

OPTIX 99 Acrylic Properties

| Physical                          | Test method               | Units   | OPTIX |
|-----------------------------------|---------------------------|---------|-------|
| Specific Gravity/Relative Density | ASTM D-792 / ISO 1183     |         | 1.19  |
| Optical Refractive Index          | ASTM D-542 / ISO 489/A    |         | 1.49  |
| Light Transmission -Total         | ASTM D-1003 / ISO 13468-1 | %       | 92    |
| Light Transmission - Haze         | ASTM D-1003 / ISO 14782   | %       | 2     |
| Sound Transmission                | ASTM E90 / E413           | db      | 27    |
| Water Absorption                  | ASTM D-570 / ISO 62       | % By wt | 0.4   |
| Mold Shrinkage                    | ASTM D-955                | mils/in | 2-6   |

| Chemical   | Test method                       | Units | OPTIX |
|--|-----------------------------------|-------|-------|
| Resistance to Stress - Critical<br>Crazing Stress to: Isopropyl<br>Alcohol | ARTC Modification of<br>MIL-P6997 | psi   | 900   |
| Resistance to Stress - Critical<br>Crazing Stress to: Lacquer<br>Thinner   | ARTC Modification of<br>MIL-P6997 | psi   | 500   |
| Resistance to Stress - Critical<br>Crazing Stress to: Toluene              | ARTC Modification of<br>MIL-P6997 | psi   | 1,300 |
| Resistance to Stress - Critical<br>Crazing Stress to: Solvesso 100         | ARTC Modification of<br>MIL-P6997 | psi   | 1,600 |

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| Mechanical  | Test method             | Units                 | OPTIX   |
|---|-------------------------|-----------------------|---------|
| Tensile Strength                                  | ASTM D-638 / ISO 527    | psi                   | 11,030  |
| Tensile Elongation – Max.                         | ASTM D-638 / ISO 527    | %                     | 5.8     |
| Tensile Modulus of Elasticity                     | --                      | psi                   | 490,000 |
| Flexural Strength                                 | ASTM D-790 / ISO 178    | psi                   | 17,000  |
| Flexural Modulus of Elasticity                    | ASTM D-790 / ISO 178    | psi                   | 490,000 |
| Izod Impact Strength – Molded Notch               | ASTM D-256 / ISO 180    | ft-lb/in Notch        | 0.4     |
| Izod Impact Strength – Milled Notch               | ASTM D-256 / ISO 180    | ft-lb/in Notch        | 0.28    |
| Tensile Impact Strength                           | ASTM D-1822             | ft-lb/in <sup>2</sup> | 20      |
| Abrasion Resistance - Change in Haze - 0 cycles   | ASTM D-1044 / ISO 9352  | Haze, %               | 0       |
| Abrasion Resistance - Change in Haze - 10 cycles  | ASTM D-1044 / ISO 9352  | Haze, %               | 11.2    |
| Abrasion Resistance - Change in Haze - 50 cycles  | ASTM D-1044 / ISO 9352  | Haze, %               | 24      |
| Abrasion Resistance - Change in Haze - 200 cycles | ASTM D-1044 / ISO 9352  | Haze, %               | 24.9    |
| Rockwell Hardness                                 | ASTM D-785 / ISO 2039-2 |                       | M-95    |

| Thermal  | Test method             | Units                           | OPTIX   |
|--|-------------------------|---------------------------------|---------|
| Maximum Recommended Continuous Service Temperature |                         | °F                              | 170-190 |
| Softening Temperature                              |                         | °F                              | 210-220 |
| Melting Temperature                                |                         | °F                              | 300-315 |
| Melt Flow Rate                                     | ASTM D-1238             | g/10 min.                       | 1.5     |
| Deflection Temperature @ 264 psi (1.8 MPa)         | ASTM D-648 / ISO 75-2/A | °F                              | 203     |
| Deflection Temperature @ 66 psi (0.45 MPa)         | ASTM D-648              | °F                              | 207     |
| Coefficient of Thermal Expansion                   | ASTM D-696 / ISO 11359  | in/(in-°F) x 10 <sup>-5</sup>   | 3.0     |
| Thermal Conductivity                               | ASTM C-177              | BTU-ft/(hr-ft <sup>2</sup> -°F) | 0.075   |
| Flammability (Burning Rate)                        | ASTM D-635              | In/minute                       | 1.019   |
| Flammability                                       | UL 94 / UL 94           |                                 | HB      |
| Smoke Density Rating                               | ASTM D-2843             | %                               | 3.4     |
| Self-Ignition Temperature                          | ASTM D-1929             | °F                              | 833     |
| Flame Spread Index                                 | ASTM E-84               |                                 | 115     |
| Smoke Developed Index                              | ASTM E-84               |                                 | 550     |

These suggestions and data are based on information we believe to be reliable. They are offered in good faith, but without guarantee, as conditions and methods of use are beyond our control. We recommend that the prospective user determine the suitability of our materials and suggestions before adopting them on a commercial scale.