

ANTIREFLECTION (AR) COATED ACRYLIC SHEETS

Description

Optical coatings for Increased Transmission and Reduced Reflection

CLAREX Anti-Reflection (AR) Coated Filters have a multi-layer AR coating which reduces reflections. The decreased reflection results in increased transmission. The sheets are Hardcoated prior to applying the AR coatings thus increasing the scratch and chemical resistance of the sheets as well.

An oleophobic Anti-Smudge coating could be added to the Anti-Reflection coated surfaces. While this additional coating will not prevent fingerprints and smudges, it makes it much easier to clean them off.

The AR coatings could be combined with non-glare textured surfaces to further reduce glare and reflection. The standard AR coating is designed for the visible range. However, the AR coating design could be customized, such as for applications in the NIR and UV ranges.

Benefits

- Highly polished mold-sets yield incredibly smooth surfaces
- Low wavefront distortion
- High light transmission – Over 98% (<2% reflections) in the visible range for clear sheets with anti-reflection coating both sides
- Isotropic transmission
- No birefringence or double refraction
- No retardation of polarized light
- The pure liquid monomer results in virtually no autofluorescence
- High long-path transmission
- High molecular weight – 2+ million
- 100% Visually Inspected for Defects
- Excellent chemical resistance
- Machines and laser cuts great
- Available from 0.2mm up to 5.0mm
- Relatively tight thickness tolerances

TYPICAL PROPERTIES*

PROPERTY	TEST METHOD	UNITS	VALUE
MISC			
Specific gravity	ASTM D-792	-	1.19
Water absorption	ASTM D-570	%	0.3
Flammability (>0.7mm)	UL	-	94HB
Contact Angle (with Antismudge oleophobic coating)	-	Angle in Degrees	110
OPTICAL (for clear/glossy sheets)			
Total light transmission	ASTM D-1003	%	AR 1-side: >95% AR 2-sides: >98%
Haze	ASTM D-1003	%	0.1
Surface Roughness	-	µm	0.02
MECHANICAL			
Elongation	ASTM D-638	%	3
Tensile Rupture Strength	ASTM D-638	MPa	50
Flexural Rupture Strength	ASTM D-790	MPa	60
Flexural Modulus	ASTM D-790	MPa	3.2x10 ³
Pencil Hardness	JIS D0202	-	>6H (on AR coated surface)
THERMAL			
Heat Distortion Temperature	ASTM D-638	°C	110
Coefficient of Thermal Expansion	ASTM D-638	cm/cm/°C	7x10 ⁻⁵
Coefficient of Thermal Conductivity	ASTM C-177	cm/m°C	0.17
Max Recommended Continuous Temp	-	°C	80-85
Heat Forming Temp	-	°C	Not possible
Specific Heat	JIS K7123	J/g°C	1.47
ELECTRICAL			
Volume Resistance	ASTM D-257	Ωcm	>10 ¹⁶
Surface Resistance	ASTM D-257	Ω	>10 ¹⁶

*VALUES SHOWN ARE TYPICAL PROPERTIES

SHEETS ARE 100% VISUALLY INSPECTED TO 80/60 SCRATCH/DIG SPECS

Maximum Scratch Width: 0.08mm

Maximum Defect Diameter: 0.60mm

THICKNESSES & TOLERANCES (mm)

0.2 ± 0.05	0.25 ± 0.05	0.3 ± 0.07	0.35 ± 0.07	0.4 ± 0.07
0.5 ± 0.07	0.6 ± 0.07	0.7 ± 0.07	0.8 ± 0.10	1.0 ± 0.12
1.2 ± 0.12	1.5 ± 0.15	2.0 ± 0.20	2.5 ± 0.25	3.0 ± 0.25
3.5 ± 0.25	4.0 ± 0.30	4.5 ± 0.30	5.0 ± 0.30	Custom Thickness

