



# Makrolon® 2558

## Grades / Medical devices

MVR (300 °C/1.2 kg) 14 cm³/10 min; medical devices; suitable for ETO and steam sterilization at 121 °C; biocompatible according to many ISO 10993-1 test requirements; medium viscosity; easy release; injection molding - melt temperature 280 - 320 °C; available in transparent and opaque colors

## ISO Shortname

PC

| Property                           | Test Condition                                    | Unit       | Standard      | typical Value |
|------------------------------------|---------------------------------------------------|------------|---------------|---------------|
| <b>Rheological properties</b>      |                                                   |            |               |               |
| C Melt volume-flow rate            | 300 °C/ 1.2 kg                                    | cm³/10 min | ISO 1133      | 14            |
| Melt mass-flow rate                | 300 °C/ 1.2 kg                                    | g/10 min   | ISO 1133      | 15.5          |
| C Molding shrinkage, parallel      | 60x60x2 mm/ 500 bar                               | %          | ISO 294-4     | 0.65          |
| C Molding shrinkage, normal        | 60x60x2 mm/ 500 bar                               | %          | ISO 294-4     | 0.7           |
| Molding shrinkage, parallel/normal | Value range based on general practical experience | %          | b.o. ISO 2577 | 0.6 - 0.8     |

## Mechanical properties (23 °C/50 % r. h.)

|                                              |              |       |                                |      |
|----------------------------------------------|--------------|-------|--------------------------------|------|
| C Tensile modulus                            | 1 mm/min     | MPa   | ISO 527-1,-2                   | 2400 |
| C Yield stress                               | 50 mm/min    | MPa   | ISO 527-1,-2                   | 66   |
| C Yield strain                               | 50 mm/min    | %     | ISO 527-1,-2                   | 6.1  |
| C Nominal strain at break                    | 50 mm/min    | %     | ISO 527-1,-2                   | > 50 |
| Stress at break                              | 50 mm/min    | MPa   | ISO 527-1,-2                   | 70   |
| Strain at break                              | 50 mm/min    | %     | b.o. ISO 527-1,-2              | 130  |
| C Tensile creep modulus                      | 1 h          | MPa   | ISO 899-1                      | 2200 |
| C Tensile creep modulus                      | 1000 h       | MPa   | ISO 899-1                      | 1900 |
| Flexural modulus                             | 2 mm/min     | MPa   | ISO 178                        | 2400 |
| Flexural strength                            | 2 mm/min     | MPa   | ISO 178                        | 97   |
| Flexural strain at flexural strength         | 2 mm/min     | %     | ISO 178                        | 7.1  |
| Flexural stress at 3.5 % strain              | 2 mm/min     | MPa   | ISO 178                        | 73   |
| C Charpy impact strength                     | 23 °C        | kJ/m² | ISO 179/1eU                    | N    |
| Charpy impact strength                       | -60 °C       | kJ/m² | ISO 179/1eU                    | N    |
| Charpy notched impact strength               | 23 °C/ 3 mm  | kJ/m² | ISO 21305/based on ISO 179/1eA | 70P  |
| Charpy notched impact strength               | -30 °C/ 3 mm | kJ/m² | ISO 21305/based on ISO 179/1eA | 16C  |
| Izod notched impact strength                 | 23 °C/ 3 mm  | kJ/m² | ISO 21305/based on ISO 180/A   | 65P  |
| Izod notched impact strength                 | -30 °C/ 3 mm | kJ/m² | ISO 21305/based on ISO 180/A   | 15C  |
| C Puncture impact properties - maximum force | 23 °C        | N     | ISO 6603-2                     | 5400 |
| C Puncture impact properties - maximum force | -30 °C       | N     | ISO 6603-2                     | 6300 |
| C Puncture energy                            | 23 °C        | J     | ISO 6603-2                     | 60   |
| C Puncture energy                            | -30 °C       | J     | ISO 6603-2                     | 65   |
| Ball indentation hardness                    |              | N/mm² | ISO 2039-1                     | 115  |

## Thermal properties

|                                                     |                   |         |                |      |
|-----------------------------------------------------|-------------------|---------|----------------|------|
| C Glass transition temperature                      | 10 °C/min         | °C      | ISO 11357-1,-2 | 144  |
| C Temperature of deflection under load              | 1.80 MPa          | °C      | ISO 75-1,-2    | 124  |
| C Temperature of deflection under load              | 0.45 MPa          | °C      | ISO 75-1,-2    | 136  |
| C Vicat softening temperature                       | 50 N; 50 °C/h     | °C      | ISO 306        | 144  |
| Vicat softening temperature                         | 50 N; 120 °C/h    | °C      | ISO 306        | 145  |
| C Coefficient of linear thermal expansion, parallel | 23 to 55 °C       | 10⁻⁴/K  | ISO 11359-1,-2 | 0.65 |
| C Coefficient of linear thermal expansion, normal   | 23 to 55 °C       | 10⁻⁴/K  | ISO 11359-1,-2 | 0.65 |
| C Oxygen index                                      | Method A          | %       | ISO 4589-2     | 28   |
| Thermal conductivity, through-plane                 | 23 °C; 50 % r. h. | W/(m·K) | ISO 8302       | 0.20 |
| Resistance to heat (ball pressure test)             |                   | °C      | IEC 60695-10-2 | 138  |
| Flash ignition temperature                          |                   | °C      | ASTM D1929     | 480  |
| Self ignition temperature                           |                   | °C      | ASTM D1929     | 550  |



