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

LPC06 - February 13, 2018

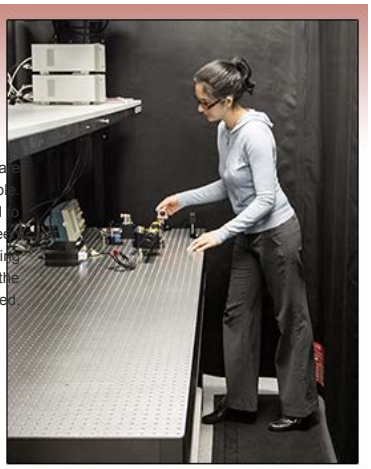
Item # LPC06 was discontinued on February 13, 2018. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

LASER SAFETY CURTAIN KITS FOR OPTICAL TABLE WORKSTATIONS OR FREE-STANDING SHELVES

- **Laser Curtains and Mounting Hardware Included**
- **Floor-Length Curtains Form Enclosed Workspace**
- **Continuous, Uninterrupted Curtain Track for Effort-Free Gliding**

TFL1225N
Laser Curtain Kit
(Shown Mounted to the TFS251 Overhead Shelf on a TF1225A7 Nexus® Optical Table Frame)

Floor-length laser curtains are provided to enclose the table. Select kits are designed to provide a walkway between the table and curtains, allowing for work to continue while the curtain is closed.



OVERVIEW

Features

- Laser Curtain Kits Designed for Thorlabs' Optical Table Workstations and Free-Standing Shelving Units
  - Workstation Requires an Overhead Shelving Unit to Attach the Curtain Kit
- Versions with and without Work Space Between the Optical Table and Curtains
- Flame Retardant, Floor-Length Laser Curtains with Magnetic Connectors for Light-Tight Seals are Included
- Includes All Components Needed to Mount the Kit
- Curtain End Stops Available to Provide a Hard Stop Along Tracks
- Replacement Wheel Runners and T-Nuts Sold Below
- Adapter Kit for Mounting to Legacy Workstations and Free-Standing Shelves Available

Laser Curtain Kits Compatibility			
No Walkway	**TFL1020**	**TFL1220**	**TFL1225**
Partial Walkway	**TFL1020N**	**TFL1220N**	**TFL1225N**
Complete Walkway	**TFL1020W**	**TFL1220W**	**TFL1225W**
Nexus Table Frames[a,b]	TF1020A7 or TF1020R7 with TFS201	TF1220A7, TF1220R7, or TF1220A6 with TFS201	TF1225A7, TF1225R7, or TF1225A6 with TFS251
Free-Standing Overhead Shelving Unit	PTA280	PTA280	PTA281

- Requires a TFS201 or TFS251 Overhead Shelving Unit to Attach the Curtains
- Legacy table frames purchased prior to approximately March 2017 require the TFLA01 Adapter Kit. See the bottom of the page for compatibility details.

Thorlabs' Laser Curtain Kits include all components needed to mount laser curtains to a Nexus® Optical Table Workstation Frame that has an overhead shelving unit installed or directly to our Free-Standing Shelves. Kits that fully enclose a 1 m x 2 m, 1.2 m x 2 m, or 1.2 m x 2.5 m optical table are available. See the table to the right for complete compatibility information.

Laser Safety Accessories
Modular Laser Curtain System
Laser Curtain Kits
Laser Glasses
Laser Signs
Beam Blocks/Traps
Beam Shutters
Aluminum Protective Screens
Blackout Materials

Click to Enlarge
Magnetic Strips are Used to Connect Curtains for a Light-Tight Seal

Click to Enlarge
Kits Attach Directly to Our Free-Standing Shelves or Our Nexus Workstation's Overhead Shelves (Upgrade Kit Available for Workstations and Shelving Purchased Prior to March 2017)

Each kit provides approximately 2.2 m (7.2') of overhead clearance when mounted, has continuous tracking for uninterrupted movement of the curtains, and includes enough laser safety curtains to fully enclose the optical table. All laser safety curtains are floor length, flame retardant, 2.1 m (7.0') long, and include magnetic connectors for light-tight seals. Kits with item numbers ending in 'N' or 'W' are designed with a walkway between the optical table and curtain; see the drawings below for details. This additional space allows for work to continue while the laser curtains remain closed.

All laser safety curtains are certified to EN 12254:2010(E)*; certification levels can be found in the *Certifications* tab. Each curtain is made using a rubber compound fabric and includes a 380 mm x 280 mm document pocket on the front of the curtain. The back of the curtain includes the item #, safety compliance information, manufacturing date, and protection level information.

Curtain end stops as well as replacement wheel runners and T-nuts are also available below. End stops provide a hard stop for a laser safety curtain mounted on the track.