*some custom features will limit the range of thicknesses available

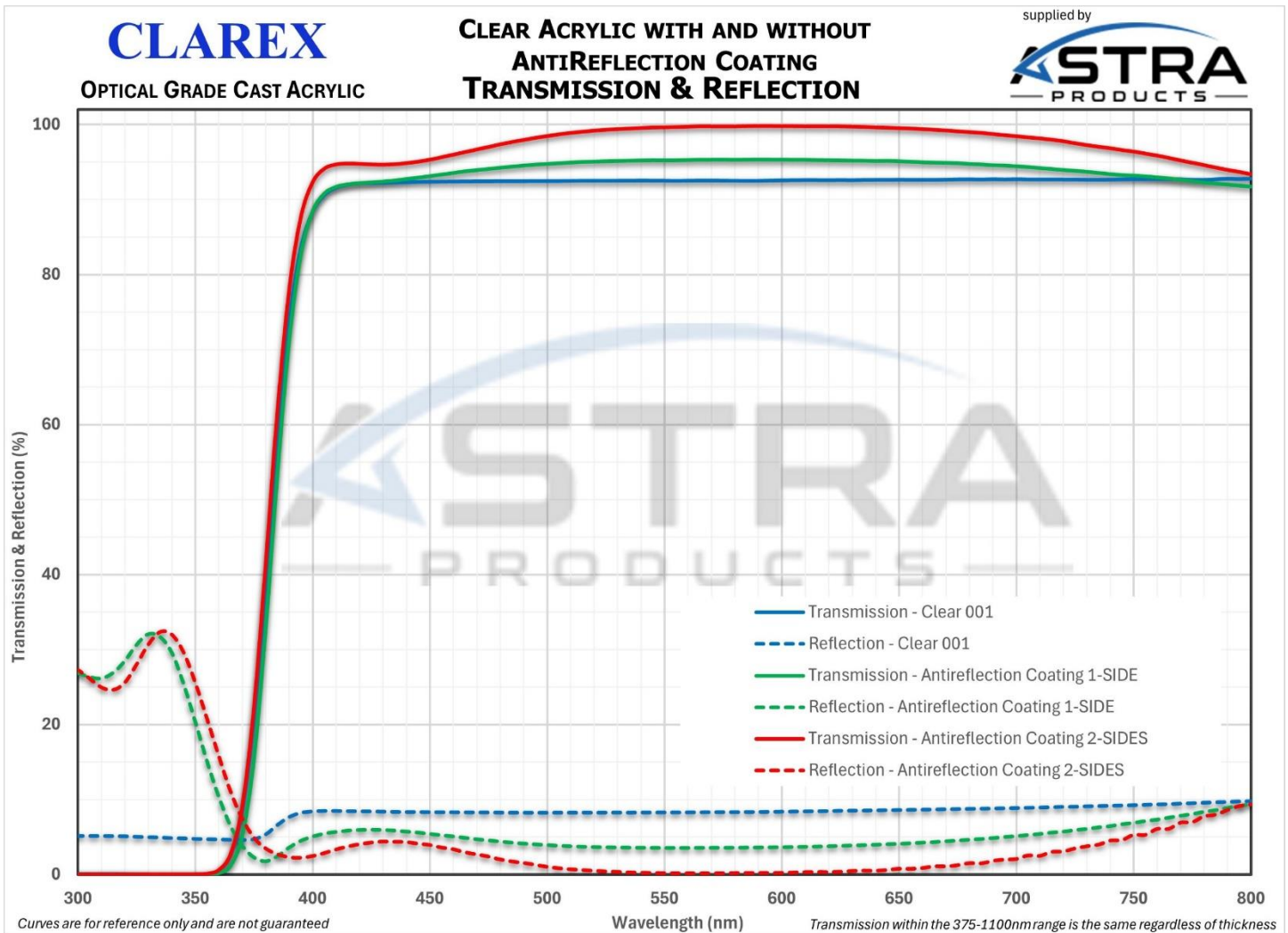
SHEET SIZES ARE TYPICALLY 360 X 290mm COATED AREA. LARGER SHEETS POSSIBLE.

