

# PSS-3000 Optical Sheet



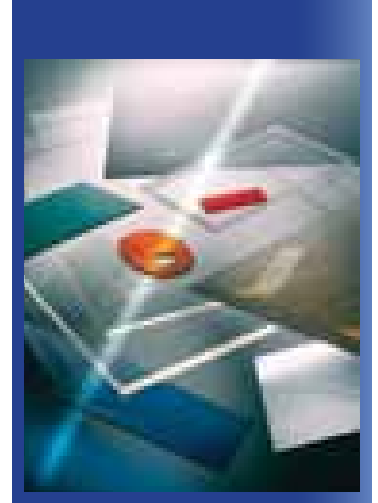
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 **ESP** <sup>TM</sup> *Engineered Sheet Products*

# PSS-3000 Optical Sheet | Overview

## Advanced Technology for All-Around Performance

PSS-3000 optical sheet is produced using a technologically advanced thermoset resin and offers excellent optical properties, rugged durability and lightweight performance, as well as outstanding chemical resistance, mechanical properties and thermal stability. PSS-3000 sheet combines the optical quality and chemical resistance of glass with the lightweight performance of plastics.



### Distortion-Free Optics

One of the most distinctive attributes of PSS-3000 sheet is its optical performance.

- High light transmission
- Low haze value

### Rugged Durability

Few other engineered plastics can match the chemical and abrasion resistance offered by PSS-3000 sheet products.

- Withstands very hot or cold temperatures
- Virtually unaffected by most organic and inorganic chemicals

## PERFORMANCE COMPARISON


|                           | PSS-3000 | ACRYLIC | POLYCARBONATE | GLASS |
|---------------------------|----------|---------|---------------|-------|
| Optical Quality           | ● ●      | ● ●     | ⊘             | ● ● ● |
| Abrasion Resistance       | ● ●      | ⊘       | ⊘             | ● ● ● |
| Chemical Resistance       | ● ●      | ⊘       | ⊘             | ● ● ● |
| Lightweight / Low Density | ● ●      | ● ● ●   | ● ● ●         | ⊘     |
| Impact Resistance         | ●        | ●       | ● ● ●         | ⊘     |

