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भारतीय मानक मसौदा  
**हाई फ्लैश हाई स्पीड डीजल - विशिष्ट**  
(IS 16861 का पहला पुनरीक्षण)

Draft Indian Standard  
**HIGH FLASH HIGH SPEED DIESEL – SPECIFICATION**  
(First Revision of IS 16861)

(ICS 75.160.20)

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Petroleum and their Related Products of Synthetic or  
Biological or Natural Origin Sectional Committee, PCD 03

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**FOREWORD**

*(Formal clauses to be added later)*

IS 1460 prescribes the requirements and methods of test for automotive diesel fuel. A separate standard was developed to cover requirements and methods of test for High Flash High Speed Diesel (hereinafter referred as HFHSD) meant for marine and non-automotive applications.

In the development of this standard, assistance was drawn from IS 1460 : 2017 and ISO 8217 : 2017. HFHSD is a complex mixture of hydrocarbons that varies depending on crude source and manufacturing process. Consequently, it is impossible to define its exact composition. This specification has therefore evolved primarily as a performance specification rather than a compositional specification.

It is recognized that there are some applications where, for technical or other reasons, limits different from those specified in this standard or additional requirements may be necessary. This standard does not cover such special applications, which are subject to agreement between the purchaser and the manufacturer. This standard, unless and otherwise provided by agreement between the purchaser and the manufacturer, prescribes the required properties of HFHSD at the time and place of delivery.

This revision has been brought out to keep pace with the latest technological developments and international practices. In this revision following major changes have been made:

- a) Fuel components derived from synthetic or renewable sources have been incorporated;
- b) Provision for blending with FAME has been incorporated; and
- c) Test methods have been updated.

Reference to following alternate test methods has been given for few parameters. In case of dispute, the referee method as given in Table 1 shall be followed.

Characteristic	Methods of Test
Total Acid Number, mg KOH/g	ASTM D664 / ASTM D974
Ash, percent by mass	ASTM D482
Carbon residue, on 10 percent residue, percent by mass	ASTM D4530 / ASTM D524
Cetane index	ASTM D4737
Pour point	ASTM D97
Copper strip corrosion for 3 h at 50 °C	ASTM D130
Distillation, percent (v/v), recovered	ASTM D86
Flash point, Pensky Martens closed cup, °C	ASTM D93
Kinematic viscosity, mm <sup>2</sup> /s, at 40°C	ASTM D7042
Density at 15 °C, kg/m <sup>3</sup>	ASTM D4052
Total sulphur, percent by mass	ASTM D2622 / ASTM D4294
Water content, ppm	ASTM D6304
Oxidation Stability, g/m <sup>3</sup>	ASTM D2274 / IP 388
Lubricity, Corrected WSD at 60 °C, microns	ASTM D6079

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

## 1. SCOPE

**1.1** This standard prescribes the requirements, methods of sampling and test for High Flash High Speed Diesel (HFHSD). It is mainly applicable for marine use including use by Indian Navy, merchant ships, fishing vessels etc. where a high flash point diesel is required and also for non-automotive purposes and in other compression ignition engines as well as stationary engines, designed to run on this type of diesel fuel.

**1.2** This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

## 2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. All standards are subject to revision and parties to agreement based on this standard are advised to use the latest editions of the standards indicated below.

