

## TABLE OF CONTENTS

- 1 Introduction
- 2 Magneto-Resistance
  - 2.1 Resistivity vs. Field, ETP Cu at Several Stress Levels
  - 2.2 Absolute Resistivity vs. Magnetic Field For Several Cu and Al Alloys
  - 2.3 Magneto-Resistivity vs. Magnetic Field For Several Cu and Al Alloys
  - 2.4 Transverse Magneto-Resistance of Aluminum
  - 2.5 Magneto-Resistance of Aluminum
- 3 Resistance vs. Stress
  - 3.1 Resistivity vs. Stress, ETP Cu
  - 3.2 Resistivity vs. Stress, OFHC Cu
  - 3.3 Yield vs. Resistivity, OFHC and ETP Cu
- 4 Superconducting Recovery Current vs. Magnetic Field For Various Materials and Temperatures
  - 4.1 AVCO 9Nb-Zr 10 Mil Wires, Short Sample Performance
  - 4.2 Cryostrand-49 Coil at 4.2<sup>o</sup>K and at 13<sup>o</sup>K to 17<sup>o</sup>K
  - 4.3 Supercon 0.010 Inch Diameter
  - 4.4 Atomics International, .01, .015 and .02 Inch Diameter at 4.2<sup>o</sup>K
- 5 Construction
  - 5.1 NASA Lewis Magnet of Aluminum in Neon

6 Properties of Boiling Cryogenic Liquids

- 6.1 Boiling Heat Transfer for  $H_2$ ,  $N_2$ , He, watts/cm<sup>2</sup> vs.  $\Delta T$ , Predictive
- 6.2 Watts/cm<sup>2</sup> vs.  $\Delta T$ , Experimental and Predictive, He,  $H_2$
- 6.3 Heat of Vaporization vs. Temperature, He
- 6.4 Temperature vs. Watt/cm<sup>2</sup> for Several Sizes of Fluid Channel Width
- 6.5 Critical Power vs. Channel Width for Several Size Channels
- 6.6 Thermal Conductivity of Gaseous Helium from 1.5°K to 21°K
- 6.7 Viscosity of Saturated Liquid Helium 1
- 6.8 Vapor Pressure of Helium 4
- 6.9 Enthalpy of Saturated Gaseous and Saturated Liquid Helium
- 6.10 Viscosity of Gaseous Helium from 100° to 300°K
- 6.11 Viscosity of Gaseous Helium from 0° to 100°K
- 6.12 Surface Tension for Helium 3 and Helium 4

7 Material Properties of Copper

- 7.1 Strength
- 7.2 Yield Strength
- 7.3 Tensile Strength
- 7.4 Elongation
- 7.5 Reduction of Area of Copper
- 7.6 Stress-Strain Diagram for Copper
- 7.7 Modulus of Elasticity and Impact Strength
- 7.8 Fatigue Strength of Copper
- 7.9 Electrical Resistivity

- 8 Thermal Properties of Copper and Other Magnet Materials
  - 8.1 Thermal Expansion of Copper and Other Metals
  - 8.2 Thermal Conductivity of Copper
  - 8.3 Specific Heat of Copper
  - 8.4 Enthalpy of Copper,
  
- 9 Miscellaneous Magnet Design Data
  - 9.1 Heat Loss for Multistage Cooled Leads
  
- 10 Material Properties of Various Insulators
  - 10.1 Modulus
  - 10.2 Yield Strength
  - 10.3 Tensile Strength
  - 10.4 Compressive Strength
  - 10.5 Thermal Expansion