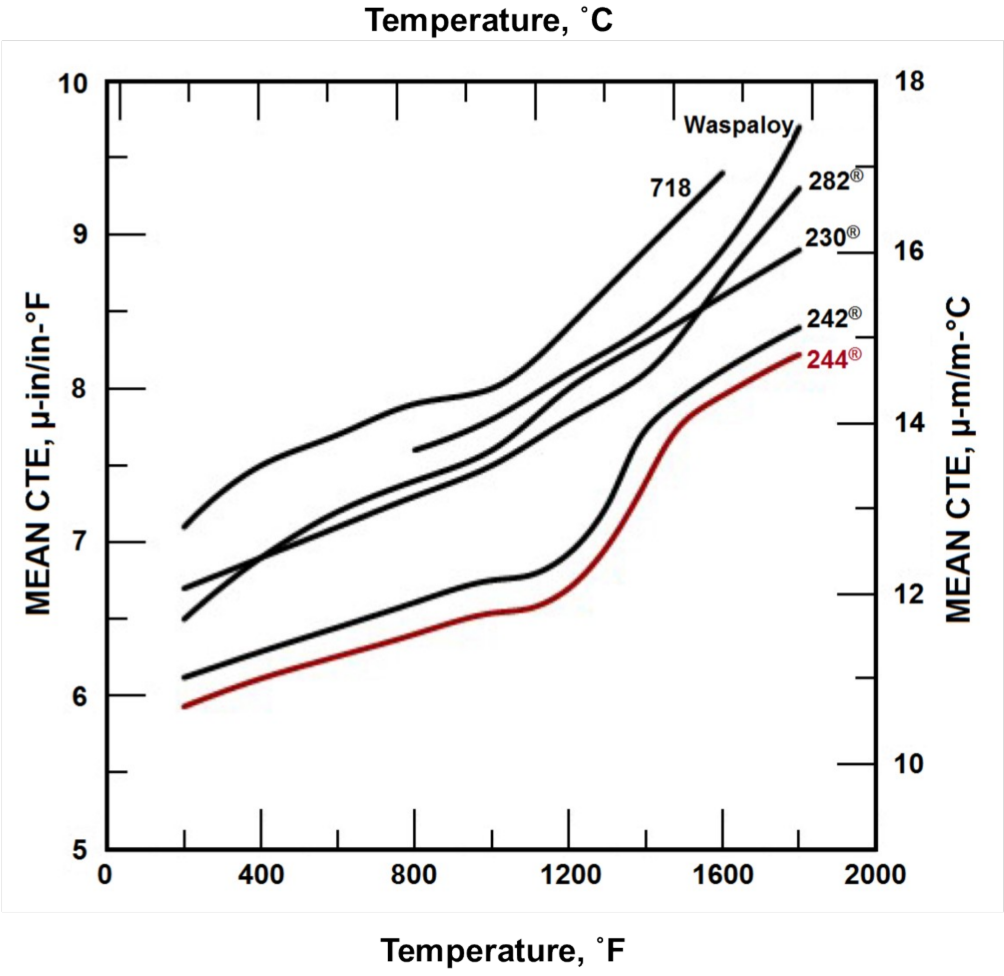
HAYNES® 244® alloy

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 Ni_2 (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

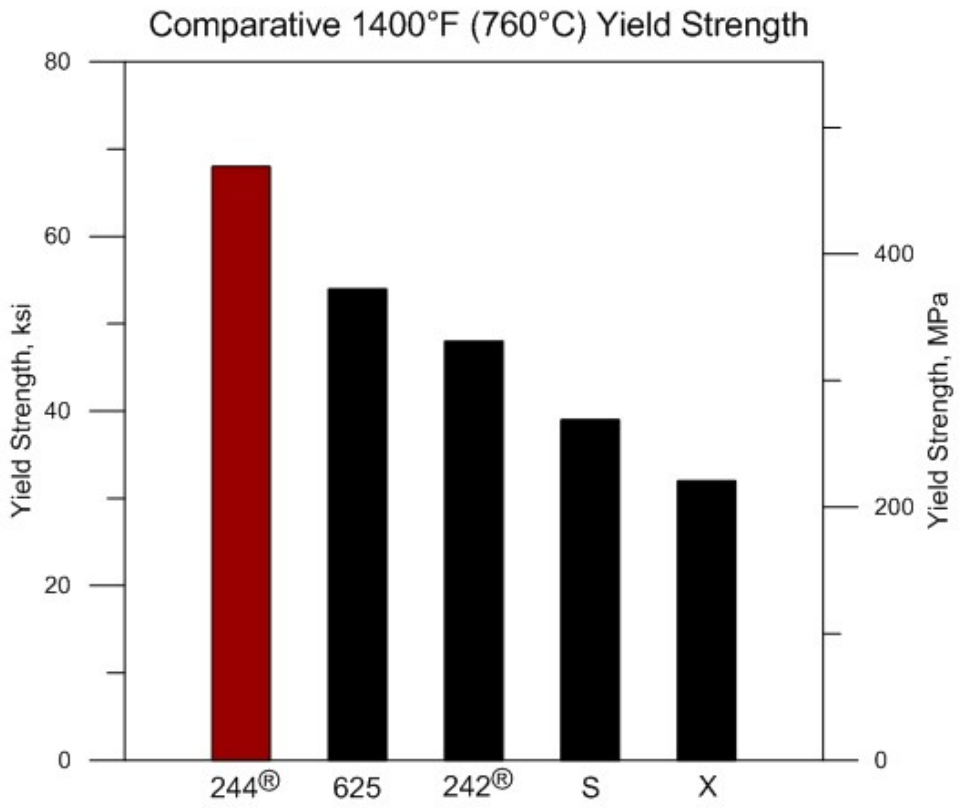
Heat Treatment:

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

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