<i>IS / ISO No.</i>	<i>Title</i>
IS 1447 (Part 1) : 2021	Methods of sampling of petroleum and its products Part 1 Manual sampling ( <i>second revision</i> )
IS 1448	Method of test for petroleum and its products
(Part 2) : 2007 / ISO 6619 : 1988	Part 2 Petroleum products and lubricants — Neutralization number — Potentiometric titration method ( <i>second revision</i> )
(Part 4/Sec 1) : 2021	Part 4/Section 1 Determination of ash ( <i>fourth revision</i> )
(Part 8) : 2012 / ISO 4262 : 1993	Part 8 Determination of carbon residue – Ramsbottom method ( <i>second revision</i> )
(Part 10 /Sec 2) :2021 / ISO 3016 : 2019	Part 10 Petroleum and related products from natural or synthetic sources Section 2 Determination of pour point ( <i>third revision</i> )
(Part 15) : 2004 / ISO 2160 : 1998	Part 15 Petroleum products — Corrosiveness to copper —Copper strip test ( <i>third revision</i> )
(Part 16) : 2014 / ISO 3675 : 1998	Part 16 Crude petroleum and liquid petroleum products — Laboratory determination of density — Hydrometer method ( <i>fourth revision</i> )
(Part 18) : 2020	Part 18 Distillation of petroleum products ( <i>third revision</i> )
(Part 21) : 2019/ ISO 2719 : 2016	Part 21 Determination of flash point — Pensky-Martens closed cup method ( <i>fourth revision</i> )
(Part 25/Sec 1) : 2018/ ISO 3104 : 1994	Part 25 Transparent and opaque liquids Section 1 Determination of kinematic viscosity and calculation of dynamic viscosity ( <i>second revision</i> )
(Part 110) : 2023	Part 110 Cold filter plugging point of distillate fuels ( <i>first revision</i> )
IS 1448 (Part 149) : 2020 / ISO 12156-1 : 2018	Part 149 Diesel fuel — Assessment of lubricity using the high-frequency reciprocating rig ( HFRR ) — Test method ( <i>second revision</i> )
(Part 154) : 2012 / ISO 12205 : 1995	Part 154 Determination of the oxidation stability of middle distillate fuels
(Part 179) : 2020 / ISO 14596 : 2007	Part 179 Petroleum Products - Determination of Sulphur Content - Oxidative Microcoulometry Method
(Part 182) : 2020 / ISO 12937 : 2000	Part 182 Petroleum Products - Determination of Water - Coulometric Karl Fischer Titration Method
IS 1460 : 2017	Automotive Diesel Fuel — Specification ( <i>sixth revision</i> )
ISO 2160 : 1998	Petroleum products Corrosiveness to copper Copper strip test
ISO 3016 : 2019	Petroleum and related products from natural or synthetic sources — Determination of pour point
ISO 3405 : 2019	Petroleum and related products from natural or synthetic sources — Determination of distillation characteristics at atmospheric pressure
ISO 4264 : 2018	Petroleum products -- Calculation of cetane index of middle-distillate fuels by the four variable equation
ISO 6245 : 2001	Petroleum products — Determination of ash

ISO 6296 : 2000	Petroleum products -- Determination of water — Potentiometric Karl Fischer titration method
ISO 6618 : 1997	Petroleum products and lubricants — Determination of acid or base number — Colour-indicator titration method
ISO 8754 : 2003	Petroleum products -- Determination of sulfur content -- Energy-dispersive X-ray fluorescence spectrometry
ISO 10370 : 2014	Petroleum products -- Determination of carbon residue -- Micro method
ISO 12185 : 1996	Crude petroleum and petroleum products -- Determination of density -- Oscillating U-tube method
ISO 23581 : 2020	Petroleum products and related products — Determination of kinematic viscosity — Method by Stabinger type viscometer

### 3. REQUIREMENTS

#### 3.1 General

The material shall be clear, bright and free from sediments, suspended matter and undissolved water.

#### 3.2 Composition

The material shall be hydrocarbon oils derived from petroleum and fuel components from synthetic or renewable sources similar in composition to petroleum distillates and blends of the above with Fatty Acid Methyl Ester (FAME). The use of fuel additives is permitted in order to improve the performance quality. Suitable fuel additives without known harmful side-effects are recommended in appropriate concentration to help avoid deterioration of product quality.

**3.2.1** This fuel shall not contain any residuum oil.

**3.2.2** The use of dyes or markers is permitted.

**3.3** The material shall also comply with the requirements prescribed in Table 1.

**Table 1 Requirements for High Flash High Speed Diesel (HFHSD)**  
(Clauses 3.3)

Sl. No.	Characteristics	Requirement	Methods of Test
(1)	(2)	(3)	(4)
(i)	Appearance	Clear, bright and free from sediments, suspended matter and undissolved water at normal ambient fuel	Visual