Click to Enlarge
Two Curtain Kits Connected to Enclose Two Tables

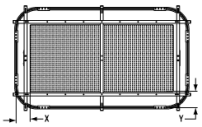
A Modular Laser Safety Curtain System that attaches to walls and ceilings is also available. This system features laser curtain panels, curtain tracks, track connectors, and mounting adapters that are each sold individually. The modular assembly imparts the ability to fully customize a system to fit most lab spaces using a standard system of components. Our laser curtain kits use many components from our modular system, including the laser curtains, curtain tracks, LPC01 track connectors, wheel runners, and T-nuts. All components from this modular system are fully compatible with our Laser Curtain Kits.

***DISCLAIMER**

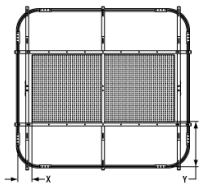
The curtain materials have been tested individually by a third party using EN specifications; see the *Certifications* tab for details. Due to manufacturing variances, mechanical wear, and laser damage, Thorlabs assumes no responsibility for laser curtain failure. Please consult your local laser safety specialist before purchasing to ensure that the curtain is suitable for your application. To minimize risk, inspect the curtain before each use and ensure that it is in excellent condition.

Laser Curtain Kit Options

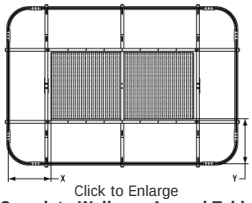
The simplified drawings below display the amount of work space provided within each kit option. Each depicts a top view of a laser safety curtain kit overlaid on an optical table. The width of each walkway is indicated by X and Y. See the tables below for the exact amount of workspace provided along the long edge and short edge of the optical table by each kit. Once a laser curtain kit is installed, it can be altered to remove or add a walkway; contact Tech Support for more details.



Click to Enlarge
No Walkway Around Table
TFL1x2x Curtain Frame Shown Above an Optical Table



Click to Enlarge
Partial Walkway Around Table
TFL1x2xN Curtain Frame Shown Above an Optical Table



Click to Enlarge
Complete Walkway Around Table
TFL1x2xW Curtain Frame Shown Above an Optical Table

CERTIFICATIONS

DISCLAIMER

The Laser Curtain materials have been tested individually by a third party using EN specifications. Due to manufacturing variances, mechanical wear, and laser damage, Thorlabs assumes no responsibility for laser curtain failure. Please consult your laser safety specialist before purchasing to ensure that these barriers are suitable for your application. To minimize risk, inspect each curtain before each use and ensure that it is in excellent condition.

EN Certification				
Certification Requirements	**Test Parameters**	**Damage Threshold**	**Maximum Spectral Transmittance Ratio**	**Certification Level[a]**
EN 12254: 2010 (E), 180 - 315 nm Range	266 nm (CW)	1×10^{7} W/m^2	1×10^{-10}	D AB10
EN 12254: 2010 (E), 180 - 315 nm Range	266 nm, 45 ms Pulses (FWHM), 10 Hz	3×10^{5} J/m^2	1×10^{-5}	I AB5
EN 12254: 2010 (E), 180 - 315 nm Range	266 nm, 5 ns Pulses (FWHM), 10 Hz	3×10^{5} J/m^2	1×10^{-4}	R AB4
EN 12254: 2010 (E), 180 - 315 nm Range	266 nm, 500 ps Pulses (FWHM), 20 Hz	3×10^{12} J/m^2	1×10^{-2}	M AB2
EN 12254: 2010 (E), 315 - 1050 nm Range	532 nm (CW)	1×10^{7} W/m^2	1×10^{-7}	D AB7
EN 12254: 2010 (E), 315 - 1400 nm Range	1064 nm, 2 ms Pulses (Square), 20 Hz	5×10^{4} J/m^2	1×10^{-7}	R AB7
EN 12254: 2010 (E), 315 - 1400 nm Range	1064 nm, 3 ms Pulses (Square), 10 Hz	5×10^{5} J/m^2	1×10^{-8}	I AB8
EN 12254: 2010 (E), 315 - 1400 nm Range	1064 nm, 500 ps Pulses (Square), 20 Hz	1.5×10^{4} J/m^2	1×10^{-8}	M AB8
EN 12254: 2010 (E), 1050 - 1400 nm Range	1070 nm (CW)	2.5×10^{6} W/m^2	1×10^{-5}	D AB5
EN 12254: 2010 (E), 1400 - 10 600 nm Range	10.6 µm (CW)	1×10^{6} W/m^2	1×10^{-4}	D AB3
EN 12254: 2010 (E), 1400 - 10 600 nm Range	10.6 µm, 3 ms Pulses (Square), 10 Hz	1×10^{6} J/m^2	1×10^{-4}	I AB4
EN 12254: 2010 (E), 1400 - 10 600 nm Range	10.6 µm, 100 ns Pulses (Square), 1 Hz	1×10^{4} J/m^2	1×10^{-4}	R AB2

- These certification levels are reproduced from EN 12254 and are included on the back of every curtain.

