

BLDRmetal™ Binder Jet Products J-10, J-11 and Bronze A

Powders for Binder Jet Additive Manufacturing

BLDRmetal™ J-10 and J-11 are designed for building highly wear resistant industrial components using binder jet additive manufacturing.

In the binder jet process, spherical BLDRmetal steel powders are printed and then infiltrated with bronze to create near net shape parts. When using J-10, the result is a component with 3x greater wear resistance and nearly 3x greater impact toughness than an equivalent part made with 420 stainless steel and bronze. J-11 demonstrates extreme wear resistance, at 10x the wear of similar parts made of 420SS and bronze. Bronze quality is critical to performance. For best results, BLDRmetal Bronze A is recommended.

Industrial applications for these wear powders include molds, dies, tools and drilling and pump components.



Example Oil & Gas Component

Powder Chemistry

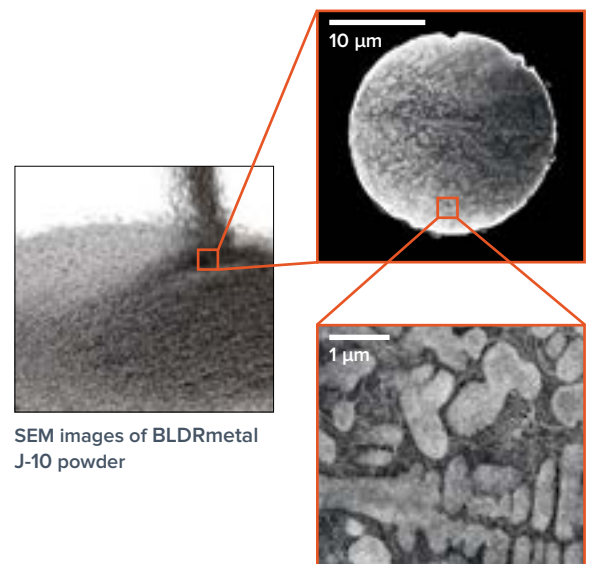
Element	Max. Weight %	
	J-10	J-11
Iron (Fe)	Balance	Balance
Chromium (Cr)	19%	21%
Nickel (Ni)	14%	0.1%
Molybdenum (Mo)	0.1%	12%
Manganese (Mn)	0.1%	3%
Tungsten (W)	0.1%	7%
Silicon (Si)	5%	3%
Boron (B)	2%	3.5%
Carbon (C)	0.3%	1.4%

Powder Properties

Property	J-10	J-11
Melt Point	1215°C	1142°C
Theoretical Density	7.6 g/cm ³	
Morphology	Spherical	
Size Range	D10: 15 µm D90: 45 µm	

Bronze Properties

Property	Bronze A
Chemistry	Cu + 10%Sn
Melt Point	1000-1020°C
Morphology	Spherical
Size Range	250-595 µm



SEM images of BLDRmetal J-10 powder



Binder Jet Process

Binder Jetting is an additive manufacturing powder bed process, where a binder is used to selectively “print” the desired part shape by adhesively joining the metal particles.

After the jetting process, the green part is sintered in a furnace to burn off the binder. An infiltrant, typically bronze, is melted and drawn into the part to fill the spaces in the sintered metal powder skeleton and create a dense component. The resulting part properties are determined by the interaction of the metal powder and the infiltrant.

Comparison with 420 SS

Parts made with bronze infiltrated BLDRmetal™ J-10 have 3x the wear resistance and nearly 3x the impact toughness of a bronze infiltrated 420 stainless steel component. If even higher wear resistance is required, J-11 can be selected to deliver 10x the wear of a bronze infiltrated 420SS component.

Standard Packaging

20 lb (9.1 kg)	40 lb (18.2 kg)	Custom quantities upon request
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Physical and Mechanical Properties¹ of Bronze Infiltrated² BLDRmetal™ Steel Powders

Property	J-10	J-11
Wear Resistance³ (mass loss)	0.79 g	0.29 g
Hardness Vickers	Steel Skeleton: 228 HV	Steel Skeleton: 787 HV
	Bronze: 125 HV	Bronze: 125 HV
Elongation	16%	3%
Charpy Un-notched	75 J	N/A
Tensile Strength	559 MPa	350 MPa

¹ Typical Values

² 40 wt% BLDRmetal Bronze A (Cu+10%Sn)

³ ASTM G65-04 Procedure A Typical Values