



एमआरपीएल

गुणवत्ता नियंत्रण प्रयोगशाला

वर्ष 2019 के लिए पेट्रो उत्पादों के लिए भारतीय मानक

MRPL

QC LABORATORY

**INDIAN STANDARD FOR PETROLEUM
PRODUCTS SPECIFICATION FOR
YEAR 2019**

BUREAU OF INDIAN STANDARDS (BIS)
SPECIFICATION FOR PETROLEUM PRODUCTS FOR YEAR
2019

S. No	Product Name	Specification Number and Revision Details
1	Liquefied Petroleum Gases (LPG)	IS 4576: 1999, 2 nd Revision, Reaffirmed 2014
2	Motor Gasoline – MG 91 BS IV	IS 2796:2017, 6 th Revision, Amendment No. 01, Sept'18
3	Aviation Turbine Fuels, (ATF) Kerosene Type, JET A-1	IS 1571:2018, 10 th Revision
4	Kerosene Grade A: Low Sulphur Kerosene Grade B: Kerosene	IS 1459: 2018, 4 th Revision
5	Automotive Diesel Fuel – Bharat Stage BS IV	IS 1460: 2017, 6 th Revision, Amendment No. 01, Sept'18
6	High Flash High Speed Diesel (HFHSD)	IS 16861:2018
7	Fuel Oil- MV2 Grade	IS 1593: 2018, 3 rd Revision
8	Paving Bitumen -VG 30	IS 73: 2013, 4 th Revision
9	Paving Bitumen -VG 10	IS 73: 2013, 4 th Revision
10	Paving Bitumen -VG 40	IS 73: 2013, 4 th Revision

Date of review: 01.01.2019

**SPECIFICATION FOR LIQUEFIED PETROLEUM GAS
(Commercial Butane-Propane Mixture)
IS 4576 – 1999**

S.No	CHARACTERISTIC	UNIT	REQUIREMENT	TEST METHOD
1	Density@ 15°C	g/ml	Report	ASTM D 2598
2	Vapour pressure at 40°C	kPa	1050 Max.	ASTM D 1267
3	Composition, Liquid		-	ASTM D 2163
	i. C2 Hydrocarbons (Ethane)	Vol%	Report	-
	ii. C3 Hydrocarbons (Propane)	Vol%	Report	-
	iii. C4 Hydrocarbons (Iso-Butane)	Vol%	Report	-
	iv. C4 Hydrocarbons (n- Butane)	Vol%	Report	-
	v. C5 Hydrocarbons & Heavier	Vol%	Max 2.5	-
	vi. Unsaturated Hydrocarbons	Vol%	Report	-
	OR		-	-
4	Volatility evaporation temperature in °C for 95 % by vol. at 760 mm Hg pressure	°C	Max +2	ASTM D 1837
5	Total Volatile Sulphur	ppm	Max 150.0	ASTM D 3246
6	Copper Corrosion @ 38°C, for 1 hour.		Not worse than No. 1	ASTM D 1838
7	Hydrogen Sulfide		Pass	ASTM D 2420
8	Free water Content		None	VISUAL

**SPECIFICATION FOR MOTOR GASOLINE
(REGULAR)MG 91
BHARAT STAGE IV
IS 2796 – 2017**

S.NO	CHARACTERISTIC	TEST METHOD	LIMIT	REQUIREMENT
1	Appearance	Visual	-	Clear and bright, Free from un-dissolved water, foreign matter and other impurities.
2	Colour	Visual	-	Orange
3	Density at 15°,kg/m3	ASTM D 4052	-	720 to 775
4	Distillation a) percent evaporated at 70°C (E 70°C), percent v/v b) percent evaporated at 100°C (E 100°C), percent v/v c) percent evaporated at 150°C (E 150°C), percent v/v d) Final boiling point,°C e) Residue, percent by volume	ASTM D 86	-	10-45
			-	40-70
			Min	75
			Max	210
			Max	2.0
5	Research octane number (RON)	IS 1448 P:27	Min	91
6	Motor octane number (MON)	IS 1448 P:26	Min	81
7	Gum content (Solvent washed),g/m3	IS 1448 P:29	Max	40
8	Total sulphur, mg/kg	ASTM D 5453/P:153	Max	50
9	Lead content (as Pb), g/l	IS 1448 P:112	Max	0.005
10	Reid vapour pressure (RVP) at 38°C, kPa	IS 1448 P: 39	Max	60
11	Vapour lock index (VLI) VLI= 10 RVP+7E 70°C	Calculation	Max	750 Summer 950 Other months
12	Benzene content percent by volume	ASTM D 3606	Max	1.0
13	Copper strip corrosion for 3 h at 50°C	IS 1448 P:15	-	Not worse than No.1
14	Water tolerance of motor gasoline-alcohol blends, temperature for phase separation	IS 2796:2017Annex-B #	Max	0°C Winter 10°C Other months
15	Engine intake system cleanliness	-	-	Report MFA used
16	Olefin content, percent by volume	ASTM D 1319/IS 1448 P:23	Max	21
17	Oxidation stability, minutes	IS 1448 P:28	Min	360

