

## NIR ACRYLIC (PMMA) SHEETS

### Description

**Optical Grade Longpass NIR Filters available in a variety of configurations to meet your needs**

CLAREX Acrylic NIR Filters transmit near Infrared (NIR) light and block/absorb visible light. There are several types of NIR filters to choose from with cut-ins from 670nm to 910nm.

Optical Grade Hardcoat could be added for increased scratch and chemical resistance.

For applications where reflections/glare are causing issues, we can supply the NIR sheets with AntiReflection coatings designed specifically for NIR applications.

### Benefits

- Highly polished mold-sets yield incredibly smooth surfaces
- Low wavefront distortion
- High light transmission – 92% in the NIR range (without anti-reflection coating)
- Isotropic transmission
- No birefringence or double refraction
- No retardation of polarized light
- High molecular weight – 2+ million
- 100% Visually Inspected for Defects
- Excellent weatherability and chemical resistance
- Machines and laser cuts great
- Available from 0.5mm up to 5.0mm
- Relatively tight thickness tolerances

### Applications

Machine Vision, LIDAR, NIR Imaging, Covert Lighting, Time of Flight Sensors

TYPICAL PROPERTIES*				
PROPERTY	TEST	UNITS	VALUE	
	METHOD		UNCOATED	W/HARDCOAT
MISC				
Specific gravity	ASTM D-792	-	1.19	1.19
Water absorption	ASTM D-570	%	0.3	0.3
Flammability (>0.7mm)	UL	-	94HB	94HB
OPTICAL				
Refractive index	ASTM D-542	-	1.49	1.49 (material) 1.53 (at surface)
Total light transmission (NIR)	ASTM D-1003	%	92	92
Haze	ASTM D-1003	%	0.1	0.1
Surface Roughness	-	µm	0.02	0.02
MECHANICAL				
Elongation	ASTM D-638	%	5	3
Tensile Rupture Strength	ASTM D-638	MPa	75	50
Flex Rupture Strength	ASTM D-790	MPa	118	60
Flexural Modulus	ASTM D-790	MPa	3.2x10 <sup>3</sup>	3.2x10 <sup>3</sup>
Impact Strength (Izod)	ASTM D-256	kJ/m <sup>2</sup>	2.0	-
Rockwell Hardness	ASTM D-785	M Scale	100	-
Pencil Hardness	JIS D0202	-	1-3H	>6H
THERMAL				
Heat Distortion Temperature	ASTM D-638	°C	108	110
Coefficient of Thermal Expansion	ASTM D-638	cm/cm/°C	7x10 <sup>-5</sup>	7x10 <sup>-5</sup>
Coefficient of Thermal Conductivity	ASTM C-177	cm/m°C	0.17	0.17
Max Recommended Continuous Temp	-	°C	80-85	80-85
*HiTemp formulation is available for 95°C Continuous Temp				
Heat Forming Temp	-	°C	140-180	N/A
Specific Heat	JIS K7123	J/g°C	1.47	1.47
ELECTRICAL				
Volume Resistance	ASTM D-257	Ωcm	>10 <sup>16</sup>	>10 <sup>16</sup>
Surface Resistance	ASTM D-257	Ω	>10 <sup>16</sup>	>10 <sup>16</sup>

\*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)

0.5 ± 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	<b>Custom Thickness</b>

