Technical Datasheet

CarTech® Micro-Melt® BioDur® Custom 470® Stainless

Identification

U.S. Patent Number

• 6,238,455

Type Analysis

Single figures are nominal except where noted.

Carbon (Maximum)	0.02 %	**Manganese (Maximum)**	0.25 %
Phosphorus (Maximum)	0.015 %	**Sulfur (Maximum)**	0.050 %
Silicon (Maximum)	0.25 %	**Chromium**	11.00 to 12.50 %
Nickel	10.75 to 11.25 %	**Molybdenum**	0.75 to 1.20 %
Titanium	1.50 to 1.80 %	**Iron**	Balance

General Information

Description

CarTech Micro-Melt BioDur Custom 470 stainless is a new powder metallurgy based improved-machining version of CarTech Custom 465® stainless steel. The alloy offers improved drillability over CarTech Custom 465 stainless and CarTech Custom 455® stainless steel. Its initial use in medical and surgical applications is in the manufacture of surgical needle wire as a replacement for CarTech Custom 455 stainless.

Properties

Physical Properties

Density		
Annealed/CT	0.2822	lb/in³
Condition H 900	0.2825	lb/in³
Condition H 950	0.2829	lb/in³
Condition H 1000	0.2832	lb/in³
Condition H 1050	0.2832	lb/in³
Condition H 1100	0.2840	lb/in³
Modulus of Elasticity (E)		
Condition H 1000	28.8	x 10 ³ ksi
Condition H 1100	28.4	x 10 ³ ksi

Density - Micro-Melt® BioDur® Custom 470® Stainless

Condition	lb/in³	kg/m³
Annealed/CT	0.2822	7810
H900	0.2825	7820
H950	0.2829	7830
H1000	0.2832	7840
H1050	0.2832	7840
H1100	0.2840	7860

Modulus of Elasticity (E)
Micro-Melt® BioDur® Custom 470® Stainless

Condition	x 10³ ksi	x 10³ MPa
H1000	28.8	199
H1100	28.4	196

Typical Mechanical Properties

Typical Room Temperature Mechanical Properties – Micro-Melt® BioDur® Custom 470® Stainless
0.081" Dia. Stainless Wire

Condition	0.2% Yield Strength		Ultimate Tensile Strength		Hardness (HRC)
	ksi	MPa	ksi	MPa	
Annealed/CT	113	779	142	979	--
Annealed+CT +H900 (900ºF/4hrs+AC)	184	1269	245	1689	49

Heat Treatment

Solution Treatment

Condition A (Solution Annealed)

Heat to 1800°F±15°F (982°C±8°C), hold one hour at heat and cool rapidly. Sections up to 12" can be quenched in a suitable liquid quenchant. Sections over 12" should be cooled rapidly in air. For optimum aging response, solution annealing should be followed by refrigerating to -100°F (-73°C), holding eight hours, then warming to room temperature (CT). Subzero cooling should be performed within 24 hours of solution annealing.

Micro-Melt BioDur Custom 470 stainless normally will be supplied from the mill in the solution annealed/cold treated condition (annealed/CT), ready for the one-step hardening treatment.

Age

Condition H 900, H 950, H 1000, H 1050 and H 1100

The high strength levels of Micro-Melt BioDur Custom 470 stainless are derived from a single age hardening step consisting of heating to a selected temperature between 900/1150°F (482/621°C), holding for four hours, followed by air cooling or suitable liquid quenchant. A liquid quench is preferred for section sizes greater than about 3". Aging temperature will depend upon the desired combination of strength, toughness and stress corrosion cracking resistance.

