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|-------------------------------|--|--------------------|-------------------|
| Laboratory | HPCL, Chennai Quality Control Lab, Chennai Terminal, 98/99, Elya Mudali Street, Washermanpet, Chennai, Tamil Nadu | | |
| Accreditation Standard | ISO/IEC 17025: 2005 | | |
| Discipline | Chemical Testing | Issue Date | 30.01.2014 |
| Certificate Number | T-1680 | Valid Until | 29.01.2016 |
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| S.No. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|--------------|---|--|--|---|
| I. | PETROLEUM PRODUCTS | | | |
| 1. | MS / HSD / SKO / SOLVENT/ HEXANE / LUBRICANTS | Appearance | -- | Visual |
| 2. | LUBRICANTS | Ca Content (% mass) | ASTM D 6481(2010) | 0.02 - 1% by weight |
| 3. | MS / HSD / SKO / LDO / SOLVENTS | Cu Strip Corrosion | IS:1448(P-15):2004/ ASTM D130 (2010) | |
| 4. | LUBRICANTS | Apparent Viscosity Cold - Cranking Simulator | ASTM 5293(2010) | 1700-17000 cP (-15 & -20°C) |
| 5. | LUBRICANTS | Density in gm/ml at 29.5°C | IS:1448(P-16):1990 (Reaffirmed 2002)/ ASTM D1298(1999, Reapproved 2005) | 0.750-1.000 |
| 6. | SKO / SOLVENTS | Colour, Saybolt | IS:1448(P-14):1960 (Reaffirmed 2003) | (-)16 to (+)30 units |
| 7. | LUBRICANTS | Specific Gravity @ 15.6 °C | IS:1448(P-16):1990 (Reaffirmed 2002)/ ASTM D1298(1999) | 0.7 - 1.5 |
| 8. | MS / HSD / SKO / LDO / FO / SOLVENTS / HEXANE / LSHS | Density & Specific Gravity at 15°C, Kg/m ³ | IS:1448(P-16):1990 (Reaffirmed 2002)/ ASTM D1298(1999) | 650-1 kg/m ³ |

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| 10. | LUBRICANTS | Emulsion Characteristics | ASTM D1401 (2002) | 1- 30 ml |
| 11. | SKO / HSD / SOLVENTS | Flash Point (Abel)°C | IS:1448(P-20):1998/ IP 170(2009) | 10 - 66 °C |
| 12. | HFHSD / LDO / FO / LUBRICANTS / LSHS | Flash Point PMCC | IS:1448(P-21) :1998 / ASTM D93(2013) | 60 - 400 °C |
| 13 | LUBRICANTS | Flash Point COC | ASTM D : 92 (2012) / IS:1448(P-69) : 1969 (Reaffirmed 2013) | 66- 400 °C |
| 14. | LUBRICANTS / LSHS | Kinematic Viscosity, at 100°C | IS:1448(P-25):1976 (Reaffirmed 2002)/ ASTM D445(2012) | 0.5 - 100 cSt, |
| 15. | HSD / LDO / LUBRICANTS | Kinematic Viscosity, at 40°C | IS:1448(P-25):1976 (Reaffirmed 2002)/ ASTM D445(2012) | 2.0 - 500 cSt |
| 16. | FO | Kinematic Viscosity, at 50°C | IS:1448(P-25):1976 (Reaffirmed 2002)/ ASTM D445(2012) | 80- 500 cSt |
| 17. | MS | Research Octane No.(RON) | IS:1448(P-27/ ISO5164-2013)/ ASTM D2699 (2013) | 40 - 100 |
| 18. | MS / HSD / SKO / LDO / FO / LSHS | Sulphur, Total | IP 336 / 1986, ASTM D 4294 (2010) ISO 20847-2004 | 3 - 1000 mg/L 1 - 5% by mass |