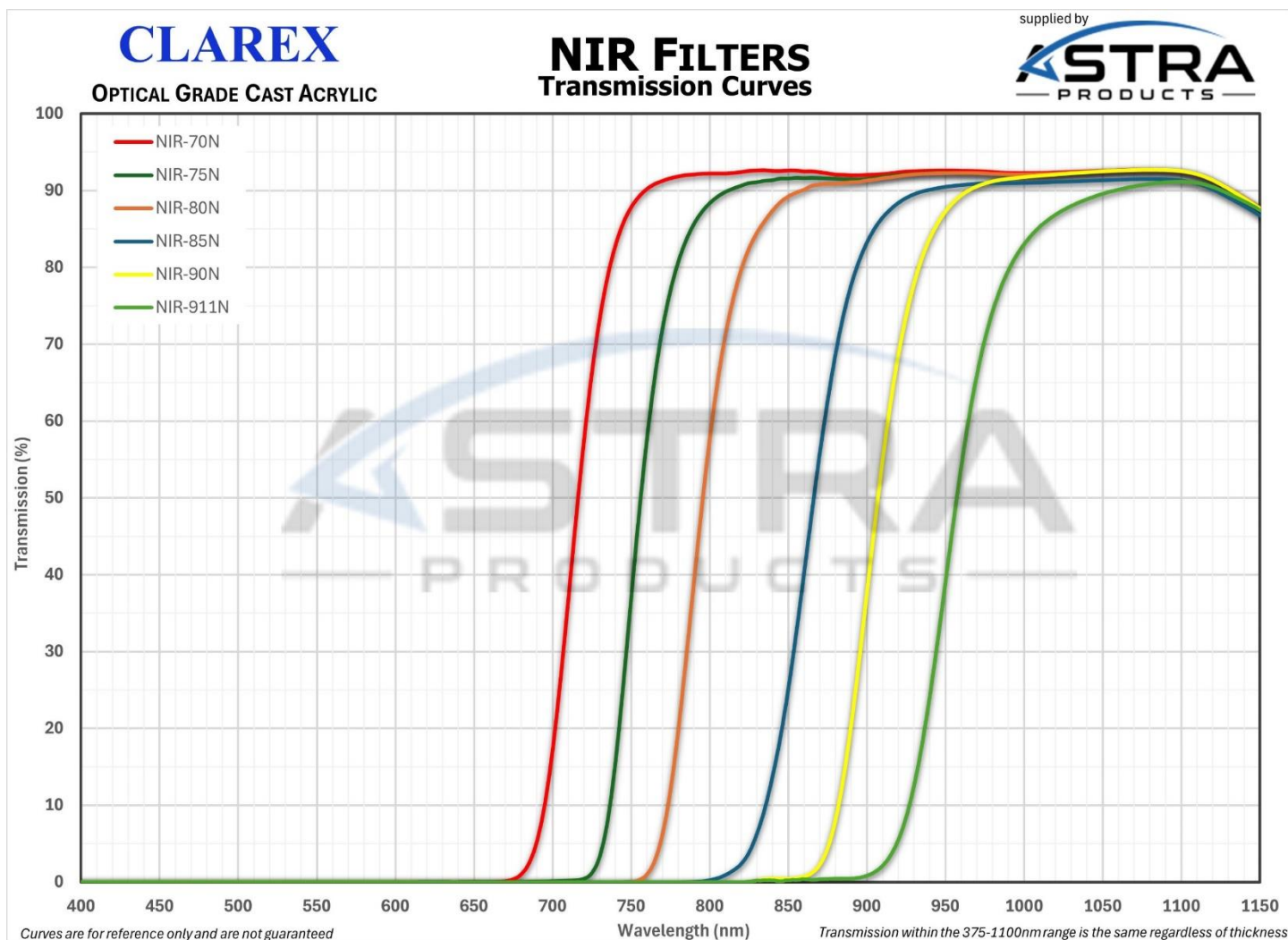
### SHEET SIZES VARY DEPENDING ON THE MATERIAL CONFIGURATION

General rule of thumb:

- AntiReflection Coated: Typically 360 x 290mm. Larger possible.
- All others: 400 x 550mm standard. Possibly up to 1000 x 1000mm

CHEMICAL RESISTANCE					
Chemical	Resistance		Chemical	Resistance	
	Uncoated	w/Hardcoat		Uncoated	w/Hardcoat
Glacial Acetic Acid (specific Gravity 1.05)	✓	✓	Oleic Acid	✓	✓
Acetic Acid (5%)	✓	✓	Citric Acid	✓	✓
Hydrochloric Acid (10%)	✓	✓	Olive Oil	✓	✓
Hydrochloric Acid (35%)	✓	✓	Cotton Seed Oil	✓	✓
Hydrogen Peroxide (3%)	✓	✓	Pure Water	✓	✓
Aqueous Ammonia (specific gravity 0.9)	✓	✓	Seawater	✓	✓
Aqueous Ammonia (10%)	✓	✓	Dichloromethane	Dissolved	✓
Acetone	✓	✓	di-Ethylether	Cracked	✓
Ethyl Acetate	✓	✓	Sodium Carbonate (2%)	✓	✓
Ethyl Alcohol (50%)	✓	✓	Sodium Carbonate (20%)	✓	✓
Ethyl Alcohol (95%)	✓	✓	di-Isobutylene	✓	✓
Isopropyl Alcohol	✓	✓	di-Methyl Horamide	Dissolved	✓
Methyl Alcohol	Swollen	✓	Sodium Hypochlorite (10%)	✓	✓
Benzene	Dissolved	✓	Sulfuric Acid (specific gravity 1.84)	Dissolved	✓
Kerosene	✓	✓	Sulfuric Acid (3%)	✓	✓
Nitric Acid (specific gravity 1.42)	Swollen	✓	Sulfuric Acid (30%)	✓	✓
Nitric Acid (10%)	✓	✓	2-Ethyl Hexoic Acid	✓	✓
Nitric Acid (40%)	✓	✓	Carbon Tetrachloride	Cracked	✓
Caustic Soda (1%)	✓	✓	Toluene	Dissolved	✓
Caustic Soda (10%)	✓	✓	n-Heptane	✓	✓
Caustic Soda (48%)	✓	✓			

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 1000hrs	No Change



## 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 0.5mm up to 5.0mm Thick
- Sheets range from 360x290mm up to 1000x1000mm
- Different features will limit/determine the available thicknesses and sheet sizes

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

- Standard
- High Temperature – Good to 95°C
- Low Moisture Absorption

### STEP3 – 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*)

### STEP4 – CHOOSE SURFACE COATINGS - MECHANICAL

- Standard Hardcoat – 6-8H Pencil Hardness & Increased Chemical Resistance
- Super Hardcoat – 9H Pencil Hardness
- Anti-Bacterial Hardcoat
- Oleophobic/AntiSmudge – Typically added to AntiReflection Coated Surfaces

### STEP5 – CHOOSE OPTICAL COATINGS

- AntiReflection Coatings custom tuned for NIR applications

### STEP6 – 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**