● ● ● Superior   ● ● Excellent   ● Good   ⊘ Poor

# PROPERTIES

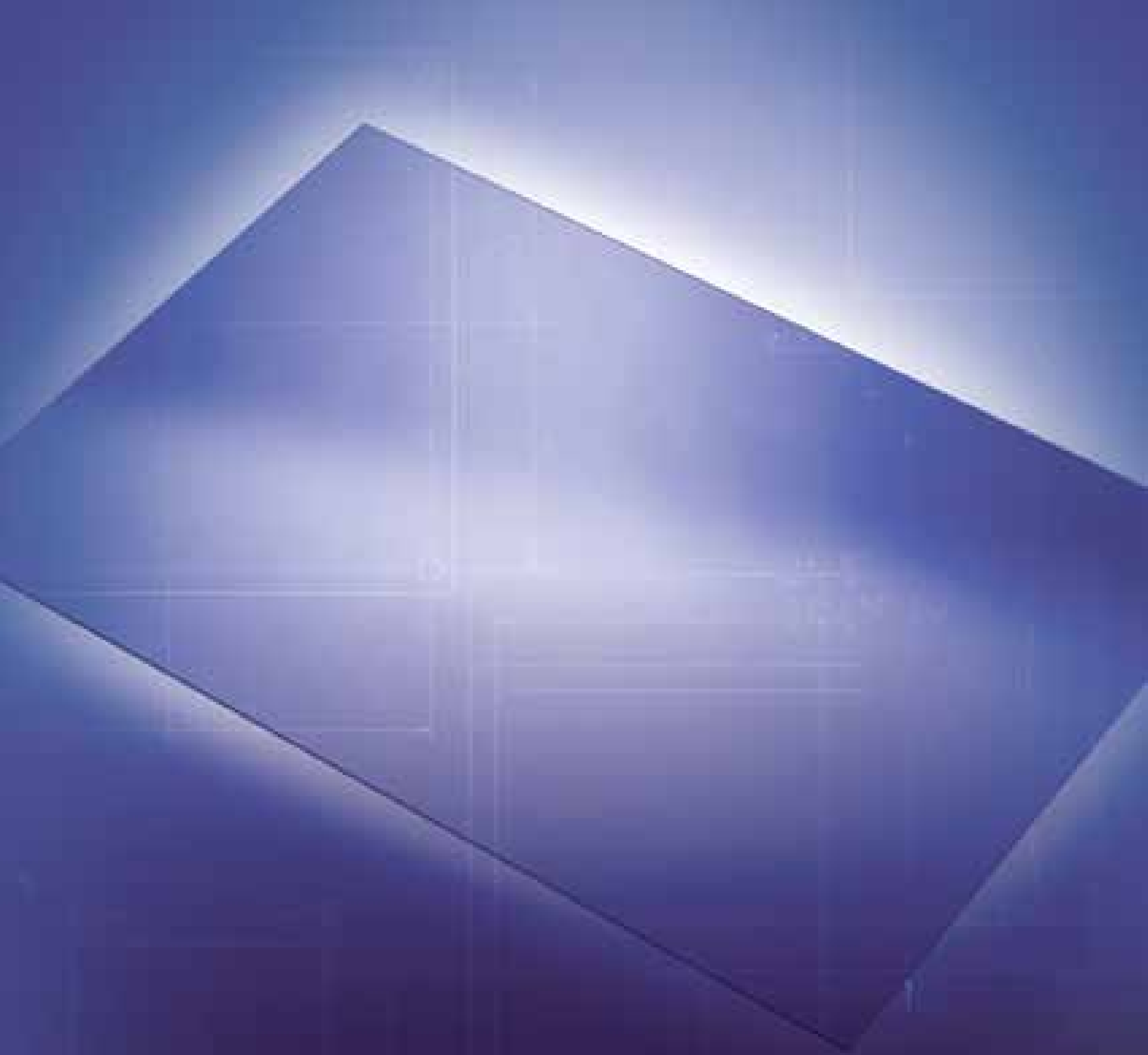
|   | TEST CONDITIONS                    | UNITS   | STANDARDS              | PSS-3000            |
|---|------------------------------------|---|------------------------|---------------------|
| <b>OPTICAL</b> Tests conducted on 3.0 mm thick sheet      |                                    |   |                        |                     |
| Luminous Transmittance                                    |                                    | %   |                        | 92                  |
| Haze  |                                    | %   |                        | 0.03                |
| Yellowness Index  |                                    |   | ASTM E313              | 0.77                |
| Refractive Index, $n_e$                                   | 23°C, 546 nm                       |   |                        | 1.50                |
| Abbe Value  |                                    |   |                        | 57                  |
| <b>MECHANICAL</b> Tests conducted on 1.0 mm thick sheet   |                                    |   |                        |                     |
| Tensile Stress at Break                                   | 50% RH / 23°C                      | MPa   | ASTM D638-08           | 51                  |
| Tensile Elongation at Break                               | 50% RH / 23°C                      | %   | ASTM D638-08           | 14                  |
| Tensile Modulus   | 50% RH / 23°C                      | MPa   | ASTM D638-08           | 1,582               |
| Tensile Yield Stress                                      | 50% RH / 23°C                      | MPa   | ASTM D638-08           | 44                  |
| Compressive Stress  | 50% RH / 23°C                      | MPa   | ASTM D695-02a          | 58                  |
| Compressive Modulus                                       | 50% RH / 23°C                      | MPa   | ASTM D695-02a          | 1,088               |
| Compressive Yield   | 50% RH / 23°C                      | MPa   | ASTM D695-02a          | 42                  |
| Maximum Load  | 50% RH / 23°C                      | N   | ASTM D790-07           | 30                  |
| Flexural Stress   | 50% RH / 23°C                      | MPa   | ASTM D790-07           | 91                  |
| Flexural Modulus  | 50% RH / 23°C                      | MPa   | ASTM D790-07           | 2,724               |
| Martens Hardness  |                                    | N/mm <sup>2</sup>                             | ISO 14577              | 103                 |
| Rockwell Hardness   | 50% RH / 23°C                      | M   | ASTM D785              | 88                  |
| Pencil Hardness   | 7.5 N Force                        |   | ISO 15184              | H                   |
| Taber Abrasion  | 500 g, 100 Cycles,<br>3.0 mm thick | %   | ASTM D1044             | 9.66%               |
| Steel Wool Abrasion                                       | 200 Cycles, #0000                  | %   |                        | 2%                  |
| Izod Impact – Notched                                     | 25°C                               | Ft lb/inch                                    | ASTM D256              | 0.2 – 0.4           |
