

Ancorsteel 4300 is the first in a new line of engineered high performance binder-treated products that simulate wrought steel compositions and can be processed at conventional sintering temperatures. The excellent strength, hardenability, fatigue, and toughness characteristics in the single press/single sinter condition provide a cost-effective alternative to alloys that require secondary thermal treatments. Low sintered oxygen levels (500 ppm) are achieved in this unique Cr-bearing alloy when processed at 1120°C (2050°F). The graphite level can be tailored to the demands of the specific application. Other advantages of this alloy include good compressibility, and exceptional dimensional stability with respect to graphite content, compaction pressure, and sintering conditions.

Typical Analysis and Properties

Alloy Composition - weight percent (wt.%)

Fe	Cr	Ni	Mo	Si	Mn	O
Balance	1.0	1.0	0.8	0.6	0.1	0.1

App. Density

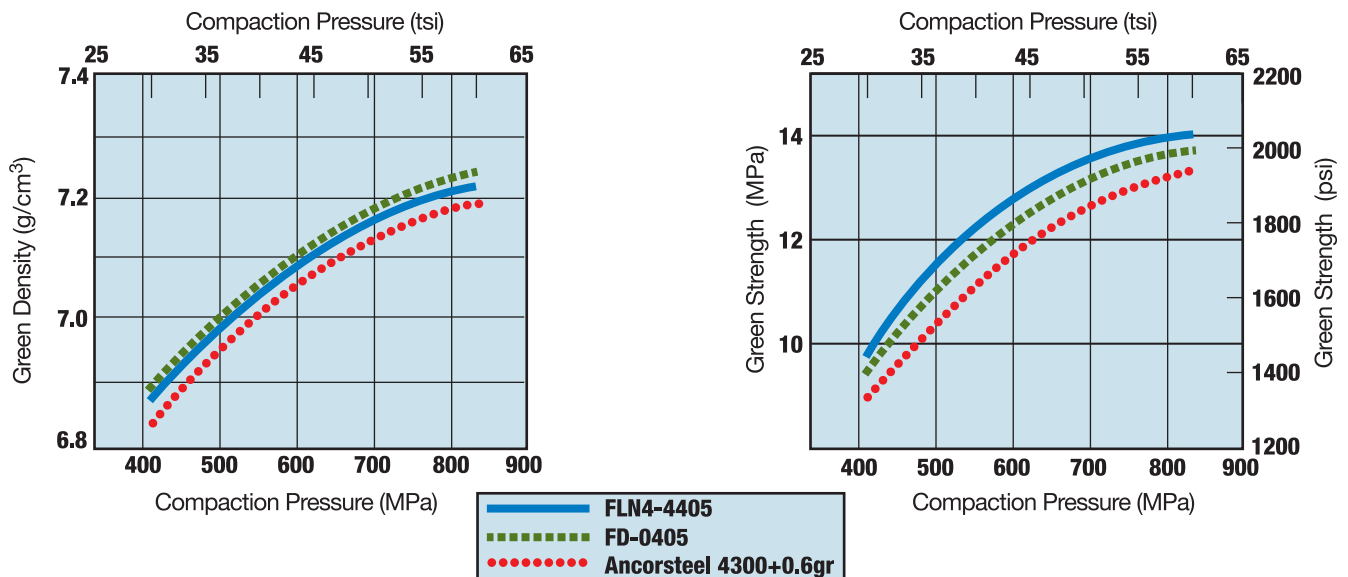
3.15 g/cm³

Flow

28 s/50 g

Micrometers	+250	-250/+150	-150/+45	-45
U.S. Standard Mesh	(+60)	(-60/+100)	(-100/+325)	(-325)
	Trace	18	68	24

Effect of Compaction Pressure on Green Properties with 0.75 wt.% ANCORBOND® lubricant



