

Laboratory Tekno Valves, Natun Rasta, Bilkanda, 24 Parganas (N), Kolkata, West Bengal

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-6894

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Validity 07.02.2018 to 06.02.2020

Last Amended on 26.09.2018

| Sl. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|-----|----------------------------|-------------------------|---|--|
|-----|----------------------------|-------------------------|---|--|

CHEMICAL TESTING

| I. METALS & ALLOYS | | | | |
|-------------------------------|------------------------------------|-----------------|-------------|-------------------|
| 1. | Copper- base alloys | Lead (Pb) | BS EN 15079 | 0.01 % to 5 % |
| | | Tin (Sn) | | 0.02 % to 2.5 % |
| | | Iron (Fe) | | 0.02 % to 7.0 % |
| | | Aluminum (Al) | | 0.01 % to 12.0 % |
| | | Nickel (Ni) | | 0.02 % to 10.0 % |
| | | Manganese (Mn) | | 0.01 % to 2.0 % |
| | | Silicon (Si) | | 0.005 % to 4.0 % |
| | | Zinc (Zn) | | 0.09 % to 45.0 % |
| | | Arsenic (As) | | 0.01 % to 0.20 % |
| 2. | Aluminum -Base Alloys | Copper (Cu) | ASTM E1251 | 0.05 % to 1.50 % |
| | | Iron (Fe) | | 0.2 % to 0.5 % |
| | | Manganese (Mn) | | 0.03 % to 0.90 % |
| | | Silicon (Si) | | 0.07 % to 15.0 % |
| | | Magnesium (Mg) | | 0.04 % to 1.50 % |
| | | Titanium (Ti) | | 0.01 % to 0.12 % |
| | | Chromium (Cr) | | 0.03 % to 0.23 % |
| 3. | Ferrous base alloy-Low alloy Steel | Carbon (C) | IS 8811 | 0.01 % to 0.55 % |
| | | Manganese (Mn) | | 0.015 % to 0.90 % |
| | | Silicon (Si) | | 0.05 % to 0.35 % |
| | | Sulphur (S) | | 0.01 % to 0.04 % |
| | | Phosphorus (P) | | 0.005 % to 0.04 % |
| | | Nickel (Ni) | | 0.05 % to 0.60 % |
| | | Chromium (Cr) | | 0.05 % to 0.60 % |
| | | Molybdenum (Mo) | | 0.02 % to 0.50 % |
| | | Copper (Cu) | | 0.02 % to 0.35 % |
| 4. | Ferrous base alloy-Stainless Steel | Carbon (C) | ASTM E1086 | 0.005 % to 0.25 % |
| | | Manganese (Mn) | | IS 9879 |
| | | Silicon (Si) | | 0.03 % to 0.90 % |

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| | | Sulphur (S) | | 0.01 % to 0.065 % |
| | | Phosphorus (P) | | 0.005 % to 0.10 % |
| | | Nickel (Ni) | | 7.5 % to 14.0 % |
| | | Chromium (Cr) | | 11.0 % to 23.0 % |
| | | Molybdenum (Mo) | | 0.05 % to 3.0 % |
| | | Copper (Cu) | | 0.01 % to 0.30 % |

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| <u>MECHANICAL TESTING</u> | | | | |
| I. | MECHANICAL PROPERTIES OF METALS | | | |
| 1. | Aluminum materials, alloys and products | Brinell Hardness | IS 1500 (Part 1) | 50 HBW to 350 HBW (2.5 mm / 187.5 kgf) |
| | | Rockwell Hardness | IS 1586 (Part 1) | 20 HRA to 88 HRA 20 HRBW to 100 HRBW 20 HRC to 70 HRC |
| | Copper material, alloys and products | Vickers Hardness | IS 1501 (Part 1) | 100 HV to 600 HV (HV 5) 100 HV to 600 HV (HV 10) 130 HV to 1000 HV (HV 30) |
| | Ferrous material, alloys and products | Izod Impact | IS 1598 | 2 J to 150 J |
| | Nickel materials, alloys and products | Tensile Strength | IS 1608 | 142 MPa to 2000 MPa |
| | | Yield Strength | | 142 MPa to 2000 MP |
| | | Elongation | | 2 % to 75 % |
| | | Reduction in area | | 10 % to 75 % |