| Izod Impact – Unnotched                                   | 25°C                               | Ft lb/inch                                    | ASTM D256              | 2 – 3               |
| <b>THERMAL</b> Tests conducted on 3.0 mm thick sheet      |                                    |   |                        |                     |
| Specific Heat   | 25°C                               | J / g / °C                                    | ASTM E1269             | 1.30                |
| Thermal Expansion Coefficient                             |                                    | $\mu\text{m} / (\text{m } ^\circ\text{C})$    | ASTM E831              | 100                 |
| Heat Distortion Temperature                               | 264 psi                            | °C  | ASTM D648              | 55                  |
| Continuous Service Temperature                            |                                    | °C  |                        | 100                 |
| Softening Temperature                                     |                                    | °C  | ASTM E1545             | > 200               |
| <b>FLAMMABILITY</b> Tests conducted on 1.0 mm thick sheet |                                    |   |                        |                     |
| UL 94 Flammability Class                                  | 50% RH / 23°C                      |   | ASTM D3801/<br>D635-06 | HB                  |
| Flash Ignition Temperature                                |                                    | °C  | ASTM D1929             | 376                 |
| Self Ignition Temperature                                 |                                    | °C  | ASTM D1929             | 382                 |
| <b>ELECTRICAL</b> Tests conducted on 1.0 mm thick sheet   |                                    |   |                        |                     |
| Surface Resistivity                                       | 50% RH / 23°C, 500 V               | Ohms  | ASTM D257-99           | $28 \times 10^{15}$ |
| Volume Resistivity  | 50% RH / 23°C, 500 V               | Ohms-cm                                       | ASTM D257-99           | $15 \times 10^{15}$ |
| Dielectric Constant                                       |                                    |   | ASTM D150              |                     |
| At 100 Hz   |                                    |   |                        | 4.4                 |
| At 1 kHz  |                                    |   |                        | 4.2                 |
| At 1 MHz  |                                    |   |                        | 3.6                 |
| <b>BASIC</b> Tests conducted on 1.0 mm thick sheet        |                                    |   |                        |                     |
| Specific Gravity  |                                    | g / cm <sup>3</sup>                           |                        | 1.31                |
| Water Absorption  | 7 days, 25°C                       | %   |                        | 0.7                 |
| Oxygen Permeability                                       | 0% RH / 23°C                       | cm <sup>3</sup> / (100 in <sup>2</sup> * day) | ASTM D3801             | 0.1                 |
| Water Vapor Transmission Rate                             | 100% RH / 38°C                     | g / (100 in <sup>2</sup> * day)               | ASTM F1249             | 0.27                |

