56 Sparta Avenue • Newton, New Jersey 07860
(973) 300-3000 Sales • (973) 300-3600 Fax
www.thorlabs.com

THORLABS

CCM5-WPBS20 - DEC 6, 2021

Item # CCM5-WPBS20 was discontinued on DEC 6, 2021. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

WIRE GRID BEAMSPLITTER CUBE IN 16 MM CAGE CUBE

- **Polarizes and Splits Wavelengths from 400 to 700 nm**
- **High Extinction Ratio: >1 000:1 for Transmitted Beam**
- **SM05 and 16 mm Cage System Compatible**
- **Engraved Housing**

CCM5-WPBS20
16 mm Wire Grid Beamsplitter
8-32 Mounting Tap

Application Idea
The CCM5-WPBS20 Beamsplitter Cube is shown connected to a SCFW6 filter mount with Ø1/2" ND filters using 16 mm cage rods.

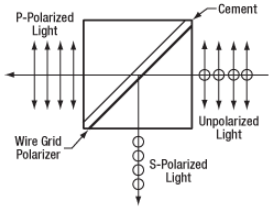
Hide Overview

OVERVIEW

Features

- Transmits P-Polarized Light and Reflects S-Polarized Light
- Antireflective (AR) Coating for 400 - 700 nm (R_{avg} < 0.5% @ 0° AOI)
- 20.0 mm (0.79") Cube in 16 mm Cage System Compatible Mounts
- Four SM05-Threaded (0.535"-40) Ports
- High Extinction Ratio
  - T_P:T_S > 1 000:1 (AOI: 0° - 5°)
  - T_P:T_S > 100:1 (AOI: 0° - 25°)

Click for Details
Each mounted wire grid beamsplitter cube is engraved with a ray diagram for one of the two preferred entrance faces.



Transmission and Reflection of Light Through a Wire Grid Polarizing Beamsplitter Cube
(Not to Scale)

Thorlabs offers a wire grid polarizing beamsplitter cube mounted in a 16 mm cage system compatible housing with SM05-threaded ports. The mounted cube consists of an array of parallel metallic wires between two N-BK7 prisms joined with optical cement. Wire grid polarizers transmit radiation with an electric field vector perpendicular to the wire and reflect radiation with the electric field vector parallel to the wire. This cube separates the s- and p-polarized components by reflecting the s-polarized component at the wire grid, while allowing the p-polarized component to pass. Due to surface reflections, the reflected beam contains both polarizations.

This beamsplitter cube has a larger Angle of Incidence (AOI) than traditional broadband polarizing beamsplitter cubes. For the highest polarization extinction ratio, use the transmitted beam, which offers an extinction ratio of T_P:T_S > 1 000:1 for an AOI from 0° to 5°. For higher AOI (5° to 25°), this cube can maintain an extinction ratio of T_P:T_S > 100:1. These beamsplitter cubes are coated with an AR thin film designed for 400 - 700 nm (R_{avg} < 0.5% @ 0° AOI).

The wire grid is sandwiched between the hypotenuses of the two prisms that make up the cube. Then, optical cement is used to bind the two prism halves together (refer to the diagram above). Light can be input into any of the polished faces to separate the s- and p-polarizations. One possible orientation is engraved on the top of the cage cube.

A bottom-located 8-32 or M4 tap is included on each housing for post mounting. The housing features four SM05-threaded entrance and exit ports for compatibility with our SM05 (0.535"-40) lens tubes. Four 4-40 tapped holes surrounding each port provide compatibility with our 16 mm cage systems. These mounted beamsplitters can be connected to other cage cubes through the use of our cage rods and SRSCA adapters.

We also offer unmounted versions of our wire grid beamsplitters in various sizes. Custom beamsplitter cubes can be ordered by contacting Tech Support. For high-power applications, we also offer high-power polarizing beamsplitting cubes that have damage thresholds greater than 10 J/cm^2. We also offer polarizing beamsplitter cubes at laser line wavelengths, which have a high extinction ratio of >3 000:1 (T_P:T_S).

