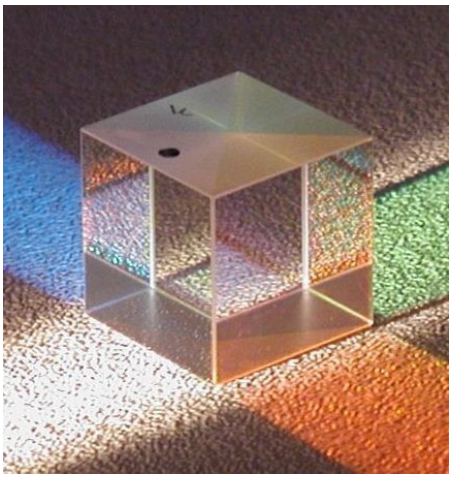
Avicon™

X-Cube Prisms Description



What is an X-Cube Prism?

An x-cube prism is a glass cube beamsplitter with coatings on both diagonals. Most cube beamsplitters have a coating on only one diagonal so that part of the incoming illumination passes straight through and part is diverted to one of the side faces. These beamsplitters are made of two right-angle prisms joined at their bases. One of these faces is coated.

X-cubes are made from four right-angle prisms bonded on both sides adjacent to the right angle. Both faces of each prism are coated. With the coatings arranged so that two continuous coatings make up the two diagonals.

Why Coat Both Diagonals?

With both diagonals coated, light can be directed to all four faces. In the prism above, the left diagonal is coated to reflect blue light and the right diagonal is coated to reflect red light. The result is that when white light is projected into the face identified by the dot, the blue goes left, the red goes right and the leftover green goes straight through.

Alternatively, red, green and blue light can be projected into the appropriate faces and the output is the combination of the three.

The coatings are not limited to visible wavelengths. Any set of non-overlapping wavelengths from about 300 to 1700 nm could be used with common glasses. Other wavelengths require different materials.

X-cubes can also be built as neutral 3-channel splitters but some light returns to the input.

Cautions When Using X-Cubes

Since the internal reflectors are at 45 degrees from the input, the polarization of the incoming light will be affected. For most X-cube applications, use of S-polarized light provides the best control. If other polarizations are required, these must be specified.

The four prisms are glued together. This results is a thin vertical line in the center of the prism where unfiltered light can pass through. The width of this line is in the range of 5-10 microns depending on the size and construction of the prism. If pure colors are required, trim filters should be added at the color faces.

X-cubes are not intended for imaging. The center line can cause contrast loss and the effects of off-normal rays from typical imaging lenses would cause large spectral shifts from center to corner. In addition, the straight-through channel image would be inverted relative to the others.

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9624-0011-12-00 PDF 02/14

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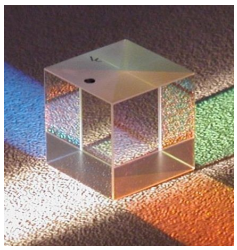
X-Cube Prisms
Available Models



These X-cube prisms are available from stock or on a few weeks notice. Some models may be available through the Alternative Vision webstore at - www.avcemporium.com.

General Description - See data sheets for full specifications				
Part Number	**Size X Y Z (mm)**	**Type**	**Polarization**	**Material**
1690-2002-01-00	25 x 25 x 25	RGB	SPS	517642 glass
1690-2002-02-00	26 x 26 x 26	RGB	SSS	517642 glass

