



Thermophysical Properties of Titanium (Ti-6Al-4V) Alloy in the Temperature Range of -125° C to 550° C.

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Abstract: Titanium 6Al 4V alloy is an $\alpha + \beta$ alloy, which generally contains alpha and beta stabilizers and is heat treatable to various temperatures. Ti 6Al 4V alloy is designed for high strength at low to moderate temperatures. This alloy is fully heat treated in section sizes up to 15 mm and is used up to approximately 400 °C. Over 70% of all titanium alloy grades melted on a sub grade of Ti 6Al 4V which is used in aerospace, air frame and engine components, The present study is focused on two different types of heat treatments on titanium (Ti 6Al 4V) alloy (solution treated and annealed). The heat treated specimens were thermal cycled to explore the stability and behaviour of these materials for property development. The present study investigates the variation in coefficient of thermal expansion for the heat treated and thermal cycled titanium alloy at various cycles in a newly designed thermal cycling apparatus. In the present investigation Coefficient of thermal expansion of thermal cycled titanium alloy was analyzed using Thermo Mechanical Analyzer (TMA) in the temperature range of 125° C to 550° C. This temperature range gives valuable information for space craft's which undergo thermal cycles from +125°C to 125°C as it moves in and out of the Earth's shadow.

Keywords: Thermal cycling; Coefficient of thermal expansion; Thermo mechanical analyzer; Heat treatment.

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