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|---|---|---|---|
| **Laboratory** | **Metallurgical Laboratory, GCF Jabalpur, Gun Carriage Factory, Jabalpur, Madhya Pradesh** | | |
| **Accreditation Standard** | **ISO/IEC 17025: 2005** | | |
| **Certificate Number** | **TC-7551** | **Page 1 of 5** | |
| **Validity** | **04.07.2018 to 03.07.2020** | **Last Amended on 30.08.2018** | |

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| | | **CHEMICAL TESTING** | | |
| **I.** | **METALS & ALLOYS** | | | |
| **1.** | **Plain Carbon & Low Alloy Steel** | C | ASTM-E-415 : 2017<br>IS:8811-98 (RA 2012) | 0.015 % to 1.40% |
| | | Mn | | 0.10% to 1.50% |
| | | Si | | 0.050% to 2.00% |
| | | Ni | | 0.025% to 4.50% |
| | | Cr | | 0.025% to 3.00% |
| | | Mo | | 0.050% to 1.00% |
| | | S | | 0.003% to 0.15% |
| | | P | | 0.003% to 0.075% |
| | | V | | 0.025% to 1.00% |
| | | W | | 0.050% to 0.75% |
| | | Co | | 0.050% to 0.50% |
| **2.** | **Copper and Its Alloys** | Mn | BSEN-15079:2017 | 0.03% to 5.51% |
| | | Al | | 0.01 % to 7.85% |
| | | Sn | | 0.135% to 11.36% |
| | | Pb | | 0.02% to 8.86% |
| | | P | | 0.01% to 5.50% |
| | | Ni | | 0.10% to 5.40% |
| | | Fe | | 0.005% to 3.31% |
| **3.** | **Aluminum & its Alloys** | Mn | ASTM-E-1251:2017 | 0.04% to 0.81% |
| | | Cu | | 0.014% to 4.58% |
| | | Fe | | 0.13% to 0.78% |
| | | Si | | 0.17% to 10.51% |
| | | Zn | | 0.029% to 2.36% |
| | | Mg | | 0.02% to 5.75% |
| | | Ni | | 0.02% to 0.13% |
| | | Cr | | 0.002% to 0.086% |
| | | Ti | | 0.017% to 0.17% |

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| **4.** | **Stainless Steel** | C | ASTM-E-1086:2017 | 0.015% to 0.20% |
| | | Mn | | 0.10% to 2.00% |
| | | Si | | 0.20% to 1.00 % |
| | | Ni | | 5.00% to 20.50% |
| | | Cr | | 5.00% to 25.50% |
| | | Mo | | 0.10% to 5.00% |
| | | S | | 0.003% to 0.35% |
| | | P | | 0.003% to 0.50% |
| **5.** | **Cast Iron** | C | IS 15338:2017 | 2% to 4.50% |
| | | Mn | | 0.10% to 1.00% |
| | | Si | | 0.50% to 2.50% |
| | | S | | 0.005% to 0.15% |
| | | P | | 0.005% to 0.15% |
| **6.** | **High Speed Tool Steel** | C | GCF/CHEM-TM-1 SOP Issue-01 Issue Dated.23-04-2016 | 0.70% to 1.40% |
| | | Mn | | 0.10% to 1.00% |
| | | Si | | 0.10% to 0.50% |
| | | Cr | | 2.00% to 5.00% |
| | | Mo | | 0.10% to 6.00% |
| | | S | | 0.003% to 0.05% |
| | | P | | 0.003% to 0.05% |
| | | V | | 0.10% to 2.00% |
| | | W | | 5% to 19.00% |
| | | Co | | 0.10% to 5.50% |
| **7.** | **Plain Carbon & Low Alloy Steel** | C | IS 228 (Part 1): 1987 (RA2008) | 0.05% to 2.50% |
| | | Mn | IS 228 (Part 2): 1987 (RA2008) | 0.10% to 1.50% |
| | | Si | IS 228 (Part 8): 1989 (RA2009) | 0.05% to 2.00% |
| | | S | IS 228 (Part 9): 1989 (RA2009) | 0.01% to 0.06% |
| | | P | IS 228 (Part 3): 1987 (RA2008) | 0.01% to 0.06% |

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| | | Ni | IS 228 (Part 5): 1987 (RA2009) | 0.10% to 3.00% |
| | | Cr | IS 228 (Part 6): 1987 (RA2002) | 0.10% to 5.00% |
| | | Mo | IS 228 (Part 7): 1990 (RA2012) | 0.50% to 1.00% |
| | | V | IS: 1559-1961 RA 1997 | 0.10% to 2.0 |
| | | W | ASTM-E-107 | 0.50% to 20% |
| | | Co | ASTM-E-75 | 0.30% to 10% |

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| | | **MECHANICAL TESTING** | | |
| **I.** | **MECHANICAL PROPERTIES OF METALS** | | | |
| **1.** | **Ferrous and Non Ferrous Metallic Raw Material , Components , Casting and Forgings** | Tensile Test: | IS : 1608/2005 (RA 2017) | |
| | | 1. UTS | | 100 N/mm$^2$ to 2000 N/mm$^2$ |
| | | 2. Yield | | 100 N/mm$^2$ to 1800N/mm$^2$ |
| | | 3. 0.2% Proof Stress | | 100 N/mm$^2$ to 1800N/mm$^2$ |
| | | 4.Elongation | | 1% to 80% |
| | | Hardness Test:<br>1. Vickers | IS:1501-Part 1/2013 | 50HV5-850HV5<br>50HV30-850HV30 |
| | | 2. BRINELL | IS:1500-Part 1/2013 | 100 to 350 HBW (2.5/187.5 Kgf)<br>100 HBW to 350HBW (5/750Kgf)<br>100 HBW to 350HBW (10/3000Kgf) |
| | | IZOD Impact Test | IS: 1598/1999 (RA 2003) | 0.5 Joules to 170 Joules |
| **2.** | **Fabrics** | Break Strength Test | IS:1969-85 RA 2006 | 5 N to 20 kN |

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| | **NON-DESTRUCTIVE TESTING** | | | |
| **I.** | **METALS AND ALLOYS** | | | |
| **1.** | **Metallic Material Components & forgings** | Ultrasonic Detection of Internal Flaws , Surface & Sub-Surface Flaws | IS 8791:1978 (RA 2003)<br>IS 3664:1981 (RA 2014)<br>IS 4225:2004 | Steel Thickness: up to 600 mm |

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