

**ATOMET DB46**, containing nickel and copper, is a highly compressible diffusion-bonded steel powder, designed for high performance applications. QMP's process diffusion bonds the alloying elements to our water-atomized steel powder, giving excellent consistency and dimensional control without sacrificing compressibility or green strength.

- **Compressibility** - high compressibility extends the benefits of high alloy compositions to high density applications for improved strength and reduced tool stress.
- **Compositional homogeneity** - the diffusion process bonds alloying elements to the iron particles, giving increased compositional homogeneity over premixes of similar composition. This ensures low part-to-part variation and improved part stability.
- **Dynamic properties** - heterogeneous mixture of phases in the sintered part impedes crack growth, improving dynamic properties such as increased ductility and high impact strength and toughness.
- **Consistency** - a stable ore base, modern steelmaking practice and statistically controlled powder manufacturing ensure lot-to-lot consistency and low part-to-part variation.
- **Purity and cleanliness** - state-of-the-art clean steel practice ensures low residuals and sets new standards for cleanliness giving improved mechanical and dynamic properties.

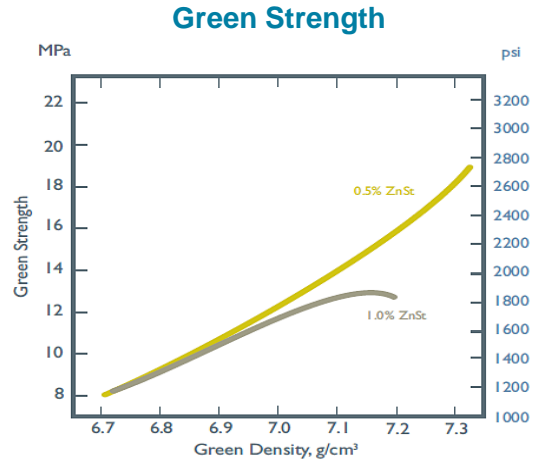
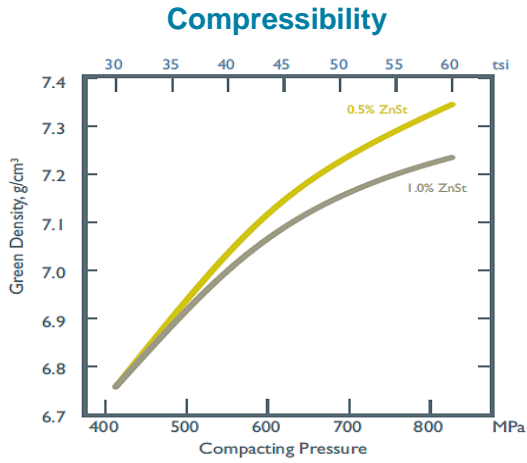
## PHYSICAL AND CHEMICAL PROPERTIES

Chemistry, wt%						
C	O	S	Mn	Mo	Ni	Cu
0.005	0.10	0.009	0.15	0.50	1.75	1.50

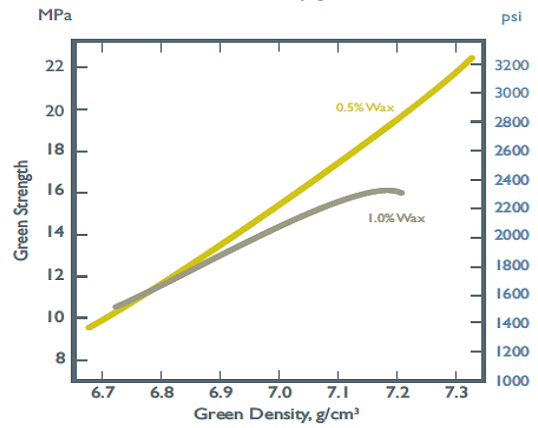
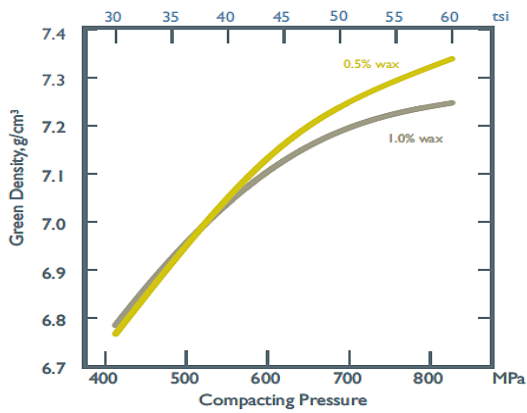
	Particle Size Analysis, wt%				A.D.	Flow	Density*
U.S. mesh	+60	+100	+325	-325	g/cm <sup>3</sup>	s/50g	g/cm <sup>3</sup>
µm	+250	+150	+45	-45	3.02	24	7.10
	Trace	10	66	24			*@43.5 tsi @600 MPa

