

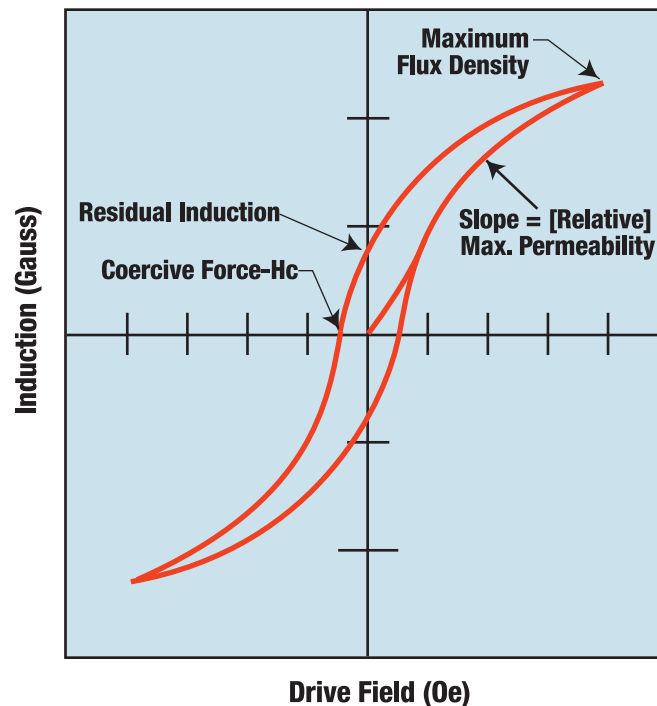
Ancorsteel phosphorus alloys are ferrous base powders for P/M parts requiring superior electromagnetic performance. Compared with parts made from pure, high compressibility iron powders, those made from the phosphorus alloys have higher resistivity, permeability and induction, and reduced coercive force. The presence of phosphorus also decreases the susceptibility of a P/M component to nitrogen aging. Ancorsteel phosphorus alloys are produced by making ferrophosphorus additions to the highly compressible iron powders Ancorsteel 1000B or Ancorsteel 1000C.

Components made from the phosphorus alloys exhibit a good combination of tensile strength, ductility, and impact absorption energy. The particle size of the added ferrophosphorus is important as it has a significant effect on these properties. The ferrophosphorus powder should be finer than 20 micrometers and preferably should have a median particle size close to 10 micrometers.

The GKN Hoeganaes products Ancorsteel 45P and Ancorsteel 80P contain 0.45 and 0.80 weight % (w/o) phosphorus respectively.

Typical applications for parts made from Ancorsteel phosphorus alloys include speed sensors, magnetic solenoids and plungers.

Hysteresis Loop with Initial (B-H) Curve



Ancorsteel® Phosphorus Alloys

Typical Magnetic Properties

Grade	Ancorsteel 1000B					
	415 (30)		550 (40)		690 (50)	
Compaction pressure, MPa (tsi)	415 (30)		550 (40)		690 (50)	
Sintering temperature, °C (°F)	1120 (2050)	1260 (2300)	1120 (2050)	1260 (2300)	1120 (2050)	1260 (2300)
Sintered density, g/cm ³	6.79	6.80	7.09	7.12	7.26	7.28
[Relative] maximum permeability, G/Oe	2100	2300	2600	2800	3000	3200
Maximum flux density, [T]	1.03	1.07	1.12	1.20	1.26	1.30
Maximum flux density, G	10300	10700	11200	12000	12600	13000
Residual induction, [T]	0.90	0.95	1.10	1.12	1.14	1.18
Residual induction, G	9000	9500	11000	11200	11400	11800
Coercive force, [A/m]	170	160	170	150	160	150
Coercive force, Oe	2.10	1.95	2.10	1.85	2.05	1.90

