

ZIRCONIUM ALLOY

ZIRCALOY 4



Zircaloy 4 (UNS R60804)

Zircaloy 4 is a zirconium-based alloy renowned for its exceptional corrosion resistance, mechanical strength, and heat transfer properties. It is primarily used in nuclear power applications, specifically as cladding material for fuel rods in nuclear reactors.

Zircaloy 4 is highly valued for its ability to withstand the demanding conditions of nuclear reactors, including high temperatures, radiation exposure, and corrosive environments.

Zircaloy 4 demonstrates excellent resistance to corrosion in high-temperature water and steam environments, making it an ideal choice for nuclear reactors. The alloy also exhibits good resistance to general corrosion, including acids, alkalis, and saltwater. It is particularly renowned for its superior resistance to stress corrosion cracking, which is crucial for maintaining the integrity of nuclear fuel cladding.

The primary application of Zircaloy 4 is in the nuclear power industry, where it is widely used as cladding material for fuel rods in pressurized water reactors (PWRs) and boiling water reactors (BWRs). It provides a protective barrier around the nuclear fuel, preventing the release of radioactive materials and ensuring the safety and efficiency of the reactor.

AVAILABLE TUBE PRODUCT FORMS

STRAIGHT

SEAMLESS

TYPICAL MANUFACTURING SPECIFICATIONS

ASTM B353

ASTM B352

Also individual customer specifications

TYPICAL APPLICATIONS

FUEL CLADDING

HEAT EXCHANGERS

HIGH-TEMPERATURE COMPONENTS

CONDENSERS

INDUSTRIES PREDOMINANTLY USING THIS GRADE

NUCLEAR AND POWER

CHEMICAL PROCESSING

AEROSPACE

MARINE



Technical Data

MECHANICAL PROPERTIES

Tensile Strength	550 MPa (80,000 psi) minimum
Yield Strength	380 MPa (55,000 psi) minimum
Elongation	20% minimum (in 2-inch gauge length)
Hardness	HRB 80-90 (Typical)

PHYSICAL PROPERTIES

Density	6.51 g/cm ³
Melting Range	1852 °C (3366 °F)
Thermal Conductivity	22.3 W/m · K (at 20 °C)
Electrical Resistivity	42.0 μΩ · m (at 20 °C)
Modulus of Elasticity	99 GPa (14.4 x 10 ⁶ psi)

CHEMICAL COMPOSITION (% by weight)

Element	Min	Max
Zr	-	98.8
Sn	1.2	1.7
Fe	-	0.2
Cr	0.7	0.13
Ni	-	0.1
O	-	0.18
H	-	0.005

Other Impurities: 0.05% maximum (each), 0.15% maximum (total)