

## Makrolon® 2805

Covestro - Polycarbonates - *Polycarbonate*

### General Information

#### Product Description

MVR (300°C/1.2 kg) 9.0 cm³/10 min; general purpose; medium viscosity; easy release; injection molding - melt temperature 280 - 320°C; available in transparent, translucent and opaque colors

#### General

|                   |                                           |                             |                    |
|-------------------|-------------------------------------------|-----------------------------|--------------------|
| Material Status   | • Commercial: Active                      |                             |                    |
| Availability      | • Africa & Middle East<br>• Asia Pacific  | • Europe<br>• Latin America | • North America    |
| Features          | • General Purpose                         | • Good Mold Release         | • Medium Viscosity |
| Uses              | • General Purpose                         |                             |                    |
| RoHS Compliance   | • RoHS Compliant                          |                             |                    |
| Appearance        | • Clear/Transparent<br>• Colors Available | • Opaque<br>• Translucent   |                    |
| Processing Method | • Injection Molding                       |                             |                    |
| ISO Designation   | • ISO 7391-PC,MR,(,)-09-9                 |                             |                    |

### Properties <sup>1</sup>

| Physical                                                 | Nominal Value | Unit             | Test Method  |
|----------------------------------------------------------|---------------|------------------|--------------|
| Density (73°F)                                           | 1.20          | g/cm³            | ISO 1183     |
| Apparent (Bulk) Density <sup>2</sup>                     | 0.66          | g/cm³            | ISO 60       |
| Melt Mass-Flow Rate (MFR) (300°C/1.2 kg)                 | 10            | g/10 min         | ISO 1133     |
| Melt Volume-Flow Rate (MVR) (300°C/1.2 kg)               | 9.0           | cm³/10min        | ISO 1133     |
| Molding Shrinkage                                        |               |                  |              |
| Across Flow                                              | 0.60 to 0.80  | %                | ISO 2577     |
| Flow                                                     | 0.60 to 0.80  | %                | ISO 2577     |
| Across Flow : 536°F, 0.0787 in <sup>3</sup>              | 0.70          | %                | ISO 294-4    |
| Flow : 0.0787 in <sup>3</sup>                            | 0.65          | %                | ISO 294-4    |
| Water Absorption (Saturation, 73°F)                      | 0.30          | %                | ISO 62       |
| Water Absorption (Equilibrium, 73°F, 50% RH)             | 0.12          | %                | ISO 62       |
| Mechanical                                               | Nominal Value | Unit             | Test Method  |
| Tensile Modulus (73°F)                                   | 348000        | psi              | ISO 527-1/1  |
| Tensile Stress (Yield, 73°F)                             | 9570          | psi              | ISO 527-2/50 |
| Tensile Stress (Break, 73°F)                             | 10200         | psi              | ISO 527-2/50 |
| Tensile Strain (Yield, 73°F)                             | 6.2           | %                | ISO 527-2/50 |
| Tensile Strain (Break, 73°F)                             | 130           | %                | ISO 527-2/50 |
| Nominal Tensile Strain at Break (73°F)                   | > 50          | %                | ISO 527-2/50 |
| Tensile Creep Modulus (1 hr)                             | 319000        | psi              | ISO 899-1    |
| Tensile Creep Modulus (1000 hr)                          | 276000        | psi              | ISO 899-1    |
| Flexural Modulus <sup>4</sup> (73°F)                     | 348000        | psi              | ISO 178      |
| Flexural Stress <sup>4</sup>                             |               |                  | ISO 178      |
| 73°F                                                     | 14100         | psi              |              |
| 3.5% Strain, 73°F                                        | 10600         | psi              |              |
| Flexural Strain at Flexural Strength <sup>5</sup> (73°F) | 7.1           | %                | ISO 178      |
| Films                                                    | Nominal Value | Unit             | Test Method  |
| Water Vapor Transmission Rate (73°F, 85% RH, 3.9 mil)    | 0.97          | g/100 in²/24 hr  | ISO 15106-1  |
| Carbon Dioxide Permeability (73°F, 1.0 mil)              | 16900         | cm³/m²/bar/24 hr | ISO 2556     |
| Gas Permeation                                           |               |                  | ISO 2556     |
| Carbon Dioxide : 3.9 mil                                 | 3800          | cm³/m²/bar/24 hr |              |



