ACRYLIC VS. POLYCARBONATE
A QUANTITATIVE AND QUALITATIVE COMPARISION

Acrylic often compared to Polycarbonate, which is an other transparent plastic, that is sometimes used for bearing loads. Polycarbonate is sometimes called Lexan®, which is a trademark by GE Plastics. An other popular brand name for Polycarbonate is Makrolon®, owned by Bayer. Acrylic on the other hand is often called Plexiglas. Plexiglas ® is a trademark by Roehm and Hass.

Popular Uses for Acrylic (Plexiglas):

- Motorcycle helmet visors
- Helicopter Windows, Submarine Windows
- Spectator protection in ice hockey
- Police riot control vehicles modifications
- Swimming Pool Windows
- Aquariums and Terariums (including large public aquarium walls and tunnels)

Popular Uses for Polycarbonate (Lexan):

- Compact discs, DVDs
- Lighting lenses, sunglass/eyeglass lenses, safety glasses, automotive headlamp lenses
- Drinking bottles
- Computers: Apple, Inc.'s MacBook, iMac, and Mac mini
- Cases
- Riot shields, visors
- Instrument panels
- Bullet-proof Glass

Key characteristics, <u>Acrylic</u> compared to Polycarbonate:

- More likely to chip, less impact resistance then Polycarbonate. (still 10-24 times more resistant than float glass)
- Less likely to scratch.
- Does NOT yellow after time.
- Better clarity. Acrylic can be restored to optical clarity by polishing.

Key characteristics, <u>Polycarbonate</u> compared to Acrylic:

- Impact/chip resistance is much higher with Polycarbonate. (about 30 times more resistant than glass)
- More likely to scratch.
- Substantially more expensive. (roughly 2 to 3 times)
- Used for more industry applications
- Bulletproof when thick enough.
- More bendable under normal temeratures (0-20°C)
- Yellows over time due to ultraviolet rays
- Easier to work with (cut, less likely to break)
- Poorer clarity, diffuses light, can lighten (could be positive).

		Polycarbonate - Lexan	Acrylic - Plexiglas GS
Density	g/cm³	1.2	1.19
Max weight gain during immersion	%	0.35	2.1
Tensile strength σM at 23°C	MPa	60-70	80
Flexural strength σbB	MPa	90	115
Impact strength acU (Charpy)	kJ/m2	35	15
Flexural strength σbB	MPa	90	115
Optical Light Transmission	%	89	92
Forming Temperature	°C	185...205	160...175
Vicat B Temperature	°C	145	115
Velocity of Sound	m/min	2270	2750
Attenuation at 5MHz	dB/cm	24.9	6.4
Fire Rating	German DIN 4102	B2	B2 (*2)

Sources:
Lexan 9030 Sheet Product Datasheet
Plexiglas GS Product Description
(*2): Makrolon AR - Bayer Sheet Europe, October 2004