ProFlux Nanowire® Technology

Polarizing Beamsplitter Cube

PBS ICE Cube Series Datasheet

ICE Cube™

Moxtek's *ICE Cube*™ is optimized for use over a wide range of acceptance angles while maintaining color uniformity and image contrast in the visible wavelength ranges. The *ICE Cube* allows compact optical designs with reduced optical paths. Engineers are now able to design smaller systems while maintaining excellent optical performance. The *ICE Cube* can be optimized for high Index, Contrast, or Efficiency (ICE) and is a superior choice over MacNeille cube designs.

Features	Benefits
Embedded Wire-Grid Polarizer	Wide angle of incidence range
	Color uniformity over wide range of angles
	High contrast over wide range of angles
	High transmission over wide range of angles

Applications

- Head-Mounted Display (HMD)
- Head-Up Display (HUD)
- 2D & 3D Projection Display
- Interferometry
- Medical/Dental Imaging

Standard Product Options

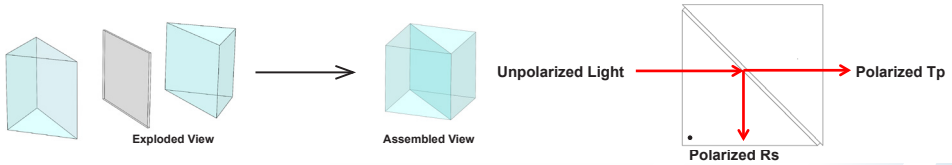
Product Name	Description
OAS00070	1x1x1 Inch Cube (High Contrast PBS, optimized for large AOI)

Custom sizes and optimization are available. Please contact a sales representative for options and ordering details.

General Specifications

Operational Wavelength Range:	400-700nm (typical average for azimuthal)
Material Type:	N-BK7
Dimensions:	25.4mm x 25.4mm x 25.4mm
AOI (Angle of Incidence):	Up to ±25°
AR Coating:	R (avg) < 0.5% @ 400-700nm (cube faces)
Maximum Temperature:	90°C
Surface Quality:	40/20 Scratch - Dig
Dimensional Tolerance:	+0.0mm/-0.25mm
Clear Aperture:	> 90%
Transmission Wavefront Distortion:	< λ/3 (typical) @ 633nm
Transmission Beam Deviation:	< 5 arc minutes
Reflected Beam Deviation:	< 5 arc minutes
RoHS Compliant:	Yes

ICE Cube Assembly and Performance Details



The ICE Cube is assembled by embedding our polarizing beamsplitter plate between two AR coated glass prisms. These cubes are designed with Nanowire® grid structures centered on the hypotenuse of the ICE Cube.

ICE Cube Polarizing beamsplitters (PBS) separate natural light into two main orthogonal, linearly polarized components; the p-polarized light which is transmitted while the s-polarized light is reflected at a 90˚ degree angle. In principle, half of the incident light is reflected and the other half is transmitted.

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Typical Angle of Incidence (AOI) Performance

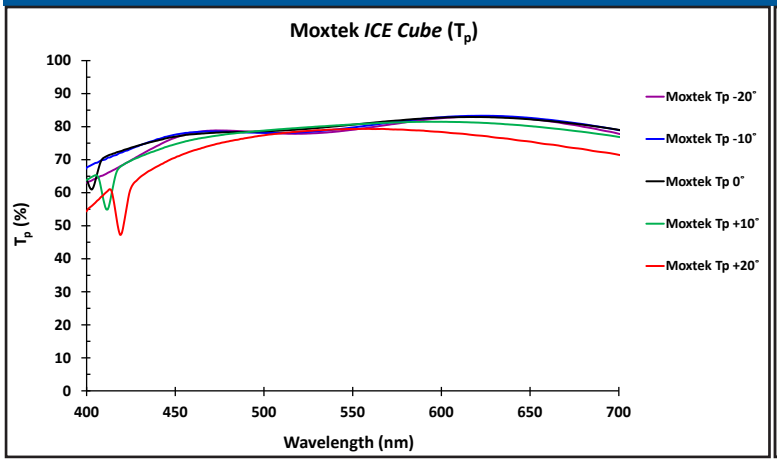
PBS ICE Cube Typical Performance	Azimuthal Angle of Incidence (AOI) - averaged 400-700nm					
	0°	±5°	±10°	±15°	±20°	±25°
T_p %	78	78	77	76	75	73
T_s %	0.016	0.015	0.015	0.017	0.020	0.025
R_s %	84	84	84	84	84	84
R_p %	1.7	1.6	2.2	3	4.3	6
Contrast Ratio (CR)	7,100	7,100	7,100	6,700	5,600	4,100
Efficiency (Eff) %	66.3	66.0	65.5	64.7	63.6	62.1