|                                                         |                      |                                            |                    |
|---------------------------------------------------------|----------------------|--------------------------------------------|--------------------|
| Nitrogen : 1.0 mil                                      | 510                  | cm <sup>3</sup> /m <sup>2</sup> /bar/24 hr |                    |
| Nitrogen : 3.9 mil                                      | 120                  | cm <sup>3</sup> /m <sup>2</sup> /bar/24 hr |                    |
| Oxygen : 1.0 mil                                        | 2760                 | cm <sup>3</sup> /m <sup>2</sup> /bar/24 hr |                    |
| Oxygen : 3.9 mil                                        | 650                  | cm <sup>3</sup> /m <sup>2</sup> /bar/24 hr |                    |
| <b>Impact</b>                                           | <b>Nominal Value</b> | <b>Unit</b>                                | <b>Test Method</b> |
| Charpy Notched Impact Strength <sup>6</sup>             |                      |                                            | ISO 179/1eA        |
| -22°F, Complete Break                                   | 7.6                  | ft·lb/in <sup>2</sup>                      |                    |
| 73°F, Partial Break                                     | 36                   | ft·lb/in <sup>2</sup>                      |                    |
| Charpy Unnotched Impact Strength                        |                      |                                            | ISO 179/1eU        |
| -76°F                                                   | No Break             |                                            |                    |
| -22°F                                                   | No Break             |                                            |                    |
| 73°F                                                    | No Break             |                                            |                    |
| Notched Izod Impact Strength <sup>6</sup>               |                      |                                            | ISO 180/A          |
| -22°F, Complete Break                                   | 7.1                  | ft·lb/in <sup>2</sup>                      |                    |
| 73°F, Partial Break                                     | 33                   | ft·lb/in <sup>2</sup>                      |                    |
| Multi-Axial Instrumented Impact Energy                  |                      |                                            | ISO 6603-2         |
| -22°F                                                   | 47.9                 | ft·lb                                      |                    |
| 73°F                                                    | 44.3                 | ft·lb                                      |                    |
| Multi-Axial Instrumented Impact Peak Force              |                      |                                            | ISO 6603-2         |
| -22°F                                                   | 1420                 | lbf                                        |                    |
| 73°F                                                    | 1210                 | lbf                                        |                    |
| <b>Hardness</b>                                         | <b>Nominal Value</b> | <b>Unit</b>                                | <b>Test Method</b> |
| Ball Indentation Hardness                               | 16700                | psi                                        | ISO 2039-1         |
| <b>Thermal</b>                                          | <b>Nominal Value</b> | <b>Unit</b>                                | <b>Test Method</b> |
| Deflection Temperature Under Load (66 psi, Unannealed)  | 279                  | °F                                         | ISO 75-2/B         |
| Deflection Temperature Under Load (264 psi, Unannealed) | 257                  | °F                                         | ISO 75-2/A         |
| Glass Transition Temperature <sup>7</sup>               | 293                  | °F                                         | ISO 11357-2        |
| Vicat Softening Temperature                             |                      |                                            |                    |
| --                                                      | 295                  | °F                                         | ISO 306/B120       |
| --                                                      | 291                  | °F                                         | ISO 306/B50        |
| Ball Pressure Test (277°F)                              | Pass                 |                                            | IEC 60695-10-2     |
| CLTE - Flow (73 to 131°F)                               | 3.6E-5               | in/in/°F                                   | ISO 11359-2        |
| CLTE - Transverse (73 to 131°F)                         | 3.6E-5               | in/in/°F                                   | ISO 11359-2        |
| Thermal Conductivity <sup>8</sup> (73°F)                | 1.4                  | Btu·in/hr/ft <sup>2</sup> /°F              | ISO 8302           |
| RTI Elec (0.06 in)                                      | 257                  | °F                                         | UL 746B            |
| RTI Imp (0.06 in)                                       | 239                  | °F                                         | UL 746B            |
| RTI Str (0.06 in)                                       | 257                  | °F                                         | UL 746B            |
| <b>Electrical</b>                                       | <b>Nominal Value</b> | <b>Unit</b>                                | <b>Test Method</b> |
| Surface Resistivity                                     | 1.0E+16              | ohms                                       | IEC 60093          |
| Volume Resistivity (73°F)                               | 1.0E+16              | ohms·cm                                    | IEC 60093          |
| Electric Strength (73°F, 0.0394 in)                     | 860                  | V/mil                                      | IEC 60243-1        |
| Relative Permittivity                                   |                      |                                            | IEC 60250          |
| 73°F, 100 Hz                                            | 3.10                 |                                            |                    |
| 73°F, 1 MHz                                             | 3.00                 |                                            |                    |
| Dissipation Factor                                      |                      |                                            | IEC 60250          |
| 73°F, 100 Hz                                            | 5.0E-4               |                                            |                    |
| 73°F, 1 MHz                                             | 9.0E-3               |                                            |                    |
| Comparative Tracking Index                              |                      |                                            | IEC 60112          |
| Solution A                                              | 250                  | V                                          |                    |
| Solution B                                              | 125                  | V                                          |                    |
| Electrolytic Corrosion (73°F)                           | A1                   |                                            | IEC 60426          |
| <b>Flammability</b>                                     | <b>Nominal Value</b> | <b>Unit</b>                                | <b>Test Method</b> |
| Flame Rating                                            |                      |                                            | UL 94              |
| 0.10 in                                                 | HB                   |                                            |                    |
| 0.030 in                                                | V-2                  |                                            |                    |
| Glow Wire Flammability Index                            |                      |                                            | IEC 60695-2-12     |
|                                                         | 1560                 | °F                                         |                    |
|                                                         | 1560                 | °F                                         |                    |
|                                                         | 1710                 | °F                                         |                    |
| Ignition Temperature                                    |                      |                                            | IEC                |



