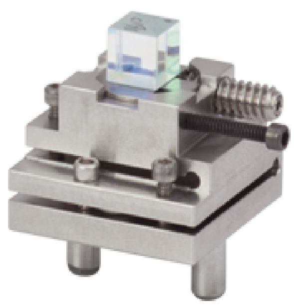
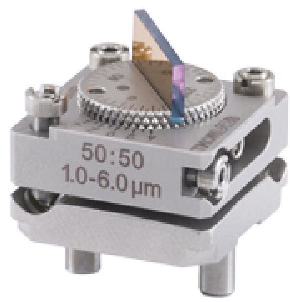
56 Sparta Avenue • Newton, New Jersey 07860
(973) 300-3000 Sales • (973) 300-3600 Fax
www.thorlabs.com

FIBERBENCH BEAMSPLITTER MODULES

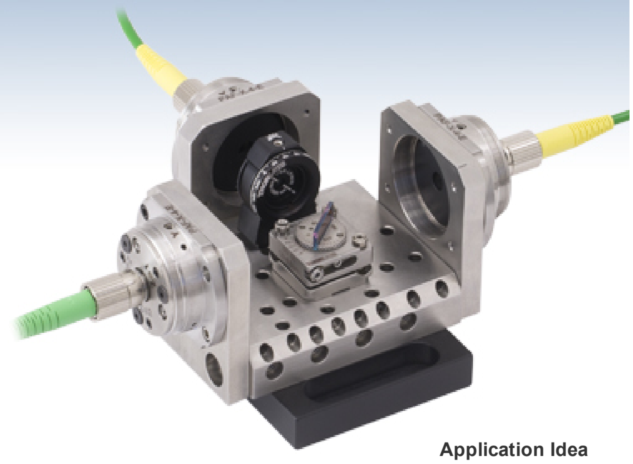
- Polarizating Beamsplitter with 1000:1 Extinction Ratio
- 4/96 or 50/50 Non-Polarizing Beamsplitter Options
- Available for Wavelengths from 600 nm to 6.0 µm
- Mounted on FiberBench-Compatible Base



PSCLB-VL-780
Polarizing Beamsplitter Module for 620 - 1000 nm



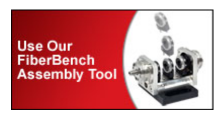
FBT-50MIR
Non-Polarizing Beamsplitter Module for 1.0 - 6.0 µm



Application Idea
FBT-50MIR and a FBR-LPNIR Polarizer Module Mounted in a FiberBench with MIR FiberPorts

OVERVIEW

Features



- Polarizing and Non-Polarizing Beamsplitters Designed for Wavelengths from 600 nm to 6.0 µm
- Compatible with FiberBenches
- Bases Provide Easy Tip, Tilt, and Rotation
- 1.0 - 6.0 µm Non-Polarizing Beamsplitter Module with 360° Rotation
- Special Wavelengths or Custom Requests Available through Tech Support

For applications that require a beam to be split or reflected, Thorlabs offers polarizing beamsplitter cubes and non-polarizing beamsplitter plates mounted on bases that provide tip, tilt, and rotational adjustment. These modules are mounted to allow easy access to the adjustment mechanism without interfering with the beam path, providing precision beam alignment and steering control.

Most of our beamsplitter modules use mounts that provide ±5° of rotation adjustment. As a result, they are offered in left- and right-handed configurations with the mounting pins in either a vertical or horizontal orientation. Care should be taken to choose a mount that directs the beam to the correct port's path so that the adjusting screws are in a convenient position for the required setup. Please see the *Pin Configuration* tab for help in selecting between vertical and horizontal mounting orientations, as well as left and right handed orientations. Please note that the FBT-50MIR beamsplitter module for 1.0 - 6.0 µm features a base with 360° of continuous rotation and therefore does not require left- and right-handed versions.

These beamsplitter modules can be used alongside FiberBench-compatible polarization, tweaker, and mirror modules.

FiberBench Accessories			
FiberPorts	Optic Mounts	Alignment Tools	Polarizers
Beamsplitter Modules	Mirror Modules	Rotating Wave Plates	FiberBenches

PSCLB-VR-1550 - February 8, 2016

Item # PSCLB-VR-1550 was discontinued on February 8, 2016. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

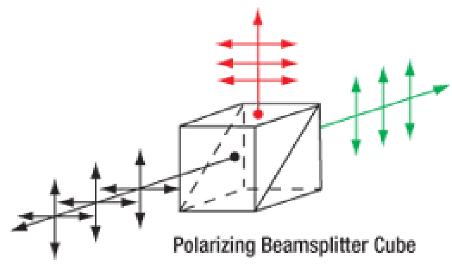
SPECS

Polarizing Beamsplitter Modules (PSCLBs)

Specifications	
AR Coating Reflection	R_{avg} <0.5% at 0° AOI
Dimensional Tolerance	±0.2 mm
Center Thickness Tolerance	±0.4 mm
Material	N-SF1
Extinction Ratio	T_p:T_s >1,000:1
Transmission Efficiency[a]	T_p >90%
Reflection Efficiency[a]	R_s >99.5%
Transmitted Beam Deviation	<5 arcmin
Reflected Beam Deviation	90° ± 5 arcmin
Clear Aperture	>70% of Dimension
Surface Flatness	λ/10 at 633 nm
Wavefront Distortion	<λ/4 at 633 nm
Surface Quality	40-20 (Scratch-Dig)

- Transmission and reflection data is based on that of the beamsplitter coating and does not account for the BBAR surface coating.

