

# HAYNES<sup>®</sup> HR-224<sup>®</sup> alloy

## Principal Features

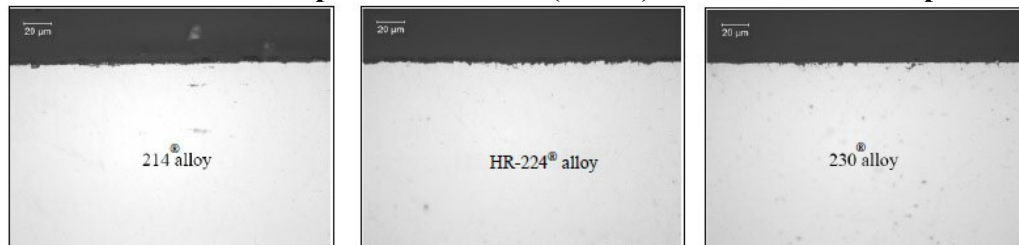
Haynes International, Inc. is pleased to announce the development of HAYNES<sup>®</sup> HR-224<sup>®</sup> alloy, a new alloy with excellent oxidation resistance and improved fabricability and weldability compared to HAYNES<sup>®</sup> 214<sup>®</sup> alloy. This Ni–27.5Fe–20Cr–3.8Al alloy achieves superior 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

Alloy	1800°F (982°C) Static Air		1400°F (760°C) Air + 5% Water Vapor			
	Average Metal Affected		Average Metal Affected		Maximum Metal Affected	
-	mils	µm	mils	µm	mils	µm
214 <sup>®</sup>	0.2	4	0.05	1.3	0.11	2.8
<b>HR-224<sup>®</sup></b>	<b>0.2</b>	<b>4</b>	<b>0.11</b>	<b>2.8</b>	<b>0.23</b>	<b>5.8</b>
230 <sup>®</sup>	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<sup>®</sup> HR-224<sup>®</sup> Alloy Preliminary Tensile Results

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

RT= Room Temperature

HAYNES<sup>®</sup> HR-224<sup>®</sup> 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.

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