DR-IIICX HIGH-TRANSMISSION LIGHT DIFFUSER SHEETS

Description

High transmission bulk diffusers for backlight applications and more

The factory loads light scattering particles into the clear cast acrylic sheets along with heavy matte textures front & back to make this line of diffusers. With light transmissions ranging from 45% to 93% in 5% increments, you can choose the transmission level that gets you the maximum brightness and uniformity without hot spots.

These diffusers are commonly used in place of OEM LED backlight diffusers. Customers get an immediate boost in brightness without reducing the uniformity.

The standard DR-IIICX diffusers are pure white with minimal color shift, making them great for flash/light diffusion where color rendition is critical

Benefits

- Light transmissions from 45% – 93% in 5% increments
- Transmission and diffusion are the same regardless of thickness
- No Newton's Rings due to the nonglare textures
- Weather resistant
- Has a color temperature of 6750K
- Machines and laser cuts great
- Can be customized for your specific requirements.

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
OPTICAL			
Refractive index	ASTM D-542	-	1.49
Total light transmission	ASTM D-1003	%	92
MECHANICAL			
Elongation	ASTM D-638	%	5
Tensile Rupture Strength	ASTM D-638	MPa	75
Flexural Rupture Strengh	ASTM D-790	MPa	118
Flexural Modulus	ASTM D-790	MPa	$3.2x10^3$
Impact Strength (Izod)	ASTM D-256	kJ/m^2	2.0
Rockwell Hardness	ASTM D-785	M Scale	100
Pencil Hardness	JIS D0202	-	1-3H
THERMAL			
Heat Distortion Temperature	ASTM D-638	°C	108
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
**HiTemp formulation is available for 95°C Continuous Temp*			
Heat Forming Temp	-	°C	140-180
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*

