भारतीय मानक

Indian Standard

IS 18722 (Part 1) : 2024

खनिज मूल के वर्जिन और पुनः परिष्कृत बेस तेल — विशिष्टि

भाग 1 ग्रूप I से ग्रूप III बेस तेल

Virgin and Re-Refined Base Oils of Mineral Origin — Specification

Part 1 Group I to Group III Base Oils

ICS 75.100

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
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April 2024 **Price Group 8**

Lubricants and their Related Products Sectional Committee, PCD 25

FOREWORD

This Indian Standard (Part 1) was adopted by the Bureau of Indian Standards, after the draft finalized by the Lubricants and their Related Products Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

Mineral base oil is a precursor to lubricants, derived from refining of crude oil. Re-refined base oil, which is as good as virgin base oil, is produced by subjecting the used lubricating oil to an extensive re-refining process to remove contaminants and undesirable matter. Virgin mineral and re-refined base oils are used to produce lubricants such as motor oil, transmission fluid, hydraulic oil, gear oil and grease, among others. As re-refined base oil promotes recycling and elimination of waste, it represents the responsible choice for the environment.

Base oil is a highly traded item in the country. Therefore, in order to cater to the requirements of revenue authorities in monitoring the quality of imported product and to promote circular economy, this standard has been formulated. The Committee responsible for the development of this standard has included the groups and viscosity grades most commonly traded and used in industry. It is expected that this standard could be reviewed subsequently based on emerging requirements of other categories of base oil. For groups and viscosity grades not covered in this standard, specification may be as agreed between supplier and purchaser.

Alternate test methods are provided below for few characteristics and in case of dispute, the referee method prescribed in Tables 1, 2, 3, and 4 shall be followed.

Characteristic	*Alternate Method of Test*
Colour	ASTM D1500
Flash point (°C)	ASTM D92
Pour point (°C)	ASTM D97/ASTM D5950
Kinematic viscosity at 40 °C and 100 °C	ASTM D445/ASTM D7042
Viscosity index	ASTM D2270
Total acid number (TAN)	ASTM D664/ASTM D974
Sulphur	ASTM D2622/ASTM D5453
Saturates	ASTM D2007/ASTM D7419
Copper strip corrosion at 100 °C for 3 h	ASTM D130
Water separability (O-W-E)	ASTM D1401
Density at 15 °C	ASTM D1298/ASTM D4052/ASTM D7042
Conradson carbon residue (CCR)/Micro carbon residue	ASTM D189/ASTM D4530
Air release value	ASTM D3427
Evaporation loss at 250 °C	ASTM D5800B
Foaming test	ASTM D892

(*Continued on third cover*)

Indian Standard

VIRGIN AND RE-REFINED BASE OILS OF MINERAL ORIGIN — SPECIFICATION

PART 1 GROUP I TO GROUP III BASE OILS

1 SCOPE

This standard prescribes requirements, methods of sampling, and tests for virgin and re-refined base oils of mineral origin. In part 1, Group I to Group III base oils are covered for virgin base oils and Group I is covered for re-refined base oils.

NOTE — The specifications of other base oils are expected to be covered in Part 2.

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 revision and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent edition of these standards.

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Virgin Base Oil — Precursor to lubricant, derived from refining of crude oil.

3.2 Re-refined Base Oil — Base oil derived from extensive re-refining of used lubricating oil of mineral origin.

4 CLASSIFICATION

4.1 Virgin mineral base oil covered in this standard shall fall under the following three categories (derived from API 1509):

a) *Group* I — contains less than 90 percent saturates and/or greater than 0.03 percent sulphur and have a viscosity index greater than or equal to 80 and less than 120 using the test methods specified in Table 1.

b) *Group* II — contains greater than or equal to 90 percent saturates and less than or equal to 0.03 percent sulphur and have a viscosity index greater than or equal to 80 and less than 120 using the test methods specified in Table 2.

c) *Group* III — contains greater than or equal to 90 percent saturates and less than or equal to 0.03 percent sulphur and have a viscosity index greater than or equal to 120 using the test methods specified in Table 3.

4.2 Re-refined base oils of mineral origin covered in this standard pertain to Group I base oils.

5 REQUIREMENTS

5.1 General

Virgin mineral base oils belonging to Group I, II, and III, and re-refined base oils (Group I) shall be clear and bright in appearance and free from objectionable odour and visible impurities.