Hide Specs

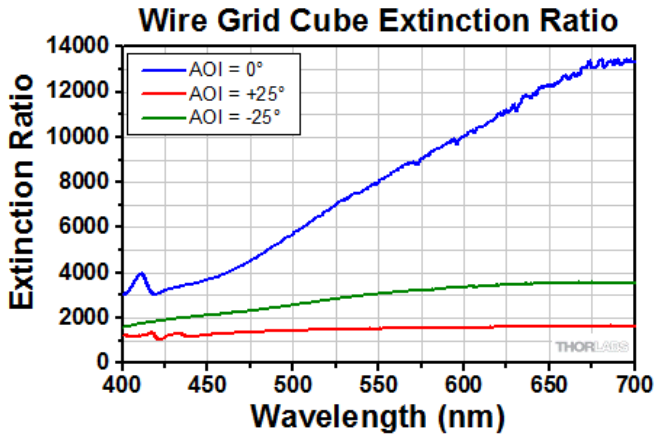
SPECS

Item #	CCM5-WPBS20
Design Wavelength	400 - 700 nm
AR Coating	R_{avg} < 0.5% @ 0° AOI for 400 - 700 nm
Material	N-BK7
Extinction Ratio[a]	T_p:T_s > 1 000:1 @ 0° - 5° AOI T_p:T_s > 100:1 @ 0° - 25° AOI
Transmission	T_p > 75% (Avg.) @ 0° AOI for 400 - 700 nm
Reflectance	R_s > 70% @ 0° - 25° AOI for 400 - 700 nm
Transmitted Beam Deviation	<20 arcmin
Reflected Beam Deviation	90° ± 20 arcmin
Clear Aperture	Ø12.5 mm
Transmitted Wavefront Error	<λ/4 @ 633 nm
Surface Quality	40-20 Scratch-Dig
Dimensions (L × W × H)	1.18" x 1.18" x 1.18" (30.0 mm x 30.0 mm x 30.0 mm)
Post Mount	8-32

a. The extinction ratio (ER) is the ratio of maximum to minimum transmission of a sufficiently linearly polarized input. When the transmission axis and input polarization are parallel, the transmission is at its maximum; rotate the polarizer by 90° for minimum transmission.

