भारतीय मानक

Indian Standard

IS 6552 : 2024

स्ट्रेट मिनरल उच्च विपासनीय तेल — विशिष्टि

(दूसरा पुनरीक्षण)

Straight Mineral High Demulsibility Oils — Specification

(Second Revision)

ICS 75.100

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
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July 2024 **Price Group 5**

Lubricants and their Related Products Committee, PCD 25

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Lubricants and their Related Products Committee had been approved by the Petroleum, Coal and Related Products Division Council.

A number of rolling mills turning out accurate profiles are using oil film bearing on the back up and/or on the main rolls. These bearings need high grade bearing oil possessing excellent water separating properties because of the peculiar feature of water contamination which is common in these systems.

This standard was first published in 1972 and was subsequently revised in 1987 to align the standard with the latest IPSS standard to enable steel plants to procure the right type of material suited to their needs.

This revision has been brought out to keep pace with the latest technological developments and international practices. In this revision, high grade mineral oil (additives type) has been incorporated for special applications, such as oil film roll neck bearings, in steel plants.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

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.

Indian Standard

STRAIGHT MINERAL HIGH DEMULSIBILITY OILS — SPECIFICATION

(Second Revision)

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for high grade straight mineral high demulsibility oils used on oil film bearings employed in steel mills and other similar applications.

2 REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revisions, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of these standards.

3 TYPES AND GRADES

3.1 Type 1

Straight mineral high demulsibility oil. It shall be of nine grades depending upon its kinematic viscosity.

3.2 Type 2

High grade straight mineral high demulsibility oil, additives type. It shall be of six grades depending upon its kinematic viscosity.

4 REQUIREMENTS

4.1 General

The material shall be bright, clear and free from water, clay, dirt or any suspended impurities.

4.2 Composition

4.2.1 The material shall consist of paraffinic base oils having a high chemical stability.

NOTE — Use of viscosity index (VI) improvers is not permitted.

4.2.2 The high-grade mineral oil shall be free from acid and other impurities, must have resistance to oxidation and formation of sludge when subjected to rolling mill service, and must separate water, air, and other contaminants rapidly.

4.3 The material shall also comply with the requirements given in Table 1 and Table 2, when tested according to the appropriate test methods prescribed in col (12) of Table 1 and col (9) of Table 2.

5 PACKING AND MARKING

5.1 Packing

The material shall be packed in securely closed metal or any other suitable containers as agreed to between the purchaser and the supplier.

5.2 Marking

5.2.1 The packaging of the material shall be marked with the following information:

a) Name and type of material;
b) Manufacturer's name, initials or trademark, if any;
c) Net mass of material;
d) Identification in code or otherwise to enable the lot of consignment or manufacture to be traced back from records; and
e) Any other statutory requirements.

5.2.2 *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 SAMPLING

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

6.2 All the requirements given in **4** shall be tested on the composite sample.

6.3 The lot shall be declared as conforming to the requirements of the specification if all the test results on the composite sample satisfy the relevant requirements.

Table 1 Requirements for Straight Mineral High Demulsibility Oils

(*Clause* 4.3)

Sl No.	Characteristic	Requirement									Method of Test
		Grade VG 32	Grade VG 46	Grade VG 68	Grade VG 100	Grade VG 150	Grade VG 220	Grade VG 320	Grade VG 460	Grade VG 680	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	Kinematic viscosity at 40 °C, mm^2/s	28.8 to 35.2	41.4 to 50.6	61.2 to 74.8	90 to 110	135 to 165	198 to 242	288 to 352	414 to 506	612 to 748	IS 1448 (Part 25/ Sec 1)
ii)	Viscosity index, *Min*	90	90	90	90	90	80	80	80	80	IS 1448 (Part 56)
iii)	Total acidity (mg of KOH per g of the oil), *Max*	← 0.10 →									IS 1448 (Part 2)
iv)	Copper strip corrosion for 3 h at 100 °C	← Not worse than no. 1 →									IS 1448 (Part 15)
v)	Pour point, °C, *Max*	← 6 →									IS 1448 (Part 10/ Sec 2)
vi)	Ash, percent by mass, *Max*	← 0.005 →									IS 1448 (Part 4/ Sec 1)
vii)	Foaming characteristic										IS 1448 (Part 67)
	Foaming stability, volume in ml of foam after 10 min, *Max*										
	a) at 24 °C										
	b) at 93 °C	← Not limited, but to be reported →									
	c) at 24 °C after testing at 9 °C										
viii)	Flash point, Cleveland (open) cup, °C, *Min*	190	190	190	190	200	200	200	250	250	IS 1448 (Part 69)
ix)	Demulsibility at (54 ± 1) °C (for VG 32, 46 and 68) and at (82 ± 1) °C (for other grades), or	← 40-37-3 (20 min) →						40-37-3 (40 min)			IS 1448 (Part 91)
	Demulsibility at (82 ± 1) °C										IS 1448 (Part 95)
	a) Percent water (*v/v*), *Max*	← 1.5 →									
	b) Free water, ml, *Min*	← 30 →									
	c) Emulsion, ml, *Max*	← 1.0 →									