5.2 Virgin mineral base oils (Group I) shall comply with the requirements given in Table 1.

5.3 Virgin mineral base oils (Group II) shall comply with the requirements given in Table 2.

5.4 Virgin mineral base oils (Group III) shall comply with the requirements given in Table 3.

5.5 Re-refined base oils (Group I) of mineral origin shall comply with the requirements given in Table 4.

Table 1 Requirements for Virgin Mineral Base Oils (Group I)

(*Clause* 5.2)

Sl No.	Characteristics	SN 60/70	SN 150	SN 500	BS 150	Method of Test
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Colour, *Max*	1.5	1.5	3.5	6.0	IS 1448 (Part 12)
ii)	Flash point (°C), *Min*	150	210	232	290	IS 1448 (Part 69)
iii)	Pour point (°C), *Max*	-6	-3	-3	0	IS 1448 (Part 10/Sec 2)
iv)	Kinematic viscosity at 100 °C, mm^2/s	To Report	To Report	9.5 to 12.5	29 to 33	IS 1448 (Part 25/Sec 1)
v)	Kinematic viscosity at 40 °C, mm^2/s	9.0 to 13.5	28 to 32	To Report	To Report	IS 1448 (Part 25/Sec 1)
vi)	Viscosity index. *Min*	95	95	95	90	IS 1448 (Part 56)
vii)	Total acid number (TAN), mg KOH/g, *Max*	0.03	0.03	0.03	0.05	IS 1448 (Part 2)/ IS 1448 (Part 188)/ IS 1448 (Part 176)*
viii)	Sulphur[a], percent by mass	> 0.03	> 0.03	> 0.03	> 0.03	IS 1448 (Part 179) /IS1448 (Part 153)*
ix)	Saturates[a], percent by mass	< 90	< 90	< 90	< 90	ASTM D2007/ ASTM D7419*
x)	Copper strip corrosion at 100 °C for 3 h, classification, *Max*	1a	1a	1a	1a	IS 1448 (Part 15)
xi)	Water separability (O-W-E), *Max*	40-37-3 (15')	40-37-3 (15')	40-37-3 (20')	40-37-3 (30')	IS 1448 (Part 91)
xii)	Water content[b]	Negative	Negative	Negative	Negative	Crackle
xiii)	Density at 15 °C, g/ml	Report	Report	Report	Report	IS 1448 (Part 16)
xiv)	PCA Content[c], percent *m/m*	<3	<3	<3	<3	IP 346

NOTE — For viscosity grades other than specified above, but not lesser than SN60 grade, specifications to be agreed between the supplier and purchaser.

[a] Group I contain less than 90 percent saturates and/or greater than 0.03 percent sulphur

[b] Water content — In case of positive crackle, water content shall be tested using test method given in ASTM D95/ASTM D6304*. Maximum water content of 0.05 percent by mass is acceptable subject to clear and bright appearance of the oil at ambient temperature.

[c] This is an optional requirement subject to agreement between supplier and purchaser

* In case of dispute, this test shall be the referee test method.

Table 2 Requirement for Virgin Mineral Base Oils (Group II)

(*Clause* 5.3)

