

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

Material Type: N-BK7

Dimensions: 25.4mm x 25.4mm x 25.4mm

Operational Wavelength Range: 400-700nm (typical average for azimuthal)

AR Coating: R (avg) < 0.5% @ 400-700nm (cube faces)

Dimensional Tolerance: +0.0mm/-0.25mm

Clear Aperture: > 90%

Angle of Incidence: Up to ±25°

Maximum Temperature: 90°C

RoHS Compliant: Yes

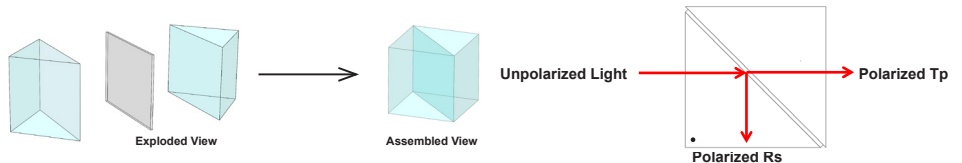
Transmission Wavefront Distortion: < λ/3 (typical) @ 633nm

Surface Quality: 40/20 Scratch - Dig

Transmission Beam Deviation: < 5 arc minutes

Reflected Beam Deviation: < 5 arc minutes

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.

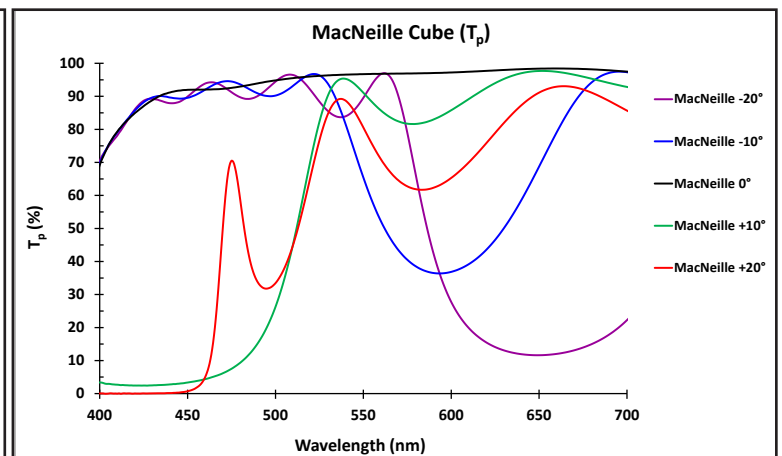
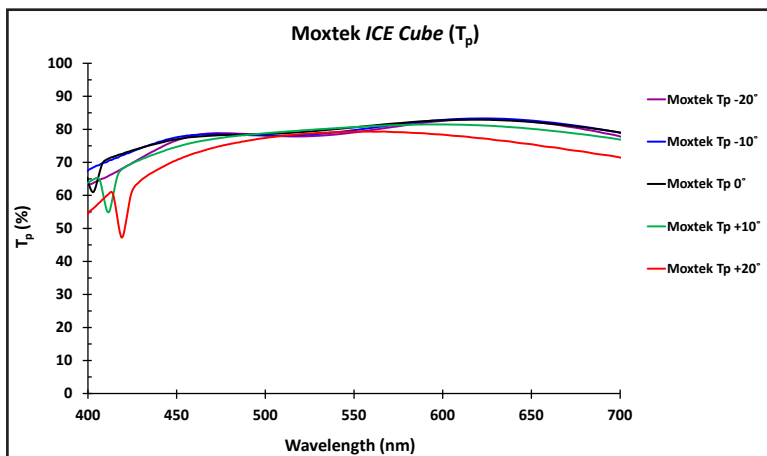
ICE Cube Polarizing beamsplitters (PBS) separate natural light into two main orthogonal, linearly polarized components; the p-polarized light which is transmitted while the s-polarized light is reflected at a 90° degree angle. In principle, half of the incident light is reflected and the other half is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

Typical Performance and Specifications

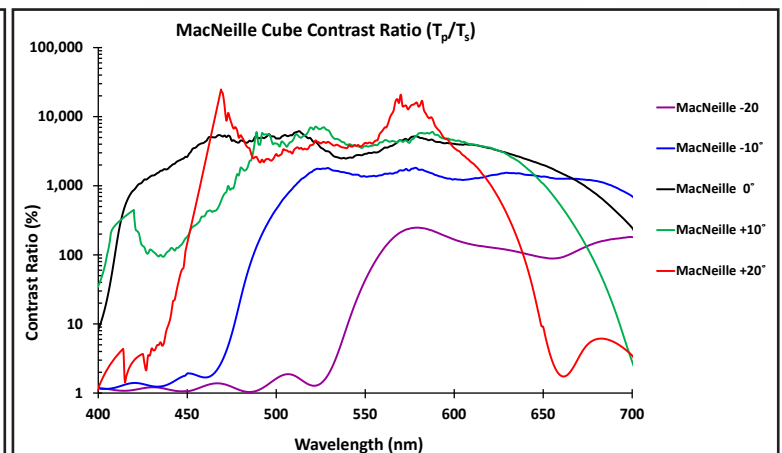
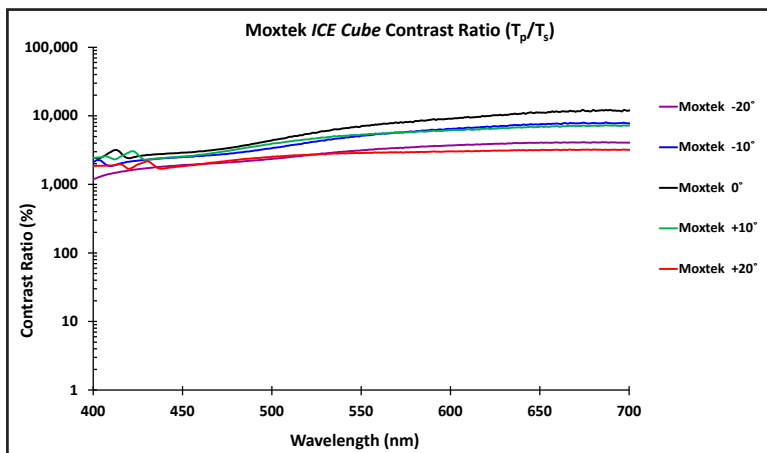
Typical Performance (Azimuthal Angle of Incidence - averaged 400-700nm)						
	0°	±5°	±10°	±15°	±20°	±25°
T_p %	78	78	77	76	75	73
T_s %	0.016	0.015	0.015	0.017	0.020	0.025
R_s %	84	84	84	84	84	84
R_p %	1.7	1.6	2.2	3	4.3	6
Contrast Ratio	7,100	7,100	7,100	6,700	5,600	4,100
Efficiency	66.3	66.0	65.5	64.7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

Performance Specifications (Measured at 0°)			
	T _p %	Efficiency %	Contrast Ratio
450nm	72	62	1,000
550nm	75	65	2,000
650nm	78	65	3,000

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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For warranty and ordering information, please visit www.moxtek.com.

OPT-DATA-1010, Rev H
 Subject to technical change without notice