Table 2 Requirements of High Grade Straight Mineral High Demulsibility Oils, Additive Type

(*Clause* 4.3)

Sl No.	Characteristic	Requirement						Method of Test
		Grade VG 100	Grade VG 150	Grade VG 220	Grade VG 320	Grade VG 460	Grade VG 680	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	Kinematic viscosity at 40 °C, mm^2/s	90 to 110	135 to 165	198 to 242	288 to 352	414 to 506	612 to 748	IS 1448 (Part 25/Sec 1)
ii)	Viscosity index, *Min*	90	90	90	90	90	80	IS 1448 (Part 56)
iii)	Total acidity (mg of KOH per g of oil), *Max*	To report						IS 1448 (Part 2)
iv)	Copper strip corrosion for 3 h at 100 °C	Not worse than No. 1						IS 1448 (Part 15)
v)	Pour point, °C, *Max*	-3				0		IS 1448 (Part 10)
vi)	Ash, percent by mass, *Max*	0.001						IS 1448 (Part 4/Sec 1)
vii)	Foaming characteristics							
	Foaming stability, volume in ml of foam after 10 min							IS 1448 (Part 67)
	a) At 24 °C, *Max*	Nil						
	b) At 93 °C, *Max*	Nil						
	c) At 24 °C, *Max*	Nil						
viii)	Flash point, cleveland (open) cup method, °C, *Min*	190	200	200	200	250	250	IS 1448 (Part 69)
ix)	Demulsibility at (52 ± 1) °C							
	a) Percent water (*v/v*), *Max*	30			26			IS 1448 (Part 95)
	b) Free water, ml, *Min*	Report						
	c) Emulsion, ml, *Max*	1.0						
x)	Rush test,							IS 1448 (Part 96)
	a) Method A	Pass						
	b) Method B	Pass						
xi)	Rotating pressure vessel oxidation test (RPVOT), *Min*	80						IS 1448 (Part 94)

ANNEX A

(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No.	*Title*
IS 1447 (Part 1) : 2021	Methods of sampling of petroleum and its products: Part 1 Manual sampling (*second revision*)
IS 1448	Methods of test for petroleum and its products:
(Part 2) : 2007/ ISO 6619 : 1988	Petroleum products and lubricants — Neutralization number — Potentiometric titration method (*second revision*)
(Part 4/Sec 1) : 2021	Determination of ash (*fourth revision*)
(Part 10/Sec 2) : 2021/ISO 3016 : 2019	Petroleum and related products from natural or synthetic sources, Section 2 Determination of pour point (*third revision*)
(Part 15) : 2004/ ISO 2160 : 1998	Petroleum products — Corrosiveness to copper — Copper strip test (*third revision*)
(Part 25/ Sec 1) : 2018/ISO 3104 : 1994	Transparent and opaque liquids, Section 1 Determination of kinematic viscosity and calculation of dynamic viscosity (*second revision*)
(Part 56) : 2013/ ISO 2909 : 2002	Calculation of viscosity index from kinematic viscosity (*third revision*)
(Part 67) : 2020	Determination of foaming characteristics of lubricating oils (*second revision*)
(Part 69) : 2019/ ISO 2592 : 2017	Determination of flash and fire points — C level and open cup method (*second revision*)
(Part 91) : 2019/ ISO 6614 : 1994	Determination of water separability of petroleum oils and synthetic fluids (*first revision*)
(Part 94) : 2019	Test for oxidation stability of lubricating grease by oxygen pressure vessel method (*first revision*)
(Part 95) : 2019	Determination of demulsibility characteristics of lubricating oils (*first revision*)
(Part 96) : 2019/ ISO 7120 : 1987	Petroleum products and lubricants — Petroleum oils and other fluids — determination of rust-preventing characteristics in the presence of water (*first revision)*

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Lubricants and their Related Products, PCD 25