Sl No.	Characteristic	60N/70N	150N	500N	Method of Test
(1)	(2)	(3)	(4)	(5)	(6)
i)	Colour, *Max*	0.5	0.5	0.5	IS 1448 (Part 12)
ii)	Flash point (°C), *Min*	160	210	230	IS 1448 (Part 69)
iii)	Pour point (°C), *Max*	-15	-12	-12	IS 1448 (Part 10/Sec 2)
iv)	Kinematic viscosity at 100 °C, mm^2/s	To Report	To Report	9.5 to 12.5	IS 1448 (Part 25/ Sec 1)
v)	Kinematic viscosity at 40 °C, mm^2/s	9.0 to 14.0	28.0 to 33.0	To Report	IS 1448 (Part 25/Sec 1)
vi)	Viscosity index, *Min*	95 to 119	95 to 119	95 to 119	IS 1448 (Part 56)
vii)	Total acid number (TAN), mg KOH/g, *Max*	0.03	0.03	0.03	IS 1448 (Part 2)/ IS 1448 (Part 188)/ IS 1448 (Part 176)*
viii)	Conradson carbon residue (CCR)/Micro carbon residue, percent by mass, *Max*	0.03	0.03	0.05	IS 1448 (Part 122)
ix)	Sulphur, percent by mass, *Max*	0.03	0.03	0.03	IS 1448 (Part 179)/ IS1448 (Part 153)*
x)	Saturates, percent by mass, *Min*	90	90	90	ASTM D2007/ ASTM D7419*
xi)	Copper strip corrosion at 100 °C for 3 h, classification, *Max*	1a	1a	1a	IS 1448 (Part 15)
xii)	Water separability (O-W-E), minutes	40-37-3 (5')	40-37-3 (5')	40-37-3 (10')	IS 1448 (Part 91)
xiii)	Water content[a]	Negative	Negative	Negative	Crackle
xiv)	Air release value, minutes, *Max*	1	1	3	IS 1448 (Part 102)

Table 2 (*Concluded*)

Sl No.	Characteristic	60N/70N	150N	500N	Method of Test
(1)	(2)	(3)	(4)	(5)	(6)
xv)	Density at 15 °C, g/ml	Report	Report	Report	IS 1448 (Part 16)
xvi)	PCA content[b], percent *m/m*	<3	<3	<3	IP 346

NOTE — For viscosity grades other than specified above, but not lesser than 60N grade, specifications to be agreed between the supplier and purchaser

[a] Water Content — In case of positive crackle, water content shall be tested using test method given in ASTM D95/ASTM D6304[*]. Maximum water content of 0.05 percent by mass is acceptable subject to clear and bright appearance of the oil at ambient temperature.

[b] This is an optional requirement subject to agreement between supplier and purchaser

[*] In case of dispute, this test shall be the referee test method.

Table 3 Requirement for Virgin Mineral Base Oils (Group III)

(*Clause* 5.4)

Sl No.	Characteristics	4 cSt	6 cSt	8 cSt	Method of Test
(1)	(2)	(3)	(4)	(5)	(6)
i)	Colour, *Max*	0.5	0.5	0.5	IS 1448 (Part 12)
ii)	Flash point (°C), *Min*	200	210	220	IS 1448 (Part 69)
iii)	Pour point (°C), *Max*	-12	-12	-12	IS 1448 (Part 10/ Sec 2)
iv)	Kinematic viscosity at 100 °C, mm^2/s	4.1 to 4.4	5.7 to 6.6	7.0 to 8.5	IS 1448 (Part 25/ Sec 1)
v)	Kinematic viscosity at 40 °C, mm^2/s	Report	Report	Report	IS 1448 (Part 25/ Sec 1)
vi)	Viscosity index, *Min*	120	120	120	IS 1448 (Part 56)
vii)	Total acid number (TAN), mg KOH/g, *Max*	0.03	0.03	0.03	IS 1448 (Part 2)/ IS 1448 (Part 188)/ IS 1448 (Part 176)*
viii)	Conradson carbon residue (CCR)/Micro carbon residue, percent by mass, *Max*	0.03	0.03	0.05	IS 1448 (Part 122)
ix)	Sulphur, percent by mass, *Max*	0.001	0.001	0.001	IS 1448 (Part 179)/ IS1448 (Part 153)*
x)	Saturates, percent by mass, *Min*	97	97	97	ASTM D2007/ ASTM D7419*
xi)	Copper strip corrosion at 100 °C for 3 h, classification, *Max*	1a	1a	1a	IS 1448 (Part 15)
xii)	Water content[a]	Negative	Negative	Negative	Crackle
xiii)	Evaporation loss at 250 °C, 1 h, percent *m/m*, *Max*	15.0	8.0	6.5	IS 1448 (Part 136)
xiv)	Density at 15 °C, g/ml	Report	Report	Report	IS 1448 (Part 16)

NOTE — For viscosity grades other than specified above, but not lesser than 4 cSt grade at 100°C grade, specifications to be agreed between the supplier and purchaser.

[a] Water Content — In case of positive crackle, water content shall be tested using test method given in ASTM D95/ASTM D6304*. Maximum water content of 0.05 percent by mass is acceptable subject to clear and bright appearance of the oil at ambient temperature.

