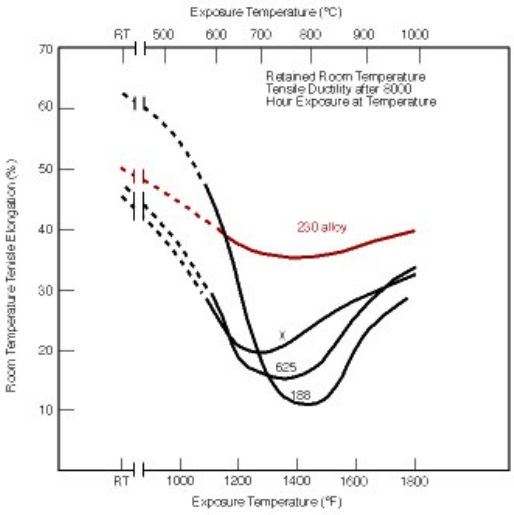
HAYNES® 230® alloy

Thermal Stability

HAYNES® 230® alloy exhibits excellent retained ductility after long-term thermal exposure at intermediate temperatures. It does not exhibit sigma phase, mu phase, or other deleterious phase formation even after 16,000 hours of exposure at temperatures from 1200 to 1600°F (649 to 871°C). Principal phases precipitated from solid solution are all carbides.

This contrasts markedly with many other solid-solution-strengthened superalloys such as HAYNES® 188 alloy, HAYNES® 625 alloy, and HASTELLOY® X alloy. These alloys all precipitate deleterious phases, which impair both tensile ductility and impact strength.



Room-Temperature Properties after Thermal Exposure

Condition	0.2% Yield Strength	Ultimate Tensile Strength	Elongation	R.A.	Impact Strength
	ksi	ksi	%	%	ft-lb
MA	58.4	123.1	50	47.2	54
+ 1200/8,000 hr	57.9	128.0	36.4	39	31.4
+ 1200/20,000 hr	57.6	128.4	34.8	37	28.9
+ 1200/30,000 hr	59.4	129.9	34	38.3	-
+ 1200/50,000 hr	61.2	131.7	33.9	36.9	25.8
+1400/8,000 hr	59.2	129.7	32	34.3	18.7
+1400/20,000 hr	55	126.9	31.2	31.6	18.8
+1400/30,000 hr	54.3	126.9	31.3	33.9	-
+1400/50,000 hr	55.2	127.7	32.2	32.5	20.7
+ 1600/8,000 hr	54.3	122.7	36.2	34.6	21.6
+ 1600/20,000 hr	50.1	121.6	34.4	31.1	19.5
+ 1600/30,000 hr	49.6	120.0	32.1	28.6	-
+ 1600/50,000 hr	50.4	116.7	25.2*	20.2	14.8

*BIGM; AGL Elong, which tends to be lower; Other data are 4D Elong.

R.A.= Reduction of Area

Retained Room Temperature Tensile Ductility after 8000 Hour Exposure at Temperature

Exposure Temperature	Room Temperature Tensile Elongation	Room Temperature Tensile Elongation	Room Temperature Tensile Elongation	Room Temperature Tensile Elongation
	230®	**188**	**625**	**X**
°F	**%**	**%**	**%**	**%**
1200	**36.4**	29.1	18	19
1400	**32**	10.8	13	19
1600	**36.2**	22.2	26	30