ASSEMBLY

Laser Safety Curtain Kit Assembly

Each kit requires an Overhead Shelving Unit or Free-Standing Overhead Shelf for assembly.

The animation below provides a simplified illustration of how the TFL1020 Curtain Kit is installed onto a TFS201

Overhead Shelf that was mounted onto a TF1020A7 Nexus® Table Frame. The steps in the assembly process are the same when mounting a kit onto a free-standing shelving unit. Enough laser curtains are included with each kit to fully enclose the optical table.

When Using a Nexus Workstation

- Or -

The animation shows the curtain kits being attached to the table frame using our TFLA01 adapter kit, which is needed to attach the kit to legacy shelving units. Our current shelving units (sold approximately after March 2017) have two Ø10 mm through holes in the top bar of each shelf support that allow the curtain kit to be directly connected using the included M8 bolts, without the use of the TFLA01. See the bottom of the page for details Note that installing the curtain kit using the TFLA01 requires temporarily removing some of the screws that support the overhead shelf, so be sure that the shelf and optical table are empty before beginning the curtain installation.

Complete assembly instructions are provided in the manual for each curtain kit, which can be accessed by clicking on the red Docs icon ( ) next to the item number below.

LASER SAFETY

Laser Safety and Classification

Safe practices and proper usage of safety equipment should be taken into consideration when operating lasers. The eye is susceptible to injury, even from very low levels of laser light. Thorlabs offers a range of laser safety accessories that can be used to reduce the risk of accidents or injuries. Laser emission in the visible and near infrared spectral ranges has the greatest potential for retinal injury, as the cornea and lens are transparent to those wavelengths, and the lens can focus the laser energy onto the retina.

Safe Practices and Light Safety Accessories

- Thorlabs recommends the use of safety eyewear whenever working with laser beams with non-negligible powers (i.e., > Class 1) since metallic tools such as screwdrivers can accidentally redirect a beam.
- Laser goggles designed for specific wavelengths should be clearly available near laser setups to protect the wearer from unintentional laser reflections.
- Goggles are marked with the wavelength range over which protection is afforded and the minimum optical density within that range.
- Laser Safety Curtains and Blackout Materials can prevent direct or reflected light from leaving the experimental setup area.
- Thorlabs' Enclosure Systems can be used to contain optical setups to isolate or minimize laser hazards.
- A fiber-pigtailed laser should always be turned off before connecting it to or disconnecting it from another fiber, especially when the laser is at power levels above 10 mW.
- All beams should be terminated at the edge of the table, and laboratory doors should be closed whenever a laser is in use.
- Do not place laser beams at eye level.
- Carry out experiments on an optical table such that all laser beams travel horizontally.
- Remove unnecessary reflective items such as reflective jewelry (e.g., rings, watches, etc.) while working near the beam path.
- Be aware that lenses and other optical devices may reflect a portion of the incident beam from the front or rear surface.
- Operate a laser at the minimum power necessary for any operation.
- If possible, reduce the output power of a laser during alignment procedures.
- Use beam shutters and filters to reduce the beam power.
- Post appropriate warning signs or labels near laser setups or rooms.
- Use a laser sign with a lightbox if operating Class 3R or 4 lasers (i.e., lasers requiring the use of a safety interlock).
- Do not use Laser Viewing Cards in place of a proper Beam Trap.

Laser Classification

Lasers are categorized into different classes according to their ability to cause eye and other damage. The International Electrotechnical Commission (IEC) is a global organization that prepares and publishes international standards for all electrical, electronic, and related technologies. The IEC document 60825-1 outlines the safety of laser products. A description of each class of laser is given below:

Class	Description	Warning Label
1	This class of laser is safe under all conditions of normal use, including use with optical instruments for intrabeam viewing. Lasers in this class do not emit radiation at levels that may cause injury during normal operation, and therefore the maximum permissible exposure (MPE) cannot be exceeded. Class 1 lasers can also include enclosed, high-power lasers where exposure to the radiation is not possible without opening or shutting down the laser.	
1M	Class 1M lasers are safe except when used in conjunction with optical components such as telescopes and microscopes. Lasers belonging to this class emit large-diameter or divergent beams, and the MPE cannot normally be exceeded unless focusing or imaging optics are used to narrow the beam. However, if the beam is refocused, the hazard may be increased and the class may be changed accordingly.	

