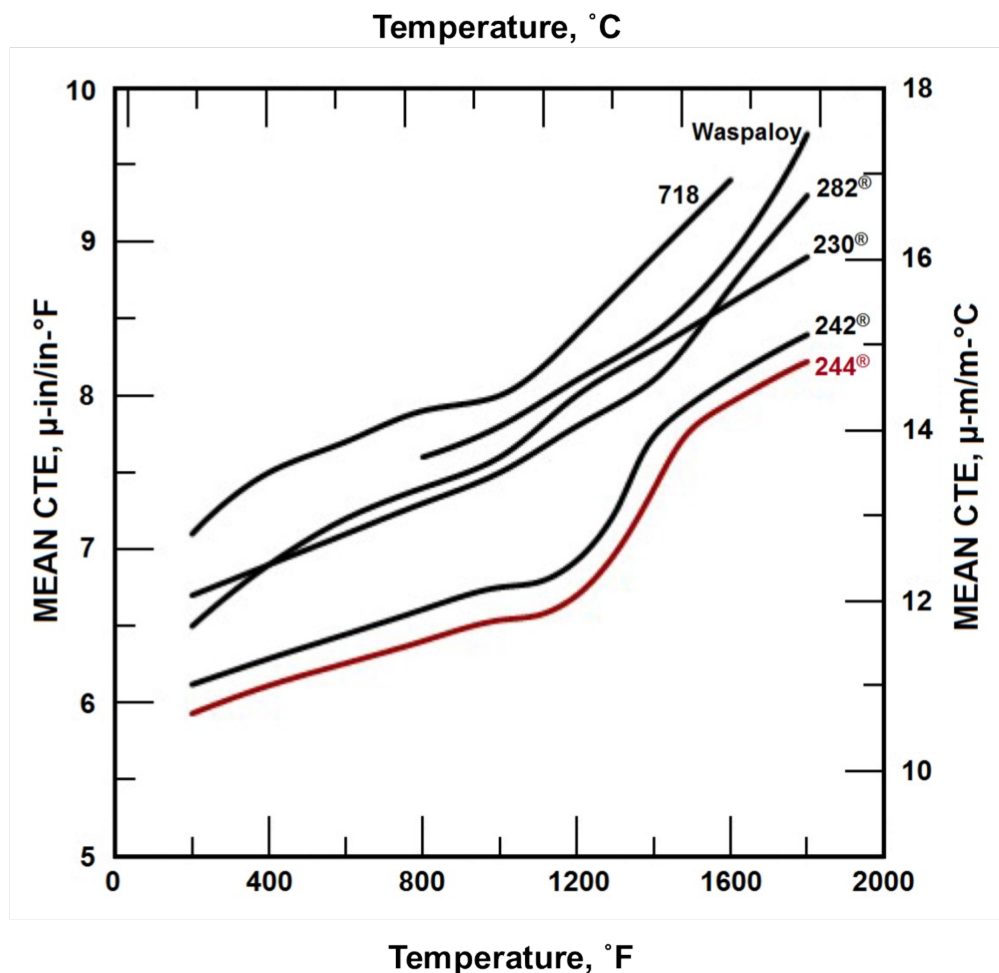


HAYNES® 244® alloy

HAYNES® 244® alloy is a new Ni-Mo-Cr-W alloy developed for static parts in advanced gas turbine engines which require low thermal expansion at temperatures up to 1400°F (760°C). It offers a higher maximum use temperature than other low thermal expansion alloys currently available, including a 100-200°F (55-110°C) improvement over HAYNES® 242® alloy. The alloy is age-hardenable by formation of Ni₂(Cr,Mo,W) domains, which are structurally similar to the strengthening domains in 242® alloy. Judicious alloying with tungsten increased the thermal stability of these domains and lowered the coefficient of thermal expansion. Other important properties such as oxidation resistance and low-cycle fatigue performance are comparable or better than those of 242® alloy.

