



Makrolon® AR sheet

Abrasion resistant

Makrolon® AR sheet is a one or both sides hard-coated polycarbonate product that adds higher abrasion resistance and surface hardness to polycarbonate's inherent performance benefits of impact strength and clarity. The proprietary hard-coat also provides chemical resistance and long lasting outdoor weathering performance. This product is available in clear, a range of standard tints, or can be custom matched to any color. Makrolon AR sheet has a seven (7) year Limited Product Warranty against breakage, yellowing, and hazing. The terms of the warranty are available on request.

Applications

Flat architectural glazing, machine guards, and laminates

Regulatory code compliance and certifications

ICC-ES Evaluation Report ESR-2728

Miami-Dade County NOA
#12-0605.05

Florida Building Code 2010
High Velocity Hurricane
Zone Classified

CPSC 16 CFR 1201 Safety Standard

UL 94 Flammability File #E351891

UL 972: Burglary Resistant
File #BP2126

Typical Properties*

| Property | Test Method | Units | Values |
|--|---------------|-------------------------------|-------------------------|
| PHYSICAL | | | |
| 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 | ASTM D 570 | % | 0.15 |
| Poisson's Ratio | ASTM E 132 | - | 0.38 |
| Chemical Resistance | ASTM D 1308 | - | Pass |
| Taber Abrasion @ 100 Cycles, Delta Haze CS-10F Wheel @ 500 g load | ASTM D 1044 | % | 2 |
| MECHANICAL | | | |
| Tensile Strength, Ultimate | 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 | 16 |
| Izod Impact Strength, Unnotched @ 0.125" | ASTM D 256 | ft-lbs/in | No Break |
| Instrumented Impact @ 0.125" | ASTM D 3763 | ft-lbs | >47 |
| Shear Strength, Ultimate | 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 |
| THERMAL | | | |
| Coefficient of Thermal Expansion | ASTM D 696 | in/in/°F | 3.75 x 10 ⁻⁵ |
| Coefficient of Thermal Conductivity | ASTM C 177 | BTU-in/hr-ft ² -°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 ² -°F | 0.85/0.92 |
| U factor @ 0.375" (summer/winter) | NFRC 100-2010 | BTU/hr-ft ² -°F | 0.78/0.85 |
| ELECTRICAL | | | |
| Dielectric Constant @ 10 Hz | ASTM D 150 | - | 2.96 |
| Dielectric Constant @ 60 Hz | ASTM D 150 | - | 3.17 |
| Volume Resistivity | ASTM D 257 | Ohm-cm | 8.2 x 10 ¹⁶ |
| Dissipation Factor @ 60 Hz | ASTM D 150 | - | 0.0009 |
| Arc Resistance | - | - | - |
| Stainless Steel Strip Electrodes | ASTM D 495 | Seconds | 10 |
| Tungsten Electrodes | ASTM D 495 | Seconds | 120 |
| Dielectric Strength, in air @ 0.125" | ASTM D 149 | V/mil | 380 |
| FLAMMABILITY | | | |
| Horizontal Burn, AEB | ASTM D 635 | in | <1 |
| Ignition Temperature, Self | ASTM D 1929 | °F | 1022 |
| Ignition Temperature, Flash | ASTM D 1929 | °F | 824 |
| Flame Class @ 0.060" | UL 94 | - | HB |
| Flame Class @ 0.236" | UL 94 | - | HB |

*Typical properties are not intended for specification purposes

Makrolon® AR sheet

Security ratings for AR 0.500"

| |
|---|
| Forced Entry & Containment |
| ASTM F 1233.08 Class 2.0 Body Passage |
| ASTM F 1233.08 Class 1.4 Contraband Passage |
| ASTM F 1915 Grade 3 |
| H.P. White TP 0500 Level 1 Sequence 8 |

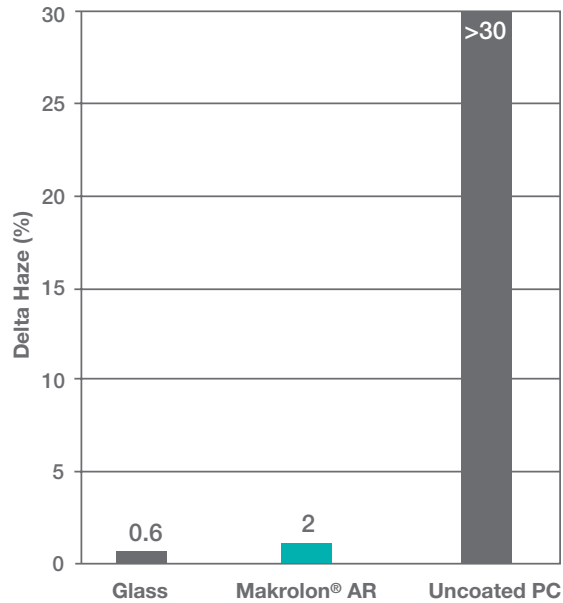
Chemical Resistance*

| Chemical Tested | Resistance Time |
|---------------------------------|-----------------|
| Acetone | >24 hrs |
| Ammonia (10% concentration) | >24 hrs |
| Antifreeze (50/50) | >24 hrs |
| Benzene | >24 hrs |
| Bleach (Clorox concentrated) | >24 hrs |
| Chloroform | >24 hrs |
| Denatured Alcohol | >24 hrs |
| Di (2-ethylhexyl) phthalate | >24 hrs |
| Diesel Oil | >24 hrs |
| Isopropyl Alcohol (IPA) | >24 hrs |
| Kerosene | >24 hrs |
| Methyl Alcohol | >24 hrs |
| Methyl Butyl Ketone | >24 hrs |
| Methyl Ethyl Ketone | >24 hrs |
| Methylene Chloride | >24 hrs |
| Naphthalene, 1-bromo- | >24 hrs |
| Potassium Hydroxide - Lye (10%) | >24 hrs |
| Sodium Hydroxide (10%) | >24 hrs |
| Toluene | >24 hrs |
| Turpentine | >24 hrs |
| Unleaded Gasoline (87 Octane) | >24 hrs |
| Vinegar | >24 hrs |
| Xylene | >24 hrs |
| Acids: | |
| Hydrochloric Acid (20%) | >24 hrs |
| Nitric Acid (20%) | >24 hrs |
| Sulfuric Acid (20%) | >24 hrs |

*Tested in accordance to ASTM D 1308-02

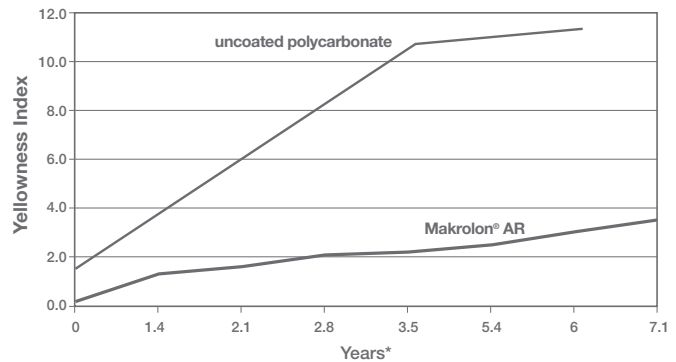
Always keep hazardous chemicals away from uncoated edge of Makrolon Polycarbonate

Abrasion Resistance*



*Taber Abrasion per ASTM D 1044, 100 cycles using CS-10F wheels at 500 g load

Weathering Behavior of Makrolon® in Vertical Orientation



*Based upon Xenon WOM accelerated weathering for UV dose at mid-latitude location

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About Bayer MaterialScience:

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