

HAYNES[®] HR-160[®] alloy

Oxidation Resistance

Oxidation in Air

Laboratory tests were conducted in flowing air at 1800 to 2200°F (982 to 1204°C) for 1008 hours, with specimens cycled to room temperature once every 168 hours.

Alloy	1800°F (982°C)				2000°F (1093°C)				2100°F (1149°C)				2200°F (1204°C)			
	Metal Loss		Average Metal Affected		Metal Loss		Average Metal Affected		Metal Loss		Average Metal Affected		Metal Loss		Average Metal Affected	
	mils	µm	mils	µm	mils	µm	mils	µm	mils	µm	mils	µm	mils	µm	mils	µm
HR-160[®]	0.7	18	5.5	140	1.7	43	10.3	262	2.5	64	16.0	406	3.6	91	22.0	559
800HT	0.0	0	4.1	104	7.6	193	11.6	295	11.0	279	15.0	381	19.4	493	>58	>1473
253MA	1.3	33	3.0	76	0.7	18	8.2	208	8.7	221	16.5	419	18.6	472	29.2	742
RA85H	0.5	13	8.2	208	2.9	74	25.9	658	3.7	94	>59	>1499	3.9	99	>59	>1499

Long-Term Oxidation in Air

Laboratory tests were conducted at 2000°F (1093°C) in still air (box furnace), with specimens being cycled to room temperature once every 30 days.

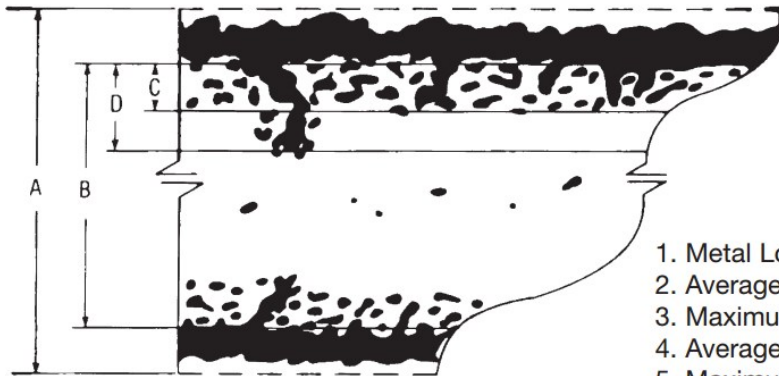
Alloy	1800°F (982°C)				2000°F (1093°C)				2100°F (1149°C)				2200°F (1204°C)			
	Metal Loss		Average Metal Affected		Metal Loss		Average Metal Affected		Metal Loss		Average Metal Affected		Metal Loss		Average Metal Affected	
	mils	µm	mils	µm	mils	µm	mils	µm	mils	µm	mils	µm	mils	µm	mils	µm
HR-160[®]	2.5	64	16.7	424	3.6	91	29.0	737	7.6	193	58.7	1491	16.7	4204	26.3	668
601	0.5	13	22.4	569	5.4	137	45.1	1146	12.6	320	72.8	1849	27.3	693	38.9	988
RA85H	6.3	160	53.7	1364	17.9	455	80.3	2040	20.0	508	94.8	2408	>251.7	>6393	>251.7	>6393
800HT	20.7	526	79.8	2027	44.3	1125	51.0	1295	65.2	1656	70.3	1786	>249.9	>6373	>249.9	>6373

Plate exposed for 360 days (8,640 hours) in still air, except for 1800°F test, which was exposed for 720 days (17,280 hours). Cycled once per month.

Alloy	1800°F (982°C)				2000°F (1093°C)				2100°F (1149°C)				2200°F (1204°C)			
	Metal Loss		Average Metal Affected		Metal Loss		Average Metal Affected		Metal Loss		Average Metal Affected		Metal Loss		Average Metal Affected	
	mils	µm	mils	µm	mils	µm	mils	µm	mils	µm	mils	µm	mils	µm	mils	µm
HR-160[®]	1.2	30	12.0	305	2.7	69	27.9	709	5.3	135	44.6	1133	8.9	226	>250.0	>6350
601	0.0	0	2.6	66	3.4	86	10.5	267	5.3	135	14.6	371	10.3	262	23.9	607
RA85H	0.7	18	14.6	371	8.9	226	14.3	363	6.4	163	>250.0	>6350	8.4	213	>250.0	>6350

Plate exposed for 360 days (8,640 hours) in still air. Cycled once every two months.

Metallographic Technique used for Evaluating Environmental Tests



1. Metal Loss = $(A - B)/2$
2. Average Internal Penetration = C
3. Maximum Internal Penetration = D
4. Average Metal Affected = $((A - B)/2) + C$
5. Maximum Metal Affected = $(A - B)/2 + D$

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