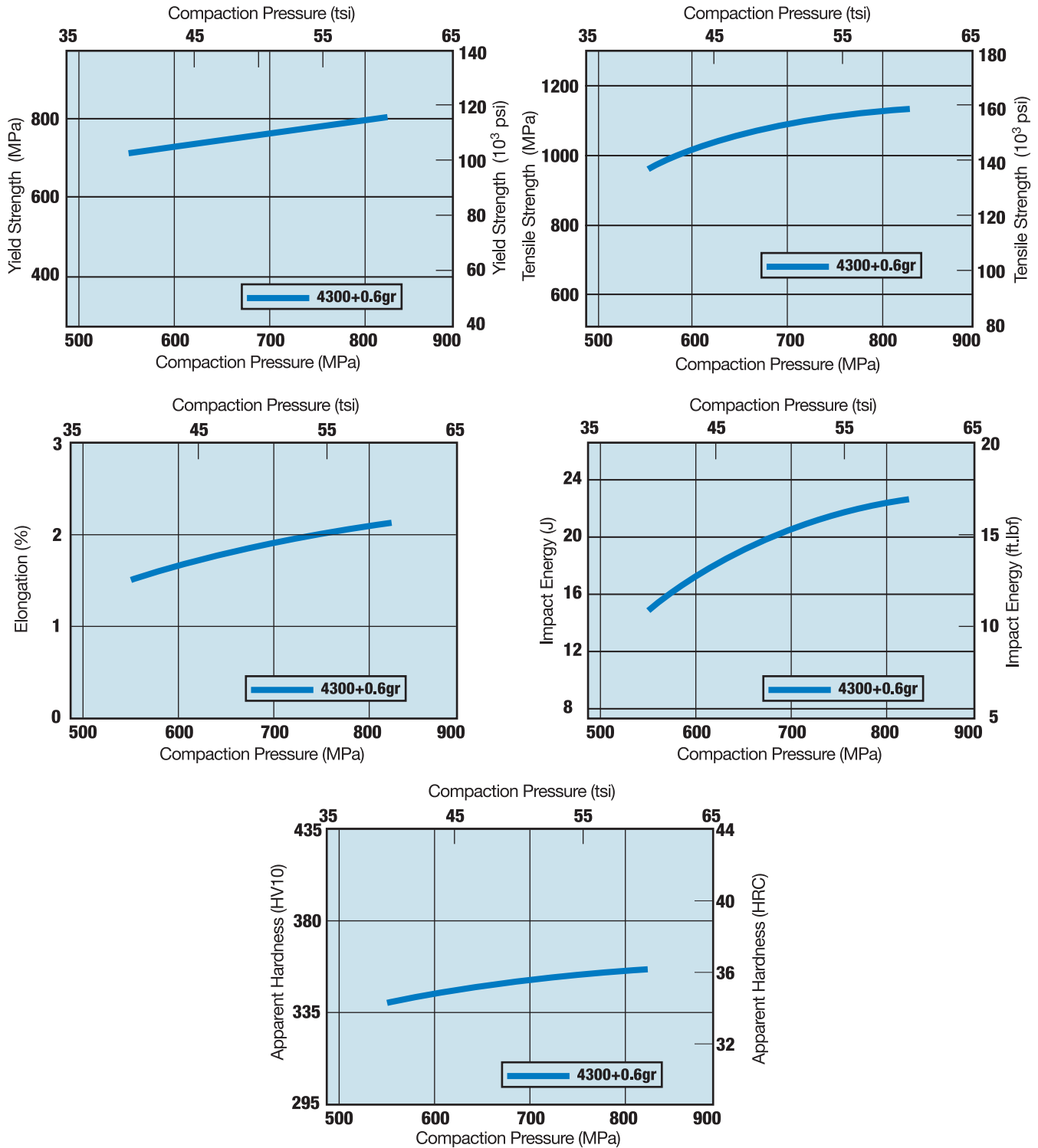
Ancorsteel® 4300

Effect of Compaction Pressure on Mechanical Properties

Samples Sintered at 1120 °C (2050 °F) for 30 minutes at temperature in 90N₂-10H₂

Average Cooling Rate 42 °C/min (1.3 °F/sec) from 650 to 315 °C (1200 to 600 °F)

