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Aubert & Duval Ti17 (UNS R58650) is a “beta-rich” alpha-beta titanium-aluminum-molybdenum-chromium-zirconium-tin alloy. This alloy has higher tensile and creep strengths than Ti-6Al-4V. While its hardenability is similar to that of other beta alloys, Aubert & Duval Ti17 has a lower density and a higher modulus than most other beta titanium alloys.

Chemical Composition

Element	Composition, wt%(a)
Carbon	(b)
Oxygen	(b)
Nitrogen	(b)
Hydrogen	(b)
Iron	(b)
Aluminum	5.00
Molybdenum	4.00
Chromium	4.00
Zirconium	2.00
Tin	2.00
Titanium	bal

(a) Nominal values unless indicated otherwise. (b) Not disclosed in the Aubert & Duval Ti17 brochure

Physical Properties

Property	Unit	At	Value
Beta-transus	°C (°F)	...	890 (1634)
Density	kg/m ³ (lb/in. ³)	RT	4650 (0.168)
Coefficient of linear thermal expansion	10 ⁻⁶ /K (10 ⁻⁶ /°F)	20–400 °C (68–752 °F)	9.7 (5.4)
Thermal conductivity	W/(m·K) (Btu/(h·ft·°F))	20 °C (68 °F)	7.8 (4.5)

Typical values. RT = room temperature

Mechanical Properties

See Tables 1–2 for tensile properties in the precipitation hardened condition.

Corrosion Resistance

Aubert & Duval Ti17 may be susceptible to stress corrosion attack because of its high chromium content. Information on corrosion resistance has been sourced from *ATI 17*, ATI, 2011.

Forging

Aubert & Duval Ti17 has excellent forgeability. Alpha-beta forging is performed in the 815 to 855 °C (1500 to 1575 °F) range. Total reductions of 50 to 75 percent are recommended

to achieve proper equiaxed structures. Beta forging is done in the 900 to 425 °C (1650 to 800 °F) range. A final reduction of 30 to 50 percent in a single step is recommended. Information on forging has been sourced from *ATI 17*, ATI, 2011.

Formability

Aubert & Duval Ti17 can be cold worked and cold formed using techniques that are used for other austenitic stainless steels, although somewhat higher loads may be required. Information on formability has been sourced from *ATI 17*, ATI, 2011.

Heat Treatment

There are different solution heat treatments for alpha-beta and beta processed material. Alpha-beta processed material has a double solution treatment; the first treatment is at 815 to 855 °C (1500 to 1575 °F) for 4 h followed by rapid air cooling. The higher temperatures are used when higher toughness is desired. The second solution treatment is done at 800 °C (1475 °F) followed by a water quench. Fan air-cooling may be used for thinner sections; however, higher and more consistent properties may be obtained by water quenching. Beta processed material receives a single solution anneal at 800 °C (1475 °F) for 4 h.

The recommended aging treatment for both alpha-beta and beta processed materials is 620 to 650 °C (1150 to 1200 °F) for 8 h.

Table 1 Typical tensile properties at room temperature

Property	Unit	Value
Tensile strength	MPa (ksi)	1150 (167)
0.2% Proof strength	MPa (ksi)	1060 (154)
Elongation(a)	%	6

(a) Gauge length = 5 × original diameter of the parallel length of a circular test piece

Table 2 Typical tensile properties at 400 °C (750 °F)

Property	Unit	Value
Tensile strength	MPa (ksi)	870 (126)
0.2% Proof strength	MPa (ksi)	700 (102)
Elongation(a)	%	10

(a) Gauge length = 5 × original diameter of the parallel length of a circular test piece

Information on heat treatment has been sourced from *ATI 17*, ATI, 2011.

Welding

It is recommended that more highly alloyed austenitic alloys be used in welds of Aubert & Duval Ti17, in order to provide the best corrosion resistance. Autogenous welds exhibit less corrosion than the base material due to segregation. However, the corrosion resistance can be improved by post-weld annealing. Information on welding has been sourced from *ATI 17*, ATI, 2011.

Comparable Grades

Aubert & Duval	Ti17
ASTM	UNS R58650
ATI	ATI 17
TIMET	TIMETAL 17

General Characteristics

Low density; high strength; good ductility and toughness; good low-cycle and high cycle fatigue properties and high

creep resistance at intermediate temperatures; deep hardenability. Information on general characteristics has been sourced from *ATI 17*, ATI, 2011, and *TIMETAL 17*, TIMET.

Product Forms

Billet; bar

Applications

Aero-engine fan discs.

Supplier

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All data from *Ti17*, Aubert & Duval S.A., except where noted.