Coefficient of Thermal Expansion:



Nominal Composition (wt%):

Ni	Al	C	Cr	Fe	Mn	Mo	W
Balance	0.5 max.	0.03 max.	8	2 max.	0.8 max.	22.5	6

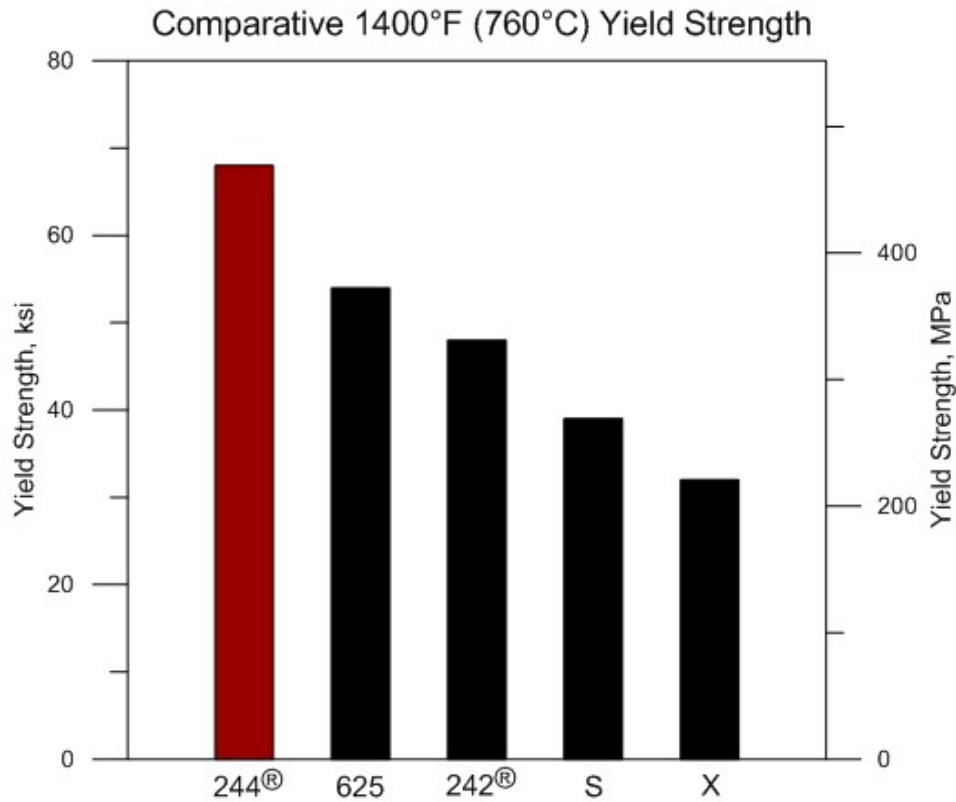
Heat Treatment:

Typical Solution Annealing Temperature: 2000-2100°F (1093-1149°C), air cool or faster
 Age Hardening: 1400°F (760°C) / 16 h / furnace cool + 1200°F (649°C) / 32 h / air cool

Material Properties:

Density	0.335 lb/in ³	9.33 g/cm ³
Melting Range	2480-2550°F	1360-1400°C

Yield Strength:



Physical Properties:

Temperature	Specific Heat	Thermal Conductivity	Dynamic Modulus of Elasticity	Electrical Resistivity	Mean Coefficient of Thermal Expansion
(°F)	(BTU/lb-°F)	(BTU-in/ft ² -hr-°F)	(10 ⁶ psi)	(μohm-in)	(μin/in-°F)
1000	0.104	144.8	27.7	45.5	6.54
1200	0.116	171.5	26.6	46.4	6.70
1300	0.144	239.9	25.2	47.4	6.97
1400	0.204	308.3	23.9	49.4	7.39
Temperature	Specific Heat	Thermal Conductivity	Dynamic Modulus of Elasticity	Electrical Resistivity	Mean Coefficient of Thermal Expansion
(°C)	(J/kg-°C)	(W/m-°C)	(GPa)	(μohm-cm)	(μm/m-°C)
500	438	20.4	193	114.4	11.7
600	428	23.0	186	117.5	11.9
700	588	33.8	175	119.8	12.5
800	852	37.0	159	128.8	13.8

Disclaimer: Haynes International makes all reasonable efforts to ensure the accuracy and correctness of the data in this document but makes no representations or warranties as to the data's accuracy, correctness or reliability. All data are for general information only and not for providing design advice. Alloy properties disclosed here are based on work conducted principally by Haynes International, Inc. and occasionally supplemented by information from the open literature and, as such, are indicative only of the results of such tests and should not be considered guaranteed maximums or minimums. It is the responsibility of the user to test specific alloys under actual service conditions to determine their suitability for a particular purpose. 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.