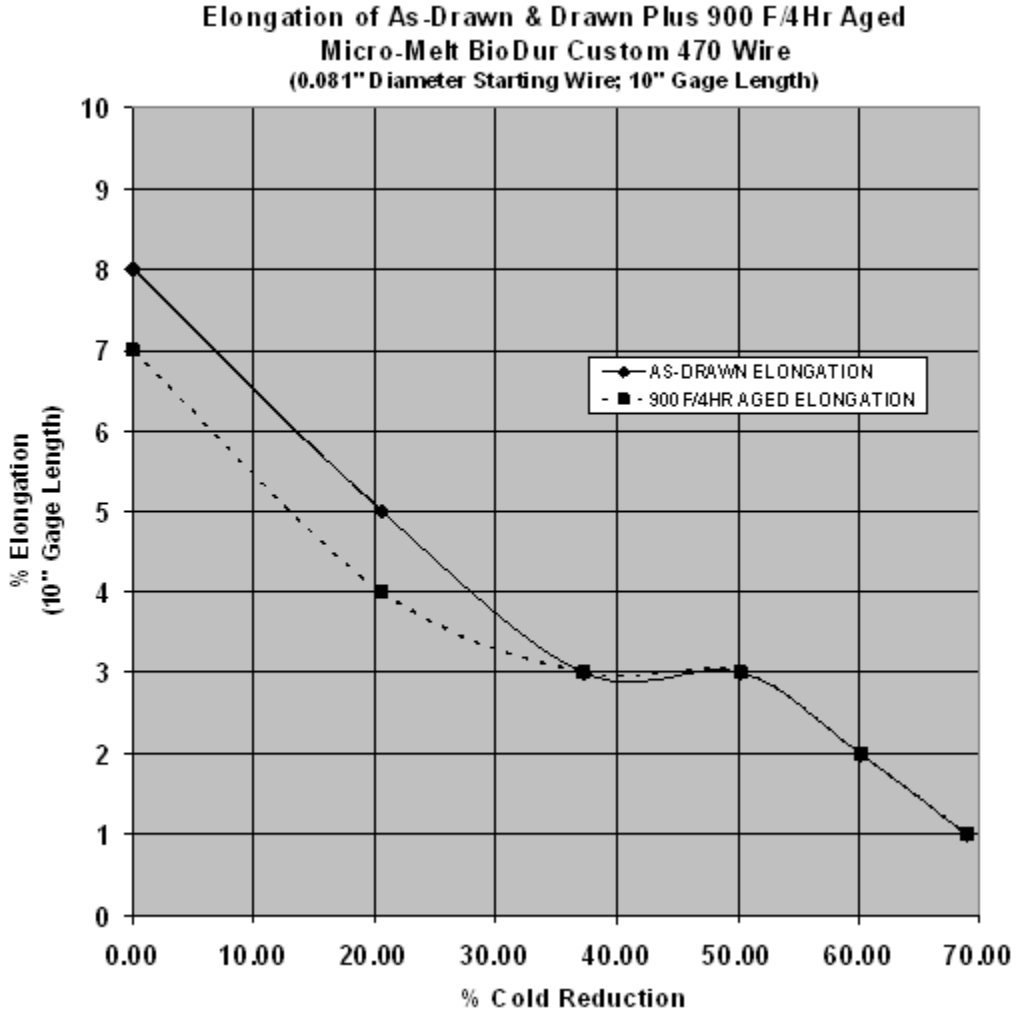
Condition H 1150M

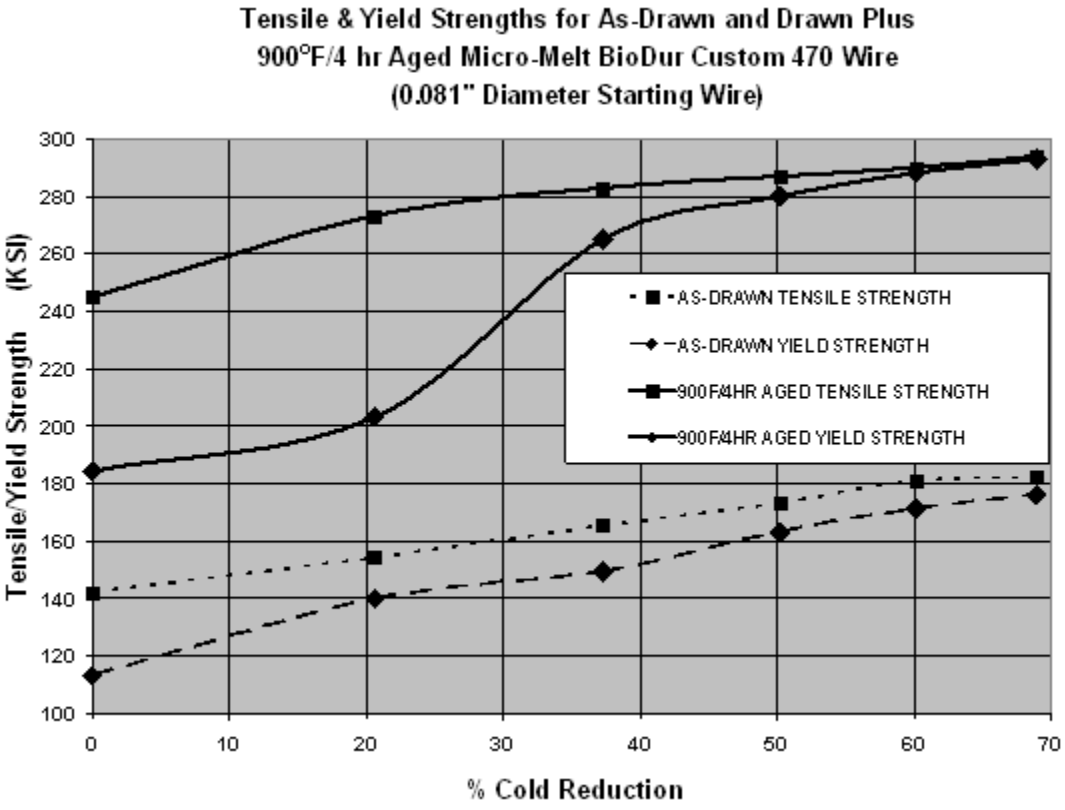
While the alloy typically will be machined in the annealed/CT condition, optimum machinability of Micro-Melt BioDur Custom 470 stainless can be achieved by overaging to the H 1150M condition. Material is heated to 1400°F±15°F (760°C±8°C) for two hours, air cooled, then reheated to 1150°F±15°F (621°C±8°C) for four hours and air-cooled. If this practice is used, parts must be reannealed at 1800°F (982°C), cold treated at -100°F (-73°C) and aged at a selected temperature.

Workability

Cold Working

Because of a relatively low annealed yield strength and low work hardening rate, Micro-Melt BioDur Custom 470 stainless can be readily cold formed by drawing or rolling. Single-step aging of cold worked material results in enhanced strengthening response as illustrated in the following graph:


Elongation of As-Drawn & Drawn Plus 900 F/4Hr Aged
Micro-Melt BioDur Custom 470 Wire
(0.081" Diameter Starting Wire; 10" Gage Length)
% Elongation
(10" Gage Length)
10
9
8
7
6
5
4
3
2
1
0
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
% Cold Reduction
AS-DRAWN ELONGATION
900 F/4HR AGED ELONGATION



Other Information

Forms Manufactured

• Wire

Edition Date: 4/8/2011

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