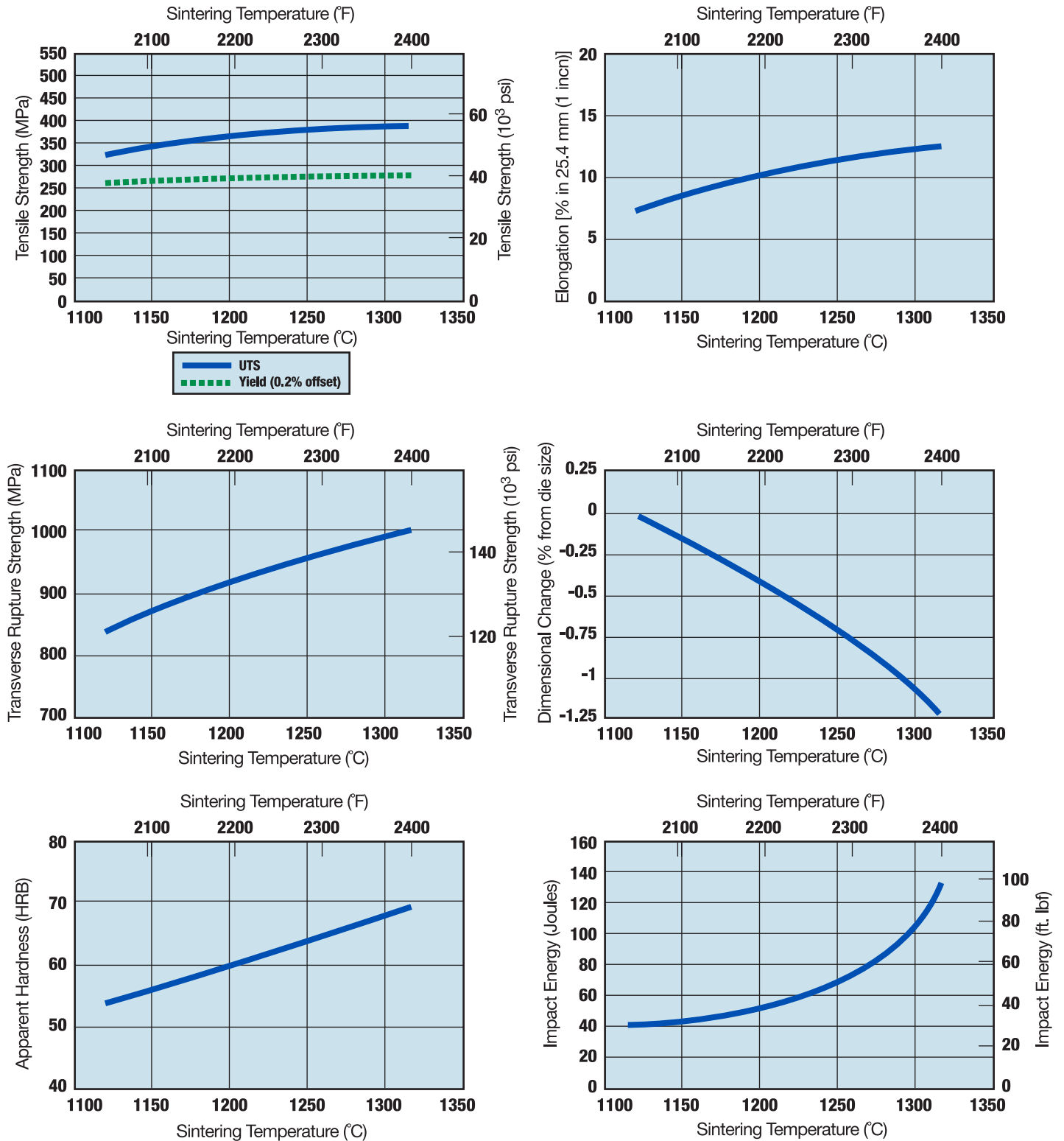
Grade	Ancorsteel 45P					
	415 (30)		550 (40)		690 (50)	
Compaction pressure, MPa (tsi)	415 (30)		550 (40)		690 (50)	
Sintering temperature, °C (°F)	1120 (2050)	1260 (2300)	1120 (2050)	1260 (2300)	1120 (2050)	1260 (2300)
Sintered density, g/cm ³	6.84	7.15	7.12	7.35	7.27	7.45
[Relative] maximum permeability, G/Oe	2800	4200	2900	4000	3600	4500
Maximum flux density, [T]	1.10	1.30	1.25	1.32	1.30	1.39
Maximum flux density, G	11000	13000	12500	13200	13000	13900
Residual induction, [T]	0.95	1.10	1.07	1.05	1.14	1.19
Residual induction, G	9500	11000	10700	10500	11400	11900
Coercive force, [A/m]	140	110	140	110	140	100
Coercive force, Oe	1.80	1.40	1.80	1.35	1.75	1.30

Grade	Ancorsteel 80P					
	415 (30)		550 (40)		690 (50)	
Compaction pressure, MPa (tsi)	415 (30)		550 (40)		690 (50)	
Sintering temperature, °C (°F)	1120 (2050)	1260 (2300)	1120 (2050)	1260 (2300)	1120 (2050)	1260 (2300)
Sintered density, g/cm ³	6.86	7.15	7.16	7.30	7.34	7.41
[Relative] maximum permeability, G/Oe	3800	4800	4500	5700	4500	6000
Maximum flux density, [T]	1.20	1.38	1.32	1.38	1.30	1.40
Maximum flux density, G	12000	13800	13200	13800	13000	14000
Residual induction, [T]	1.05	1.10	1.12	1.18	1.15	1.25
Residual induction, G	10500	11000	11200	11800	11500	12500
Coercive force, [A/m]	120	110	120	100	110	100
Coercive force, Oe	1.50	1.35	1.45	1.30	1.40	1.30

Sintering was done in a synthetic dissociated ammonia atmosphere for 30 minutes at temperature. Typical magnetic properties were tested at a peak drive field of 1200 A/m (15 oersteds).

Ancorsteel® Phosphorus Alloys

Mechanical Properties - Ancorsteel 45P



Samples compacted at 550 MPa (40 tsi) and sintered in a synthetic dissociated ammonia atmosphere for 45 minutes at temperature.

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