* In case of dispute, this test shall be the referee test method.

Table 4 Requirements for Re-refined Base Oil (Group I)

(*Clause* 5.5)

Sl No.	Characteristic	RR-L	RR-L	RR-M	RR-M	RR-H	RR-H	Method of Test, Ref to
		Low Sulphur	High Sulphur	Low Sulphur	High Sulphur	Low Sulphur	High Sulphur	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	Colour, *Max*	2.0	2.0	3.5	3.5	4.0	4.0	IS 1448 (Part 12)
ii)	Flash point (°C), *Min*	200	200	210	210	210	210	IS 1448 (Part 69)
iii)	Pour point (°C), *Max*	-3	-3	-3	-3	0	0	IS 1448 (Part 10/ Sec 2)
iv)	Kinematic viscosity at 100 °C, mm^2/s	Report	Report	Report	Report	Report	Report	IS 1448 (Part 25/ Sec 1)
v)	Kinematic viscosity at 40 °C, mm^2/s	29 to 35	29 to 35	42 to 50	42 to 50	62 to 74	62 to 74	IS 1448 (Part 25/ Sec 1)
vi)	Viscosity index, *Min*	95	95	95	95	95	95	IS 1448 (Part 56)
vii)	Total acid number (TAN), mg KOH/g, *Max*	0.05	0.05	0.05	0.05	0.05	0.05	IS 1448 (Part 2)/ IS 1448 (Part 188)/ 1448 (Part 176)*
viii)	Strong acid number, mg KOH/g, *Max*	NIL	NIL	Nil	NIL	NIL	NIL	IS 1448 (Part 2)/ IS 1448 (Part 188)/ IS 1448 (Part 176)*

Table 4 (*Continued*)

Sl No.	Characteristic	RR-L	RR-L	RR-M	RR-M	RR-H	RR-H	Method of Test, Ref to
		Low Sulphur	High Sulphur	Low Sulphur	High Sulphur	Low Sulphur	High Sulphur	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ix)	Sulphur, percent by mass	< 0.2	0.2 to 1.2	< 0.2	0.2 to 1.2	< 0.2	0.2 to 1.2	IS 1448 (Part 179)/ IS 1448 (Part 153)*
x)	Saturates, percent by mass, *Min*	80	80	80	80	80	80	ASTM D2007/ ASTM D7419*
xi)	Copper strip corrosion at 100 °C for 3 h, classification, *Max*	1a	1a	1a	1a	1a	1a	IS 1448 (Part 15)
xii)	Water content[a]	Negative	Negative	Negative	Negative	Negative	Negative	Crackle
xiii)	Foaming test, ml/ml, *Max*:							IS 1448 (Part 67)
	a) Sequence I	20/Nil	20/Nil	20/Nil	20/Nil	20/Nil	20/Nil	
	b) Sequence II	50/Nil	50/Nil	50/Nil	50/Nil	50/Nil	50/Nil	
	c) Sequence III	20/Nil	20/Nil	20/Nil	20/Nil	20/Nil	20/Nil	
xiv)	Water separability (O-W-E), minutes, *Max*	40-37-3(20')	40-37-3(20')	40-37-3(20')	40-37-3(20')	40-37-3(20')	40-37-3(20')	IS 1448 (Part 91)
xv)	Density at 15 °C, g/ml	Report	Report	Report	Report	Report	Report	IS 1448 (Part 16)
xvi)	Calcium content, percent by mass, *Max*	0.000 5	0.000 5	0.000 5	0.000 5	0.000 5	0.000 5	ASTM D5185

Table 4 (*Concluded*)

Sl No.	Characteristic	RR-L	RR-L	RR-M	RR-M	RR-H	RR-H	Method of Test, Ref to
		Low Sulphur	High Sulphur	Low Sulphur	High Sulphur	Low Sulphur	High Sulphur	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
xvii)	Phosphorus content, percent by mass, *Max*	0.00 1	0.00 1	0.00 1	0.00 1	0.001	0.00 1	
xviii)	Silica content, percent by mass, *Max*	0.000 5	0.000 5	0.000 5	0.000 5	0.000 5	0.000 5	
xix)	Other trace metals, percent by mass, *Max*	0.0005	0.000 5	0.000 5	0.0005	0.000 5	0.000 5	
xx)	PCA content[b], percent *m/m*	<3	<3	<3	<3	<3	<3	IP 346
xxi)	Carcinogenicity, mutagenicity index[b] (MI), *Max*	To Report	To Report	To Report	To Report	To Report	To Report	ASTM E1687

NOTE — For viscosity grades other than specified above, but not lesser than RR-L grade, specifications to be agreed between the supplier and purchaser.