Hide Graphs

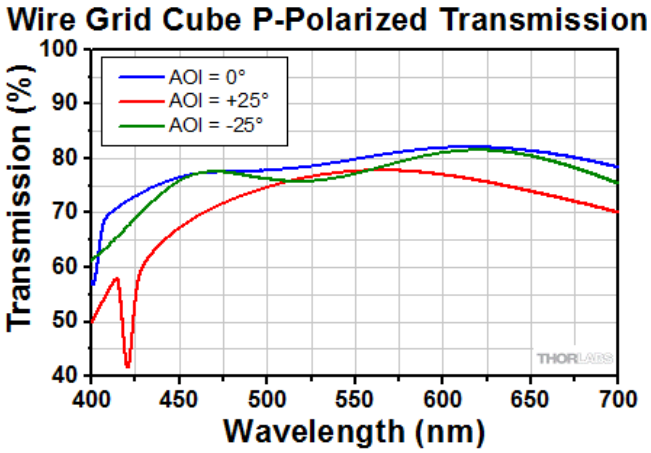
GRAPHS



Click to Enlarge

Click for Raw Data

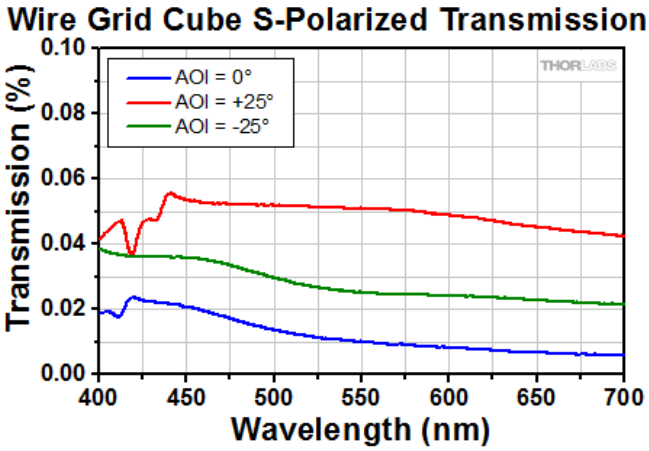
The graph above shows the measured extinction ratio (ER) for transmitted light for light incident upon one of the entrance faces. The extinction ratio (also known as contrast) is the ratio of the maximum transmission of a sufficiently linearly polarized signal when the polarizer's axis is aligned with the signal to the minimum transmission when the polarizer is rotated by 90°. The plotted data is given for AOIs of 0° and ±25°.



Click to Enlarge

Click for Raw Data

The graph above shows the measured transmission through the wire grid polarizing cube for p-polarized light for light incident upon one of the entrance faces. The plotted data is given for AOIs of 0° and ±25°.

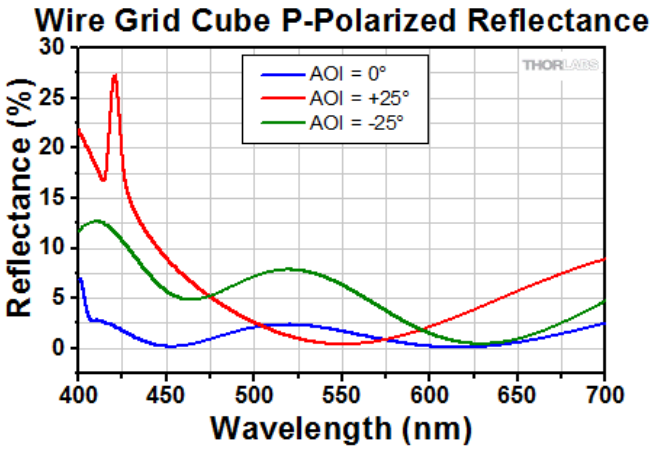


Click to Enlarge

Click for Raw Data

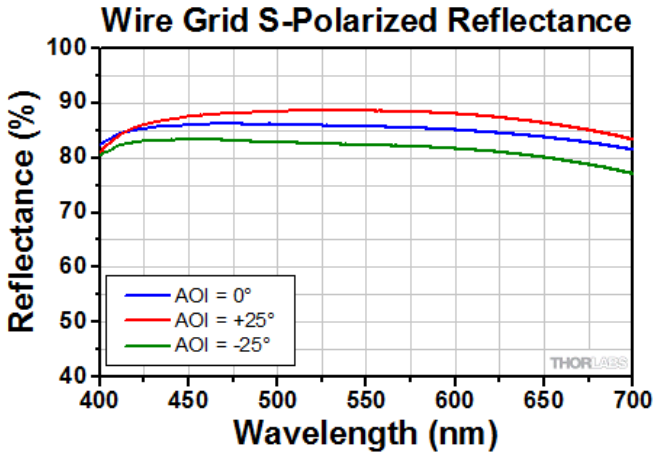
The graph above shows the measured transmission through the wire grid polarizing cube for s-polarized light for light incident upon one of the entrance faces. The plotted data is

given for AOIs of 0° and ±25°.



Click to Enlarge
Click for Raw Data

The graph above shows the measured reflectance from the wire grid polarizing cube for p-polarized light for light incident upon one of the entrance faces. The plotted data is given for AOIs of 0° and ±25°.



Click to Enlarge
Click for Raw Data

The graph above shows the measured reflectance from the wire grid polarizing cube for s-polarized light for light incident upon one of the entrance faces. The plotted data is given for AOIs of 0° and ±25°.

