MEDICAL

BIODUR® 108 FOR ADDITIVE MANUFACTURING

Essentially nickel- and cobalt-free stainless steel for high-strength medical implants and surgical instrumentation

CARPENTER ADDITIVE®

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.

BioDur 108 applications include:

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

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

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 of approximately 1%. 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, argon-atomized BioDur 108 powder and offers laser-powder bed fusion (L-PBF) manufacturing services. Preliminary results show additively produced Biodur 108 is capable of Biodur 108 cold work strength according to ASTM F2229.

ADDITIVE MINIMUM EXPECTED PROPERTIES

CONDITION	YS (ksi)	UTS (ksi)	ELONGATION (%)	RA (%)
As-Built	125.0	150.0	15.0	10.0
Annealed	80.0	140.0	20.0	20.0
HIP + Anneal	80.0	140.0	30.0	25.0

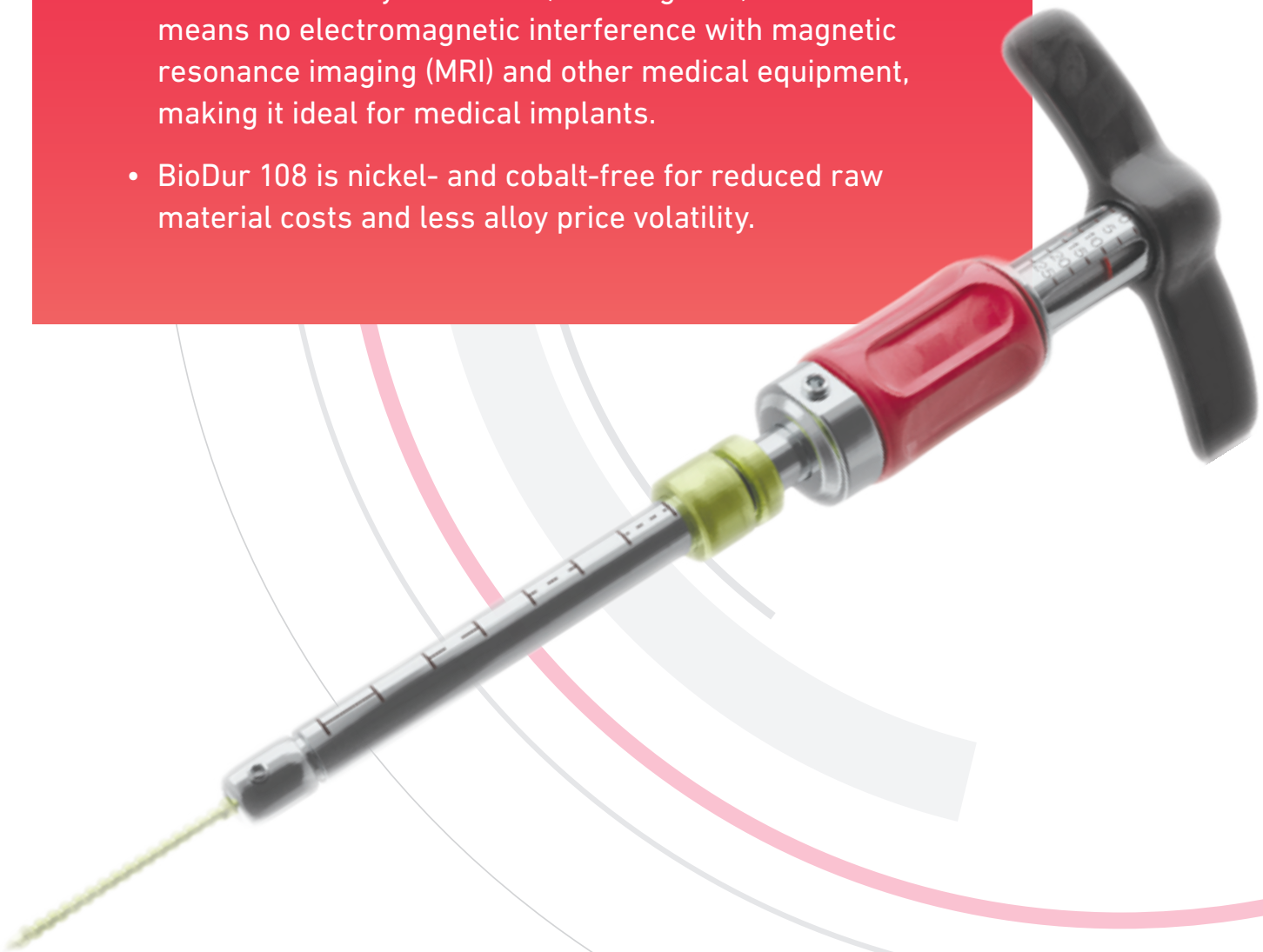
Minimum results from 3 heats of material (low and high nitrogen levels)

TYPICAL CHEMISTRY (MEETS ASTM F2229)

ELEMENT	ASTM F2229
C	0.08 max
O	N/A
N	0.85-1.10
S	0.01 max
Mn	21.0-24.0
Cr	19.0-23.0
Ni	0.05 max
Mo	0.50-1.50
Cu	0.25 max
Co	N/A

BioDur 108 additive manufacturing solutions

- AM annealed BioDur 108 can achieve strength comparable to up to 30% cold worked 316, but with greater ductility/elongation. Optimizations in chemistry and printing can achieve further improvement.
- BioDur 108's fully austenitic (non-magnetic) structure means no electromagnetic interference with magnetic resonance imaging (MRI) and other medical equipment, making it ideal for medical implants.
- BioDur 108 is nickel- and cobalt-free for reduced raw material costs and less alloy price volatility.



For additional information, please contact your nearest sales office:
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