Item #	AR Coating Range	Damage Threshold
PSCLB-xx-780	620 - 1000 nm	2 J/cm^2 at 810 nm, 10 ns, 10 Hz, Ø0.166 mm
PSCLB-xx-1064	900 - 1300 nm	2 J/cm^2 at 1064 nm, 10 ns, 10 Hz, Ø0.484 mm
PSCLB-xx-1550	1200 - 1600 nm	5 J/cm^2 at 1542 nm, 10 ns, 10 Hz, Ø0.181 mm

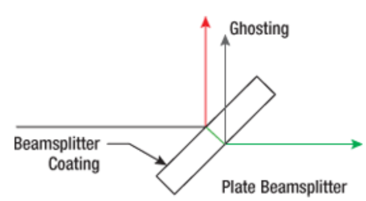


Non-Polarizing Beamsplitter Modules (MSBs and FBT-50MIR)

Item #	MSB-xx-xxx-50/50	MSB-xx-xxx-4/96	FBT-50MIR
Transmission Efficiency	50 ± 10%	96 +1%/-0%	50 ± 20%
Reflection Efficiency	50 ± 10%	4 +0%/-0.7%	50 ± 20%
Beam Displacement	~ 0.5 mm		
Clear Aperture	80% of Length and Width		90% of Length and Width
Transmitted Wavefront Distortion	≤λ/4 @ 633 nm		≤λ/8 @ 633 nm
Optic Substrate[a]	Fused Silica		Calcium Fluoride
Plate Thickness	1.0 mm		
Surface Quality	10-5 Scratch-Dig		40-20 Scratch-Dig

- Click the substrate for detailed information.

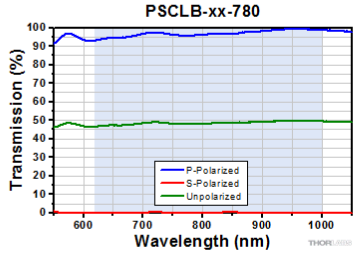
Item #	Coating Range	Damage Threshold
MSB-xx-780-xx/xx	750 - 860 nm	2 J/cm^2 at 810 nm, 10 ns, 10 Hz, Ø0.166 mm
MSB-xx-1064-xx/xx	950 - 1100 nm	2 J/cm^2 at 1064 nm, 10 ns, 10 Hz, Ø0.484 mm
MSB-xx-1550-xx/xx	1250 - 1600 nm	5 J/cm^2 at 1542 nm, 10 ns, 10 Hz, Ø0.181 mm
FBT-50MIR	1.0 - 6.0 µm	Pulsed: 0.5 J/cm^2 at 2.1 µm, 30 ns, 167 Hz, Ø0.027 mm CW: 100 W/cm^2 at 2.1 µm, Ø0.027 mm



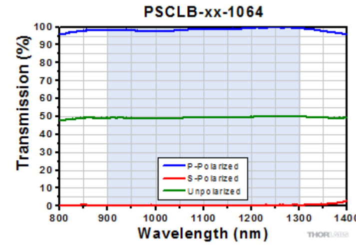
GRAPHS

The following graphs show beam transmission percentages for each of our beamsplitter modules. The blue-shaded regions indicate the operating wavelength range of each beamsplitter. Performance outisde of this range is not guaranteed.

Polarizing Beamsplitter Modules



Click to Enlarge



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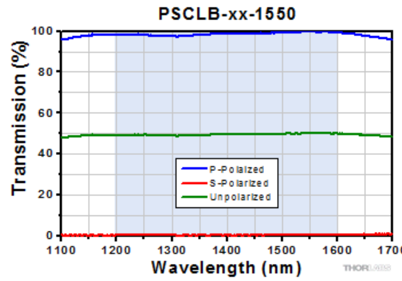
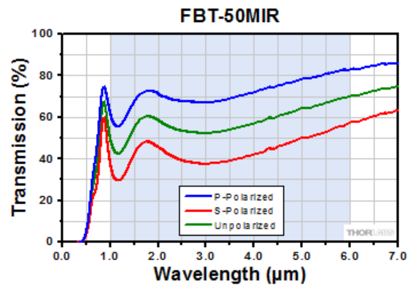


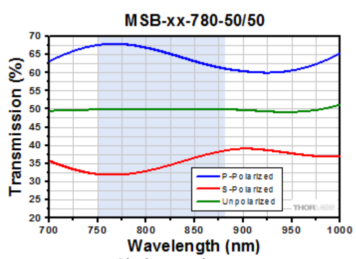
Click to Enlarge

1.0 µm - 6.0 µm Non-Polarizing Beamsplitter Module with 360° Rotation



Click to Enlarge

Non-Polarizing Beamsplitter Modules



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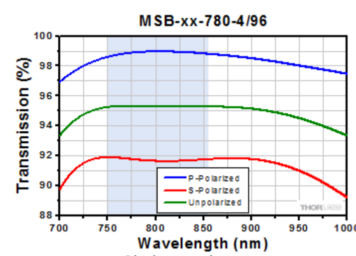

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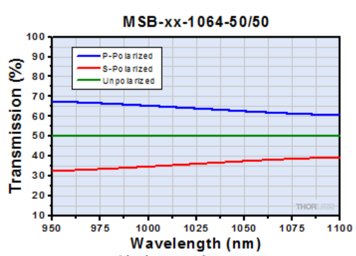