|                                                                 |                           |                    |
|-----------------------------------------------------------------|---------------------------|--------------------|
| 0.030 in                                                        | 1610 °F                   |                    |
| 0.04 in                                                         | 1610 °F                   |                    |
| 0.06 in                                                         | 1610 °F                   |                    |
| 0.12 in                                                         | 1650 °F                   |                    |
| Oxygen Index <sup>9</sup>                                       | 28 %                      | ISO 4589-2         |
| Application of Flame from Small Burner <sup>10</sup> (78.7 mil) | K1, F1                    | DIN 53438-1, -3    |
| Burning Rate <sup>11</sup> (> 39.4 mil)                         | passed                    | ISO 3795           |
| Flash Ignition Temperature                                      | 896 °F                    | ASTM D1929         |
| Glow Wire Test                                                  |                           | EDF HN60 E.02      |
| 59.1 mil                                                        | 1382 °F                   |                    |
| 0.12 in                                                         | 1382 °F                   |                    |
| Needle Flame Test                                               |                           | IEC 60695-11-5     |
| 59.1 mil <sup>12</sup>                                          | 60 sec                    |                    |
| 59.1 mil <sup>13</sup>                                          | 5 sec                     |                    |
| 78.7 mil <sup>12</sup>                                          | 60 sec                    |                    |
| 78.7 mil <sup>13</sup>                                          | 5 sec                     |                    |
| 0.12 in <sup>13</sup>                                           | 10 sec                    |                    |
| 0.12 in <sup>12</sup>                                           | 120 sec                   |                    |
| Self Ignition Temperature                                       | 1022 °F                   | ASTM D1929         |
| <b>Optical</b>                                                  | <b>Nominal Value Unit</b> | <b>Test Method</b> |
| Refractive Index <sup>14</sup>                                  | 1.586                     | ISO 489            |
| Light Transmittance                                             |                           | ISO 13468-2        |
| 39.37 mil                                                       | 89.0 %                    |                    |
| 78.74 mil                                                       | 89.0 %                    |                    |
| 118.1 mil                                                       | 88.0 %                    |                    |
| 157.5 mil                                                       | 87.0 %                    |                    |
| Haze (118.1 mil)                                                | < 0.800 %                 | ISO 14782          |

### Processing Information

| <b>Injection</b>                   | <b>Nominal Value Unit</b> |
|------------------------------------|---------------------------|
| Drying Temperature - Dry Air Dryer | 248 °F                    |
| Drying Time - Dry Air Dryer        | 2.0 to 3.0 hr             |
| Suggested Max Moisture             | < 0.020 %                 |
| Suggested Shot Size                | 30 to 70 %                |
| Rear Temperature                   | 482 to 500 °F             |
| Middle Temperature                 | 518 to 536 °F             |
| Front Temperature                  | 536 to 554 °F             |
| Nozzle Temperature                 | 554 to 572 °F             |
| Processing (Melt) Temp             | 536 to 608 °F             |
| Mold Temperature                   | 176 to 248 °F             |
| Back Pressure                      | 725 to 2180 psi           |
| Vent Depth                         | 9.8E-4 to 3.0E-3 in       |

### Injection Notes

Peripheral Screw Speed: 0.05 - 0.2 m/s  
Standard Melt Temperature: 300°C  
Hold Pressure (% of Injection Pressure): 50 - 75%

### Notes

<sup>1</sup> Typical properties: these are not to be construed as specifications.

<sup>2</sup> Pellets

<sup>3</sup> 60x60x2mm, 500 bar

<sup>4</sup> 0.079 in/min

<sup>5</sup> 2.0 mm/min

<sup>6</sup> 3 mm

<sup>7</sup> 10°C/min

<sup>8</sup> Across Flow

A  
and F  
S



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<sup>12</sup> Method F

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<sup>13</sup> Method K

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<sup>14</sup> Method A

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