

HAYNES[®] R-41 alloy

Oxidation Resistance

Static Oxidation Testing

Environment: Flowing Air

Test Duration: 1,008 h

Number of Cycles: 6

Cycle Length: 168 h

Temperatures: 1600, 1700, 1800°F (871, 927, 982°C)

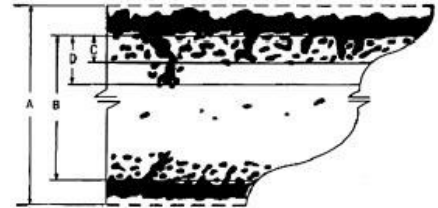
Metal Loss = (A-B)/2

Average Internal Penetration = C

Maximum Internal Penetration = D

Average Metal Affected = Metal Loss + Average Internal Penetration

Maximum Metal Affected = Metal Loss + Maximum Internal Penetration



Comparative Oxidation Resistance in Flowing Air, 1008 Hours

Alloy	1600°F (871°C)				1700°F (927°C)				1800°F (982°C)			
	Metal Loss		Avg. Met. Aff.		Metal Loss		Avg. Met. Aff.		Metal Loss		Avg. Met. Aff.	
	mils	µm	mils	µm	mils	µm	mils	µm	mils	µm	mils	µm
263	0.1	3	0.4	10	0.2	5	0.7	18	0.9	23	5.0	127
282[®]	0.2	5	0.6	15	0.1	3	1.1	28	0.2	5	1.8	46
R41	0.2	5	0.8	20	0.2	5	1.5	38	0.2	5	2.9	74
Waspaloy	0.3	8	1.4	36	0.3	8	3.4	86	0.7	18	5.0	127

Dynamic Oxidation Testing (Burner Rig)

Burner rig oxidation tests were conducted by exposing, in a rotating holder, samples 0.375 inch x 2.5 inches x thickness (9.5mm x 64mm x thickness) to the products of combustion of fuel oil (2 parts No. 1 and 1 part No. 2), burned at an air to fuel ratio of about 50:1. The gas velocity was about 0.3 mach. Samples were automatically removed from the gas stream every 30 minutes and fan cooled to less than 500°F (260°C) and then reinserted into the flame tunnel.

Alloy	1600°F (871°C), 1000 hours, 30 minute cycles				1800°F (982°C), 1000 hours, 30 minute cycles			
	Metal Loss,		Avg. Met. Aff.		Metal Loss,		Avg. Met. Aff.	
	mils	µm	mils	µm	mils	µm	mils	µm
263	1.4	36	4.0	102	12.5	318	16.1	409
282[®]	1.8	46	4.2	107	8.0	203	13.0	330
Waspaloy	1.9	48	4.3	109	9.5	241	13.6	345
R41	1.2	30	4.4	112	5.8	147	12.1	307