Tempered at 205 °C (400 °F) for 1 hour

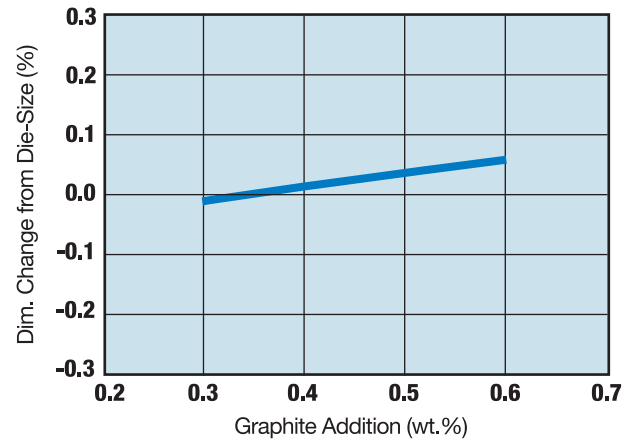
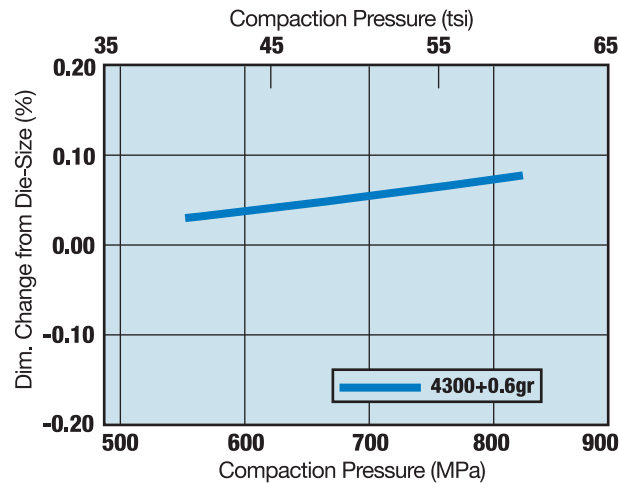
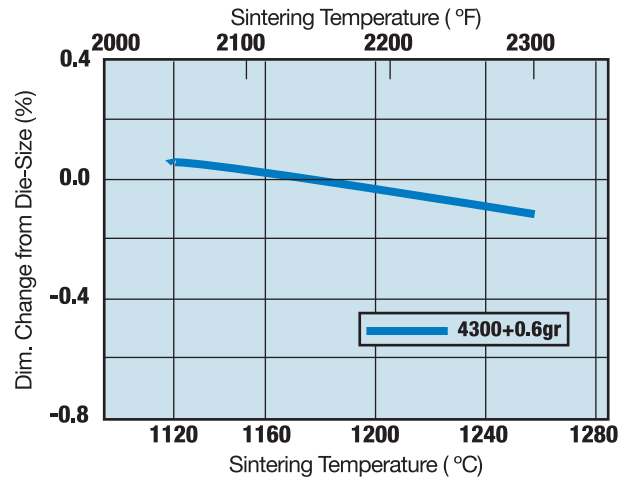


IMPORTANT NOTICE: The data shown are based on laboratory processing standard test specimens. Results may vary from those obtained in production processing.

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Dimensional Stability

Samples Sintered at 1120 °C (2050 °F) for 30 minutes in 90N₂-10H₂
 Average Cooling Rate 42 °C/min (1.3 °F/sec) from 650 to 315 °C (1200 to 600 °F)
 Tempered at 205 °C (400 °F) for 1 hour
 Compaction Pressure 690 MPa (50 tsi) Unless Otherwise Noted



