

# Elgiloy Specialty Metals Material Datasheet

<b>HAYNES® 233™ Alloy</b>										UNS: N/A W.Nr: N/A						
<p><b>Description:</b> HAYNES® 233™ alloy is a new Ni-Cr-Co-Mo-Al alloy formulated with excellent creep strength (akin to HAYNES 230® alloy) and with oxidation resistance approaching that of HAYNES 214® alloy. The alloy is also readily fabricable, exhibiting good hot workability, cold formability, and weldability. The alloy obtains its oxidation resistance via the formation of a protective alumina layer and high creep strength through solid solution and carbide strengthening. The alloy can be age hardened by heat treatment to produce even greater strength.</p> <p><b>Applications include:</b> Gas turbine components, Industrial heating fixtures, Structural components</p> <p><b>Industries supplied include:</b> Aerospace, Industrial Heat Treating, Power Generation</p>																
<b>Nominal Composition</b>																
	<b>C</b>	<b>Mn</b>	<b>Si</b>	<b>Ni</b>	<b>Cr</b>	<b>Co</b>	<b>Mo</b>	<b>Fe</b>	<b>Ti</b>	<b>Al</b>	<b>Ta</b>	<b>W</b>	<b>B</b>	<b>Zr</b>	<b>Y</b>	
<b>min</b>	0.05	0.10	0.040	BAL	18.00	18.00	7.00	-	0.40	3.00	0.40	-	-	-	-	
<b>max</b>	0.12	0.40	0.20	-	20.00	20.00	8.00	1.50	0.60	3.50	0.80	0.30	0.006	0.050	0.025	
<b>Physical Properties</b>																
	At 70°F							At 20°C								
<b>Density</b>	0.296 lb/in <sup>3</sup>							8.18 g/cm <sup>3</sup>								
<b>Coefficient of Expansion</b>	7.8 microinches/in.-°F (1200°F)							13.8 μm/m-°C (600°C)								
<b>Electrical Resistivity</b>	54.4 μohm-in							137 μohm-cm								
<b>Thermal Conductivity</b>	138 Btu-in./ft. <sup>2</sup> hr.-°F							19.1 W/m-K								
<b>Applicable Specifications</b>																
Strip	N/A															
<b>Typical Mechanical Properties</b>																
<b>Condition</b>	<b>Heat Treatment</b>				<b>Tensile Strength</b>				<b>Suggested Operating Conditions</b>							
<b>Annealed</b>	2125-2150°F (1163-1177°C)				140 ksi (965 MPa)				70°F to 2100°F (20°C to 1149°C)							
<b>Age-Hardened</b>	1650°F/4h/AC + 1450°F/8h/AC (899°C/4h/AC + 788°C/8h/AC)				170 ksi (1172 MPa)				70°F to 1400°F (20°C to 760°C)							
Elgiloy Specialty Metals 1565 Fleetwood Drive Elgin, IL 60123 <a href="http://WWW.ELGILOY.COM">WWW.ELGILOY.COM</a>																

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