GREEN PROPERTIES

ATOMET DB46 + ZnSt



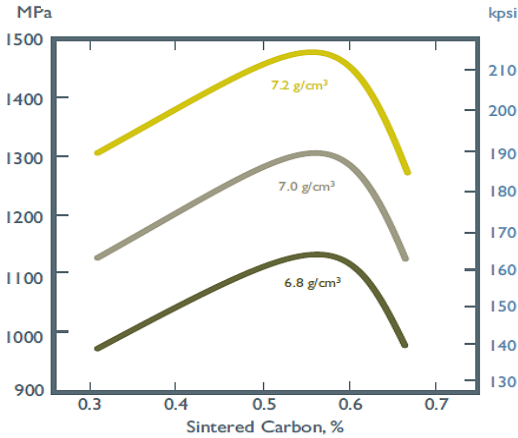
ATOMET DB46 + Wax



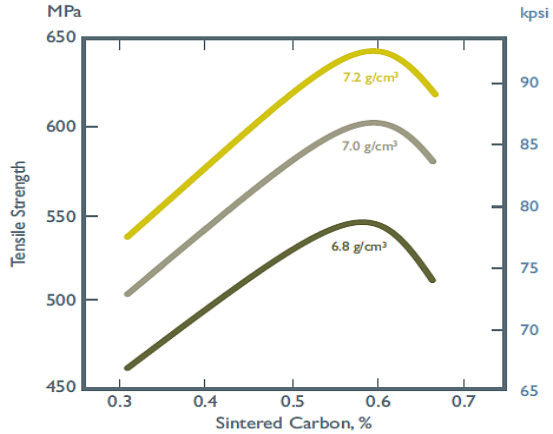
## SINTERED PROPERTIES

Composition: **ATOMET DB46** + graphite + 0.75% wax  
 Sintered in a 90% nitrogen-based atmosphere at 1120°C (2050°F) for 25 minutes.