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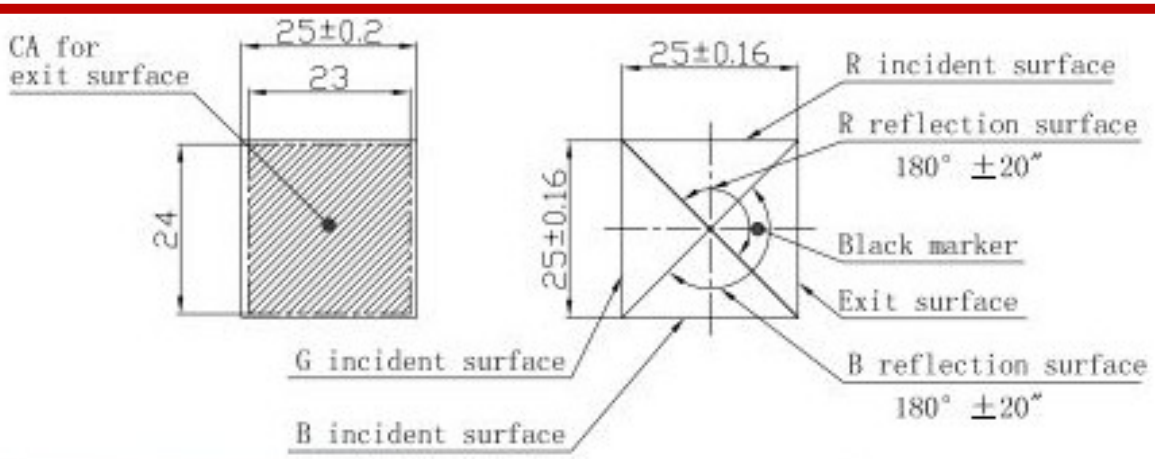
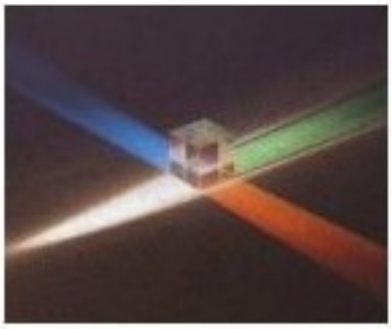
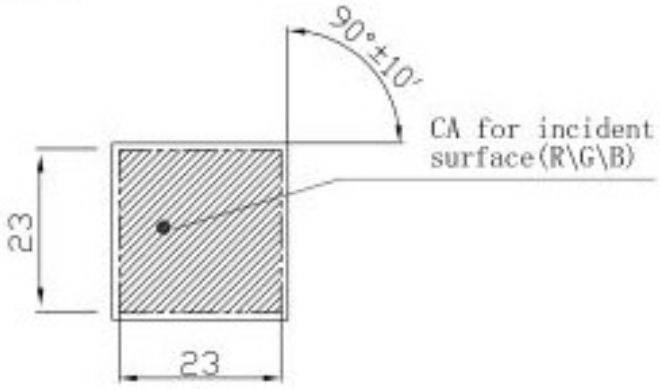
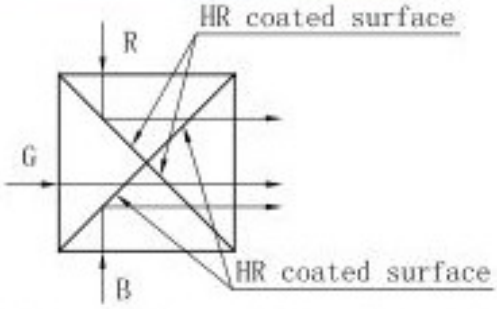
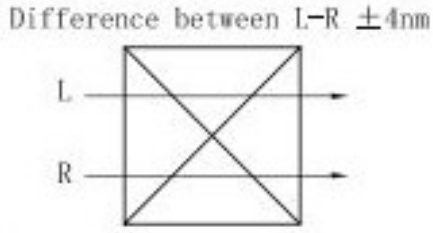


