

Developmental Product Information

Polycarbonate PC/ABS 3633L

PC/ABS 3633L is one of a family of alloys combining ABS with polycarbonate. This compound exhibits high toughness while retaining excellent strength and rigidity. **PC/ABS 3633L** has been formulated to provide high flow characteristics for molding applications, including thin-wall section or multi-cavity tools, and is lubricated for ease of mold release.

Compared with unmodified polycarbonate, this alloy exhibits better chemicals resistance, and reduced dependence of notch sensitivity upon part thickness, as well as improved cost-effectiveness. The benefits of this alloy compared with conventional ABS are a substantial increase in toughness, particularly at low temperatures, and improved higher temperature performance.

PC/ABS 3633L exhibits easy processing characteristics, producing parts of exceptional surface gloss at competitive cycle times. Drying of this compound is strongly recommended prior to processing, to optimize mechanical performance and surface appearance.

PRELIMINARY PROPERTIES*

| <u>PROPERTY</u> | <u>ASTM TEST METHOD</u> | <u>ENGLISH</u> | | <u>S.I.</u> | |
|--|-----------------------------|------------------------|--------------|--------------|--------------|
| | | <u>UNITS</u> | <u>VALUE</u> | <u>UNITS</u> | <u>VALUE</u> |
| Vicat Softening Point | D1525 | °F | 275 | °C | 135 |
| Specific Gravity | D792 | - | 1.14 | - | 1.14 |
| Water Absorption (24 hours immersion) | D570 | % | 0.12 | % | 0.12 |
| Heat Deflection Temperature at 264 lbs/in ² (1.82 MPa) | D648 | °F | 237 | °C | 114 |
| Mold Shrinkage Guideline** (Flow Direction) | 1/8" section | % | 0.5-0.6 | % | 0.5-0.6 |
| Tensile Strength at Yield | D638 | lbs/in ² | 7,000 | MPa | 48 |
| Elongation at Break | D638 | % | 60+ | % | 60+ |
| Flexural Strength | D790 | lbs/in ² | 10,000 | MPa | 70 |
| Flexural Modulus | D790 | lbs/in ² | 300,000 | MPa | 2069 |
| Izod Impact Strength (Notched, 1/8" specimen) | D256 | ft. lbs/in of notch | 7 | J/m | 374 |

****Please review shrinkages projections for specific applications with an MDE Technical Representative.**

All data generated using test specimens injection molded from natural color material. Inclusion of color pigments or other additives may change some or all of these test results. Tests are conducted at 23°C and 50% relative humidity unless otherwise stated.

These mechanical property test data have been developed using injection molded specimens tested under standardized conditions; furthermore, many of the mechanical properties of thermoplastic materials can be influenced by changes in processing conditions, environmental factors such as temperature and humidity, and rate of application of stress. Therefore, these test results, which characterize typical production material, should not be used either to establish specification limits or alone as the basis for engineering design.

* These properties are based on a limited number of developmental/scale-up lots and are therefore listed as preliminary data, and may be adjusted with additional production experience.

PC/ABS 3633L

Processing Guidelines

Drying

Although polycarbonate/ABS alloys from MDE are shipped in moisture-resistant packaging, in order to realize best mechanical performance and surface appearance it is critical that they are further dried before processing.

The use of dehumidifying dryers is strongly recommended. The dew point of the drying air stream should be no more than -20°F, and preferably lower. The drying air temperature must be high enough to achieve a pellet temperature of at least 200°F. If using a hopper dryer, depending on air hose length, and insulation of hoses and hopper, the drying air temperature may need to reach 210-220°F to achieve the required material temperature. Insulation of hoses and especially the hopper is strongly recommended. If the material temperature reaches 200°F, a residence time of 4 hours is generally adequate to ensure that the material is ready to be processed. If residence times are shorter, material temperatures should be increased to 220°F, which will normally ensure adequate drying within two hours.

Note that while high moisture levels will usually result in visual evidence in molded parts such as splay or silver streaking, it is possible to satisfactorily process material and make parts of acceptable appearance, even though its moisture content is high enough to seriously diminish mechanical performance.

If moisture analysis equipment is available, then acceptable maximum moisture content for polycarbonate/ABS alloys is 0.02%.

Temperature Guidelines

The following temperature guidelines are suggested for general use **if a machine can be selected where shot size is 40-70% of nominal machine capacity.**

| <u>Tool Surface</u> <u>Temperature (°F)</u> | <u>Melt Temperatures (°F)</u> | | | <u>Typical Cylinder</u> <u>Temperatures (°F)</u> | | |
|--|-------------------------------|------------------|-------------|---|---------------|-------------|
| | <u>Max.</u> | <u>Preferred</u> | <u>Min.</u> | <u>Front</u> | <u>Center</u> | <u>Rear</u> |
| 180-200 | 520 | 480-500 | 440 | 500 | 490 | 480 |

- Melt temperatures over 500°F have been used successfully to further help flow in thin section or long flow-path tools, provided cylinder residence times are short.
- A mold surface temperature in the suggested range improves surface appearance, helps consistency of mold fill and therefore consistency of dimensions, minimizes the effect of weld lines and also helps realize best molded part performance.
- A medium to fast injection speed maximizes weld line strength, minimizes molded-in stress, and also assures achievement of best surface gloss. Good venting of cavities is essential to allow fast fill without burning.

Screw Forward Time

Adequate screw forward time under follow-up pressure is important to ensure proper packing before gate freeze, during which time it is essential to maintain a "cushion" of 1/8"-1/4". Optimum screw forward time can be judged by a part weight vs. forward time plot. Avoid overpacking, which can generate molded-in stresses.

Screw Recovery

Low back pressures - nominal 50-100 psi gauge - is normally sufficient to help development of a homogenous melt, and to ensure consistent shot volume. Screw rotation should also be as slow as possible consistent with cycle time goals, usually 40-80 r.p.m.

Mold Shrinkage

Standard ASTM test specimens will be used to develop these guidelines. Test specimens are end-gated, 1/8 inch thickness, and molded at conditions recommended for this formulation. **Actual shrinkage in molded parts will depend on several variables, including processing conditions, part configuration and gate location, both of which influence material flow direction, and wall section thickness.**