

Introducing **HAYNES® 233™** alloy

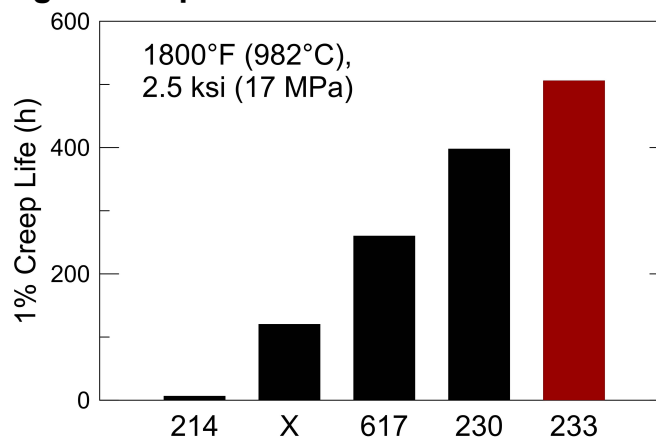
Haynes International, Inc. is pleased to announce the development of HAYNES® 233™ alloy. This alloy has excellent oxidation resistance at temperatures up to 2100°F (1149°C) or higher coupled with superior creep strength - a combination of properties never before achieved in a readily fabricable alloy. The alloy achieves its exceptional oxidation resistance through the formation of a protective alumina layer, while the high creep strength is a result of solid-solution and carbide strengthening. Additionally, for use in intermediate temperature applications the alloy can be age-hardened by heat treatment to produce even greater strength. Finally, the alloy can be readily fabricated using conventional methods since it exhibits good hot workability, cold formability, and weldability. Potential applications include hot gas components in aerospace and industrial gas turbines, industrial heating fixtures and sensors, and various structural components in the emerging technology market. Preliminary results from mill products are provided below.

Oxidation Resistance: 2100°F (1149°C) in Air for 1,008 h – Cycled Weekly

Alloy	Metal Loss	Avg. Metal Affected
	mils/side (µm/side)	mils/side (µm/side)
214®	0.1 (3)	0.5 (13)
233™	0.3 (8)	0.5 (13)
230®	1.2 (30)	4.4 (112)
617	1.0 (25)	5.2 (132)
X	3.6 (91)	6.1 (155)

*Average Metal Affected = Metal Loss + Internal Attack

Creep Strength: Comparative Time to Produce 1% Creep (Sheet)



Material is expected to be available for trial evaluation as manufacturing progresses. Planned product forms include sheet, plate, billet, bar, wire, pipe, and tube. For more information on 233™ alloy, please contact Ron Block at (765) 456-6170 or rblock@haynesintl.com.