

<b>Laboratory</b>	<b>MRPL Quality Control Laboratory, Mangalore Refinery and Petrochemicals Ltd., Kuthethoor P.O., (Via) Katipala, Mangalore, Karnataka</b>		
<b>Accreditation Standard</b>	<b>ISO/IEC 17025: 2005</b>		
<b>Discipline</b>	<b>Chemical Testing</b>	<b>Issue Date</b>	<b>31.03.2016</b>
<b>Certificate Number</b>	<b>T-1328</b>	<b>Valid Until</b>	<b>30.03.2018</b>
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<b>S. No.</b>	<b>Product / Material of Test</b>	<b>Specific Test Performed</b>	<b>Test Method Specification against which tests are performed</b>	<b>Range of Testing / Limits of Detection</b>
<b>I.</b>	<b>PETROLEUM</b>			
<b>1.</b>	<b>KEROSENE, HSD, FO</b>	Acidity	IS 1448 (Part 1): 2007 IP 177: 2013 ASTM D 664: 2011	(0.05 mg KOH to 0.50 mg KOH)/g
			IS 1448 (Part 2): 2007 IP 182: 2006 IP 139: 2004 ASTM D 974: 2015	(0.01 mg KOH to 0.50 mg KOH)/g
<b>2.</b>	<b>HSD, FO</b>	Ash Content	IS 1448 (Part 4): 2008 ISO 6245: 2001E IP 4: 2012 ASTM D 482: 2013	0.0001 % wt to 0.18 % wt
		Pour Point	IS 1448 (Part 10/Sec II): 2013 ISO 3016: 1994E IP 15: 2014/ ASTM D 97: 2012 ASTM D 5950: 2012	(-)30 <sup>0</sup> C to (+)30 <sup>0</sup> C
		Sediments by Extraction	IS 1448 (Part 30): 2013 ISO 3735: 1999 IP 53: 2014 ASTM D 473: 2012	0.01 % wt to 0.1 % wt
		Water Content	IS 1448 (Part 40): 2006 ISO 3733: 1999 IP 74: 2014 ASTM D 95: 2013	0.02 % vol to 10 % vol
		Flash Point	IS 1448 (Part 21): 2012 ISO 2719: 2002 E IP 34: 2003 ASTM D 93 A & B: 2012	35 °C to 120 °C

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3.	HSD	Water Content	ISO 6296: 2000 IP 439: 2001 ASTM D 4377: 2011	0.02 % m/m to 0.10 % m/m
		RCR	ISO 12937: 2000/ IP 438: 2013 IS 1448 (Part 8): 2003 ISO 6615: 1993(E) ASTM D 524: 2010	0.003 % to 0.10 % 0.01 % wt to 2.0 % wt
		Cetane Index Calculated)	IP 380: 2014 ASTM D 4737: 2010	32.5 to 65
		Cetane Number	IS 1448 (Part 9): 2007 ISO 5165: 1998 IP 41: 2014 ASTM D 613: 2010	30 to 65
		CFPP	IS 1448 (Part 110): 2003 IP 309: 2014 ASTM D 6371: 2010	(-)10°C to (+)10 °C
		Cloud Point	IS 1448 (Part 10/Sec I): 2012 ASTM D 5771: 2012	(-)10°C to +18 °C
		HFRR	ISO 12156: 2007 IP 450: 2000 ASTM D 6079: 2011	200 µm to 500 µm
		Oxidation Stability	IP 388: 2004 ASTM D 2274: 2010	(0.1 mg to 2.5 mg)/100ml
		PAH	IP 391: 2007 ASTM D 6591: 2011	0 % wt to 5.0 % wt