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Effect of Cooling Rate

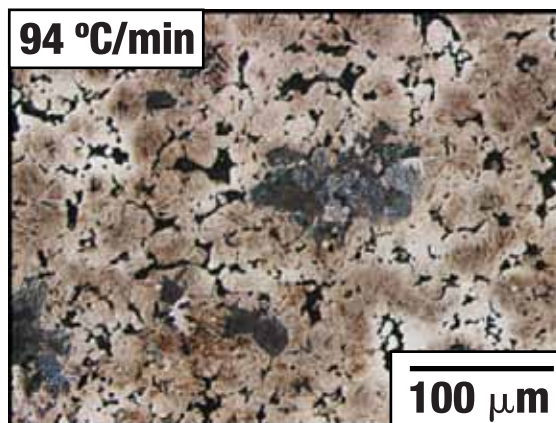
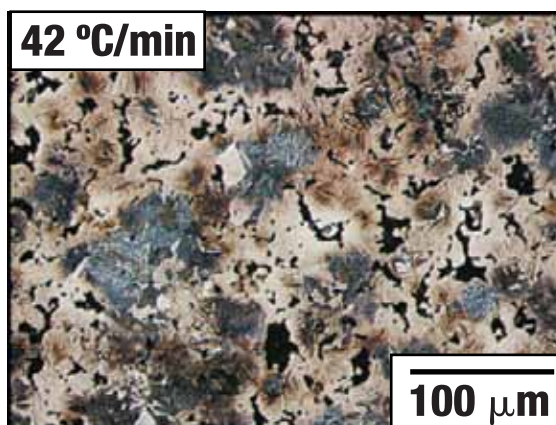
Samples Compacted at 690 MPa (50 tsi), Sintered at 1120 °C (2050 °F) for 30 minutes in 90N₂-10H₂
 Average Cooling Rates Measured from 650 to 315 °C (1200 to 600 °F)
 Tempered at 205 °C (400 °F) for 1 hour

42 °C/min = 1.3 °F/sec

94 °C/min = 2.8 °F/sec

Ancorsteel 4300 + 0.6 wt.% graphite

Average Cooling Rate (°C/min)	Sintered Density (g/cm ³)	DC (%)	YS MPa (10 ³ psi)	UTS MPa (10 ³ psi)	Elg (%)	Impact J (ft.lbf)	Apparent Hardness HV10 (HRC)
42	7.14	+0.05	750 (109)	1060 (154)	1.9	20 (15)	324 (33)
94	7.14	+0.07	910 (132)	1160 (168)	1.5	18 (13)	382 (39)



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Rotating Bending Fatigue Performance

Samples Compacted at 690 MPa (50 tsi), Sintered at 1120 °C (2050 °F) for 30 minutes in 90N₂-10H₂
Average Cooling Rates Measured from 650 to 315 °C (1200 to 600 °F)
Tempered at 205 °C (400 °F) for 1 hour

Ancorsteel 4300 + 0.6 wt.% Graphite

Cool Rate (°C / min)	UTS MPa (10 ³ psi)	90% Endurance Limit MPa (10 ³ psi)	50% Endurance Limit MPa (10 ³ psi)
42	1035 (150)	310 (45)	315 (46)
94	1170 (170)	325 (47)	340 (49)

Effect of Sintering Temperature

Samples Compacted at 690 MPa (50 tsi), Sintered at 1120 °C (2050 °F) for 30 minutes in 90N₂-10H₂
Average Cooling Rates Measured from 650 to 315 °C (1200 to 600 °F)
Tempered at 205 °C (400 °F) for 1 hour

Ancorsteel 4300 + 0.6 wt.% Graphite

Temp (°C / °F)	Sintered Density (g/cm ³)	DC (%)	YS MPa (10 ³ psi)	UTS MPa (10 ³ psi)	Elg (%)	Impact J (ft.lbf)	Apparent Hardness HV10 (HRC)
1120 / 2050	7.14	+0.05	750 (109)	1060 (154)	1.9	20 (15)	324 (33)
1150 / 2100	7.14	+0.03	765 (111)	1105 (160)	2.0	22 (16)	324 (33)
1175 / 2150	7.16	+0.01	780 (113)	1140 (165)	2.2	23 (17)	324 (33)
1260 / 2300	7.18	-0.11	815 (118)	1270 (185)	2.3	24 (18)	345 (35)

Ancorsteel 4300 + 0.6 wt.% Graphite

Temp (°C / °F)	C (wt.%)	S (wt.%)	O ₂ (wt.%)	N ₂ (wt.%)
1120 / 2050	0.57	0.005	0.05	0.03
1150 / 2100	0.55	0.005	0.04	0.03
1175 / 2150	0.53	0.004	0.04	0.03
1260 / 2300	0.52	0.004	0.03	0.03

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