18	Aromatics content, percent by volume	ASTM D 1319/IS 1448 P:23	Max	35
19	Oxygen content, percent by mass	ASTM D 6839 #	Max	3.7
20	Ethanol content, percent by volume	ASTM D 4815 #	Max	5.0
21	Oxygenates percent by volume a) Ethers containing 5 or more 'C' atoms per molecules such as MTBE,ETBE or TAME b) Any other oxygenates	ASTM D 4815-Annex C #	Max -	15 Not permitted

SPECIFICATION FOR AVIATION TURBINE FUEL JET A-1 IS 1571-2018

S.NO	CHARACTERISTIC	TEST METHOD	LIMIT	REQUIREMENT
1	<i>Appearance:</i>			
a)	Visual appearance	Visual	-	Clear, bright and free from solid matter and un-dissolved water at ambient fuel temperature.
b)	Colour	ASTM D 6045	-	Report
c)	Particulate contamination at point of manufacture.mg/l	ASTMD 5452	Max	1.0
d)	Particulate, at point of manufacture, cumulative channel particle counts, 1) $\geq 4 \mu\text{m}(c)$ 2) $\geq 6 \mu\text{m}(c)$ 3) $\geq 14 \mu\text{m}(c)$ 4) $\geq 21 \mu\text{m}(c)$ 5) $\geq 25 \mu\text{m}(c)$ 6) $\geq 30 \mu\text{m}(c)$	IP 565	-	ISO code Channel counts Report Report Report Report Report Report
2	<i>Composition:</i>			
a)	Total acidity, mg KOH/g	IS 1448 P:113	Max	0.015
b)	Aromatics, percent by volume OR Total Aromatics percent by volume	IS 1448 P:23 ASTM D 6379	Max Max	25.0 (22.0 Defence Max) 26.5
c)	Total sulphur, percent by mass	ASTM D 4294	Max	0.30 (0.25 Defence Max)
d)	Sulphur mercaptan , percent (m/m) OR	IS 1448 P:109	Max	0.003 (0.002 Defence Max)
e)	Doctor Test	IS 1448 P:19	-	Negative
f)	Refining components, at the point of manufacture			
	1) Non-hydro processed components, percent (v/v)	-	-	Report
	2) Severely Hydro processed components, percent (v/v)	-	-	Report
	3) Mildly hydro processed components, percent (v/v)	-	-	Report
	4) Synthetic components, percent (v/v)	-	-	Report
3	<i>Volatility:</i>			
a)	Distillation: 1) Initial boiling point, °C 2) 10 percent recovery °C (v/v) 3) 50 percent recovery °C (v/v) 4) 90 percent recovery °C (v/v) 5)Final boiling point, °C	ASTM D 86	Max Max	Report 205.0 Report Report 300.0

