



## CARBON STEEL

1. Common trade names:

	UNITS		
2. Density	g/cm <sup>3</sup>	7.86	Mass per unit volume
3. Mold Shrinkage	in./in.		Size of part versus mold cavity
4. Continuous Service Temp	°F	1200	Highest temp material can perform reliably for the long term
5. Melting Point	°F	2760	Temperature material begins to melt
6. Processing Temp	°F	2760+	Recommended temperature for molding
7. Tensile Strength	$\frac{lb}{in.^2}$	48000	Maximum stress without yielding to a stretching mold
8. Izod Impact Strength	$\frac{ft-lb}{in.}$	720	Energy required to break at a v-notch
9. Compressive Strength	$\frac{10^3 lb.}{in.^2}$	225	Resist a crushing force
10. Flexural Strength, yeild	$\frac{10^3 lb.}{in.^2}$	500	Resistance to fracture during bending
11. Elongation, tensile break	%	25	Stretching ability before breaking
12. Dielectric Strength	$\frac{V}{10^{-3} in.}$	N/A	Voltage material can withstand before dielectric breakdown * = aluminum oxide
13. Water Absorption, 24 hours	%	N/A	% Water absorbed when immersed in water for 24 hours
14. Coefficient of Lin. Thermal Expansion	$10^{-5} \frac{in.}{in. \text{ } ^\circ F}$	0.7	Change in length per change in temperature
15. Crystalline or Amorphous	C = Crystalline A = Amorphous	C	Crystalline: arranged polymer, sharp melting point Amorphous: random polymer, broad melt )
16. Clarity	O = Opaque TP = Transparent TL = Translucent	O	Opaque = no light passes through it Transparent = some light passes through it Translucent = light passes directly through it
17. Flammability	Flame Resistance High ← Low 5VA 5VB V-0 V-1 V-2 HB		Reference standard UL 94
18. Process: Drying Required		N/A	Is it recommended to dry the material prior to molding?
19. Hot Stamp			Does the material hot stamp?
20. Machining Qualities		Excellent	How does the material machine?
21. Creep Resistance		Excellent	Can this material keep it's shape under load? * = with additive or co-polymer
22. Ultrasonic Welding		N/A	Does the material weld via ultrasonics?
23. Low Friction			Surface lubricity
24. Abrasion Resistance		Excellent	How well does the material withstand wear? * = with additive or co-polymer
25. Solvent Resistance		Excellent	How well does the material withstand chemicals?
26. UV Resistance		Excellent	How well does the material withstand UV rays? * = with UV additive
27. Environmental Stress Crack Resistance		Good	Can this material resist environmental stress cracking? * = with additive or co-polymer
28. FDA			Are there FDA grades available?
29. Living Hinge		No	Can this material be used in a living hinge application?
30. Year Developed			
31. Cost: year 2006	$\frac{\$}{lb.}$ @ 5,000 lbs.	\$0.90	Natural/Black Year 2006

**Qualitative Scale:  
 Excellent,  
 Good,  
 Fair,  
 Poor**

32. Applications:

High Strength Low Cost Applications, Low Moisture Environments