[a] Water Content — In case of positive crackle, water content shall be tested using test method given in ASTM D95/ASTM D6304*. Maximum water content of 0.05 % by mass is acceptable subject to clear and bright appearance of the oil at ambient temperature.

[b] Type test (to demonstrate process capability)

* In case of dispute, this test shall be the referee test method.

6 PACKING AND MARKING

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

6.2 Each container shall be securely closed and marked with the following information:

a) Name and grade of the material;

b) Manufacturer's name, address and recognized trade mark, if any;

c) Net mass/volume in the container;

d) Identification in code or otherwise to enable the lot to be traced back from records;

e) Date or year of manufacture/packing; and

f) Any other statutory requirements.

6.3 BIS Certification Marking

The containers may also be marked with the Standard Mark.

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

7 SAMPLING

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

7.2 Number of Tests

Test for all requirements specified in 5, as per respective table, shall be carried out on the composite sample of the material.

7.3 Criteria for Conformity

The material shall be considered to be conforming to this specification if the composite sample passes all the requirements specified in the standard.

ANNEX A

(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No./International Standards	*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 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 12) : 2013/ ISO 2049 : 1996	Determination of colour (ASTM Scale) (*second revision*)
(Part 15) : 2004/ ISO 2160 : 1998	Petroleum products — Corrosiveness to copper — Copper strip test (*third revision*)
Part 16) : 2014/ ISO 3675 : 1998	Crude petroleum and liquid petroleum products — Laboratory determination of density — Hydrometer method (*fourth 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 — Cleveland open cup method (*second revision*)
(Part 91) : 2019/ ISO 6614 : 1994	Determination of water separability of petroleum oils and synthetic fluids (*first revision*)
(Part 102) : 2023	Determination of air release value (*first revision*)
(Part 122) : 2013 /ISO 6615 : 1993	Determination of carbon residue — Conradson method (*first revision*)
(Part 136) : 1991	Determination of evaporation loss of lubricating oils (noacks method)
(Part 153) : 2012/ ISO 20847 : 2004	Petroleum products — Determination of sulfur content of automotive fuels — Energy-dispersive X-ray fluorescence spectrometry
(Part 176) : 2020/ ISO 7537 : 1997	Petroleum products — Determination of acid number — Semi-micro colour-indicator titration method
(Part 179) : 2020/ ISO 14596 : 2007	Petroleum products — Determination of sulfur content — Wavelength-dispersive X-ray fluorescence spectrometry
(Part 188) : 2021/ ISO 6618 : 1997	Petroleum Products and Lubricants — Determination of acid or base number — Colour-indicator titration method
API 1509	Engine oil licensing and certification system
ASTM D95-13	Standard test method for water in petroleum products

IS No./International Standards	*Title*
	and bituminous materials by distillation
ASTM D2007-19	Standard test method for characteristic groups in rubber extender and processing oils and other petroleum-derived oils by the clay-gel absorption chromatographic method
ASTM D5185-18	Standard test method for multielement determination of used and unused lubricating oils and base oils by inductively coupled plasma atomic emission spectrometry (ICP-AES)
ASTM D6305-21	Standard practice for calculating bending strength design adjustment factors for fire-retardant-treated plywood roof sheathing
ASTM D7419-18	Standard test method for determination of total aromatics and total saturates in lube base stocks by high performance liquid chromatography (HPLC) with refractive index detection
ASTM E1687-19	Standard test method for determining carcinogenic potential of virgin base oils in metalworking fluids
IP 346/1992	Determination of polycyclic aromatics in unused lubricating base oils and asphaltene free petroleum fractions — Dimethyl sulphoxide extraction refractive index method

