

# Covestro Makrolon® 2856

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

As of 1 September 2015, Bayer MaterialScience was separated from Bayer AG and officially adopted its new name – Covestro.

| Physical Properties                | Metric                                                       | English                                                              | Comments                                                     |
|------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------|
| Bulk Density                       | 0.660 g/cc                                                   | 0.0238 lb/in³                                                        | Pellets; ISO 60                                              |
| Density                            | 1.20 g/cc                                                    | 0.0434 lb/in³                                                        | ISO 1183                                                     |
| Moisture Absorption at Equilibrium | 0.12 %                                                       | 0.12 %                                                               | ISO 62                                                       |
| Water Absorption at Saturation     | 0.30 %                                                       | 0.30 %                                                               | ISO 62                                                       |
| Water Vapor Transmission           | 15.0 g/m²/day<br>@Thickness 0.100 mm,<br>Temperature 23.0 °C | 0.966 g/100 in²/day<br>@Thickness 0.00394 in,<br>Temperature 73.4 °F | 85% RH; ISO 15106-1                                          |
| Oxygen Transmission                | 650 cc-mm/m²-24hr-atm                                        | 1650 cc-mil/100 in²-24hr-atm                                         | cm³/(m²·24 h·bar),<br>100 µm film; b.o. ISO<br>2556          |
|                                    | 2760 cc-mm/m²-24hr-atm                                       | 7010 cc-mil/100 in²-24hr-atm                                         | cm³/(m²·24 h·bar),<br>25.4 µm (1 mil) film;<br>b.o. ISO 2556 |
| Nitrogen Transmission              | 120 cc-mm/m²-24hr-atm                                        | 305 cc-mil/100 in²-24hr-atm                                          | cm³/(m²·24 h·bar),<br>100 µm film; b.o. ISO<br>2556          |
|                                    | 510 cc-mm/m²-24hr-atm                                        | 1300 cc-mil/100 in²-24hr-atm                                         | cm³/(m²·24 h·bar),<br>25.4 µm (1 mil) film;<br>b.o. ISO 2556 |
| Carbon Dioxide Transmission        | 3800 cc-mm/m²-24hr-atm                                       | 9650 cc-mil/100 in²-24hr-atm                                         | cm³/(m²·24 h·bar),<br>100 µm film; b.o. ISO<br>2556          |
|                                    | 16900 cc-mm/m²-24hr-atm                                      | 42900 cc-mil/100 in²-24hr-atm                                        | cm³/(m²·24 h·bar),<br>25.4 µm (1 mil) film;<br>b.o. ISO 2556 |
| Linear Mold Shrinkage              | 0.0060 - 0.0080 cm/cm                                        | 0.0060 - 0.0080 in/in                                                | parallel/normal; b.o.<br>ISO 2577                            |
| Linear Mold Shrinkage, Flow        | 0.0070 cm/cm                                                 | 0.0070 in/in                                                         | 60x60x2 mm; 500<br>bar; ISO 294-4,2577                       |
| Linear Mold Shrinkage, Transverse  | 0.0050 cm/cm                                                 | 0.0050 in/in                                                         | 60x60x2 mm; 500<br>bar; ISO 294-4,2577                       |
| Melt Flow                          | 10 g/10 min<br>@Load 1.20 kg,<br>Temperature 300 °C          | 10 g/10 min<br>@Load 2.65 lb,<br>Temperature 572 °F                  | ISO 1133                                                     |

| Mechanical Properties     | Metric   | English   | Comments                            |
|---------------------------|----------|-----------|-------------------------------------|
| Ball Indentation Hardness | 115 MPa  | 16700 psi | ISO 2039-1                          |
| Tensile Strength at Break | 70.0 MPa | 10200 psi | 50 mm/min; ISO<br>527-1/-2          |
| Tensile Strength, Yield   | 65.0 MPa | 9430 psi  | 50 mm/min; ISO<br>527-1/-2          |
| Elongation at Break       | >= 50 %  | >= 50 %   | Nominal, 50 mm/min;<br>ISO 527-1/-2 |
|                           | 130 %    | 130 %     | 50 mm/min; ISO<br>527-1/-2          |
| Elongation at Yield       | 6.2 %    | 6.2 %     | 50 mm/min; ISO<br>527-1/-2          |