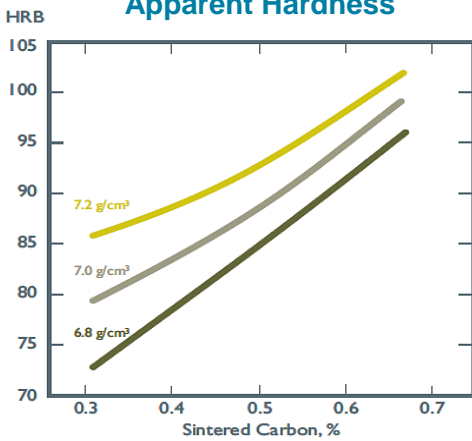
**Transverse Rupture Strength**



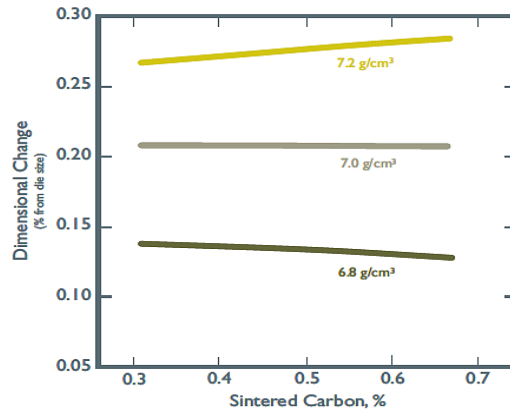
**Tensile Strength**



**Apparent Hardness**



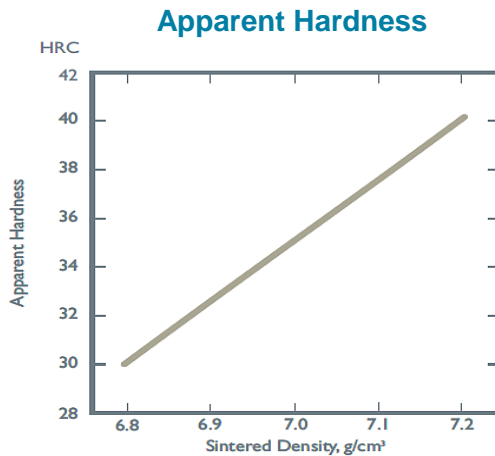
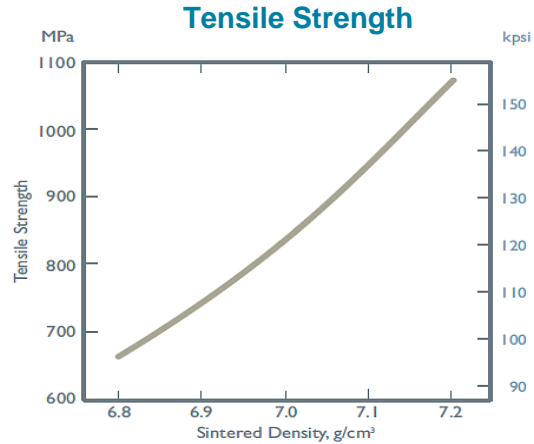
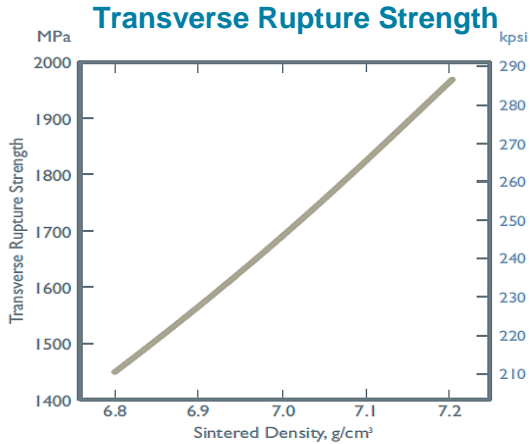
**Dimensional Change**



Sintered Density	Added Graphite	Combined Carbon	Transverse Rupture Strength		Tensile Strength		Yield Strength		Elongation	Apparent Hardness	Dimensional Change	Impact Energy	
			MPa	kpsi	MPa	kpsi	MPa	kpsi				J	lb-fft
6.80	0.35	0.31	972	141	462	67	331	48	2.1	73	0.14	15	11
7.00	0.35	0.31	1131	164	503	73	359	52	2.7	80	0.21	24	18
7.20	0.35	0.31	1317	191	538	78	379	55	2.8	86	0.27	38	28
6.80	0.65	0.57	1138	165	545	79	386	56	1.5	89	0.13	15	11
7.00	0.65	0.57	1317	191	600	87	414	60	1.7	93	0.21	22	16
7.20	0.65	0.57	1496	217	641	93	441	64	1.8	96	0.29	27	20
6.80	0.75	0.67	972	141	510	74	407	59	1.0	96	0.13	14	10
7.00	0.75	0.67	1124	163	579	84	469	68	1.1	99	0.21	20	15
7.20	0.75	0.67	1282	186	614	89	524	76	1.2	102	0.29	23	17

**HEAT-TREATED PROPERTIES**

Composition: **ATOMET DB46** + 0.45% graphite + 0.75% wax.  
 Sintered in a 90% nitrogen-based atmosphere at 1120°C (2050°F) for 25 minutes.  
 Heat-treated 15 minutes at 850°C (1560°F), atmosphere with 0.8% carbon potential.  
 Oil quenched and tempered 1 hour at 175°C (350°F).



Sintered Density g/cm <sup>3</sup>	Added Graphite %	Combined Carbon %	Transverse Rupture Strength		Tensile Strength		Yield Strength		Apparent Hardness HRC	Impact Energy	
			MPa	kpsi	MPa	kpsi	MPa	kpsi		J	lb-ftf
6.80	0.45	0.40	1448	210	662	96	579	84	30	12	9
7.00	0.45	0.40	1689	245	827	120	689	100	35	15	11
7.20	0.45	0.40	1965	285	1069	155	876	127	40	16	12

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