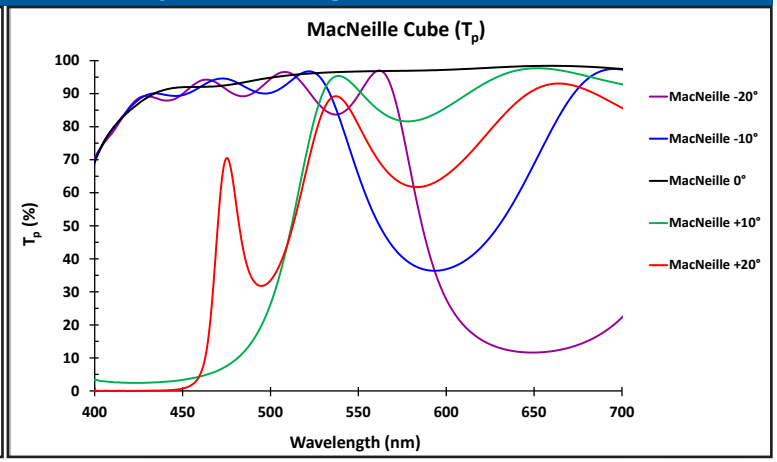
Performance Specifications at Normal Incidence

PBS ICE Cube Performance Specifications at 0˚ AOI	450nm			550nm			650nm		
	MIN Tp (%)	MIN Eff (%)	CR (Tp/Ts)	MIN Tp (%)	MIN Eff (%)	CR (Tp/Ts)	MIN Tp (%)	MIN Eff (%)	CR (Tp/Ts)
OAS00070	72	62	1000	75	65	2000	78	65	3000

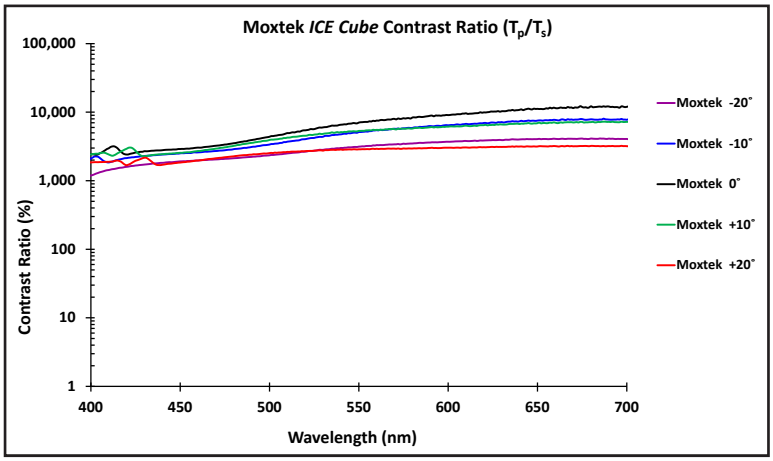
Tp- Transmitted "p" polarization, **Ts**- Transmitted "s" polarization, **CR**- Contrast ratio, Tp/Ts, **Eff-** Efficiency, Tp*Rs

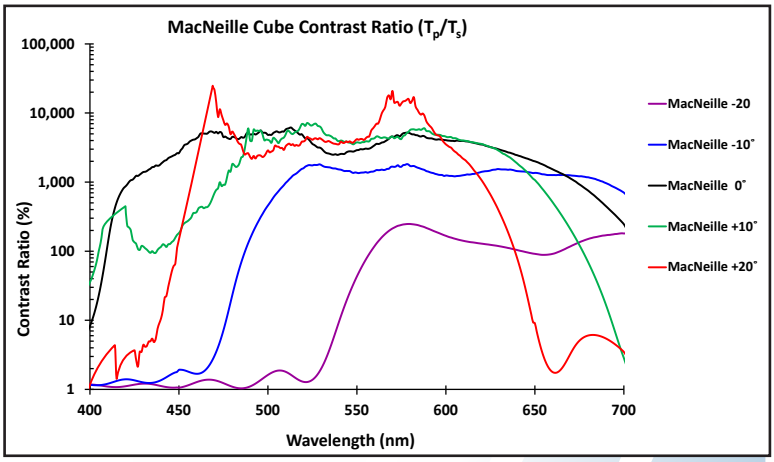
ICE Cube and MacNeille Cube Performance Comparison Charts (typical average for azimuthal)





Typical Transmission (T_p) Performance Curves





Typical Contrast Ratio (CR) Performance Curves

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