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Lubricants and their Related Products Sectional Committee, 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 D. BALAKRISHNAN SHRI MAHESH P. (*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 MURALI (*Alternate*)
Bharat Petroleum Corporation Limited, Mumbai	SHRI M. SOHAIL AKHTAR DR TARUNENDR SINGH (*Alternate*)
Bosch Limited, Bengaluru	SHRI FREDRICK A. SHRI RAGHUVEER RAO (*Alternate*)
Chennai Petroleum Corporation Limited, Chennai	SHRI H. RAMAKRISHNAN SHRI M. ABDUL KAREEM (*Alternate*)
Consumer Guidance Society of India, Mumbai	DR SITARAM DIXIT DR M. S. KAMATH (*Alternate*)
CSIR - Indian Institute of Petroleum, Dehradun	DR DEVENDRA SINGH DR G. D. THAKRE (*Alternate* I) DR SAILESH KUMAR SINGH (*Alternate* II)
Directorate General of Quality Assurance, Ministry of Defence, Kanpur	SHRI A. K. KANAUJIA SHRI OM PRAKASH SINGH (*Alternate*)
Gulf Oil Lubricants India Limited, Mumbai	SHRI GIRISH JANGE SHRI JENCEN MATHAI ARIVANNOOR (*Alternate*)
Hindustan Petroleum Corporation Limited, Mumbai	SHRI LOKENDER SINGH TEVATHIYA SHRI ASHISH KHANNA (*Alternate* I) SHRI ABHIJIT SARKAR (*Alternate* II)
Indian Oil Corporation (MKTG), Mumbai	SHRI H. S. NEGI SHRI ABHIJEET CHAKRABORTI (*Alternate*)
Indian Oil Corporation (R and D Centre), Faridabad	SHRI MUKUL MAHESHWARI DR PANKAJ BHATNAGAR (*Alternate*)
Lubrizol India Limited, Mumbai	SHRI RAHUL MISRA SHRI AVINASH KAMUNI (*Alternate*)
Mahindra and Mahindra Limited, Mumbai	SHRI R. RAMAPRABHU

Organization	*Representative(s)*
Ministry of Petroleum and Natural Gas, New Delhi	SHRI RAJESH MANOCHA
National Test House, Kolkata	DR MANGESH GHARPURE SHRI BHASKAR N. BARSAGADE (*Alternate*)
Netra NTPC Limited,Noida	SHRI RAJIV SATYAKAM SHRIMATI VANI G. D. (*Alternate*)
Reliance Industries Limited, Mumbai	SHRI BALASUBRAMANIAN K. SHRI K. K. SREERAMACHANDRAN (*Alternate*)
Research Designs and Standards Organization (RDSO), Lucknow	SHRI KAMAL PRAKASH SINGH SHRI RAJESH SRIVASTAVA (*Alternate*)
Research Designs and Standards Organization (RDSO), Lucknow	SHRI KAMAL PRAKASH SINGH SHRI BHARAT PRASAD (*Alternate*)
Society of Indian Automobile Manufacturers (SIAM),Delhi	SHRI PRASHANT KUMAR BANERJEE DR SANDEEP GARG (*Alternate*)
Swastik Oil Products Manufacturing Company Private Limited, Mumbai	SHRI BHUPENDRA RATHOD SHRI SANAT RATHOD (*Alternate* I) SHRI MITESH A. RATHOD (*Alternate* II)
Tata Motors Limited, Pune	SHRI PALLIPALAYAM GOWRISHANKAR SHRI PALLAV CHATTERJEE (*Alternate*)
Vinni Chemicals Private Limited, New Delhi	SHRI HARSH VARDHAN JAIN
BIS Directorate General	SHRIMATI MEENAL PASSI, SENIOR DIRECTOR/ SCIENTIST 'F' AND HEAD (PETROLEUM, COAL AND RELATED PRODUCT) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

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

PCD 25:1 Automotive Lubricants and Specialities (Including Brake Fluid and Radiator Coolant) Subcommittee

Organization	*Representative(s)*
Indian Oil Corporation (R and D Centre), Faridabad	SHRI MUKUL MAHESHWARI **(*Convenor*)**
Apar Industries Limited, Mumbai	SHRI N. R. BHOOPATKAR DR T. C. S. M. GUPTA (*Alternate*)
Arteco Coolants India Private limited, Pune	SHRI AMOL CHORE
Ashok Leyland Limited, Chennai	SHRI MAHESH P. SHRI P. RAMESH (*Alternate*)
Bajaj Auto Limited, Pune	SHRI YOGESH R. MAHAJAN SHRI RAMESH GOYKAR (*Alternate*)