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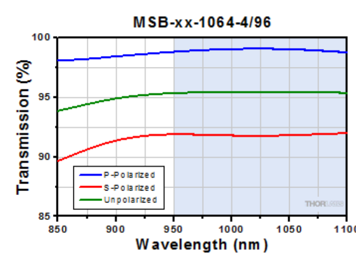

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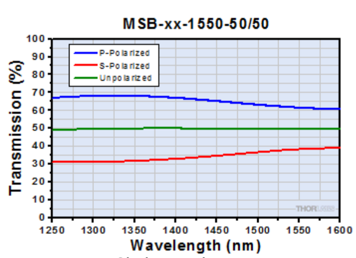

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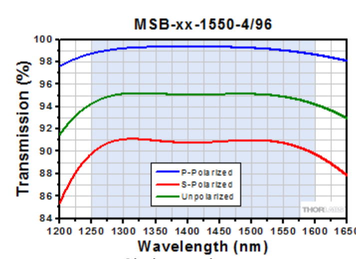
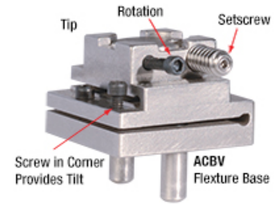


Click to Enlarge

PIN CONFIGURATION

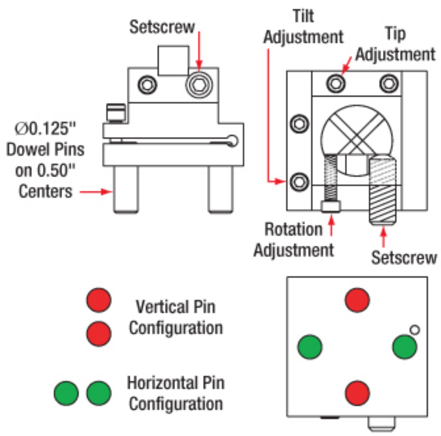
With the exeption of the FBT-50MIR beamsplitter module, the flexure bases for these modules have two basic pin mounting orientations: **vertical** and **horizontal**. Although the vertical pin configuration is the most common, both the vertical and horizontal pins are compatible with our FiberBenches. A vertical pin configuration is defined as having the pins mounted parallel to the rotation adjustment screw. In the horizontal configuration, the pins will be mounted perpendicular to the rotation adjustment screw.



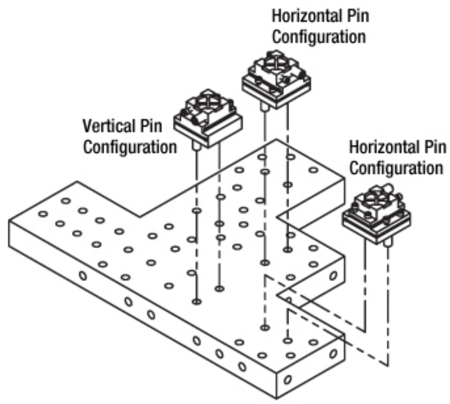
Click to Enlarge

The flexture bases are also separated by handedness: **right** or **left**. The right or left designation will determine the orientation of the cube, plate, or mirror with respect to the rotation adjustment screw and refers to how the beam will be turned. See the sketches and diagrams below for help in selecting a component. Please be careful about sending the beam to an available port.

Please note: the FBT-50MIR 50:50 IR beamsplitter module has full rotation about 360°, and therefore does not require multiple pin configurations or orientations.



Horizontal and Vertical Pin Configurations
Click to Enlarge



Flexure Base on FT-114X149 Multi-Axis FiberBench
Click to Enlarge

DAMAGE THRESHOLDS

Damage Threshold Data for Thorlabs' Polarizing Beamsplitter Modules

The specifications to the right are measured data for the beamsplitters shipped with Thorlabs' polarizing beamsplitter modules. Damage threshold specifications are constant for a given item number stem regardless of the pin configuration of the beamsplitter module.

Damage Threshold Specifications	
Item #	**Damage Threshold**
PSCLB-xx-780	2 J/cm^2 at 810 nm, 10 ns, 10 Hz, Ø0.166 mm
PSCLB-xx-1064	2 J/cm^2 at 1064 nm, 10 ns, 10 Hz, Ø0.484 mm
PSCLB-xx-1550	5 J/cm^2 at 1542 nm, 10 ns, 10 Hz, Ø0.181 mm
FBT-50MIR	Pulsed: 0.5 J/cm^2 (2.1 µm, 30 ns, 167 Hz, Ø0.027 mm) CW[a]: 100 W/cm^2 (2.1 µm, Ø0.027 mm)

- The power density of your beam should be calculated in terms of W/cm. For an explanation of why the linear power density provides the best metric for long pulse and CW sources, please see the "Continuous Wave and Long-Pulse Lasers" section below.