|                                   |                                                                       |                                                                            |                                           |
|-----------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------|
| Tensile Modulus                   | 2.40 GPa                                                              | 348 ksi                                                                    | 1 mm/min; ISO 527-1/-2                    |
| Flexural Strength                 | 97.0 MPa                                                              | 14100 psi                                                                  | 2 mm/min; ISO 178                         |
|                                   | 73.0 MPa<br>@Strain 3.5 %                                             | 10600 psi<br>@Strain 3.5 %                                                 | 2 mm/min; ISO 178                         |
| Flexural Modulus                  | 2.40 GPa                                                              | 348 ksi                                                                    | 2 mm/min; ISO 178                         |
| Flexural Strain at Yield          | 7.1 %                                                                 | 7.1 %                                                                      | 2 mm/min; ISO 178                         |
| Izod Impact, Notched (ISO)        | 15.0 kJ/m <sup>2</sup><br>@Thickness 3.00 mm,<br>Temperature -30.0 °C | 7.14 ft-lb/in <sup>2</sup><br>@Thickness 0.118 in,<br>Temperature -22.0 °F | complete break; ISO 7391/b.o. ISO 180-A   |
|                                   | 70.0 kJ/m <sup>2</sup><br>@Thickness 3.00 mm,<br>Temperature 23.0 °C  | 33.3 ft-lb/in <sup>2</sup><br>@Thickness 0.118 in,<br>Temperature 73.4 °F  | partial break; ISO 7391/b.o. ISO 180-A    |
| Charpy Impact Unnotched           | NB                                                                    | NB                                                                         | ISO 179/1eU                               |
|                                   | NB<br>@Temperature -30.0 °C                                           | NB<br>@Temperature -22.0 °F                                                | ISO 179/1eU                               |
|                                   | NB<br>@Temperature -60.0 °C                                           | NB<br>@Temperature -76.0 °F                                                | ISO 179/1eU                               |
| Charpy Impact, Notched            | 1.60 J/cm <sup>2</sup><br>@Thickness 3.00 mm,<br>Temperature -30.0 °C | 7.61 ft-lb/in <sup>2</sup><br>@Thickness 0.118 in,<br>Temperature -22.0 °F | complete break; ISO 7391/b.o. ISO 179-1eA |
|                                   | 7.50 J/cm <sup>2</sup><br>@Thickness 3.00 mm,<br>Temperature 23.0 °C  | 35.7 ft-lb/in <sup>2</sup><br>@Thickness 0.118 in,<br>Temperature 73.4 °F  | partial break; ISO 7391/b.o. ISO 179-1eA  |
| Impact                            | 5400                                                                  | 5400                                                                       | Puncture - maximum force (N); ISO 6603-2  |
|                                   | 6300<br>@Temperature -30.0 °C                                         | 6300<br>@Temperature -22.0 °F                                              | Puncture - maximum force (N); ISO 6603-2  |
| Puncture Energy                   | 60.0 J                                                                | 44.3 ft-lb                                                                 | ISO 6603-2                                |
|                                   | 65.0 J<br>@Temperature -30.0 °C                                       | 47.9 ft-lb<br>@Temperature -22.0 °F                                        | ISO 6603-2                                |
| Tensile Creep Modulus, 1 hour     | 2200 MPa                                                              | 319000 psi                                                                 | ISO 899-1                                 |
| Tensile Creep Modulus, 1000 hours | 1900 MPa                                                              | 276000 psi                                                                 | ISO 899-1                                 |