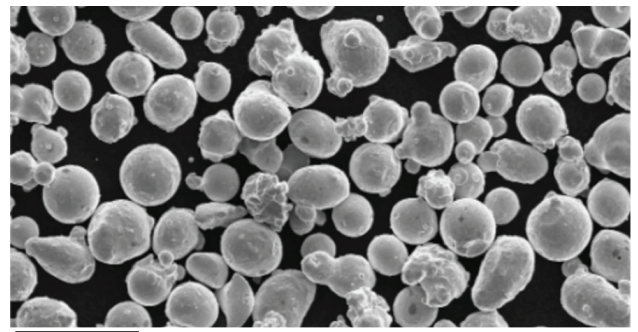


## Nominal Composition

Alloy	Co	Cr	Mo	Si	Mn	Fe	C	Ni	All Others
Stellite 21AM	Bal	27.5	5.5	1.7	<1	<2.0	0.25	2.5	<1.0

## Powder Characteristics

Alloy	Scott Density (g/cc)	Tap Density (g/cc)	Hall Flow (s, 50g)	Melting Range (C)
Stellite 21AM	5	5	12	1290-1440



100µm  
Micrograph of Stellite 21AM Powder

## Product Description

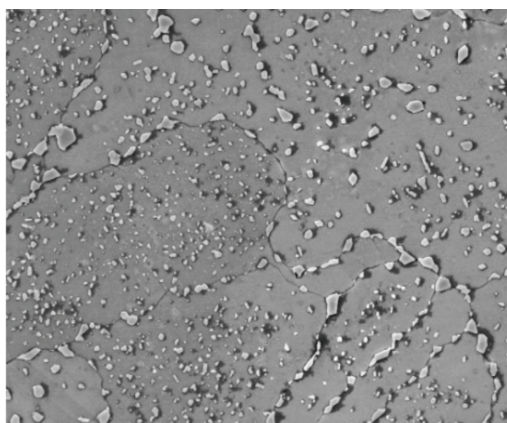
The cobalt-based Stellite alloy family has been historically recognized as one of the most successful wear- and corrosion-resistant alloy families in the world. It combines excellent mechanical wear resistance, especially at high temperatures, with very good corrosion resistance.

Stellite 21AM is the first generation of the Stellite family approved for Laser Powder Bed Fusion platforms. It is recommended for applications involving cavitation, erosion, corrosion and/or high temperatures, such as downhole flow control assemblies and valve trim for petrochemical and power generation industries.

## Wear & Corrosion Resistance

Stellite 21AM consists of a CoCrMo alloy matrix containing dispersed hard carbides which strengthen the alloy and increase its hardness. Historically, Stellite 21 has excellent cavitation, galling and metal-to-metal sliding wear resistance. Because its ternary alloying element is Mo and not W, it has higher resistance to reducing or complex environments (e.g. sulphuric acid, hydrochloric acid, and sour gas) than CoCrW alloys such as Stellite 6.





Micrograph of Stellite 21AM Powder After Heat Treatment

## Physical Properties

Stellite 21AM	
Hardness (HRC)*	35-45
Density (g/cc)	8.3
Porosity (%)	<0.1
Thermal Conductivity (W/mC) Room Temperature, As Printed	15.1

\* As printed and heat treated @ 2175°F

## Nominal Tensile Properties at Room Temperature

		UTS		Yield Stress (.2%)		Elastic Modulus		
		ksi	MPa	ksi	MPa	A (%)	Psi x 10 <sup>6</sup>	GPa
Stellite 21 Castings		103	710	82	565	9	36	220
Stellite 21 AM	Horizontal	210	1450	175	1210	7	29	200
As Printed	Vertical	189	1305	111	765	10	25	170
Stellite 21 AM Post HT*	Horizontal	155	1070	87	600	8	32	220
* Heat Treatment @ 2175°F	Vertical	157	1080	80	555	12	32	220

## Corrosion Resistance

Reagent	Temp	As Printed	HT*
5% HCl	100°F	E	E
10% H <sub>2</sub> SO <sub>4</sub>	150°F	E	E
10% HNO <sub>3</sub>	150°F	E	E
10% NaCl	100°F	E	E

E = Excellent, Less than 10mdd (2mpy), \*Heat Treatment @ 2175°F

## Wear and Erosion Resistance

		As Printed	Post HT*
Wear Volume Loss (mm <sup>3</sup> )	ASTM G65 @2000revs	120	110
Erosion Rate (mm <sup>3</sup> /kg)	ASTM G76 Modified G76**	30	25
		8	8

\* Heat Treatment @ 2175°F

\*\* Slurry erosion test utilizing Silica sand at 1000psi

## Thermal Expansion Coefficient and Specific Heat

Thermal expansion coefficient, As printed (µm/mC)				
100°C	300°C	500°C	700°C	900°C
13.4	14.3	14.6	14.7	15.1

\* Specific heat (J/gC), Room temperature, as printed: 0.6

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