Laser Induced Damage Threshold Tutorial

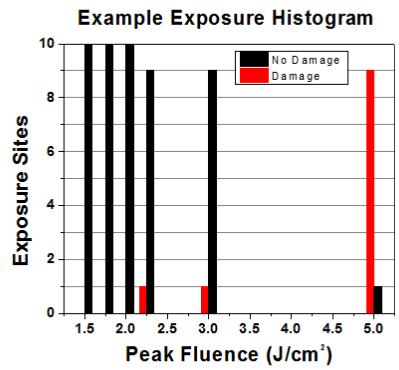
The following is a general overview of how laser induced damage thresholds are measured and how the values may be utilized in determining the appropriateness of an optic for a given application. When choosing optics, it is important to understand the Laser Induced Damage Threshold (LIDT) of the optics being used. The LIDT for an optic greatly depends on the type of laser you are using. Continuous wave (CW) lasers typically cause damage from thermal effects (absorption either in the coating or in the substrate). Pulsed lasers, on the other hand, often strip electrons from the lattice structure of an optic before causing thermal damage. Note that the guideline presented here assumes room temperature operation and optics in new condition (i.e., within scratch-dig spec, surface free of contamination, etc.). Because dust or other particles on the surface of an optic can cause damage at lower thresholds, we recommend keeping surfaces clean and free of debris. For more information on cleaning optics, please see our *Optics Cleaning* tutorial.

Testing Method

Thorlabs' LIDT testing is done in compliance with ISO/DIS11254 specifications. A standard 1-on-1 testing regime is performed to test the damage threshold.

First, a low-power/energy beam is directed to the optic under test. The optic is exposed in 10 locations to this laser beam for a set duration of time (CW) or number of pulses (pulse repetition frequency specified). After exposure, the optic is examined by a microscope (~100X magnification) for any visible damage. The number of locations that are damaged at a particular power/energy level is recorded. Next, the power/energy is either increased or decreased and the optic is exposed at 10 new locations. This process is repeated until damage is observed. The damage threshold is then assigned to be the highest power/energy that the optic can withstand without causing damage. A histogram such as that below represents the testing of one BB1-E02 mirror.

The photograph above is a protected aluminum-coated mirror after LIDT testing. In this particular test, it handled 0.43 J/cm^2 (1064 nm, 10 ns pulse, 10 Hz, Ø1.000 mm) before damage.



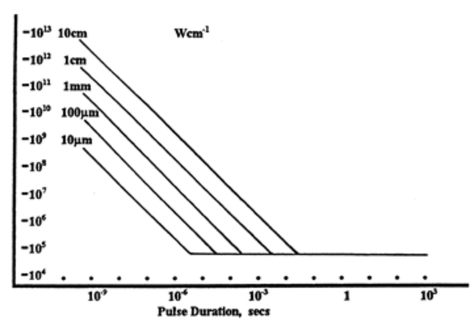
Example Test Data			
Fluence	# of Tested Locations	Locations with Damage	Locations Without Damage
1.50 J/cm^2	10	0	10
1.75 J/cm^2	10	0	10
2.00 J/cm^2	10	0	10
2.25 J/cm^2	10	1	9
3.00 J/cm^2	10	1	9
5.00 J/cm^2	10	9	1

According to the test, the damage threshold of the mirror was 2.00 J/cm^2 (532 nm, 10 ns pulse, 10 Hz, Ø0.803 mm). Please keep in mind that these tests are performed on clean optics, as dirt and contamination can significantly lower the damage threshold of a component. While the test results are only representative of one coating run, Thorlabs specifies damage threshold values that account for coating variances.

Continuous Wave and Long-Pulse Lasers

When an optic is damaged by a continuous wave (CW) laser, it is usually due to the melting of the surface as a result of absorbing the laser's energy or damage to the optical coating (antireflection) [1]. Pulsed lasers with pulse lengths longer than 1 µs can be treated as CW lasers for LIDT discussions. Additionally, when pulse lengths are between 1 ns and 1 µs, LIDT can occur either because of absorption or a dielectric breakdown (must check both CW and pulsed LIDT). Absorption is either due to an intrinsic property of the optic or due to surface irregularities; thus LIDT values are only valid for optics meeting or exceeding the surface quality specifications given by a manufacturer. While many optics can handle high power CW lasers, cemented (e.g., achromatic doublets) or highly absorptive (e.g., ND filters) optics tend to have lower CW damage thresholds. These lower thresholds are due to absorption or scattering in the cement or metal coating.

Pulsed lasers with high pulse repetition frequencies (PRF) may behave similarly to CW beams. Unfortunately, this is highly dependent on factors such as absorption and thermal diffusivity, so there is no reliable method for determining when a high PRF laser will damage an optic due to thermal effects. For beams with a large PRF both the average and peak powers must be compared to the equivalent CW power. Additionally, for highly transparent materials, there is little to no drop in the LIDT with increasing PRF.

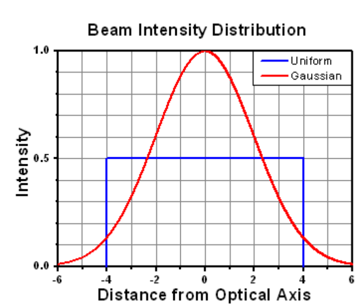


LIDT in linear power density vs. pulse length and spot size. For long pulses to CW, linear power density becomes a constant with spot size. This graph was obtained from [1].

