



OSPREY® Ti-6Al-4V FOR METAL INJECTION MOLDING

DATASHEET

GENERAL DESCRIPTION

Osprey® Ti-6Al-4V Grade 5 & Grade 23 powders are manufactured to the highest international standards by Electrode Inert Gas Atomization, using a state-of-the-art titanium powder plant that offers a high level of automation, ensuring even better reliability and consistency. Offering typically lower cost & higher capacity than plasma atomized powders. Designed for processing by Metal Injection Molding processes, including medical, aerospace, automotive and engineering applications that require significant weight saving while maintaining high performance.

CHEMICAL COMPOSITION

Osprey® Ti-6Al-4V Class 5*, Chemical composition (nominal), wt%

Ti	Al	V	Fe	O	C	N	H	Y	Others, each	Other, each
Balance	5.50- 6.75	3.5-4.5	<0.30	<0.20	<0.08	<0.05	<0.015	<0.005	<0.10	<0.40

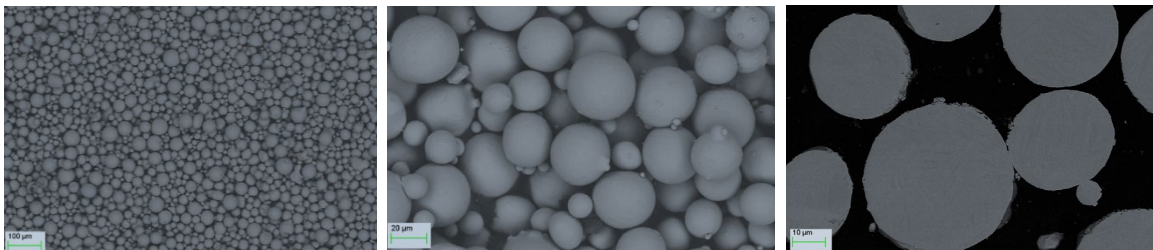
*According to ASTM F2924-14

Osprey® Ti-6Al-4V Class 23**

Ti	Al	V	Fe	O	C	N	H	Y	Others, each	Other, each
Balance	5.50- 6.75	3.5-4.5	<0.25	<0.13	<0.08	<0.05	<0.012	<0.005	<0.10	<0.40

**According to ASTM F3001-14

POWDER MORPHOLOGY



SEM micrographs of -63 +20 µm powder with a spherical morphology (HS Circularity 0.95), smooth surface and low level of powder satellites (magnifications x100 & x250) and a section through the powder (magnification x1000), with no visible internal porosity.

MECHANICAL PROPERTIES

Typical mechanical properties of Osprey® TI-6AL-4V Grade 23 powder L-PBF after solution annealing at 850°C for 2h, followed by air cooling and a combination of solution annealing with hot isostatic pressing (HIP) at 920°C for 2h with a pressure of 100 MPa, followed by furnace cooling.

Metric units

Condition	Direction	Proof strength	Tensile strength	E-modulus	Elongation	Impact toughness
		R _{p0.2}	R _m		A	
		MPa	MPa	GPa	%	J
Heat treated	Horizontal	957 ±7	1076 ±6	119 ±2	14.4 ±0.6	23 ±0.5
	Vertical	997 ±6	1094 ±4	122 ±2	15.5 ±0.5	22 ±0.9
HIP	Horizontal	906 ±2	1014 ±1	125 ±3	17.7 ±0.8	23 ±0.7
	Vertical	915 ±8	1015 ±4	126 ±3	17.2 ±0.04	25 ±0.8

Imperial units

Condition	Direction	Proof strength	Tensile strength	E-modulus	Elongation	Impact toughness
		R _{p0.2}	R _m		A	
		ksi	ksi	ksi	%	J
Heat treated	Horizontal	139 ±1	156 ±1	17,260 ±290	14.4 ±0.6	204 ±4
	Vertical	145 ±1	159 ±1	17,695 ±290	15.5 ±0.5	195 ±8
HIP	Horizontal	131 ±1	147 ±1	18,130 ±435	17.7 ±0.8	204 ±6
	Vertical	133 ±1	147 ±1	18,275 ±435	17.2 ±0.04	204 ±7

Typical Vicker's Hardness levels (ASTM E92, ISO 6507-1, JIS Z2244, GB/T 4340.1), of Osprey® TI-6AL-4V Grade 23 in the L-PBF heat-treated condition.

Condition	Direction	Hardness HV
Heat treated	Horizontal	344 ±4
	Vertical	346 ±4
HIP	Horizontal	329 ±4
	Vertical	329 ±4

Typical surface roughness (Ra), of Osprey® TI-6AL-4V Grade 23 in the L-PBF heat-treated condition.

Condition	Direction	Rougness Ra (μm)
Heat treated	Horizontal	8.4 \pm 0.9
	Vertical	9.0 \pm 0.2

High cycle fatigue at 350MPa, of Osprey® TI-6AL-4V Grade 23 in the L-PBF heat-treated condition, at different build orientations and surface roughness conditions.