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| Property                                               | Test Condition    | Unit              | Standard    | typical Value |
|--------------------------------------------------------|-------------------|-------------------|-------------|---------------|
| <b>Electrical properties (23 °C/50 % r. h.)</b>        |                   |                   |             |               |
| C Relative permittivity                                | 100 Hz            | -                 | IEC 60250   | 3.1           |
| C Relative permittivity                                | 1 MHz             | -                 | IEC 60250   | 3.0           |
| C Dissipation factor                                   | 100 Hz            | 10 <sup>-4</sup>  | IEC 60250   | 5.0           |
| C Dissipation factor                                   | 1 MHz             | 10 <sup>-4</sup>  | IEC 60250   | 90            |
| C Volume resistivity                                   |                   | Ohm·m             | IEC 60093   | 1E14          |
| C Surface resistivity                                  |                   | Ohm               | IEC 60093   | 1E16          |
| C Electrical strength                                  | 1 mm              | kV/mm             | IEC 60243-1 | 34            |
| C Comparative tracking index CTI                       | Solution A        | Rating            | IEC 60112   | 250           |
| <b>Other properties (23 °C)</b>                        |                   |                   |             |               |
| C Water absorption (saturation value)                  | Water at 23 °C    | %                 | ISO 62      | 0.30          |
| C Water absorption (equilibrium value)                 | 23 °C; 50 % r. h. | %                 | ISO 62      | 0.12          |
| C Density                                              |                   | kg/m <sup>3</sup> | ISO 1183-1  | 1200          |
| Bulk density                                           | Pellets           | kg/m <sup>3</sup> | ISO 60      | 660           |
| <b>Material specific properties</b>                    |                   |                   |             |               |
| Refractive index                                       | Procedure A       | -                 | ISO 489     | 1.586         |
| Haze for transparent materials                         | 3 mm              | %                 | ISO 14782   | < 0.8         |
| Luminous transmittance (clear transparent materials)   | 1 mm              | %                 | ISO 13468-2 | 89            |
| C Luminous transmittance (clear transparent materials) | 2 mm              | %                 | ISO 13468-2 | 89            |
| Luminous transmittance (clear transparent materials)   | 3 mm              | %                 | ISO 13468-2 | 88            |
| Luminous transmittance (clear transparent materials)   | 4 mm              | %                 | ISO 13468-2 | 87            |
| <b>Processing conditions for test specimens</b>        |                   |                   |             |               |
| C Injection molding - Melt temperature                 |                   | °C                | ISO 294     | 290           |
| C Injection molding - Mold temperature                 |                   | °C                | ISO 294     | 80            |
| C Injection molding - Injection velocity               |                   | mm/s              | ISO 294     | 200           |
| <b>Recommended processing and drying conditions</b>    |                   |                   |             |               |
| Melt temperatures                                      |                   | °C                | -           | 280 - 320     |
| Standard Melt temperature                              |                   | °C                | -           | 300           |
| Barrel Temperatures - Rear                             |                   | °C                | -           | 250 - 260     |
| Barrel Temperatures - Middle                           |                   | °C                | -           | 270 - 280     |
| Barrel Temperatures - Front                            |                   | °C                | -           | 280 - 290     |
| Barrel Temperatures - Nozzle                           |                   | °C                | -           | 290 - 300     |
| Mold Temperatures                                      |                   | °C                | -           | 80 - 120      |
| Hold Pressure (% of injection pressure)                |                   | %                 | -           | 50 - 75       |
| Plastic Back Pressure (specific)                       |                   | bar               | -           | 50 - 150      |
| Peripheral Screw Speed                                 |                   | m/s               | -           | 0.05 - 0.2    |
| Shot-to-Cylinder Size                                  |                   | %                 | -           | 30 - 70       |
| Dry Air Drying Temperature                             |                   | °C                | -           | 120           |
| Dry Air Drying Time                                    |                   | h                 | -           | 2-3           |
| Moisture Content max. (%)                              |                   | %                 | -           | <= 0,02       |
| Vent Depth                                             |                   | mm                | -           | 0.025 - 0.075 |

C These property characteristics are taken from the CAMPUS plastics data bank and are based on the international catalogue of basic data for plastics according to ISO 10350.

Impact properties: N = non-break, P = partial break, C = complete break