In order to use the specified CW damage threshold of an optic, it is necessary to know the following:

1. Wavelength of your laser
2. Linear power density of your beam (total power divided by 1/e^2 spot size)
3. Beam diameter of your beam (1/e^2)
4. Approximate intensity profile of your beam (e.g., Gaussian)

The power density of your beam should be calculated in terms of W/cm. The graph to the right shows why the linear power density provides the best metric for long pulse and CW sources. Under these conditions, linear power density scales independently of spot size; one does not need to compute an adjusted LIDT to adjust for changes in spot size. This calculation assumes a uniform beam intensity profile. You must now consider hotspots in the beam or other nonuniform intensity profiles and roughly calculate a maximum power density. For reference, a Gaussian beam typically has a maximum power density that is twice that of the uniform beam (see lower right).



Now compare the maximum power density to that which is specified as the LIDT for the optic. If the optic was tested at a wavelength other than your operating wavelength, the damage threshold must be scaled appropriately. A good rule of thumb is that the damage threshold has a linear relationship with wavelength such that as you move to shorter wavelengths, the damage threshold decreases (i.e., a LIDT of 10 W/cm at 1310 nm scales to 5 W/cm at 655 nm):

$$Adjusted\ LIDT = LIDT\ Power\left(\frac{Your\ Wavelength}{LIDT\ Wavelength}\right)$$

While this rule of thumb provides a general trend, it is not a quantitative analysis of LIDT vs wavelength. In CW applications, for instance, damage scales more strongly with absorption in the coating and substrate, which does not necessarily scale well with wavelength. While the above procedure provides a good rule of thumb for LIDT values, please contact Tech Support if your wavelength is different from the specified LIDT wavelength. If your power density is less than the adjusted LIDT of the optic, then the optic should work for your application.

Please note that we have a buffer built in between the specified damage thresholds online and the tests which we have done, which accommodates variation between batches. Upon request, we can provide individual test information and a testing certificate. The damage analysis will be carried out on a similar optic (customer's optic will not be damaged). Testing may result in additional costs or lead times. Contact Tech Support for more information.

Pulsed Lasers

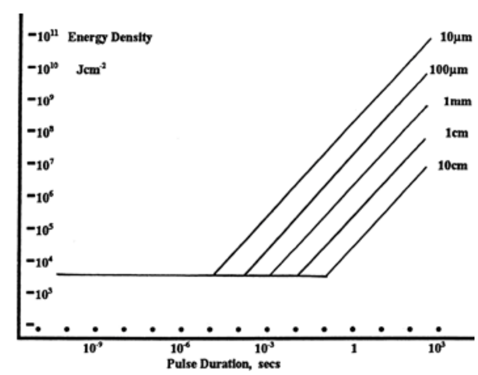
As previously stated, pulsed lasers typically induce a different type of damage to the optic than CW lasers. Pulsed lasers often do not heat the optic enough to damage it; instead, pulsed lasers produce strong electric fields capable of inducing dielectric breakdown in the material. Unfortunately, it can be very difficult to compare the LIDT specification of an optic to your laser. There are multiple regimes in which a pulsed laser can damage an optic and this is based on the laser's pulse length. The highlighted columns in the table below outline the relevant pulse lengths for our specified LIDT values.

Pulses shorter than 10^{-9} s cannot be compared to our specified LIDT values with much reliability. In this ultra-short-pulse regime various mechanics, such as multiphoton-avalanche ionization, take over as the predominate damage mechanism [2]. In contrast, pulses between 10^{-7} s and 10^{-4} s may cause damage to an optic either because of dielectric breakdown or thermal effects. This means that both CW and pulsed damage thresholds must be compared to the laser beam to determine whether the optic is suitable for your application.

Pulse Duration	$t < 10^{-9}$ s	$10^{-9} < t < 10^{-7}$ s	$10^{-7} < t < 10^{-4}$ s	$t > 10^{-4}$ s
Damage Mechanism	Avalanche Ionization	Dielectric Breakdown	Dielectric Breakdown or Thermal	Thermal
Relevant Damage Specification	N/A	Pulsed	Pulsed and CW	CW

When comparing an LIDT specified for a pulsed laser to your laser, it is essential to know the following:

1. Wavelength of your laser
2. Energy density of your beam (total energy divided by $1/e^2$ area)
3. Pulse length of your laser
4. Pulse repetition frequency (prf) of your laser
5. Beam diameter of your laser ($1/e^2$)
6. Approximate intensity profile of your beam (e.g., Gaussian)



LIDT in energy density vs. pulse length and spot size. For short pulses, energy density becomes a constant with spot size. This graph was obtained from [1].

The energy density of your beam should be calculated in terms of J/cm^2. The graph to the right shows why the energy density provides the best metric for short pulse sources. Under these conditions, energy density scales independently of spot size, one does not need to compute an adjusted LIDT to adjust for changes in spot size. This calculation assumes a uniform beam intensity profile. You must now adjust this energy density to account for hotspots or other nonuniform intensity profiles and roughly calculate a maximum energy density. For reference a Gaussian beam typically has a maximum energy density that is twice that of the $1/e^2$ beam.

Now compare the maximum energy density to that which is specified as the LIDT for the optic. If the optic was tested at a wavelength other than your operating wavelength, the damage threshold must be scaled appropriately [3]. A good rule of thumb is that the damage threshold has an inverse square root relationship with wavelength such that as you move to shorter wavelengths, the damage threshold decreases (i.e., a LIDT of 1 J/cm^2 at 1064 nm scales to 0.7 J/cm^2 at 532 nm):

$$Adjusted\ LIDT = LIDT\ Energy\sqrt{\frac{Your\ Wavelength}{LIDT\ Wavelength}}$$

You now have a wavelength-adjusted energy density, which you will use in the following step.

