

# BIODUR® 108

For Additive Manufacturing

**ESSENTIALLY NICKEL- AND COBALT-FREE  
STAINLESS STEEL FOR HIGH-STRENGTH  
MEDICAL IMPLANTS AND SURGICAL  
INSTRUMENTATION**



STAINLESS STEEL

# BioDur 108

Nickel sensitivity in the United States is estimated at 12% by the Center for Devices and Radiological Health (CDRH), and exposure to nickel ions released from the normal wear of medical implants can lead to adverse side effects. BioDur 108 offers a solution—an essentially nickel- and cobalt-free alternative to other stainless steel options.

- FDA-approved
- Essentially nickel-free stainless steel alloy
- Strong and corrosion-resistant
- Developed in response to patient allergies

## BioDur 108 applications include:

- Implantable orthopedic devices
- High-strength surgical instrumentation
- Orthodontic devices
- Hypoallergenic jewelry



## Powerful stainless steel for high-quality manufacturing

The non-magnetic, austenitic phase structure of BioDur 108 is maintained by manganese (Mn) and a relatively high nitrogen content, approximately one percent. In addition to austenitic stability, the high nitrogen content improves corrosion resistance and strength, providing significant advantages compared to traditional stainless steels.

Carpenter Additive produces high-pressure, nitrogen-atomized BioDur 108 powder and offers laser powder bed fusion (L-PBF) manufacturing services. Preliminary results show realization of cold work (CW) properties in an additively manufactured component without physical cold working.

BIODUR 108						
HEAT TREATMENT	DIRECTION	TENSILE STRENGTH	0.2% YIELD STRENGTH	ELONGATION	REDUCTION AREA	HARDNESS
		ksi	ksi	%	%	HR <sub>C</sub>
As-Printed	X and Y	168	143	26	24	34
	Z	159	128	23	20	34
HIP + Anneal	X and Y	147	83	53	50	25
	Z	142	85	54	45	24

## Carpenter's BioDur 108 additive manufacturing solutions enable:

- Solid solutions—strength properties meet 20% CW, compared to 48% CW for 316L, far exceeding ASTM F3184 AM minimum requirements
- Elongation over 20% in both XY- and Z-build directions, indicating a good trade-off between strength and ductility
- Fully austenitic (non-magnetic) structure suitable for medical implants to avoid electromagnetic interference with magnetic resonance imaging (MRI) and other medical equipment

TYPICAL CHEMISTRY (MEETS ASTM F2229)		
ELEMENT	ASTM F2229	BIODUR 108 MEASURED
C	0.08 max	0.044
O	N/A	0.040
N	0.85-1.10	0.86
S	0.01 max	0.007
Mn	21.0-24.0	21.96
Cr	19.0-23.0	21.00
Ni	0.05 max	<0.01
Mo	0.50-1.50	0.69
Cu	0.25 max	<0.01
Co	N/A	<0.01