

MAKROLON® AR Sheet

Abrasion Resistant

MAKROLON® AR Sheet is a hard-coated polycarbonate product designed for exceptional durability in harsh environments. The advanced surface treatment provides outstanding resistance to abrasion when compared to uncoated transparent materials. MARKOLON AR features improved chemical resistance to common cleaners and solvents. This product is suitable for exterior applications where enhanced UV resistance is needed. MAKROLON AR Sheet has a seven (7) year Limited Product Warranty against breakage, yellowing and hazing for architectural glazing applications. The terms of the warranty are available upon request.

Applications

Architectural glazing including correctional, detention, industrial and transportation shelters, machine guarding, heavy equipment and other application in harsh environments

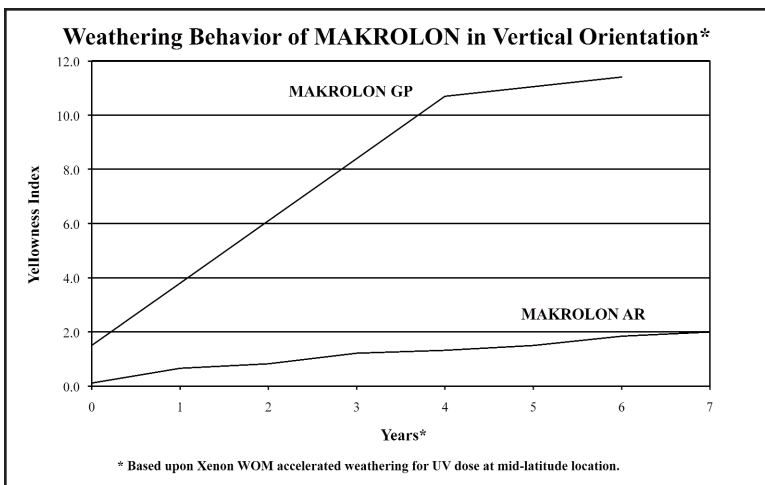
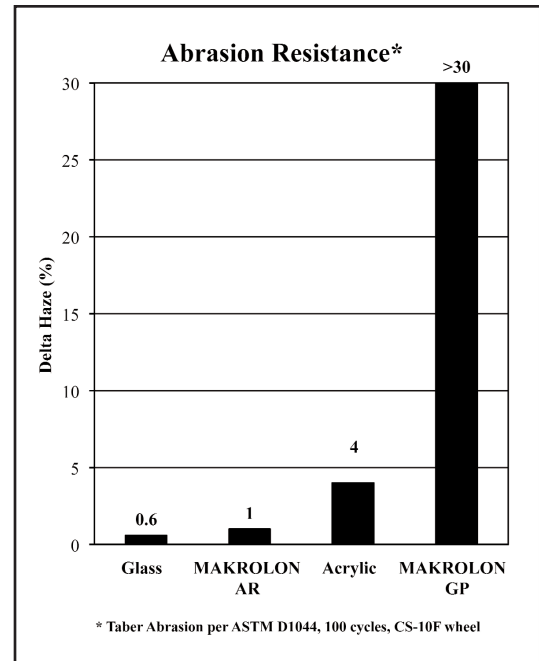
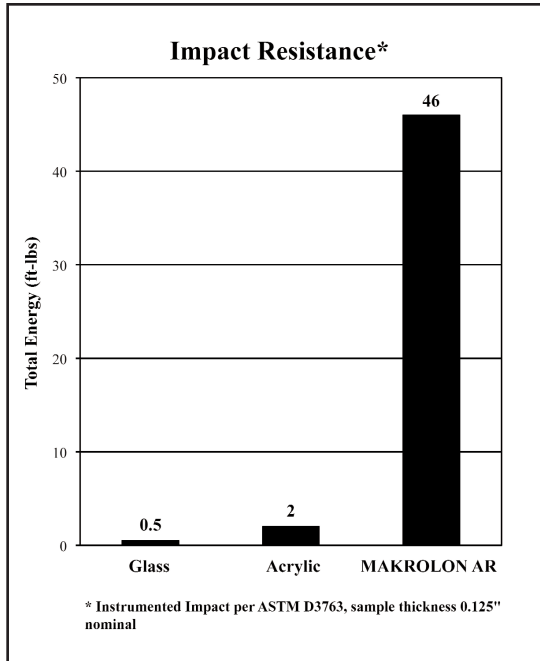
Regulatory Code Compliance and Certifications