Hide Polarizer Guide

POLARIZER GUIDE

Polarizer Selection Guide

Thorlabs offers a diverse range of polarizers, including wire grid, film, calcite, alpha-BBO, rutile, and beamsplitting polarizers. Collectively, our line of wire grid polarizers offers coverage from the visible range to the beginning of the Far-IR range. Our nanoparticle linear film polarizers provide extinction ratios as high as 100 000:1. Alternatively, our other film polarizers offer an affordable solution for polarizing light from the visible to the Near-IR. Next, our beamsplitting polarizers allow for use of the reflected beam, as well as the more completely polarized transmitted beam. Finally, our alpha-BBO (UV), calcite (visible to Near-IR), rutile (Near-IR to Mid-IR), and yttrium orthovanadate (YVO_4) (Near-IR to Mid-IR) polarizers each offer an exceptional extinction ratio of 100 000:1 within their respective wavelength ranges.

To explore the available types, wavelength ranges, extinction ratios, transmission, and available sizes for each polarizer category, click *More [+]* in the appropriate row below.

Wire Grid Polarizers	More [+]
Film Polarizers	More [+]
Beamsplitting Polarizers	More [+]
alpha-BBO Polarizers	More [+]
Calcite Polarizers	More [+]
Quartz Polarizers	More [+]
Magnesium Fluoride Polarizers	More [+]
Yttrium Orthovanadate (YVO_4) Polarizers	More [+]
Rutile Polarizers	More [+]

- Click on the graph icons in this column to view a transmission curve for the corresponding polarizer. Each curve represents one substrate sample or coating run and is not guaranteed.
- Mounted in a protective box, unthreaded ring, or cylinder.
- Available unmounted or in an SM05-threaded (0.535"-40) mount that indicates the polarization axis.
- Available unmounted or in an SM1-threaded (1.035"-40) mount that indicates the polarization axis.
- PBS519: Average T_P:T_S > 1000:1
- Available unmounted or mounted in cubes for cage system compatibility.
- Calcite's transmittance of light near 350 nm is typically around 75% (see *Transmission* column).
- Available unmounted or in an unthreaded Ø1/2" housing.
- The transmission curves for calcite are valid for linearly polarized light with a polarization axis aligned with the mark on the polarizer's housing.
- The 1064 nm V coating corresponds to a -C26 suffix in the item number.
- Available unmounted or mounted in a protective box or unthreaded cylinder that indicates the polarization axis.

Hide BS Selection Guide

BS SELECTION GUIDE

Thorlabs' portfolio contains many different kinds of beamsplitters, which can split beams by intensity or by polarization. We offer plate and cube beamsplitters, though other form factors exist, including pellicle and birefringent crystal. Many of our beamsplitters come in premounted or unmounted variants. Below is a complete listing of our beamsplitter offerings. To explore the available types, wavelength ranges, splitting/extinction ratios, transmission, and available sizes for each beamsplitter category, click *More [+]* in the appropriate row below.

Non-Polarizing Beamsplitters

Plate Beamsplitters	More [+]
Cube Beamsplitters	More [+]
Pellicle Beamsplitters	More [+]

- 45° AOI Unless Otherwise Noted

Polarizing Beamsplitters

Plate Beamsplitters	More [+]
Cube Beamsplitters	More [+]
Birefringent Crystal Beamsplitters	More [+]

- PBS519: Average T_P:T_S > 1000:1
- Mounted in a protective box, unthreaded ring, or cylinder.

- Available unmounted or mounted in a protective box or unthreaded cylinder.

Other Beamsplitters

Other Beamsplitters More [+]

Hide

Part Number	Description	Price	Availability
CCM5-WPBS20	16 mm Cage Cube-Mounted Wire Grid Beamsplitter Cube, 400 - 700 nm, 8-32 Tap	$464.67	Lead Time

Visit the *Wire Grid Beamsplitter Cube in 16 mm Cage Cube* page for pricing and availability information:
https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=11233