CHEMICAL RESISTANCE			
Chemical	Resistance	Chemical	Resistance
Artificial Perspiration (+pH)	✓	Distilled Water	✓
Artificial Perspiration (-pH)	✓	Seawater	✓
Isopropyl Alcohol	✓	Glycerine	✓
Ethyl Alcohol	✓	Ammonia	✓
Engine Oil	✓	Benzene	✓
Gasoline	✓	Acetone	✓

Custom AntiReflection coating options are available for applications requiring maximum chemical resistance

WEATHERABILITY		
Property	Test Condition	Test Result
Heat Resistance	85°C x 250 hrs	No Change
Cold Resistance	-40°C x 250 hrs	No Change
Thermal Cycle	-40°C to 85°C 200 cycles @ 30min each	No Change
Humidity Resistance	60°C x 90% RH x 250hrs	No Change
UV Resistance	Fademeter x 100hrs	No Change

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CUSTOMIZABLE FEATURES

COMBINE DIFFERENT FEATURES TO BUILD YOUR OWN CUSTOM OPTICAL GRADE SHEET

FROM LOW VOLUMES (1 SHEET) UP TO MASS PRODUCTION

STEP1 – CHOOSE THICKNESS & SHEET SIZE

- From 0.2mm up to 5.0mm Thick
- Sheets range from 360x290mm up to 470x970mm
- Different features will limit/determine the available thicknesses and sheet sizes

STEP2 – CHOOSE BASE FORMULATION OPTIONS (THEY'RE ALL OPTICAL GRADE ACRYLIC)

- Standard
- UV Transmit – None of the standard UV Inhibitors
- UV Block – Added UV Inhibitors
- High Temperature – Good to 95°C
- Low Moisture Absorption

STEP3 – CHOOSE ADDITIVES – COLOR DYES & PIGMENTS AND DIFFUSION PARTICLES

- Transparent, Translucent, and Opaque colors
- Neutral Density (smoke)
- We can color match if we don't already have the color you need in our portfolio
- NIR Pigments (High-Pass, blocks visible and transmits NIR ,with several options for cut-in)

STEP4 – CHOOSE SURFACE TEXTURES

- Smooth/Glossy – Optics quality with incredibly low surface roughness
- High Gloss Textures for Newton Ring Elimination or Partial Glare Reduction
- Medium Gloss Nonglare (Antiglare) Textures for Glare Reduction, Optimized for use in front of Displays
- Low Gloss (Heavy Matte) Textures for Light Diffusion
- Can select different textures for each side of the sheet
- Surface textures are cast into the sheet (not coatings based)
- Coatings could be applied on top of the textured surfaces without filling in the texture (*UNIQUE TO CLAREX*)

STEP5 – CHOOSE ANTIREFLECTION COATINGS

- Standard AntiReflection (AR) Coating for Visible Light
- Custom Tuned AntiReflection Coating, such as for UV and NIR applications
- Oleophobic/AntiSmudge –Added to AntiReflection Coated Surfaces to make the easier to clean

STEP7 – FABRICATION OPTIONS (ISO 9001 & IATF 16949 CERTIFIED)

- None – Take as full sheets (with protective removable masking both sides)
- CNC Laser Cut for most 2-Dimensional shapes and/or features
- CNC Router Cut for 2.5-Dimension features such as step cuts, pockets, and beveled edges
- Laser Etching
- Printing – Bezels/Frames, Logos, Deadfront, Light Guides
- Adhesive application using 2-side adhesive films/tapes
- NIST Traceable Inspection Equipment

PLEASE GIVE US A CALL OR EMAIL TO DISCUSS ALL THESE DIFFERENT OPTIONS