduated glass trap); electric heater; magnetic stirrer;

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 the product of the same grade, manufactured from same batch of raw materials on a single day.

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/empaneled 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 licence shall be incorporated legibly and indelibly on the container transporting Fuel oil, 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 If material is supplied in tank cars, tank trucks, container ships etc. the Standard Mark as given in Schedule of the licence and Licence Number (i.e. CM/L) shall be incorporated on a test certificate to be provided along with each tank car/tank truck/container ship as per the format at Appendix-1 enclosed, provided always that the product thus marked conforms to all the requirement of the specification. Packing shall be done as per provisions of Indian Standard and the marking details as per IS 1593:2018 shall also be indicated on the test certificate.

3.3 Additional Marking requirements: The material shall also be marked with the following additional requirement on the container transporting Fuel oil:

a) “For BIS certification details please visit www.bis.gov.in”

4 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)		
Test Details				Test equipment requirement R: required (or)S:Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods Clause Reference			No. of Sample	Frequency	Remarks
4.1.1	free from grit and other foreign impurities	--	IS 1593	R	Firm to have adequate in process controls to ensure compliance to this parameter of the IS and appropriate records shall be maintained for evidence of conformity		
4.2	Pour point*	--	IS 1448 (P10/Sec 1)	S	1	Once in six months	
4.3	Asphaltene Content*	--	IS 1448 (P :22) / ASTM D 6560 / IP 143	S	1	Once in six months	
4.4	Total Sediment*	--	ISO 10307 (Section 1 and 2) / ASTM D 4870	S	1	Once in six months	
4.5	Spot Test*	--	ASTM D 4740	S	1	Once in six months	
4.6, Sl no i)	Acidity, inorganic	--	ASTM D974/IP 139	R	1	Each Control unit	
4.6, Sl no ii)	Ash, percent by mass	--	IS 1448 (P : 4)	R	1	Each Control unit	
4.6 Sl no iii)	Carbon residue, mass percent	--	IS 1448(P : 122)/ISO 10370	R	1	Each Control unit	
4.6 Sl no iv)	Gross, calorific value	--	IS 1448 (P : 6) / (P : 7)	R	1	Each Control unit	

4.6 Sl no v)	Density at 15°C kg/m ³ or Relative density at 15.6/15.6°C	--	IS 1448 (P : 16) IS 1448 (P : 32)	R	1	Each Control unit	
4.6 Sl no vi)	Flash point (Pensky Martens (closed)	--	IS 1448(P : 21)	R	1	Each Control unit	
4.6 Sl no vii)	Kinematic viscosity in centistokes at 50°C	--	IS 1448(P : 25/Sec 1)	R	1	Each Control unit	
4.6 Sl no viii)	Sediment, percent by mass	--	IS 1448(P : 30)	R	1	Each Control unit	
4.6 Sl no ix)	Sulphur, total, percent by mass	--	IS 1448 (P : 33)/ISO 8754	R	1	Each Control unit	
4.6 Sl no x)	Water content, percent by volume	--	IS 1448 (P : 40)/ISO 3733	R	1	Each Control unit	

*Requirement of these tests shall be as agreed to between the purchaser and the supplier.

Appendix-1
TEST CERTIFICATE XYZ COMPANY
(REGISTERED OFFICE ADDRESS AND WORKS ADDRESS)
TEST CERTIFICATE FOR FUEL OIL AS PER IS 1593:2018

TEST CERTIFICATE NO. _____

DATED _____

SUPPLIED TO M/s _____ (Name and Address of Consignee)

It is certified that the material described below fully conforms to IS 1593 : 2018. The properties of the product, as tested in accordance with the Scheme of Inspection and Testing contained in the BIS Certification Marks License No. CM/L _____ are as indicated below against each order no. etc.

(PLEASE REFER TO IS 1593 : 2018 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order no and date	Control Unit/ Batch Number	Month and Year of manufacture	Quantity	Requirements															Remarks
				free from grit and other foreign impurities	Pour Point	Asphaltene Content	Total Sediment percent by mass	Spot Test	Acidity, inorganic	Ash, percent by mass	Carbon residue, mass percent	Gross, calorific value	Density at 15°C kg/m3 or Relative density at 15.6/15.6°C	Flash point (Pensky Martens (closed), °C	Kinematic viscosity in centistokes at 50°C	Sediment, percent by mass	Sulphur, total, percent by mass	Water content, percent by volume	

The material supplied conforms to specified requirements of IS 1593 : 2018.

REMARKS: Tank Car / Tank Truck / Container ship no.

(Signature)
For XYZ Company