- * IBC 2606.4, Class CC1 for gauges 60 - 500 mils
- * Miami-Dade County NOA #08-0926.15
- * CPSC 16 CFR 1201 Category II: Safety Standard for Architectural Glazing Materials
- * ANSI Z97.1- 1984: American National Standard for Safety Glazing Materials Used in Buildings Safety Performance Specifications and Methods of Test
- * UL 972: Burglary Resistant Glazing Materials UL Listed product UL File #BP2126
- * UL 94 Flammability file # E71069

| Typical Properties | | | |
|---|-------------|-------------------------------|-------------------------|
| Property | Test Method | Units | Values |
| PHYSICAL | | | |
| Specific Gravity | ASTM D792 | - | 1.2 |
| Refractive Index | ASTM D542 | - | 1.586 |
| Light Transmission, Clear @ 0.125" | ASTM D1003 | % | 86 |
| Light Transmission, Gray, Bronze | ASTM D1003 | % | 50 |
| Light Transmission, Dark Gray | ASTM D1003 | % | 18 |
| Water Absorption, 24 hrs | ASTM D570 | % | 0.15 |
| Poisson's Ratio | ASTM E132 | - | 0.38 |
| Chemical Resistance | ASTM D1308 | - | pass |
| MECHANICAL | | | |
| Tensile Strength, Ultimate | ASTM D638 | psi | 9,500 |
| Tensile Strength, Yield | ASTM D638 | psi | 9,000 |
| Tensile Modulus | ASTM D638 | psi | 340,000 |
| Elongation | ASTM D638 | % | 110 |
| Flexural Strength | ASTM D790 | psi | 13,500 |
| Flexural Modulus | ASTM D790 | psi | 345,000 |
| Compressive Strength | ASTM D695 | psi | 12,500 |
| Compressive Modulus | ASTM D695 | psi | 345,000 |
| Izod Impact Strength, Notched @ 0.125" | ASTM D256 | ft-lbs/in | 18 |
| Izod Impact Strength, Unnotched @ 0.125" | ASTM D256 | ft-lbs/in | 60 (no failure) |
| Instrumented Impact, 0.125" | ASTM D3763 | ft-lbs | >45 |
| Shear Strength @ Yield | ASTM D732 | psi | 6,000 |
| Shear Strength, Ultimate | ASTM D732 | psi | 10,000 |
| Shear Modulus | ASTM D732 | psi | 114,000 |
| Rockwell Hardness | ASTM D785 | - | M70/R118 |
| Taber Abrasion, 100 Cycles, CS10F wheel | ASTM D1044 | % | 1-2 |
| THERMAL | | | |
| Coefficient of Thermal Expansion | ASTM D696 | in/in/°F | 3.75 x 10 ⁻⁵ |
| Coefficient of Thermal Conductivity | ASTM C177 | BTU-in/hr-ft ² -°F | 1.35 |
| Heat Deflection Temperature @ 264 psi | ASTM D648 | °F | 270 |
| Heat Deflection Temperature @ 66 psi | ASTM D648 | °F | 280 |
| Brittleness Temperature | ASTM D746 | °F | -200 |
| Shading Coefficient, Clear 0.125" | ASHRAE | - | 1.02 |
| Shading Coefficient, Gray, Bronze 0.125" | ASHRAE | - | 0.70 |
| U factor 0.25" (summer gain, winter loss) | ASTM D1363 | BTU/hr-ft ² -°F | 0.90, 0.96 |
| ELECTRICAL | | | |
| Dielectric Constant, @10Hz | ASTM D150 | - | 2.96 |
| Dielectric Constant @ 60Hz | ASTM D150 | - | 3.17 |
| Volume Resistivity | ASTM D257 | Ohm-cm | 8.2 x 10 ¹⁶ |
| Dissipation Factor @ 60 Hz | ASTM D150 | - | 0.0009 |
| Arc Resistance | - | - | - |
| Stainless Steel Strip electrode | ASTM D495 | Seconds | 10-11 |
| Tungsten Electrodes | ASTM D495 | Seconds | 120 |
| Dielectric Strength, in air @ 0.125" | ASTM D149 | V/mil | 380 |
| FLAMMABILITY | | | |
| Horizontal Burn, AEB | ASTM D635 | inch | <1 |
| Ignition Temperature, Self | ASTM D1929 | °F | 1070 |
| Ignition Temperature, Flash | ASTM D1929 | °F | 870 |
| Flame Class, Clear @ 0.060" | UL 94 | - | HB |
| Flame Class, Clear @ 0.236" | UL 94 | - | V1 |

Product Data

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Chemical Resistance

| Chemical Tested | Resistance Time |
|---|-----------------|
| acetone | >24 hrs |
| ethylene dichloride (EDC) | >24 hrs |
| gasoline | >24 hrs |
| hydrochloric acid (10%) | >24 hrs |
| isopropyl alcohol (IPA, isopropanol) | >24 hrs |
| kerosene (paraffin) | >24 hrs |
| methyl alcohol (methanol) | >24 hrs |
| methylene chloride (DCM, dichloromethane) | >24 hrs |
| methyl ethyl ketone (MEK, butanone) | >24 hrs |
| nitric acid (100%) | <24 hrs |
| sodium hydrochloride (10%) | <24 hrs |
| sulfuric acid (1%) | >24 hrs |
| toluene (methlbenzene) | >24 hrs |

* Tested in accordance to ASTM D 1308

Disclaimer

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 and information 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 us. 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.

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