HAYNES® HR-224® alloy

Principle Features

Haynes International, Inc. is pleased to announce the development of HAYNES® HR-224® alloy, a new alloy with excellent oxidation resistance and improved fabricability and weld-ability compared to HAYNES® 214® alloy. This Ni–27.5Fe–20Cr–3.8Al alloy achieves superior oxidation resistance through the formation of a tightly adherent alumina protective scale. It exhibits excellent ductility and formability characteristics, with weldability on par with nickel-iron-chromium alloys of substantially lower aluminum contents. Potential uses include applications in heat recuperators, automotive catalytic converters and heat shields, strand annealing furnace tubulars, and other severely oxidizing environments.

1,008-Hour Oxidation Resistance Preliminary Test Results

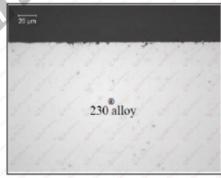
attender attender	1800°F (982°C) Static Air		1400°F (760°C) Air + 5% Water Vapor				
Alloy	Averag Affe		Average Metal Affected		Maximum Metal Affected		
Steel Steel Steel Steel Steel St	mils	μm	mils	μm	mils	μm	
214®	0.2	4 4	0.05	1.3	0.11	2.8	
HR-224®	0.2	4 4	0.11	2.8	0.23	5.8	
230 [®]	0.7	18	0.24	6.1	0.43	10.9	

Average Metal Affected = Metal Loss + Average Penetration; Maximum Metal Affected = Metal Loss + Maximum Internal Penetration

Cross Sections after Exposure to 1400°F (760°C) Air + 5% Water Vapor for 1,008 Hours







HAYNES® HR-224® Alloy Preliminary Tensile Results

Test Temperature		0.2% Yield Strength		Ultimate Tensile Strength		Elongation	
°F arm	°C 🦿	ksi	MPa	/ ksi/	MPa	% of % of	
gr RT gr	RT	50	342	/ 107/	739	45	
1400	760	58	401	70 /	481	27	

RT= Room Temperature

HAYNES® HR-224® alloy will become available for commercial sale upon completion of key process developments. It is being manufactured in a variety of forms, including sheet, plate, bar, structural and weld wire, and welded tubular products. Material for trial evaluations and fabrications is available.

Please contact Dr. Keith Kruger at (765) 456-6098 or kkruger@haynesintl.com for more information.

Nominal Composition

Weight %

Nickel:	47 Balance			
Cobalt:	2 max.			
Iron:	27.5			
Chromium:	20 / / /			
Molybdenum:	0.5 max.			
Tungsten:	0.5 max.			
Manganese:	0.5 max.			
Silicon:	0.3			
Columbium:	0.15 max.			
Aluminum:	3.8			
Titanium:	0.3			
Carbon:	0.05			
Boron:	0.004 max.			
Zirconium:	0.025 max.			
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Disclaimer:

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For specific concentrations of elements present in a particular product and a discussion of the potential health affects thereof, refer to the Safety Data Sheets supplied by Haynes International, Inc. All trademarks are owned by Haynes International, Inc., unless otherwise indicated.