Beam diameter is also important to know when comparing damage thresholds. While the LIDT, when expressed in units of J/cm², scales independently of spot size; large beam sizes are more likely to illuminate a larger number of defects which can lead to greater variances in the LIDT [4]. For data presented here, a <1 mm beam size was used to measure the LIDT. For beams sizes greater than 5 mm, the LIDT (J/cm2) will not scale independently of beam diameter due to the larger size beam exposing more defects.

The pulse length must now be compensated for. The longer the pulse duration, the more energy the optic can handle. For pulse widths between 1 - 100 ns, an approximation is as follows:

$$\text{Adjusted LIDT} = \text{LIDT Energy}\sqrt{\frac{\text{Your Pulse Length}}{\text{LIDT Pulse Length}}}$$

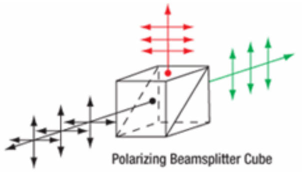
Use this formula to calculate the Adjusted LIDT for an optic based on your pulse length. If your maximum energy density is less than this adjusted LIDT maximum energy density, then the optic should be suitable for your application. Keep in mind that this calculation is only used for pulses between 10^{-9} s and 10^{-7} s. For pulses between 10^{-7} s and 10^{-4} s, the CW LIDT must also be checked before deeming the optic appropriate for your application.

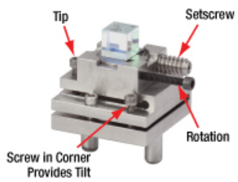
Please note that we have a buffer built in between the specified damage thresholds online and the tests which we have done, which accommodates variation between batches. Upon request, we can provide individual test information and a testing certificate. Contact Tech Support for more information.

[1] R. M. Wood, Optics and Laser Tech. **29**, 517 (1997).
[2] Roger M. Wood, *Laser-Induced Damage of Optical Materials* (Institute of Physics Publishing, Philadelphia, PA, 2003).
[3] C. W. Carr *et al.*, Phys. Rev. Lett. **91**, 127402 (2003).
[4] N. Bloembergen, Appl. Opt. **12**, 661 (1973).

Adjustable Polarizing Cube Beamsplitter Modules

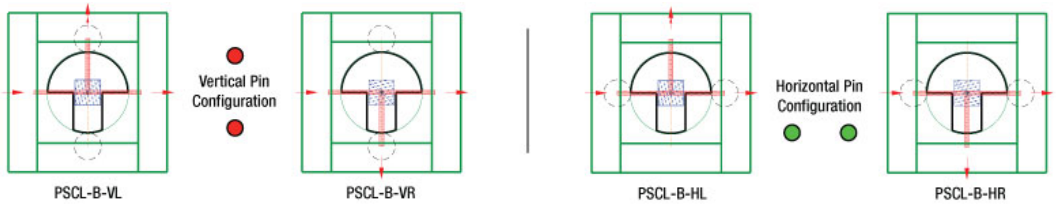
- **Wavelength Ranges:** 620 - 1000 nm, 900 - 1300 nm, or 1200 - 1600 nm
- **Clear Aperture:** 80% of Length and Width
- **Beam Deviation:** 90° ± 5 arcmin
- **Wavefront Distortion:** λ/4
- **Reflectance of S Component:** >98%
- **Transmittance of P Component:** >96% (R < 1.5%)
- **Cube Size:** 5 mm
- **Tip/Tilt Adjustment:** 6°
- **Rotation Adjustment:** ±5°





Click to Enlarge
Each Polarizing Beamsplitter is Mounted on a Flexure Base with Tip, Tilt, and Rotation Adjustment Screws

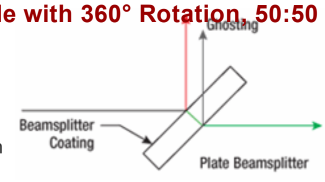
These modules consist of a polarizing beamsplitter cube mounted on a flexure base. Each module provides a polarization-dependent split with an extinction ratio that is better than 1,000:1. These modules are useful for polarization-dependent measurements and applications that require a spatial beam overlap. Please see the Pin Configuration tab for help in selecting between vertical and horizontal mounting orientations, as well as left- and right-handed orientations. Each module includes a hex key which can be used to adjust the tilt and rotation of the base. Please contact Tech Support for special wavelengths.