	6) Residue, percent(v/v) 7) Loss ,percent (v/v)		Max Max	1.5 1.5
b)	Flash point (Abel),°C	IP 170	Min	38.0
c)	Density at 15°C,kg/m3	ASTM D 4052	-	775.0 to 840.0
4	Fluidity:			
a)	Freezing point,°C	ASTM D 5972	Max	Minus 47
b)	Kinematic viscosity at minus 20°C, mm2/s	IS 1448 P:25	Max	8.000
5	Combustion:			
a)	Specific energy MJ/kg	ASTM D 3338	Min	42.80
b)	Smoke point, mm or 1) Smoke point, mm 2) Naphthalenes, percent (v/v)	IP 598 IS 1448 P:118	Min Min Max	25.0 18.0 3.00
6	Corrosion:			
a)	Copper strip corrosion for 2 h at 100°C	IS 1448 P:15	-	Not worse than No.1
b)	Silver strip corrosion Classification for 4 h at 50°C	IP 227	-	"0" at Refinery point "1" at Delivery point
7	Thermal stability at control Temperature of 260°C.			
a)	Filter pressure differential, mm Hg	IS 1448 P:97	Max	25
b)	1) Tube rating, visual (VTR) 2) ITR or ETR, average over area of 2.5 mm ² in nm		Max	Less than 3, No 'Peacock' (P) or 'Abnormal' (A) 85
8	Contaminants:			
a)	Existent gum, mg/100ml	IS 1448 P:29	Max	7
9	Water Separation Characteristic:			
a)	Water reaction: Interface rating	IS 1448 P:42	Max	1b
b)	Micro-separometer rating at the point of manufacture: 1) MSEP without SDA 2) MSEP with SDA	IS 1448 P:142	Min Min	85 70
10	Conductivity			
	Electrical conductivity, pS/m	ISO 6297	Min Max	50 600
11	Lubricity:			
	Wear scar diameter, mm	ASTM D 5001	Max	0.85 (0.65 Defence Max)
12	Fatty Acid Methyl Ester, mg/kg	# IP 585	Max	50
13	Additives:			
	a) Static dissipater additive (SDA, mg/l) Qualification ref no: RDE/A/621 b) Antioxidant (for Hydro processed Qty) ,mg/l Qualification ref no: RDE/A/607	-	Max -	3.0 Range 17 to 24

**SPECIFICATION FOR KEROSENE
GRADE A-Low Sulphur Kerosene
IS 1459 -2018**

S.NO	CHARACTERISTICS	TEST METHODS	LIMIT	REQUIREMENT
1	Appearance	Visual	-	Clear and Bright, free from un-dissolved water, foreign matter and other visible impurities
2	Acidity, inorganic	ASTM D 974	-	Nil
3	Burning quality a) Char value, mg/kg of oil consumed.	IS 1448 P:5	Max	20
	b) Bloom on glass chimney		-	Not darker than grey
4	Colour a) Saybolt (in case of undyed kerosene)	ASTM D 156	Min	10
	b) Visual (in case of dyed kerosene)	Visual Annex A	-	Blue
5	Copper strip corrosion for 3 h at 50°C	IS 1448 P:15	-	Not worse than No.1
6	Density at 15°, kg/m ³	ASTM D 4052	-	Not limited, but to be reported
7	Distillation, a) Percent recovered upto 200°C, percent (v/v) b) Final boiling point, °C	ASTM D 86	Min	20
			Max	300
8	Flash point (Abel), °C	IP 170	Min	35
9	Smoke point, mm	IP 598	Min	18
10	Total sulphur content, percent, m/m	ASTM D 4294	Max	0.10

**SPECIFICATION FOR KEROSENE
GRADE B- Kerosene
IS 1459 -2018**

S.NO	CHARACTERISTICS	TEST METHOD	LIMIT	REQUIREMENT
1	Appearance	Visual	-	Clear and Bright,free from un-dissolved water,foreign matter and other visible impurities
2	Acidity,inorganic	ASTM D 974	-	Nil
3	Burning quality a) Char value,mg/kg of oil consumed.	IS 1448 P:5	Max	20
	b) Bloom on glass chimney		-	Not darker than grey
4	Colour a) Saybolt (in case of undyed kerosene)	ASTMD 156	Min	10
	b) Visual (in case of dyed kerosene)	Visual Annex A	-	Blue
5	Copper strip corrosion for 3 h at 50°C	IS 1448 P:15	-	Not worse than No.1
6	Density at 15°,kg/m ³	ASTM D 4052	-	Not limited ,but to be reported
7	Distillation, a) Percent recovered upto 200°C,percent (v/v) b) Final boiling point ,°C	ASTM D 86	Min	20
			Max	300
8	Flash point (Abel),°C	IP 170	Min	35
9	Smoke point, mm	IP 598	Min	18
10	Total sulphur content, percent, m/m	ASTM D 4294	Max	0.20