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	<b>HSD</b>	Total Contamination	ISO EN 12662: 08/ IP 440: 2008	1.0 mg/kg to 40 mg/kg
<b>4.</b>	<b>HSD, FO, ATF</b>	Kinematic Viscosity	IS 1448 (Part 25): 2007 ISO 3104: 1997 IP 71: 1997 ASTM D 445: 2012	1.0 cSt to 380 cSt
<b>5.</b>	<b>Naphtha, KEROSENE, ATF, HSD</b>	Colour	IS 1448 (Part 14): 2003 IP 196: 2011 ASTM D 1500: 2012 ASTM D 156: 2012 ASTM D 6045: 2012	0 to 30
<b>6.</b>	<b>FO , HSD, Naphtha</b>	Calorific Value	IS 1448 (Part 6): 2007 IP 12: 2001 ASTM D 240: 2009	8000 cal/g to 13,000 cal/g
<b>7.</b>	<b>FO</b>	Asphaltenes	IP 143: 2004	0.5 % wt to 15 % wt
		MCR	ISO 10370 : 1996 IP 398: 2004 ASTM D 4530: 2011	0.1 % wt to 25 % wt
		Sediments - Total	ISO 10307-1, 2-B- 2009 IP 375: 2011/ IP 390: 2011 ASTM D 4870: 2009	0.01 % wt to 0.5 % wt
		H <sub>2</sub> S	ASTM D 7621: 2013	0 mg/kg to 30.0 mg/kg
<b>8.</b>	<b>KEROSENE</b>	Burning Quality (Char value)	IS 1448 (Part 5): 2008 IP 10: 2012	0 mg/kg to 20 mg/kg
<b>9.</b>	<b>KEROSENE, ATF</b>	Smoke Point	IS 1448 (Part 31): 2003 ISO 3014: 1993/ IP 57: 2013 ASTM D 1322: 2012	15 mm to 30 mm

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10.	KEROSENE, ATF, HSD, MIXED XYLENE	Flash Point	IS 1448 (Part 20): 2004 ISO 13736: 2008 IP 170: 2014	19 °C to 70 °C
11.	ATF	Acidity	IS 1448 (Part 113): 1983 (RA 2006) IP 354: 2009 ASTM D 3242: 2011	(0.01 mg KOH to 0.50 mg KOH)/g
		Flash Point	ASTM D 56: 2010	30 °C to 70 °C
		Aniline Point	IS 1448 (Part 3): 2007 IP 2: 2014/ ASTM D 611: 2012	50 °C to 80 °C
		BOCLE	ASTM D 5001: 2010	0.4 mm to 1.0 mm
		Doctor Test	IS 1448 (Part 19): 2007 ASTM D 4952: 2012	Qualitative (Pass / Fail)
		Freezing Point	IS 1448 (Part 11): 2004 ASTM D 2386: 2012, ASTM D 5972: 2010	(-)80 °C to (-)30 °C
		JFTOT	IS 1448 (Part 97): 2007 ISO 6249: 1999 ASTM D 3241: 2013	Upto 25 mm Hg
		MSEP	IS 1448 (Part 142): 2006 ASTM D 3948: 2013	50 to 100
		Naphthalene	IS 1448 (Part 118): 2007 ASTM D 1840-B: 2013	0.08 % vol to 5.0 % vol

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	<b>ATF</b>	Particulate Contaminations	IP 423: 10/ ASTM D 5452: 2013	0.02 mg/l to 6.0 mg/l
		Water Reaction	IS 1448 (Part 42): 2006 IP 289: 2006 ASTM D 1094: 2013	1 to 4
		Cumulative Channel Particle Count	IP 565: 2013	4 microns to 100 microns
		Silver Corrosion Test	ASTM D 227: 1987	0 to 4 Number
<b>12.</b>	<b>ATF, HSD</b>	Electrical Conductivity	ISO 6297: 1997 IP 274: 2009 ASTM D 2624: 2009	(15 pS to 700 pS)/m
<b>13.</b>	<b>ATF, MS</b>	Sulphur - Mercaptan	IS 1448 (Part 109): 2004 ISO 3012: 1999 IP 342: 2014 ASTM D 3227: 2013	3 mg/kg to 40 mg/kg
<b>14.</b>	<b>MS, ATF</b>	Existent Gum	IS 1448 (Part 29): 2004 ISO 6246: 1998 IP 131: 1999 ASTM D 381: 2012	(1 mg to 7.0 mg)/100 ml 10 g/m <sup>3</sup> to 70 g/m <sup>3</sup>
<b>15.</b>	<b>ATF, MS, Naphtha</b>	FIA Analysis	IS 1448 (Part 23): 2004 ISO 3837: 1993 IP 156: 2008 ASTM D 1319: 2013	A: 5.0 vol % to 50 vol %
<b>16.</b>	<b>MS, Naphtha, Kerosene, ATF, HSD, Mixed Xylene</b>	Copper Strip Corrosion Test	IS 1448 (Part 15): 2004 ISO 2160: 1998 E IP 154: 2013 ASTM D 130: 2012 ASTM D 849: 2011	1 to 4 Number