WEATHERABILITY with and without Hardcoat

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

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

Maximum Scratch Width: 0.08mm	Maximum Defect Diameter: 0.60mm

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%)	✓	✓			

THICKNESS AVAILABILITY AND TOLERANCES

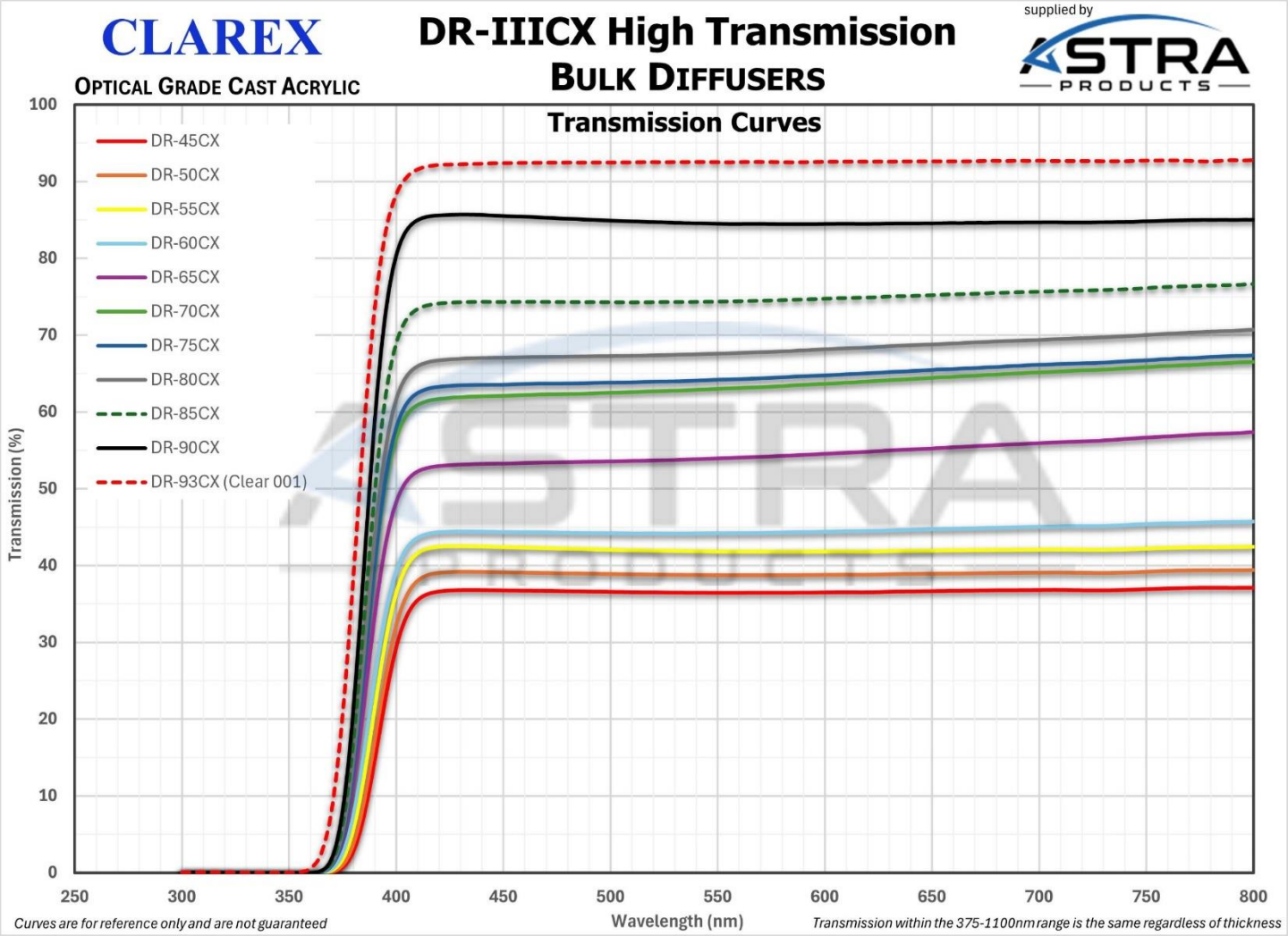
Thickness	DR-45CX 45% LT	DR-50CX 50% LT	DR-55CX 55% LT	DR-60CX 60% LT	DR-65CX 65% LT	DR-70CX 70% LT	DR-75CX 75% LT	DR-80CX 80% LT	DR-85CX 85% LT	DR-90CX 90% LT	DR-93CX 93% LT
0.2 ± 0.05										✓	✓
0.25 ± 0.05								✓	✓	✓	✓
0.3 ± 0.07								✓	✓	✓	✓
0.35 ± 0.07								✓	✓	✓	✓
0.4 ± 0.07						✓	✓	✓	✓	✓	✓
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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

- ***Thicker sheets could be made custom***
- ***The transmission from 400-1100nm is the same regardless of thickness***

SHEET SIZES VARY DEPENDING ON THE MATERIAL CONFIGURATION

General rule of thumb:

- Anything 0.2-0.4mm thick: Max sheet size is 400 x 550mm
- 0.5 and up: 400 x 500mm standard. Possibly up to 1000 x 1000mm


CLAREX
OPTICAL GRADE CAST ACRYLIC
DR-IIICX High Transmission
BULK DIFFUSERS
supplied by
ASTRA PRODUCTS
Transmission Curves
DR-45CX
DR-50CX
DR-55CX
DR-60CX
DR-65CX
DR-70CX
DR-75CX
DR-80CX
DR-85CX
DR-90CX
DR-93CX (Clear 001)
Transmission (%)
100
90
80
70
60
50
40
30
20
10
0
250
300
350
400
450
500
550
600
650
700
750
800
Wavelength (nm)
Curves are for reference only and are not guaranteed
Transmission within the 375-1100nm range is the same regardless of thickness

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 sizes range 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
- 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 (DIFFUSION PARTICLES ALREADY INCLUDED)

- Color
- 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

The diffuser sheets include a heavy matte low gloss texture on both sides for diffusion. But these could be changed out.

- Smooth/Glossy – Typically selected for one surface for applications where the diffuser will be laminated.
- High & Medium Gloss Textures
- 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 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

STEP6 – CHOOSE OPTICAL COATINGS

While not typical on diffusers, we have added optical coatings to diffusers in the past for unique applications!

- Standard AntiReflection (AR) Coating for Visible Light
- Custom Tuned AntiReflection Coating, such as for UV and NIR applications
- NIR-Blocking/NIR-Cut for NVIS and Heat Reduction
- Mirror coatings – 1st Surface, 2nd Surface, Partial with tunable transmission, Colored

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, etc
- 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