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| 19. | LUBRICANTS | Total Base Number (TBN) mg KOH/gm, | IS:1448 (P:86) :1977/ ASTM D : 2896 (2011) | 0.1- 100 |
| 20. | LUBRICANTS | Viscosity Index | IS:1448 (P : 56) : 1980 (Reaffirmed 2013)/ ASTM D : 2270 (1998) | 65- 165 |
| 21. | HSD / LDO / FO / LUBRICANTS / LSHS | Water Content | IS:1448(P-40):1987 (Reaffirmed 2000)/ ASTM D95 (2013) | 0.01 - 25 % by Vol. |
| 22 | LUBRICANTS | Zn content (% mass) | ASTM D 6481(2010) | 0.02 - 0.3 % by mass |
| 23 | HSD / LDO / FO / LSHS/ LUBRICANTS | Pour Point, °C | IS:1448 (P:10) :1970 (Reaffirmed 2008)/ ASTM D-97 (2012) | 45 to - 36 °C |
| 24 | HSD / LDO / FO / LSHS/ LUBRICANTS | Pour Point, °C | ASTM D-5950 (2012) | 45 to - 36 °C |
| 25. | LUBRICANTS | Colour (Auto) | ASTM D 6045 (2012) | -16 to + 30 - Saybolt 0 to 8 max |
| 26. | LUBRICANTS | Total Acidity, mg KOH/gm (TAN) | ASTM D-974 (2012) | 0.2 - 3.0 mg KOH/gm |
| 27. | LUBRICANTS | Total Acidity, mg KOH/gm (TAN) | ASTM D 664(2011) | 0.02 - 6 |
| 28. | LUBRICANTS | Foaming Tendency (Sequence I , II , III) | ASTM D-892 (2013) | 10 - 300 ml |

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| 29. | LUBRICANTS | Rust Test | IS:1448 (P:96):2004 Reaffirmed/ ASTM D6577 2013) | Pass/Fail |
| 31. | LUBRICANTS | Saponification Value | IS:1448 (P:55) sec 1:2004 / ASTM D 94 (2012) | 0.5 - 10.0 mg KOH/gm |
| 32. | LUBRICANTS | Evaporation Loss | IS 1448 P 2664 (A) (2003) | 0.01 - 1.0% |
| 33. | LUBRICANTS | Metal Elements % Wt. By ICP | ASTM D-4951(2009) | 3 - 5000 mg/L |
| 34. | USED OILS | Metal Elements % Wt By ICP. | ASTM D-5185(2013) | 3 - 5000 mg/L |
| 35. | FO/LSHS | Al & Si content % Wt | ASTM D-5184(2012) | Al 5 - 150 mg/L Si 10 - 250 mg/L |
| 36. | FO/LSHS | Aluminum ,Silicon, Vanadium, Nickel, Iron , Sodium, Calcium, Zinc and Phosphorus | IP 501(2005) | Al – 5- 150 mg/L Silicon – 5 - 250 Vanadium – 5 - 400 mg/L Nickel – 5 - 100 mg/L Iron – 5 -60 ppm Calcium- 3 - 100 mg/L Sodium – 5 - 100 mg/L Zinc – 5 - 70 mg/L Phosphorus – 5- 60 mg/L |
| 37. | FO | Total sediments (potential) in Fuel oils | ISO 10307-2 (2009) IP 390 (2011) | 0.01 - 0.5 % |

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| 38. | FO/LSHS | Sediment by Extraction | ISO 3735 (1999)/ IP 53(2000 Reaffirmed 2010) IS 1448-P 30:2013/ ASTM D 473(2012) | 0.001 - 10 % |
| 39. | LUBRICATING GREASES | Cone Penetration 0.1 MM (Worked & Unworked) | IS1448 - P-60:1994/ ASTM D 217 (2010) | 100 - 400 |
| 40. | LUBRICATING GREASES | Drop Point | IS 1448 -P 52:1971/ ASTM - D 566(2009) | 70- 250 ° C |
| 41. | LUBRICATING OILS/ HSD | Water content | IP 438 (2001)/ ISO 12937 (2001) | 20 - 1000 mg/L |
| 42. | MS/HSD | Sulphur | ASTM 2622(2010) | 3- 5000 mg/L |
| 43. | LUBRICATING OIL | P, S, Ca, & Zn | ASTM 6443 -04 (2010) | 3 - 5000 mg/L |
| 44. | HSD/FO/LSHS | Micro carbon Residue %/mass | ASTM D 4530(2011)/ ISO 10370(1993)/ IP 398 (2004) | 0.01 - 20 |
| 45. | LUBRICANTS | Sulfated Ash % by mass | IS 1448-P 4: 1984 (Reaffirmed 2008)/ ASTM D874 (2007) | 0.5- 2% |
| 46. | FO/LSHS/ LUBRICANTS | Ash % by mass | ASTM D 482(2007)/ ISO 6245 (2001) | 0.001 - 2% |

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