

TIMETAL® EXHAUST XT™

Low Alloyed Titanium For Automotive & Motorcycle Applications

TIMETAL® EXHAUST XT™ is a low-alloy content titanium alloy suited for automotive and motorcycle exhausts as well as other industrial applications. Weight savings in excess of 40% have been realized by substituting TIMETAL® EXHAUST XT™ for stainless steel in automotive and motorcycle exhaust applications. TIMETAL® EXHAUST XT™ exhibits superior oxidation resistance and elevated temperature strength compared to other commercially pure titanium alloys.

TABLE 1

CHEMICAL COMPOSITION

ELEMENT	WEIGHT %		
	Min.	Nominal	Max.
Iron	-	-	0.50
Silicon	0.15	0.45	0.60
Oxygen	0.02	-	0.15
Carbon	-	-	0.10
Nitrogen	-	-	0.03
Hydrogen	-	-	0.015*
Residual Elements, each	-	-	0.1
Residual Elements, total	-	-	0.4

* Hydrogen content depends on product form

TABLE 2

PHYSICAL PROPERTIES

PROPERTY	VALUE		
	Temp. F° (C°)	English	SI
Density	RT	0.163 lbs/in ³	4.51 g/cm ³
Thermal Conductivity	RT	9.2 Btu•ft/h•ft ² •°F	15.9 W/m•°K
Specific Heat	RT	0.128 cal/g•°K	0.534 J/kg•°K
Diffusivity	RT	7.1 x 10 ⁻⁶ ft ² /s	0.0661 cm ² /s
Mean Coefficient of Thermal Expansion	77-212 (25-100)	5.3 x 10 ⁻⁶ /°F	9.6 x 10 ⁻⁶ /°C
	77-932 (25-500)	5.8 x 10 ⁻⁶ /°F	10.4 x 10 ⁻⁶ /°C
	77-1472 (25-800)	5.5 x 10 ⁻⁶ /°F	10.0 x 10 ⁻⁶ /°C

TABLE 3

TYPICAL ROOM TEMPERATURE MECHANICAL PROPERTIES

CONDITION		TENSILE PROPERTIES			FORMABILITY
		Ultimate Tensile Strength ksi (MPa)	0.2% Yield Strength ksi (MPa)	Elongation %	Bend Radius
Annealed	Minimum	60 (414)	50 (345)	20	4T
Sheet	Typical	84 (581)	77 (531)	30	<2T

TABLE 4

TYPICAL COLD FORMING PROPERTIES FOR SHEET

Direction	n	K ksi (MPa)	r-value	Ericksen* in (mm)
Transverse	0.089	111 (768)	3.8	~0.3 (7.7)
Longitudinal	0.152	133 (915)	2.1	

* Gauge: 0.025 in (0.064 mm)
Note: $\sigma = K\epsilon^n$

TABLE 5

CREEP PROPERTIES AT 800°F (427°C)

Stress ksi (MPa)	Creep Rate % at 50 hrs	Creep Rate (in/in/hr)
10 (69)	0.029	0.0004
20 (138)	0.108	0.0015

TABLE 6

GENERAL CORROSION

Media	Concentration	Temperature	Corrosion Rate mpy (mm/y)
Hydrochloric Acid	1%	Boiling	80.6 ^a (2.05)
Nitric Acid	40%	Boiling	35.6 ^b (0.904)

a Typical CP Ti Grade 2 is approximately 70 mpy
b Typical CP Ti Grade 2 is approximately 25 mpy

Note:

- Crevice Corrosion: No major attack is observed in a 5% NaCl solution at 90°C at pH 4 or 8 for 30 days.
- Stress Corrosion Cracking (SCC): No cracks or failures are observed in ASTM seawater at (pH 4) at 90°C or 150°C for 30 days

FIGURE 2

TYPICAL HIGH TEMPERATURE MECHANICAL PROPERTIES

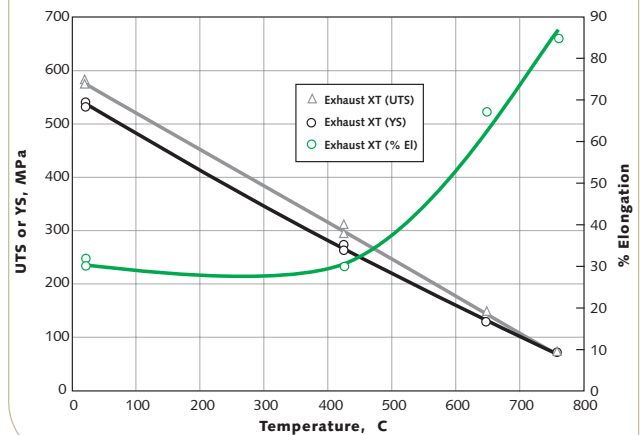
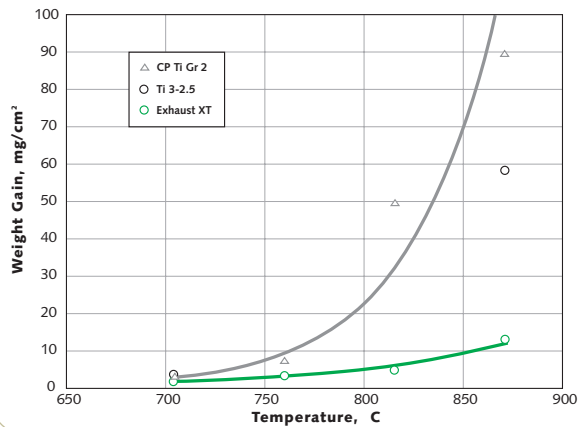


FIGURE 1

OXIDATION RESISTANCE

COMPARISON OF WEIGHT GAIN BETWEEN EXHAUST XT AND CP TITANIUM GRADES AFTER EXPOSURE AT ELEVATED TEMPERATURES FOR 100 HOURS IN AIR



For more information, please contact the Timet Sales Office/ Service Center nearest you, TIMET's Technical Laboratories or TIMET's Website @ www.timet.com

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The data and other information contained herein are derived from a variety of sources, which TIMET believes are reliable. Because it is not possible to anticipate specific uses and operating conditions, TIMET urges you to consult with our technical personnel on your particular applications.



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