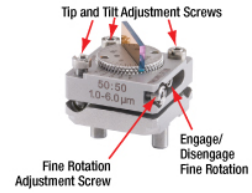


Part Number	Description	Price	Availability
PSCLB-VL-780	Polarizing FiberBench Beamsplitter Module, Vertical Left, 620 - 1000 nm	$400.00	Today
PSCLB-VR-780	Polarizing FiberBench Beamsplitter Module, Vertical Right, 620 - 1000 nm	$400.00	Today
PSCLB-HL-780	Polarizing FiberBench Beamsplitter Module, Horizontal Left, 620 - 1000 nm	$400.00	Today
PSCLB-HR-780	Polarizing FiberBench Beamsplitter Module, Horizontal Right, 620 - 1000 nm	$400.00	Today
PSCLB-VL-1064	Polarizing FiberBench Beamsplitter Module, Vertical Left, 900 - 1300 nm	$400.00	Today
PSCLB-VR-1064	Polarizing FiberBench Beamsplitter Module, Vertical Right, 900 - 1300 nm	$400.00	Today
PSCLB-HL-1064	Polarizing FiberBench Beamsplitter Module, Horizontal Left, 900 - 1300 nm	$400.00	Today
PSCLB-HR-1064	Polarizing FiberBench Beamsplitter Module, Horizontal Right, 900 - 1300 nm	$400.00	Today
PSCLB-VL-1550	Polarizing FiberBench Beamsplitter Module, Vertical Left, 1200 - 1600 nm	$400.00	Today
PSCLB-VR-1550	Polarizing FiberBench Beamsplitter Module, Vertical Right, 1200 - 1600 nm	$400.00	Today
PSCLB-HL-1550	Polarizing FiberBench Beamsplitter Module, Horizontal Left, 1200 - 1600 nm	$400.00	Today
PSCLB-HR-1550	Polarizing FiberBench Beamsplitter Module, Horizontal Right, 1200 - 1600 nm	$400.00	Today

Adjustable Non-Polarizing Mid-IR Beamsplitter Module with 360° Rotation, 50:50

- **Wavelength Range:** 1.0 - 6.0 µm
- **Split Ratios for Unpolarized Signals:** 50:50
- **Clear Aperture:** >90% of Length and Width
- **Wavefront Distortion:** ≤λ/8 @ 633 nm
- **Plate Thickness:** 1.0 mm
- **Rotation Adjustment:** Continuous 360° with ± 12° Fine Adjustment





Click to Enlarge
The FBT-50MIR is Mounted on an FBTP Base with Tip, Tilt, and Fine Rotation Adjustment Screws

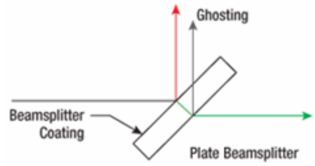
This module consists of a wideband CaF_2 non-polarizing plate beamsplitter mounted on an FBTP base. This beamsplitter is useful for mid-IR beam sampling applications or applications which require a relatively flat and neutral 50:50 split at 45° AOI.

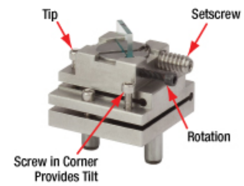
The base in this module is designed to allow for easy adjustment without interrupting the beam path. It features 360° of continuous adjustment, eliminating the need for left- and right-handed variants. The base is engraved with a dot to mark the reflective side of the beamsplitter, and each module includes a compatible spanner wrench for fast adjustment. Like other beamsplitter modules on this page, the FBT-50MIR beamsplitter module features two Ø0.125" (Ø3.2 mm) dowel pins which are compatible with Thorlabs' FiberBenches.

Part Number	Description	Price	Availability
FBT-50MIR	NEW! 50:50 Fiberbench Beamsplitter Module, 1.0 - 6.0 µm	$440.00	3-5 Days

Adjustable Non-Polarizing Plate Beamsplitter Modules, 50:50

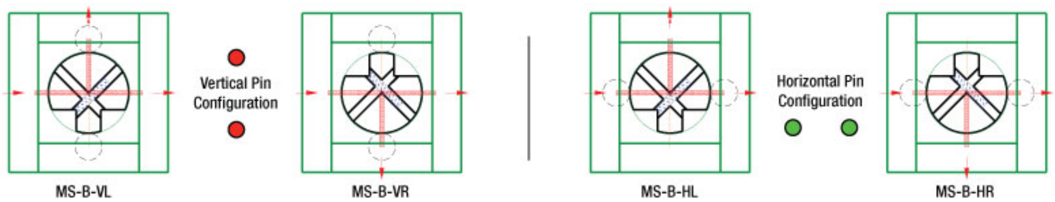
- **Wavelength Ranges:** 750 - 860 nm, 950 - 1100 nm, or 1250 - 1600 nm
- **Split Ratios for Unpolarized Signals:** 50:50
- **Clear Aperture:** 80% of Length and Width
- **Beam Displacement:** ~0.5 mm
- **Wavefront Distortion:** λ/4
- **Plate Thickness:** 1.0 mm
- **Tip/Tilt Adjustment:** 6°
- **Rotation Adjustment:** ±5°





Click to Enlarge
Each Non-Polarizing Beamsplitter is Mounted on a Flexure Base with Tip, Tilt, and Rotation Adjustment Screws

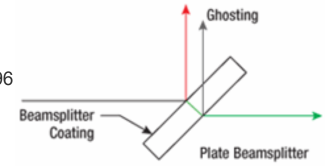
These modules consist of a narrow-band non-polarizing beamsplitter plate mounted on a flexure base. These plate beamsplitters are useful for beam sampling applications or applications that require a relatively flat and neutral 50:50 split. Please see the *Pin Configuration* tab for help in selecting between vertical and horizontal mounting orientations, as well as left- and right-handed orientations. Each module includes a hex key which can be used to adjust the tilt and rotation of the base. For wavelengths besides the ones listed below, please contact Tech Support.