Organization	*Representative(s)*
In Personal Capacity (*Flat - 1002, Raheja Heights, D - Wing, off Gen A K Vaidya Marg, Dindoshi, Malad East Mumbai - 400097*)	DR Y. P. RAO **(*Chairperson*)**
Afton Chemicals Private Limited, Mumbai	SHRI ANAND KUMAR
Ashok Leyland Limited, Chennai	SHRI MAHESH P. SHRI D. BALAKRISHNAN (*Alternate*)
BASF India Limited, Mumbai	SHRI NEVILLE COLACO SHRI ASHOK SAMBANDAM (*Alternate*)
Bajaj Auto Limited, Pune	SHRI YOGESH R. MAHAJAN SHRI RAMESH GOYKAR (*Alternate*)
Balmer Lawrie and Company Limited, Kolkata	DR MOHAN LAL DAS SHRI SRINIVASAN MURLI (*Alternate*)
Bharat Petroleum Corporation Limited, Mumbai	SHRI R. SUBRAMANIAN DR TARUNENDER SINGH (*Alternate*)
Bosch Limited, Bengaluru	DR FREDRICK A. SHRI RAGHUVEER RAO (*Alternate*)
CSIR - Indian Institute of Petroleum, Dehradun	DR ANIL KUMAR SINHA DR G. D. THAKRE (*Alternate* I) SHRI SAILESH KUMAR SINGH (*Alternate* II)
Central Pollution Control Board, New Delhi	SHRI DINABANDHU GOUDA
Centre for High Technology, New Delhi	DR P. RAMAN DR N. S. RAMAN (*Alternate* I) SHRI SHEKAR KULKARNI (*Alternate* II)
Chennai Petroleum Corporation Limited, Chennai	DR V. SELVAVATHI SHRI H. RAMAKRISHNAN (*Alternate*)
Consumer Guidance Society of India, Mumbai	DR SITARAM DIXIT DR M. S. KAMATH (*Alternate*)
Defence Research and Development Organization, Research Centre Imarat, Hyderabad	SHRI KAMAL PRAKASH SINGH SHRI SONAM GUPTA (*Alternate*)
Directorate General of Quality Assurance, Ministry of Defence, Kanpur	DR OM PRAKASH SINGH SHRI A. K. KANAUJIA (*Alternate*)
Gulf Oil Lubricants India Limited, Mumbai	SHRI GIRISH JANGE DR JENCEN MATHAI ARIVANNOOR (*Alternate*)
Hero Motocorp Limited, New Delhi	SHRI FEROZ ALI KHAN SHRI RAKESH SHARMA (*Alternate* I) SHRI DIWIT PRAJAPATI (*Alternate* II)
Hindustan Petroleum Corporation Limited, Mumbai	SHRI LOKENDER SINGH TEVATHIYA SHRI ASHISH KHANNA (*Alternate*)

Organization	*Representative(s)*
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Indian Oil Corporation (MKTG), Mumbai	SHRI RAJESH NAMBIAR DR S. VENKATESAN (*Alternate*)
Indian Oil Corporation (R and D Centre), Faridabad	DR DEEPAK SAXENA DR PANKAJ BHATNAGAR (*Alternate*)
Indian Oil Corporation Limited - Refineries and Pipelines Division, New Delhi	SHRI ASHWANI SHARMA SHRI R. K. CHUGH (*Alternate*)
Lubrizol India Limited, Mumbai	SHRI KAILASH SAWANT SHRI SREEHARI KUMAR (*Alternate*)
Mahindra and Mahindra Limited, Mumbai	SHRI R. RAMAPRABHU
Maruti Udyog Limited, Gurugram	SHRI ASHOK PERMUDE SHRI NARINDER KUMAR (*Alternate*)
Ministry of Road Transport and Highways, New Delhi	SHRI G. SHARAN SHRI S. S. NAHAR (*Alternate*)
National Test House, Kolkata	DR S. N. BANDHOPADHYAY DR UMESH SINGH (*Alternate*)
Netra NTPC Limited, Noida	SHRI RAJIV SATYAKAM DR VANI G. D. (*Alternate*)
Oil Industry Safety Directorate, Noida	SHRI RAJESH MANOCHA
Reliance India Limited, Mumbai	SHRI RAHUL SAXENA
Research Designs and Standards Organization (RDSO), Lucknow	SHRI KAMAL PRAKASH SINGH SHRI RAJESH SRIVASTAVA (*Alternate*)
Society of Indian Automobile Manufacturers (SIAM), New Delhi	SHRI PRASHANT KUMAR BANERJEE DR SANDEEP GARG (*Alternate*)
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Swastik Oil Products Manufacturing Company Private Limited, Mumbai	SHRI BHUPENDRA RATHOD SHRI SANAT RATHOD (*Alternate*)
TVS Motor Company Limited, Hosur	SHRI AJITH KUMAR
Tata Motors Limited, Pune	SHRI MANISH GOPAL SHRI PALLIPALAYAM GOWRISHANKAR (*Alternate*)
BIS Directorate General	SHRIMATI MEENAL PASSI, SCIENTIST 'F'/SENIOR DIRECTOR AND HEAD (PETROLEUM, COAL AND RELATED PRODUCTS) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary
SHRIMATI KREETI DAS
SCIENTIST C/DEPUTY DIRECTOR
(PETROLEUM, COAL AND RELATED PRODUCTS), BIS

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

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This Indian Standard has been developed from Doc No.: PCD 25 (18597).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Published by BIS, New Delhi