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17.	<b>Naphtha, MS, KEROSENE, ATF, HSD, FO. MIXED XYLENE</b>	Density	IS 1448 (Part 16): 2014 ISO 3675: 2001 ISO 12185: 1996E IP 160: 1999/ IP 365: 2004 ASTM D 1298: 2012b ASTM D 4052: 2011	0.65 g/ml to 1.00 g/ml
18.	<b>MS, HSD</b>	Total Sulphur	ASTM D 5453: 2012  ISO 14596: 2007	1.0 mg/l to 50 mg/l  0.001 % m/m to 1.0 % m/m
19.	<b>Naphtha, MS, KEROSENE, ATF, HSD, FO</b>	Total Sulphur	ISO 8754: 2003E IP 336: 2004 ASTM D 4294: 2010	17 mg/kg to 4.0 % wt
20.	<b>MS</b>	Induction Period	IS 1448 (Part 28): 2008 ISO 7536: 1994 IP 40: 2014 ASTM D 525: 2012a	1 min to 360 min
		Benzene Content	ASTM D 3606: 2010	0.1 vol % to 5 vol %
		Lead	IP 352: 2007 ASTM D 3237 (2012)	2.5 mg/l to 25 mg/l
		MON	IS 1448 (Part 26): 2013 ISO 5163: 2005 IP 236: 2009 ASTM D 2700: 2013b	70 to 100
		RON	IS 1448 (Part 27): 2013 ISO 5164: 2005 IP 237: 2006 ASTM D 2699-2013 b	85 to 100

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	<b>MS</b>	Potential Gum	IS 1448 (Part 147): 2004 ISO 6246: 1998 IP 131: 1999 ASTM D 873: 2012	4 g/m <sup>3</sup> to 60 g/m <sup>3</sup>
<b>21.</b>	<b>Naphtha, MS</b>	Vapour Pressure, Reid Method	IS 1448 (Part 39): 2012 ISO 3007: 1999 IP 69: 2008 ASTM D 323: 2008	7 kPa to 100 kPa
<b>22.</b>	<b>Naphtha</b>	Chloride Content	ASTM D 4929-B: 2007	0.5 mg/kg to 10.0 mg/kg
		Residue On Evaporation	IS 1448 (Part 64): 2008	(1 mg to 10 mg) /100ml
		PIONA (Paraffin)	ASTM D 6733: 2011	60.0 % to 95 %
		PIONA (Olefin)		0.2 % to 2.0 %
		PIONA (Naphthenes)		5 % to 25 %
		PIONA (Aromatics)		0.5 % to 25 %
<b>23.</b>	<b>KEROSENE, ATF, HSD, Naphtha, MS</b>	Distillation	IS 1448 (Part 18): 2006 ISO 3405: 2011/ IP 123: 2011 ASTM D 86: 2011b	30 °C to 370 °C
<b>24.</b>	<b>Mixed Xylene</b>	Distillation	ASTM D 850: 2011	30 °C to 250 °C
		Nitrogen	ASTM D 6069: 2006	0.2 mg/kg to 2.0 mg/kg
		Bromine Index	ASTM D 5776: 2012	(0 to 50 mg Br)/100 g
		Pt/Co Color	ASTM D 5386: 2010	0 color to 100 color

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	Mixed Xylene	Composition	ASTM D 6563: 2012	0.01 % wt to 99.0 % wt
		Acid Wash colour	ASTM D 848: 2009	0 to 14 Scale
25.	Treated Effluent	pH	APHA 4500-H <sup>+</sup> B: 2012 ASTM 1293: 2012	5 to 10
		Suspended Solid	APHA 2540D: 2012 3025 17: 1984	2.5 mg/l to 100 mg/l
		Sulphide	APHA 4500S <sup>2</sup> F: 2012 3025 29: 1986	0 mg/l to 5.0 mg/l
		COD	APHA 5220B: 2012 ASTM 1252: 2012	0 mg/l to 250 mg/l
		Oil & Grease	APHA 5520C: 2012	0 mg/l to 100 mg/l
		Phenol	APHA 5530C: 2012 3025 43: 1992	0 mg/l to 5.0 mg/l
		BOD	APHA 5210-B: 2012 3025c44: 1993	0 mg/l to 50 mg/l

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