# PRODUCT AVAILABILITY

| <b>STANDARD SHEET SIZE</b><br>(Tolerances: $\pm 0.1$ mm) | <b>Custom Sizes up to 960 mm x 480 mm (37.8" x 18.9")</b>  |      |   |     |       |     |       |     |       |     |       |     |       |  |      |      |     |      |     |      |     |      |     |      |   |  |
|--|--|------|---|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|--|------|------|-----|------|-----|------|-----|------|-----|------|---|--|
| <b>STANDARD THICKNESS</b><br>(Tolerances: $\pm 10\%$ )   | <table border="1"> <thead> <tr> <th>(mm)</th> <th>(in)</th> </tr> </thead> <tbody> <tr><td>0.5</td><td>0.020</td></tr> <tr><td>0.7</td><td>0.028</td></tr> <tr><td>1.0</td><td>0.039</td></tr> <tr><td>1.5</td><td>0.059</td></tr> <tr><td>2.0</td><td>0.079</td></tr> </tbody> </table> | (mm) | (in)  | 0.5 | 0.020 | 0.7 | 0.028 | 1.0 | 0.039 | 1.5 | 0.059 | 2.0 | 0.079 | <table border="1"> <thead> <tr> <th>(mm)</th> <th>(in)</th> </tr> </thead> <tbody> <tr><td>3.0</td><td>0.12</td></tr> <tr><td>4.0</td><td>0.16</td></tr> <tr><td>5.0</td><td>0.20</td></tr> <tr><td>6.0</td><td>0.24</td></tr> </tbody> </table> | (mm) | (in) | 3.0 | 0.12 | 4.0 | 0.16 | 5.0 | 0.20 | 6.0 | 0.24 |  |  |
| (mm)   | (in)   |      |   |     |       |     |       |     |       |     |       |     |       |  |      |      |     |      |     |      |     |      |     |      |   |  |
| 0.5  | 0.020  |      |   |     |       |     |       |     |       |     |       |     |       |  |      |      |     |      |     |      |     |      |     |      |   |  |
| 0.7  | 0.028  |      |   |     |       |     |       |     |       |     |       |     |       |  |      |      |     |      |     |      |     |      |     |      |   |  |
| 1.0  | 0.039  |      |   |     |       |     |       |     |       |     |       |     |       |  |      |      |     |      |     |      |     |      |     |      |   |  |
| 1.5  | 0.059  |      |   |     |       |     |       |     |       |     |       |     |       |  |      |      |     |      |     |      |     |      |     |      |   |  |
| 2.0  | 0.079  |      |   |     |       |     |       |     |       |     |       |     |       |  |      |      |     |      |     |      |     |      |     |      |   |  |
| (mm)   | (in)   |      |   |     |       |     |       |     |       |     |       |     |       |  |      |      |     |      |     |      |     |      |     |      |   |  |
| 3.0  | 0.12   |      |   |     |       |     |       |     |       |     |       |     |       |  |      |      |     |      |     |      |     |      |     |      |   |  |
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| 5.0  | 0.20   |      |   |     |       |     |       |     |       |     |       |     |       |  |      |      |     |      |     |      |     |      |     |      |   |  |
| 6.0  | 0.24   |      |   |     |       |     |       |     |       |     |       |     |       |  |      |      |     |      |     |      |     |      |     |      |   |  |
| <b>SURFACE FINISHES</b>                                  | <b>Four Surface Finishes Available, One or Two Sides</b> <ul style="list-style-type: none"> <li>• Smooth / Smooth</li> <li>• Light Glare Reduction / 135 Gloss Units</li> <li>• Medium Glare Reduction / 110 Gloss Units</li> <li>• Heavy Glare Reduction / 85 Gloss Units</li> </ul>    |      |   |     |       |     |       |     |       |     |       |     |       |  |      |      |     |      |     |      |     |      |     |      |   |  |
| <b>STANDARD COLORS</b>                                   | Clear (Colorless)<br>Neutral Gray<br>Blue<br>Aqua (Blue-Green)<br>Amber<br>Yellow  |      | Brown<br>Red<br>Laser Red (650 nm)<br>Laser Red (670 nm)<br>Green<br>IR Transmitting Only |     |       |     |       |     |       |     |       |     |       |  |      |      |     |      |     |      |     |      |     |      |   |  |



Custom Sizes, Thickness and Colors available upon request



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