**SPECIFICATION FOR AUTOMOTIVE DIESEL FUEL
(BHARAT STAGE IV)
IS 1460 – 2017**

S.NO	CHARACTERISTIC	TEST METHOD	LIMIT	REQUIREMENT
1	Appearance	Visual	-	Clear, bright and free from sediments, suspended matter and undissolved water at normal ambient fuel temperature
2	Acidity, Inorganic,mg of KOH/g	ASTM D 974	-	Nil
3	Acidity,total,mg of KOH/g	ASTMD 974	Max	0.20
4	Ash,percent by mass	IS 1448 P:4	Max	0.01
5	Carbon residue(Ramsbottom or micro) on 10 percent residue,percent by mass	ASTM D 4530	Max	0.30
6	Cetane number	IS 1448 P: 9	Min	51
7	Cetane index	IP 380	Min	46
8	Pour point	ASTM D 5950	Max	3 °C Winter 15 °C Summer
9	Copper strip corrosion for 3 h at 50°C	IS 1448 P:15	-	Not worse than No.1
10	Distillation,95 percent v/v, recovery, °C	ASTM D 86	Max	360
11	Flash point,			
	a) Abel, °C	IP 170	Min	35
	b)PMCC,°C	ASTM D 93A	Min	66
12	Kinematic viscosity, cSt, at 40°C	IS 1448 P:25	-	2.0 to 4.5
13	Total contamination, mg/kg	IP 440	Max	24
14	Density at 15°,kg/m ³	ASTM D 4052	-	815 to 845
15	Total sulphur, mg/kg	ASTM D 5453/D 4294	Max	50
16	Water content, mg/kg	ISO 12937	Max	200
17	Cold Filter Plugging Point (CFPP)	ASTM D 6371	-	6°C Winter 18°C Summer
18	Oxidation stability,g/m ³	IS 1448 P:154	Max	25
19	Polycyclic Aromatic Hydrocarbon (PAH),percent by mass	IP 391	Max	8
20	Lubricity corrected wear scar diameter (wsd 1.4) at 60°C,microns	ISO 12156/P:149	Max	460
21	FAME content,% v/v	ASTM D 7371#	Max	7.0

SPECIFICATION FOR HFHSD IS 16861–2018

S.NO	CHARACTERISTICS	TEST METHOD	LIMIT	REQUIREMENT
1	Appearance	Visual	-	Clear and Bright
2	Acid Number, mg of KOH/g	ASTM D 974	Max	0.5
3	Ash, percent by mass	IS 1448 P:4	Max	0.01
4	Carbon residue on 10 percent volume distillation residue,% mass	ASTM D 4530	Max	0.3
5	Cetane index	ASTM D 4737	Min	45
6	Pour point	ASTM D 97	Max	3 °C Winter 15 °C Summer
7	Copper strip Corrosion for 3 h at 100°C	ASTM D 130	-	Not worse than No.1
8	Distillation,% (v/v), recovered a) at 350°C b) at 370°C	ASTM D 86	Min	85 95
9	Flash point Pensky Martens closed cup °C	ASTM D 93	Min	66
10	Kinematic viscosity, cSt ,at 40°C	IS 1448 P:25	-	2.0 to 5.0
11	Density at 15°,kg/m3	ASTM D 4052	Max	860
12	Total sulphur, % by mass	ASTM D 4294	Max	0.20
13	Water content, ppm	ISO 12937	Max	500
14	Cold Filter Plugging Point (CFPP),°C	ASTM D 6371	-	To report
15	Oxidation stability, g/m3	ASTM D 2274	Max	25
16	Lubricity corrected WSD at 60°C,microns	ISO 12156-1	Max	520