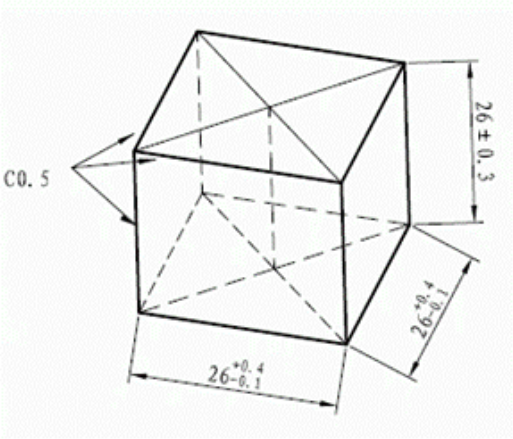


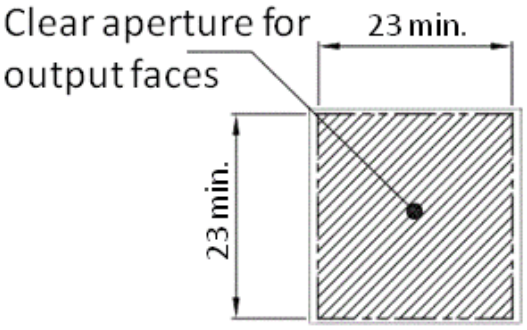


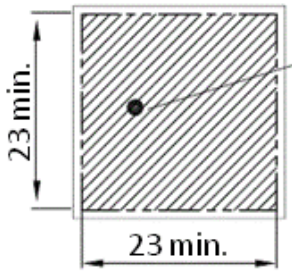




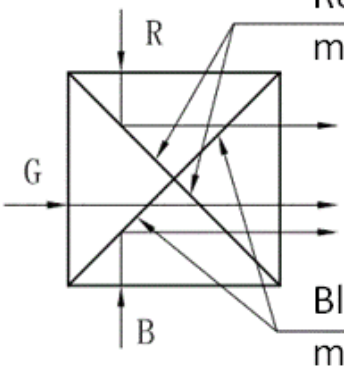
1. Corner chamfer C0.4mm, chip ≤0.2mm after beveling
2. Reflection surface flatness: N=1, △N=0.5, Incident and exit surface flatness: N=2, △N=1
3. Surface quality: 60-40, no contanmination, no strips
4. Coating:
   Blue reflection: S polarization, AOL=45° , Rs(ave)>96% @ 420-495nm
   Rs(50%)=530±6nm, wavelength shift at 0° ±10° : ±28nm
   Difference between 2 reflecting surfaces (50% wavelength), ≤4nm
   Red reflection: S polarization, AOL=45° , Rs(ave)>96% @ 590-680nm
   Rs(50%)=560±6nm, wavelength shift at 0° ±10° : ±38nm
   Difference between 2 reflecting surfaces (50% wavelength), ≤4nm
   Green transmission: Tp(ave)>94% @ 485-590nm
   AR coating on outside 4 surfaces, R(ave)<0.5% @ 400-700nm
5. Central line: glue layer thickness <3um, gluing centers tolerance:<5um central line width <8um(viewed from exit surface)







Clear aperture for input face



Red dichroic mirror coating

Blue dichroic mirror coating

Parameter	Specification
Corner Chamfer	C0.5 mm, chips 0.2 mm max after grinding
Surface Flatness	Faces N=2, Mirrors N=1
Face Perpendicularity	90° ± 10′
Surface Quality	60/40, no contamination, no stripes
Central Glue Line	7 µm maximum
External Face Coating	Broadband anti-reflectance Ravg 0.5% max, 420-680 nm
Red Reflecting Coating	Ts (50%) = 560 ± 10 nm Ts (10%-80%) = 20 nm max Ts (420-510 nm) = 94% avg (97% nominal avg) (92% min) Ts (595-680 nm) + 1.0% max Ts (50% shift) = ± 25 nm for ± 5° deviation
Blue Reflecting Coating	Ts (50%) = 530 ± 10 nm Ts (10%-80%) = 20 nm max Ts (565-680 nm) = 94% avg (97% nominal avg) (92% min) Ts (420-490 nm) + 1.0% max Ts (50% shift) = ± 17 nm for ± 5° deviation
Green P Transmission	Tp (490-590 nm) = 94% avg (90% min)
Left/Right Curve Match	s = 4 nm max, p = 5 nm max (50% point shift)