		temperature	
(ii)	Total Acid Number, mg KOH/g, <i>Max</i>	0.5	IS 1448 (Part 2) <sup>a</sup> / ISO 6618
(iii)	Ash, percent by mass, <i>Max</i>	0.01	IS 1448 (Part 4/Sec 1) <sup>a</sup> / ISO 6245
(v)	Carbon residue, on 10 percent residue, percent by mass, <i>Max</i>	0.3	IS 1448 (Part 8) <sup>a</sup> / ISO 10370
(vi)	Cetane index <sup>b</sup> , <i>Min</i>	45	ISO 4264 <sup>a</sup>
(vii)	Pour point <sup>c</sup> , <i>Max</i> a) Winter b) Summer	3°C 15°C	IS 1448 (Part 10/Sec 2) <sup>a</sup> / ISO 3016
(viii)	Copper strip corrosion for 3 h at 50 °C, <i>Max</i>	1	IS 1448 (Part 15) <sup>a</sup> / ISO 2160
(ix)	Distillation, percent (v/v), recovered a) at 350 °C, <i>Min</i> b) at 370 °C, <i>Min</i>	85 95	IS 1448 (Part 18) <sup>a</sup> / ISO 3405
(x)	Flash point, Pensky Martens closed cup, °C, <i>Min</i>	66	IS 1448 (Part 21)
(xi)	Kinematic viscosity, mm <sup>2</sup> /s, at 40°C	2.0 to 5.0	IS 1448 (Part 25/Sec 1) <sup>a</sup> / ISO 23581
(xii)	Density <sup>d</sup> at 15 °C, kg/m <sup>3</sup> , <i>Max</i>	860	IS 1448 (Part 16) <sup>a</sup> / ISO 12185
(xiii)	Total sulphur <sup>e</sup> , percent by mass, <i>Max</i>	0.20	ISO 8754 <sup>a</sup> / IS 1448 (Part 179)
(xiv)	Water content, ppm, <i>Max</i>	500	IS 1448 (Part 182) <sup>a</sup> / ISO 6296
(xv)	Cold filter plugging point (CFPP), °C	To report	IS 1448 (Part 110)
(xvi)	Oxidation Stability <sup>f</sup> , g/m <sup>3</sup> , <i>Max</i>	25	IS 1448 (Part 154)
(xvii)	Lubricity <sup>g</sup> , Corrected WSD at 60 °C, microns, <i>Max</i>	520	IS 1448 (Part 149)
(xviii)	FAME content, percent by volume, <i>Max</i>	7.0	Annex A of IS 1460

#### NOTES

- a) In case of dispute, this method shall be the referee test method.
- b) Cetane index relaxation time frame, if any, for fuel processed from Assam Crude, may be guided by the notifications issued by Government of India, from time to time.
- c) Winter shall be the period from November to February (both months inclusive) and rest of the months of the year shall be called as summer.
- d) Density range relaxation and time frame, if any, for fuel processed from Assam Crude, may be guided by the notifications issued by Government of India, from time to time.
- e) For supplies to Indian Navy, the limit of sulphur shall be in agreement between the buyer and the supplier.
- f) This test shall be carried out at the manufacturer's end only.
- g) This requirement is applicable to fuels with a sulfur content below 500 ppm.

#### 4. SAMPLING

4.1 Representative samples of the material shall be drawn as prescribed in IS 1447 (Part 1).

## **5. PACKING AND MARKING**

### **5.1 Packing**

If needed, the material shall be packed in suitable containers prescribed by Petroleum and Explosives Safety Organization (PESO) from time to time.

### **5.2 Marking**

**5.2.1** The material shall be supplied in accordance with the marking and shipping regulations laid down by Petroleum and Explosives Safety Organization (PESO) and by Director General of Shipping from time to time.

**5.2.2** Each container shall be marked with the following information:

- a) Name and grade of the material;
- b) Indication of the source of manufacturer, initials or trade-mark, if any;
- c) Volume of the contents, in litres;
- d) Year and month of manufacturing or packing; and
- e) Any other statutory requirements.

#### **5.2.3 *BIS Certification Marking***

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the Bureau of Indian Standards Act, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

## **6. QUALITY ASSURANCE**

**6.1** HFHSD quality assurance is based on batch certification during production at refineries. It is essential that refineries ensure batches are homogenous so that test results are representative of the product supplied.

**6.2** At the point of manufacture, the refinery shall issue a Certificate of Quality to certify that the batch of fuel complies with all of the requirements of this standard.

**6.2.1** The minimum requirements of information to be provided on the fuel's batch test Certificate of Quality at the point of manufacture are as under:

- a) Specification name, issue and any amendment number;
- b) Name and address of testing laboratory;
- c) Batch number or unique identification;
- d) Characteristics tested including specification limit, test method, result of test and remarks indicating compliance to standards;
- e) Identification of the signatory certifying the report;
- f) Date of certification; and
- g) Quantity certified.

**6.3** To certify compliance with requirement clauses **3.1** to **3.3**, representative samples shall be drawn using appropriate procedures such as those outlined in IS 1447 (Part 1). Each homogeneous batch of the finished product released from manufacturing point shall be tested

against all the requirements given in clauses **3.1** to **3.3**. Results shall be reported on the appropriate batch Certificate of Quality. This requirement is not satisfied by averaging on-line analysis results.