



# Wire-Grid Polarizing Beamsplitter Cube

PBS ICE Cube™ Series Data Sheet



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	Large 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

## 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) @ 632nm

*Surface Quality:* 40/20 Scratch - Dig

*Transmission Beam Deviation:* < 5 arc minutes

*Reflected Beam Deviation:* < 5 arc minutes

## Applications

- Head-Mounted Display (HMD)
- Head-Up Display (HUD)
- 2D & 3D Projection Display
- Interferometry
- Spectroscopy

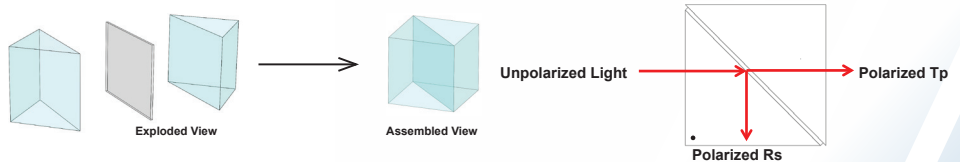
## Standard Sizes

Length x Width x Height	Part Number	Product Name
25.4mm x 25.4mm x 25.4mm	0AS00070	ICE-CUBE-C Contrast Optimized

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



## 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.

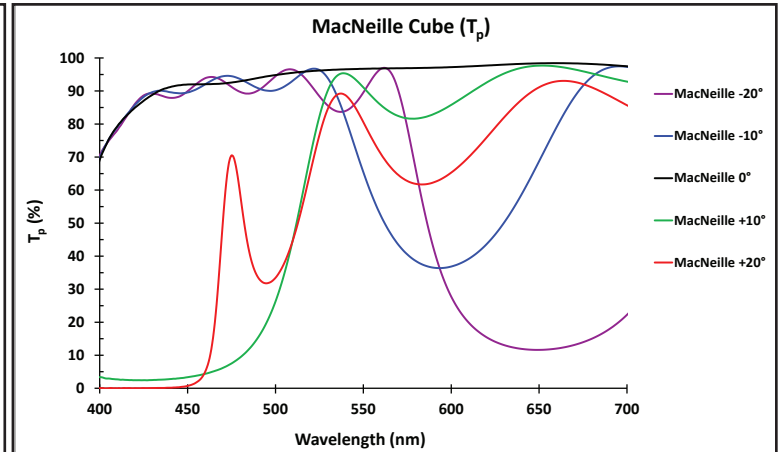
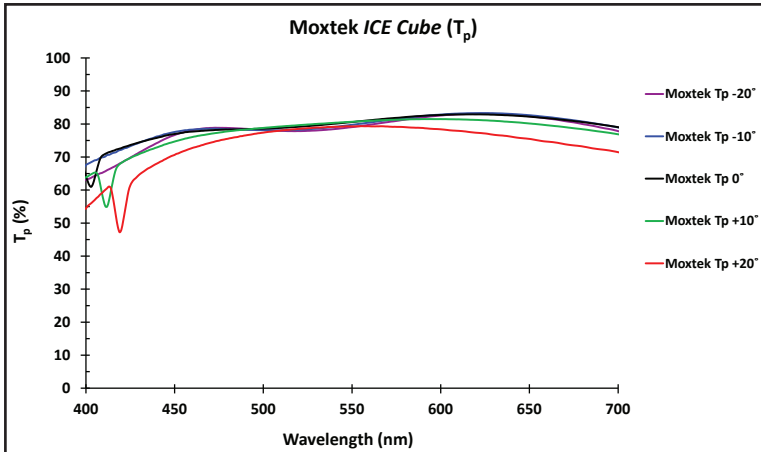


# Typical Performance and Specifications

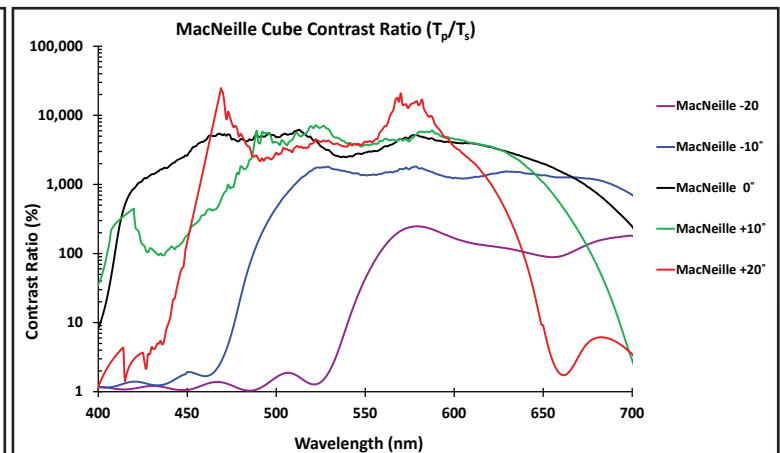
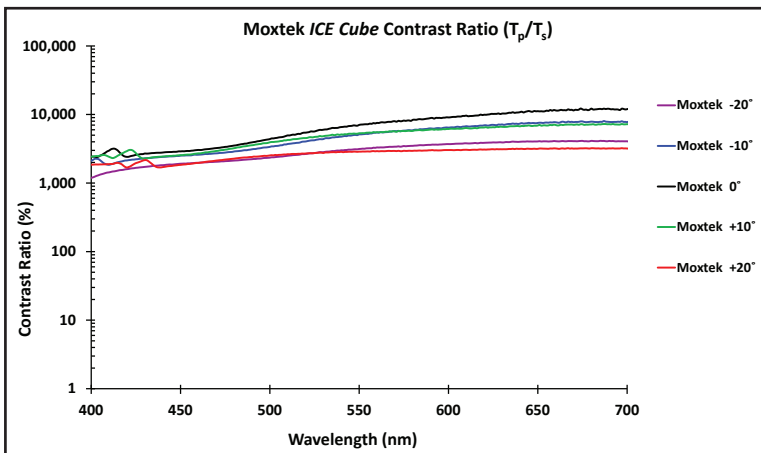
Typical Performance (Azimuthal Angle of Incidence - averaged 400-700nm)						
	0°	±5°	±10°	±15°	±20°	±25°
<b>T<sub>p</sub> %</b>	78	78	77	76	75	73
<b>T<sub>s</sub> %</b>	0.016	0.015	0.015	0.017	0.020	0.025
<b>R<sub>s</sub> %</b>	84	84	84	84	84	84
<b>R<sub>p</sub> %</b>	1.7	1.6	2.2	3	4.3	6
<b>Contrast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

Performance Specifications (Measured at 0°)			
	T <sub>p</sub> %	Efficiency %	Contrast Ratio
<b>450nm</b>	72	62	1,000
<b>550nm</b>	75	65	2,000
<b>650nm</b>	78	65	3,000

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



Typical Transmission (T<sub>p</sub>) Performance Curves



Typical Contrast Ratio (CR) Performance Curves



452 West 1260 North / Orem, UT 84057  
 Phone 801.225.0930 / Fax 801.221.1121  
[www.moxtek.com](http://www.moxtek.com)  
[info@moxtek.com](mailto:info@moxtek.com)