



# Makrolon® OP-V sheet

## Optical quality

Makrolon® OP-V sheet is a polished surface, UV stabilized, transparent polycarbonate product. OP-V is a flame retardant grade, UL 94 V-2 rating at 0.060" and greater, and V-0 rating at 0.236" and greater. Designed for use in applications requiring improved optical quality, it features outstanding impact strength, superior dimensional stability, high temperature resistance, and high clarity. This lightweight thermoformable sheet is also easy to fabricate and decorate. Makrolon OP-V sheet is offered with a five (5) year Limited Product Warranty against breakage. The terms of the warranty are available upon request.

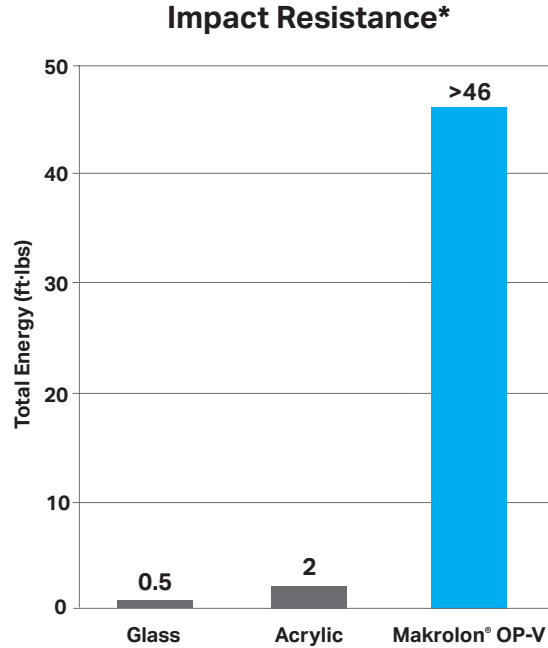
## Applications

Electrical cabinet doors and thermoformed enclosures

| Typical Properties*                          |               |                               |                         |
|--|---------------|-------------------------------|-------------------------|
| Property                                     | Test Method   | Units                         | Values                  |
| <b>PHYSICAL</b>                              |               |                               |                         |
| Specific Gravity                             | ASTM D 792    | –                             | 1.2                     |
| Refractive Index                             | ASTM D 542    | –                             | 1.586                   |
| Light Transmission, Clear @ 0.118"           | ASTM D 1003   | %                             | 86                      |
| Light Transmission, I30 Gray @ 0.118"        | ASTM D 1003   | %                             | 50                      |
| Light Transmission, K09 Bronze @ 0.118"      | ASTM D 1003   | %                             | 50                      |
| Light Transmission, I35 Dark Gray @ 0.118"   | ASTM D 1003   | %                             | 18                      |
| Water Absorption, 24 hours @ 73°F            | ASTM D 570    | %                             | 0.15                    |
| Poisson's Ratio                              | ASTM E 132    | –                             | 0.38                    |
| <b>MECHANICAL</b>                            |               |                               |                         |
| Tensile Strength, Break                      | ASTM D 638    | psi                           | 9,500                   |
| Tensile Strength, Yield                      | ASTM D 638    | psi                           | 9,000                   |
| Tensile Modulus                              | ASTM D 638    | psi                           | 340,000                 |
| Elongation                                   | ASTM D 638    | %                             | 110                     |
| Flexural Strength                            | ASTM D 790    | psi                           | 13,500                  |
| Flexural Modulus                             | ASTM D 790    | psi                           | 345,000                 |
| Compressive Strength                         | ASTM D 695    | psi                           | 12,500                  |
| Compressive Modulus                          | ASTM D 695    | psi                           | 345,000                 |
| Izod Impact Strength, Notched @ 0.125"       | ASTM D 256    | ft-lbs/in                     | 18                      |
| Izod Impact Strength, Unnotched @ 0.125"     | ASTM D 256    | ft-lbs/in                     | 60 (no failure)         |
| Instrumented Impact @ 0.125"                 | ASTM D 3763   | ft-lbs                        | >46                     |
| Shear Strength, Break                        | ASTM D 732    | psi                           | 10,000                  |
| Shear Strength, Yield                        | ASTM D 732    | psi                           | 6,000                   |
| Shear Modulus                                | ASTM D 732    | psi                           | 114,000                 |
| Rockwell Hardness                            | ASTM D 785    | –                             | M70 / R118              |
| <b>THERMAL</b>                               |               |                               |                         |
| Coefficient of Thermal Expansion             | ASTM D 696    | in/in/°F                      | 3.75 x 10 <sup>-5</sup> |
| Coefficient of Thermal Conductivity          | ASTM C 177    | BTU-in/hr-ft <sup>2</sup> -°F | 1.35                    |
| Heat Deflection Temperature @ 264 psi        | ASTM D 648    | °F                            | 270                     |
| Heat Deflection Temperature @ 66 psi         | ASTM D 648    | °F                            | 280                     |
| Brittleness Temperature                      | ASTM D 746    | °F                            | -200                    |
| Shading Coefficient, Clear @ 0.236"          | NFRC 100-2010 | –                             | 0.97                    |
| Shading Coefficient, Gray or Bronze @ 0.236" | NFRC 100-2010 | –                             | 0.77                    |
| U factor @ 0.236" (summer, winter)           | NFRC 100-2010 | BTU/hr-ft <sup>2</sup> -°F    | 0.85, 0.92              |
| U factor @ 0.375" (summer, winter)           | NFRC 100-2010 | BTU/hr-ft <sup>2</sup> -°F    | 0.78, 0.85              |
| <b>FLAMMABILITY</b>                          |               |                               |                         |
| Flame Class @ 0.060"                         | UL 94         | –                             | V-2                     |
| Flame Class @ 0.236"                         | UL 94         | –                             | V-0                     |

\*Typical properties are not intended for specification purposes.

# Makrolon® OP-V sheet



\*Instrumented Impact per ASTM D 3763,  
sample thickness 0.125" nominal

## Agency and specification compliance

|   |             |                    |
|---|-------------|--------------------|
| Architectural Flat Glass Clad polycarbonate | ASTM C 1349 | Appendix X1 Type 1 |
| Polycarbonate sheet classification          | A-A-59502   | Type 1 Class 1     |
| Polycarbonate resin classification          | ASTM D 3935 | PC0136             |
| Flammability - Plastic component            | UL 94       | UL File #E351891   |



119 Salisbury Road  
Sheffield, MA 01257  
Toll Free: 800.254.1707  
Fax: 800.457.3553  
sfdinfo@covestro.com  
sheets.covestro.com

The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations, are beyond our control. Therefore, it is imperative that you test our products, technical assistance, information and recommendations to determine to your own satisfaction whether our products, technical assistance and information are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by Covestro.

Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale which are available upon request. All information and technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with any claim of any patent relative to any material or its use. No license is implied or in fact granted under the claims of any patent.

With respect to health, safety and environment precautions, the relevant Material Safety Data Sheets (MSDS) and product labels must be observed prior to working with our products.