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| **Laboratory** | **Plant Laboratory, Bharat Heavy Electricals Limited, Tiruchirappalli, Tamil Nadu** | | |
| **Accreditation Standard** | **ISO/IEC 17025: 2005** | | |
| **Discipline** | **Chemical Testing** | **Issue Date** | **08.12.2014** |
| **Certificate Number** | **T-0004** | **Valid Until** | **07.12.2016** |
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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.** | **METAL AND ALLOYS** | | | |
| **1.** | **Steel, Iron and Nickel Alloys** | Carbon | ASTM E 1019-11 | 0.01 % to 4.50 % |
| | | Sulphur | ASTM E 1019-11 | 0.01 % to 0.35 % |
| **2.** | **Carbon And Low Alloy Steels** | Carbon | ASTM E 415-14 | 0.08 % to 1.1 % |
| | | Sulphur | ASTM E 415-14 | 0.01 % to 0.05 % |
| | | Manganese | ASTM E 415-14<br>ASTM E 350-12 | 0.10 % to 1.50 %<br>0.10 % to 1.50 % |
| | | Silicon | ASTM E 415-14 | 0.05 % to 1.15 % |
| | | Phosphorous | ASTM E 415-14<br>ASTM E 350-12 | 0.02 % to 0.085 %<br>0.01 % to 0.085 % |
| | | Chromium | ASTM E 415-14<br>ASTM E 350-12 | 0.05 % to 2.25 %<br>0.05 % to 3.99 % |
| | | Nickel | ASTM E 415-14<br>ASTM E 350-12 | 0.05 % to 5.00 %<br>0.05 % to 5.00 % |
| | | Molybdenum | ASTM E 415-14 | 0.05 % to 0.60 % |
| | | Copper | ASTM E 415-14 | 0.05 % to 0.50 % |
| | | Cobalt | ASTM E 415-14 | 0.02 % to 0.18 % |

| S.No. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | **Carbon And Low Alloy Steels** | Vanadium | ASTM E 415-14 | 0.02 % to 0.30 % |
| | | Aluminium | ASTM E 415-14 | 0.02 % to 0.075 % |
| **3.** | **Stainless Steel** | Carbon | ASTM E 1086-14 | 0.01 % to 0.25 % |
| | | Sulphur | ASTM E 1086-14 | 0.01 % to 0.06 % |
| | | Manganese | ASTM E 1086-14 | 0.20 % to 2.00 % |
| | | Silicon | ASTM E 1086-14 | 0.05 % to 0.90 % |
| | | Phosphorous | ASTM E 1086-14<br>ASTM E 353-93 RA 06 | 0.01 % to 0.15 %<br>0.01 % to 0.20 % |
| | | Chromium | ASTM E 1086-14<br>ASTM E 353-93 RA 06 | 17 % to 23.00 %<br>0.5 % to 30.0 % |
| | | Nickel | ASTM E 1086-14<br>ASTM E 353-93 RA 06 | 7.5 % to 13.0 %<br>0.5 % to 25.0 % |
| | | Molybdenum | ASTM E 1086-14 | 0.05 % to 3.00 % |
| | | Copper | ASTM E 1086-14 | 0.01 % to 0.30 % |
| | | Titanium | ASTM E 1086-14 | 0.02 % to 1.00 % |

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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 |
|---|---|---|---|---|
| **4** | **Nickel base alloys (Inconel only)** | Carbon | OES Technique-in house validated method PL:WI:121:01:02 | 0.01 % to 0.20 % |
| | | | ASTM E 1019-11 | 0.01 % to 0.20 % |
| | | Sulphur | OES Technique-in house validated method PL:WI:121:01:02 | 0.01 % to 0.03 % |
| | | | ASTM E 1019-11 | 0.01 % to 0.03 % |
| | | Manganese | OES Technique-in house validated method PL:WI:121:01:02 | 0.10 % to 1.50 % |
| | | | ICP: ASTM 2594-09 RA 2014 | 0.10 % to 1.50 % |
| | | Silicon | OES Technique-in house validated method PL:WI:121:01:02 | 0.10 % to 1.0 % |
| | | Phosphorous | OES Technique-in house validated method PL:WI:121:01:02 | 0.01 % to 0.03 % |
| | | Iron | OES Technique-in house validated method PL:WI:121:01:02 | 0.20 % to 11.0 % |
| | | | ICP: ASTM 2594-09 RA 2014 | 0.20 % to 11.0 % |
| | | Chromium | OES Technique PL:WI:121:01:02 | 1.00 % to 20.0 % |
| | | | ICP: ASTM 2594-09 RA 2014 | 1.00 % to 23 % |

| S.No. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | **Nickel base alloys (Inconel only)** | Titanium | ICP: ASTM 2594-09 RA 2014 | 0.1 % to 3.0 % |
| | | Aluminium | ICP: ASTM 2594-09 RA 2014 | 0.1 % to 1.0 % |
| **II.** | **PAINTS AND SURFACE COATING** | | | |
| **1.** | **Paint** | Consistency (Flow cup method) | IS 101: 1989 (Part 1/Sec 5) (RA 2009) | 10.0 s to 150.0 s |
| | | Mass per Ten liters | IS 101: 1987 (Part 1/Sec 7) (RA 2009) | 8.0 to 25.0 kg/10 L |
| | | Drying Time | IS 101: 1986 (Part 3/Sec 1) (RA 2012) | Upto 24.0 hrs |
| | | Dry Film Thickness in (on brushed paint coating) microns | IS 101: 1989 (Part 3/Sec 2) (RA 2009) | Upto 50 μm<br>50 μm to 200 μm<br>200 μm to 400 μm<br>400 μm to 1000 μm |
| | | Pigment | IS 101: 1990 (Part 8/Sec 2) (RA 2012) | 10.0 % to 60.0 % |
| | | Volume Solids | IS 101: 1993 (Part 8/Sec 6) (RA 2009) | 10.0 % to 75.0 % |
| | | Iron oxide in pigment % by mass | IS 6947: 1975 (Part 2) (RA 2004) | 10.0 % to 60.0 % |

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|---|---|---|---|---|
| | **Paint** | Volatile Matter | IS101: 1986 (Part 2/Sec 2) (RA 2012) | 0 to 50 % |

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