| | | | |
|---|---|---|---|
| **Laboratory** | **Metallurgical Laboratory, Heavy Vehicles Factory, Avadi, Chennai, Tamil Nadu** | | |
| **Accreditation Standard** | **ISO/IEC 17025: 2005** | | |
| **Discipline** | **Chemical Testing** | **Issue Date** | **18.09.2016** |
| **Certificate Number** | **T-0950** | **Valid Until** | **17.09.2018** |
| **Last Amended on** | **22.09.2016** | **Page** | **1 of 4** |

| S. No. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| **I.** | **METALS & ALLOYS** | | | |
| **1.** | **Low Alloy Steel** | C | ASTM E 415: 2015<br>IS 8811: 1998 (RA 2012) | 0.02 % to 1.5 % |
| | | Si | | 0.05 % to 1.7 % |
| | | Mn | | 0.03 % to 1.54 % |
| | | P | | 0.005 % to 0.09 % |
| | | S | | 0.005 % to 0.0769 % |
| | | Cr | | 0.05 % to 3.2 % |
| | | Ni | | 0.05 % to 4.58 % |
| | | Mo | | 0.03 % to 1.2 % |
| | | V | | 0.01 % to 0.65 % |
| | | Cu | | 0.01 % to 0.73 % |
| | | Al | | 0.012 % to 0.09 % |
| | | Co | | 0.01 % to 0.10 % |
| | | W | | 0.05 % to 0.30 % |
| | | Sn | | 0.03 % to 0.11 % |
| **2.** | **Stainless Steel** | C | ASTM E 1086-14<br>IS 9879: 1998 | 0.02 % to 0.3 % |
| | | Si | | 0.32 % to 1.4 % |
| | | Mn | | 0.20 % to 2.00 % |

| S. No. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | **Stainless Steel** | P | ASTM E 1086-14<br>IS 9879: 1998 | 0.015 % to 0.035 % |
| | | S | | 0.002 % to 0.04 % |
| | | Cr | | 9.0 % to 25.0 % |
| | | Ni | | 0.25 % to 36.0 % |
| | | Mo | | 0.03 % to 2.15 % |
| | | V | | 0.02 % to 0.18 % |
| | | Cu | | 0.05 % to 0.38 % |
| | | Al | | 0.02 % to 0.04 % |
| | | Co | | 0.02 % to 0.23 % |
| | | W | | 0.02 % to 0.10 % |
| | | Nb | | 0.01 % to 0.28 % |
| **3.** | **Tool Steel** | C | ASTM E 415: 2015<br>IS: 8811: 1998 (RA 2012) | 0.65 % to 1.02 % |
| | | Si | | 0.11 % to 0.30 % |
| | | Mn | | 0.21 % to 0. 41 % |
| | | P | | 0.02 % to 0.045 % |
| | | S | | 0.02 % to 0.04 % |
| | | Cr | | 2.90 % to 4.98 % |
| | | Mo | | 0.17 % to 9.5 % |

| S. No. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | **Tool Steel** | V | ASTM E 415: 2015<br>IS: 8811: 1998 (RA 2012) | 0.29 % to 2.0 % |
| | | Co | | 0.06 % to 7.95 % |
| | | W | | 1.8 % to 9.28 % |
| | | Sn | | 0.014 % to 0.02 % |
| **4.** | **Al & Al Base Alloys** | Si | ASTM E 1251 – 2011 | 0.07 % to 14.0% |
| | | Fe | | 0.20 % to 0.50% |
| | | Cu | | 0.04 % to 5.50% |
| | | Mn | | 0.01 % to 0.90% |
| | | Mg | | 0.01 % to 5.00% |
| | | Cr | | 0.01 % to 0.20% |
| | | Zn | | 0.01 % to 0.12% |
| | | Ti | | 0.01 % to 0.12% |
| | | Ni | | 0.01 % to 0.60% |
| | | Pb | | 0.04 % to 0.221% |
| | | Sn | | 0.03 % to 0.199% |
| **5.** | **Cu Base Alloys** | Zn | HVF/ML/CHEM/SOP-01<br>Issue No. 04/ 27/08/15 | 0.02 % to 39.0% |
| | | Pb | | 0.01 % to 11.74% |

| | | | |
|---|---|---|---|
| **Laboratory** | **Metallurgical Laboratory, Heavy Vehicles Factory, Avadi, Chennai, Tamil Nadu** | | |
| **Accreditation Standard** | **ISO/IEC 17025: 2005** | | |
| **Discipline** | **Chemical Testing** | **Issue Date** | **18.09.2016** |
| **Certificate Number** | **T-0950** | **Valid Until** | **17.09.2018** |
| **Last Amended on** | **22.09.2016** | **Page** | **4 of 4** |

| S. No. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| | **Cu Base Alloys** | Sn | HVF/ML/CHEM/SOP-01 Issue No. 04/ 27/08/15 | 0.02 % to 11.8% |
| | | P | | 0.03 % to 0.177% |
| | | Mn | | 0.02 % to 1.33% |
| | | Fe | | 0.06 % to 5.5% |
| | | Ni | | 0.01 % to 6.2% |
| | | As | | 0.06 % to 0.20% |
| | | Sb | | 0.04 % to 0.50% |
| | | Al | | 0.01 % to 10.5% |
| | | Be | | 0.11 % to 2.5% |
| | | Si | | 0.01 % to 0.5% |

-X-X-X-X-X-X-X-X-X-X-X-X-X-X-

**Nikhil Kumar**
**Convenor**

**N. Venkateswaran**
**Program Manager**