**SPECIFICATION FOR FURNACE OIL
MV2 Grade
IS 1593-2018**

S. No	CHARACTERISTIC	UNIT	TEST METHOD	REQUIREMENT
1	Acidity, Inorganic	mg KOH/gm	IS 1448, P: 2	Nil
2	Ash	% Mass	IS 1448, P: 4	Max 0.1
3	Carbon residue-Micro	% Mass	ISO 10370	Max 18.0
4	Gross Calorific Value	Cal/gm	IS 1448, P: 7	Report
5	Density at 15°C or Relative Density @ 15.6/15.6°C	Kg/m ³ -	IS 1448, P:16	Report
6	Flash Point (PMC)	°C	IS 1448, P: 21	Min 66.0
7	Kinematic Viscosity at 50 ° C	cSt	IS 1448, P: 25	125- 180
8	Sediment	% Mass	IS 1448, P: 30	Max 0.25
9	Total Sulphur	% Mass	ISO 8754	Max 4.0
10	Water content	% Vol	IS 1448, P: 40	Max 1.0
11	Pour Point	°C	ASTM D 97	Report
12	Spot Test	Number	ASTM D 4740	Report
13	Asphaltene content	% Mass	IP 143	Report

Note: Tests indicated in Sl. No. 11-13 are, as per customer requirements.

SPECIFICATION FOR PAVING BITUMEN (VG 30) IS 73 - 2013

S. No	CHARACTERISTIC	UNIT	REQUIREMENT	TEST METHOD
1	Specific Gravity/Density at 27°C/27°C	-	Report	IS 1202
2	Absolute Viscosity at 60°C	poises	Range 2400-3600	IS 1206(Part 2)
3	Kinematic viscosity at 135°C	cSt	Min 350	IS 1206(Part 3)
4	Flash Point (COC)	°C	Min 220	IS 1448 P:69
5	Solubility in Trichloroethylene	%	Min 99.0	IS : 1216
6	Penetration at 25 ° C,100 g,5 sec	0.1 mm	Min 45	IS: 1203
7	Softening Point (R&B)	°C	Min 47	IS: 1205
8	Tests on Residue from thin film oven tests/ RTFOT			
i)	Viscosity ratio at 60°C	Calculation	Max 4.0	IS 1206(Part 2)
ii)	Ductility at 25°C, cm, after Rotating thin film oven test	cm	Min 40	IS 1208

**SPECIFICATION FOR PAVING BITUMEN (VG 10)
IS 73 - 2013**

S. No	CHARACTERISTIC	UNIT	REQUIREMENT	TEST METHOD
1	Specific Gravity/Density at 27°C/27°C	-	Report	IS 1202
2	Absolute Viscosity at 60°C	poises	Range 800-1200	IS 1206(Part 2)
3	Kinematic viscosity at 135°C	cSt	Min 250	IS 1206(Part 3)
4	Flash Point (COC)	°C	Min 220	IS 1448, P:69
5	Solubility in Trichloroethylene	%	Min 99.0	IS : 1216
6	Penetration at 25 °C,100 g,5 sec	0.1 mm	Min 80	IS: 1203
7	Softening Point (R&B)	°C	Min 40	IS: 1205
8	Tests on Residue from thin film oven tests/ RTFOT			
i)	Viscosity ratio at 60°C	Calculation	Max 4.0	IS 1206(Part 2)
ii)	Ductility at 25°C, cm, after Rotating thin film oven test	cm	Min 75	IS 1208

SPECIFICATION FOR PAVING BITUMEN (VG 40) IS 73 - 2013

S. No	CHARACTERISTIC	UNIT	REQUIREMENT	TEST METHOD
1	Specific Gravity/Density at 27°C/27°C	-	Report	IS 1202
2	Absolute Viscosity at 60°C	poises	Range 3200-4800	IS 1206(Part 2)
3	Kinematic viscosity at 135°C	cSt	Min 400	IS 1206(Part 3)
4	Flash Point (COC)	°C	Min 220	IS 1448 P:69
5	Solubility in Trichloroethylene	%	Min 99.0	IS : 1216
6	Penetration at 25 ° C,100 g,5 sec	0.1 mm	Min 35	IS: 1203
7	Softening Point (R&B)	°C	Min 50	IS: 1205
8	Tests on Residue from thin film oven tests/ RTFOT			
i)	Viscosity ratio at 60°C	Calculation	Max 4.0	IS 1206(Part 2)
ii)	Ductility at 25°C, cm, after Rotating thin film oven test	cm	Min 25	IS 1208