Organization	*Representative(s)*
Balmer Lawrie and Company Limited, Kolkata	DR MOHAN LAL DAS SHRI SRINIVASAN MURALI (*Alternate*)
Bharat Petroleum Corporation Limited, Mumbai	SHRI M. RAJENDRAN SHRI AMITAVA PAL (*Alternate* I) SHRI KHALID ZUBAIR MOHAMMAD (*Alternate* II)
Bosch Limited, Bengaluru	SHRI RAGHUVEER RAO DR FREDRICK A. (*Alternate*)
Central Institute of Road Transport, Pune	SHRI N. R. TIWARI SHRI R. N. GORE (*Alternate*)
Consumer Guidance Society of India, Mumbai	SHRI SITARAM DIXIT SHRI M. S. KAMATH (*Alternate*)
CSIR - Indian Institute of Petroleum, Dehradun	SHRI MANOJ SRIVASTAVA DR DEVENDRA SINGH (*Alternate*)
Directorate General of Quality Assurance, Ministry of Defence, Kanpur	SHRI A. K. KANAUJIA SHRI OM PRAKASH SINGH (*Alternate*)
Gulf Oil Lubricants India Limited, Mumbai	SHRI K. SWAMINATHAN
Hero Motocorp Limited, New Delhi	SHRI HARJEET SINGH SHRI ASHOK KATARIA (*Alternate*)
Hindustan Petroleum Corporation Limited, Mumbai	SHRI LOKENDER SINGH TEVATHIYA SHRI ABHIJIT A. SARKAR (*Alternate*)
Indian Oil Corporation (MKTG), Mumbai	SHRI S. VENKATESAN SHRI ARJUN SINGH TUTEJA (*Alternate*)
Indian Oil Corporation (R and D Centre), Faridabad	DR SARITA SETH (*Alternate*)
Lubrizol India Limited, Mumbai	SHRI RAHUL MISRA SHRI AVINASH KAMUNI (*Alternate*)
Mahindra and Mahindra Limited, Mumbai	SHRI R. RAMAPRABHU
Research Designs and Standards Organization (RDSO), Lucknow	SHRI KAMAL PRAKASH SINGH SHRI BHARAT PRASAD (*Alternate*)
Shell India Markets Private Limited, Mumbai	SHRI SIVA KASTURI
The Western India Genuine Ghee Company Private Limited, Mumbai	SHRI DHANESH RATHOD SHRI PARESH RATHOD (*Alternate*)
Tide Water Oil Company India Limited, Kolkata	SHRI JAIDEEEP M. SARNAIK
Ultra Plus Lubes Private Limited, Panvel	SHRI SIDDESH N. SAVANT SHRI N. C. SEKHARAN (*Alternate*)
Vinni Chemicals Private Limited, New Delhi	SHRI HARSH VARDHAN JAIN

PCD 25:1/P4 Panel for Formulating Standards for Base Oil

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Bharat Petroleum Corporation Limited, Mumbai	SHRI AMITAVA PAL
Central Revenue Control Laboratory, New Delhi	SHRI CHILAKA NARESH
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CSIR - Indian Institute of Petroleum, Dehradun	SHRI RAJ K. SINGH
Hindustan Petroleum Corporation Limited, Mumbai	SHRI ABHIJIT A. SARKAR
IFP Petro Products Private Limited, Ghaziabad	SHRI SANJAY BHARGAVA SHRI ANANT BHARGAVA (*Represe ve*)
Indian Oil Corporation (MKTG), Mumbai	SHRI S. VENKATESAN
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Petroleum Re-refiners Association of India, Jaipur	SHRI PHILIP MATHEW DR SHASHANK VASANT NIVSARKAR (*Representat*
Shell India Markets Private Limited, Mumbai	SHRI AJAY AGARWAL
Society of Indian Automobile Manufacturers (SIAM), Delhi	SHRI PRASHANT KUMAR BANERJEE SHRI SANDEEP GARG (*Alternate*)

(*Continued from second cover*)

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.

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