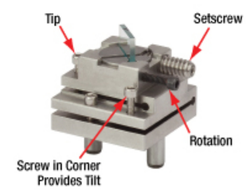


Part Number	Description	Price	Availability
MSB-VL-780-50/50	50:50 FiberBench Beamsplitter Module, Vertical Left, 750 - 860 nm	$375.00	Today
MSB-VR-780-50/50	50:50 FiberBench Beamsplitter Module, Vertical Right, 750 - 860 nm	$375.00	Today
MSB-HL-780-50/50	50:50 FiberBench Beamsplitter Module, Horizontal Left, 750 - 860 nm	$375.00	Today
MSB-HR-780-50/50	50:50 FiberBench Beamsplitter Module, Horizontal Right, 750 - 860 nm	$375.00	Today
MSB-VL-1064-50/50	50:50 FiberBench Beamsplitter Module, Vertical Left, 950 - 1100 nm	$375.00	Today
MSB-VR-1064-50/50	50:50 FiberBench Beamsplitter Module, Vertical Right, 950 - 1100 nm	$375.00	Today
MSB-HL-1064-50/50	50:50 FiberBench Beamsplitter Module, Horizontal Left, 950 - 1100 nm	$375.00	Today
MSB-HR-1064-50/50	50:50 FiberBench Beamsplitter Module, Horizontal Right, 950 - 1100 nm	$375.00	Today
MSB-VL-1550-50/50	50:50 FiberBench Beamsplitter Module, Vertical Left, 1250 - 1600 nm	$375.00	Today
MSB-VR-1550-50/50	50:50 FiberBench Beamsplitter Module, Vertical Right, 1250 - 1600 nm	$375.00	Today
MSB-HL-1550-50/50	50:50 FiberBench Beamsplitter Module, Horizontal Left, 1250 - 1600 nm	$375.00	Today
MSB-HR-1550-50/50	50:50 FiberBench Beamsplitter Module, Horizontal Right, 1250 - 1600 nm	$375.00	Today

Adjustable Non-Polarizing Plate Beamsplitter Modules, 4:96

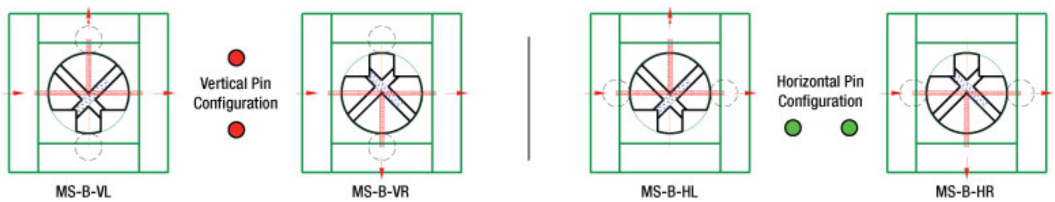
- **Wavelength Ranges:** 750 - 860 nm, 950 - 1100 nm, or 1250 - 1600 nm
- **Split Ratios for Unpolarized Signals:** 4:96
- **Clear Aperture:** 80% of Length and Width
- **Beam Displacement:** ~0.5 mm
- **Wavefront Distortion:** λ/4
- **Plate Thickness:** 1.0 mm
- **Tip/Tilt Adjustment:** 6°
- **Rotation Adjustment:** ±5°





Click to Enlarge
Each Non-Polarizing Beamsplitter is Mounted on a Flexure Base with Tip, Tilt, and Rotation Adjustment Screws

These modules consist of a narrow-band non-polarizing beamsplitter plate mounted on a flexure base. These plate beamsplitters provide a 4:96 split and are useful for beam sampling applications. Please see the *Pin Configuration* tab for help in selecting between vertical and horizontal mounting orientations, as well as left- and right-handed orientations. Each module includes a hex key which can be used to adjust the tilt and rotation of the base. For wavelengths besides the ones listed below, please contact Tech Support.



Part Number	Description	Price	Availability
MSB-VL-780-4/96	4:96 FiberBench Beamsplitter Module, Vertical Left, 750 - 860 nm	$375.00	Today
MSB-VR-780-4/96	4:96 FiberBench Beamsplitter Module, Vertical Right, 750 - 860 nm	$375.00	Today
MSB-HL-780-4/96	4:96 FiberBench Beamsplitter Module, Horizontal Left, 750 - 860 nm	$375.00	Today
MSB-HR-780-4/96	4:96 FiberBench Beamsplitter Module, Horizontal Right, 750 - 860 nm	$375.00	Today
MSB-VL-1064-4/96	4:96 FiberBench Beamsplitter Module, Vertical Left, 950 - 1100 nm	$375.00	Today
MSB-VR-1064-4/96	4:96 FiberBench Beamsplitter Module, Vertical Right, 950 - 1100 nm	$375.00	Today
MSB-HL-1064-4/96	4:96 FiberBench Beamsplitter Module, Horizontal Left, 950 - 1100 nm	$375.00	Today
MSB-HR-1064-4/96	4:96 FiberBench Beamsplitter Module, Horizontal Right, 950 - 1100 nm	$375.00	Today
MSB-VL-1550-4/96	4:96 FiberBench Beamsplitter Module, Vertical Left, 1250 - 1600 nm	$375.00	Today
MSB-VR-1550-4/96	4:96 FiberBench Beamsplitter Module, Vertical Right, 1250 - 1600 nm	$375.00	Today
MSB-HL-1550-4/96	4:96 FiberBench Beamsplitter Module, Horizontal Left, 1250 - 1600 nm	$375.00	Today
MSB-HR-1550-4/96	4:96 FiberBench Beamsplitter Module, Horizontal Right, 1250 - 1600 nm	$375.00	Today

Visit the *FiberBench Beamsplitter Modules* page for pricing and availability information:
http://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=3102