2	Class 2 lasers, which are limited to 1 mW of visible continuous-wave radiation, are safe because the blink reflex will limit the exposure in the eye to 0.25 seconds. This category only applies to visible radiation (400 - 700 nm).	
2M	Because of the blink reflex, this class of laser is classified as safe as long as the beam is not viewed through optical instruments. This laser class also applies to larger-diameter or diverging laser beams.	
3R	Lasers in this class are considered safe as long as they are handled with restricted beam viewing. The MPE can be exceeded with this class of laser, however, this presents a low risk level to injury. Visible, continuous-wave lasers are limited to 5 mW of output power in this class.	
3B	Class 3B lasers are hazardous to the eye if exposed directly. However, diffuse reflections are not harmful. Safe handling of devices in this class includes wearing protective eyewear where direct viewing of the laser beam may occur. In addition, laser safety signs lightboxes should be used with lasers that require a safety interlock so that the laser cannot be used without the safety light turning on. Class-3B lasers must be equipped with a key switch and a safety interlock.	
4	This class of laser may cause damage to the skin, and also to the eye, even from the viewing of diffuse reflections. These hazards may also apply to indirect or non-specular reflections of the beam, even from apparently matte surfaces. Great care must be taken when handling these lasers. They also represent a fire risk, because they may ignite combustible material. Class 4 lasers must be equipped with a key switch and a safety interlock.	
All class 2 lasers (and higher) must display, in addition to the corresponding sign above, this triangular warning sign		

Laser Curtain Kit for a 1.0 m x 2.0 m Optical Table

- Designed to Enclose 1.0 m x 2.0 m (3' x 6') Optical Tables
- Attach Directly to an Optical Table Workstation with a TFS201 Overhead Shelving Unit
- Attach Directly to a PTA280 Free-Standing Overhead Shelving Unit

For step-by-step instructions detailing how to assemble our Laser Safety Curtain Kits, please view the manual, which can be found by clicking the red docs icon ( ) below. For additional support, please contact Tech Support. It is recommended that two people work together to assemble these kits.

When Using a Nexus Workstation

- Or -

Laser Curtain Kit (Click for Drawing)	TFL1020 (No Walkway)		TFL1020N (Partial Walkway)		TFL1020W (Complete Walkway)	
Space Between Curtain and Table[a]	X	Y	X	Y	X	Y
1 m x 2 m Table	84.3 mm (3.12")	183.7 mm (7.23")	84.3 mm (3.12")	583.7 mm (22.98")	506.5 mm (19.94")	583.7 mm (22.98")
3' x 6' Table		226.5 mm (8.92")		626.5 mm (24.66")		626.5 mm (24.66")

- a. X corresponds to the space along the short side of the table and Y corresponds to space along the long side of the table.

Kit Components

- Laser Safety Curtains:
  - TFL1020: LPCP57 (x1) and LPCP107 (x2)
  - TFL1020N: LPCP57 (x1), LPCP77 (x1), and LPCP107 (x2)
  - TFL1020W: LPCP57 (x2), LPCP77 (x1), and LPCP107 (x2)
- Laser Curtain Tracks, LPC01 Track Connectors, Wheel Runners, and T-Nuts
- Support Frame with Adapters to Attach to Nexus Frame or Free-Standing Shelf
- All Hardware Needed to Construct the Curtain System
- Required Hex Keys and Wrenches

Note that each system will ship in a 2.2 m x 1.5 m x 0.6 m (7.2' x 4.9' x 2.0') crate.

Part Number	Description	Price	Availability
TFL1020	Laser Curtain Kit for 1 m x 2 m Nexus™ Optical Table, No Walkway	$6,140.00	Lead Time
TFL1020N	Laser Curtain Kit for 1 m x 2 m Nexus™ Optical Table, Partial Walkway	$7,930.00	Today
TFL1020W	Laser Curtain Kit for 1 m x 2 m Nexus™ Optical Table, Complete Walkway	$8,900.00	Today

Laser Curtain Kit for a 1.2 m x 2.0 m Optical Table

- Designed to Enclose 1.2 m x 2.0 m (4' x 6') Optical Tables
- Attach Directly to an Optical Table Workstation with a TFS201 Overhead Shelving Unit
- Attach Directly to a PTA280 Free-Standing Overhead Shelving Unit

When Using a Nexus Workstation

- Or -

Laser Curtain Kit (Click for Drawing)	TFL1220 (No Walkway)		TFL1220N (Partial Walkway)		TFL1220W (Complete Walkway)	
Space Between Curtain and Table[a]	X	Y	X	Y	X	Y
1.2 m x 2 m Table		186.7 mm		586.7 mm		586.7 mm

	106.5 mm (4.19")	(7.35")	106.5 mm (4.19")	(23.10")	506.5 mm (19.94")	(23.10")
4' x 6' Table		177.1 mm (6.97")		577.1 mm (22.72")		577.1 mm (22.72")

- a. X corresponds to the space along the short side of the table and Y corresponds to space along the long side of the table.

Kit Components

- Laser Safety Curtains:
  - TFL1220: LPCP57 (x2), LPCP77 (x1), and LPCP107 (x1)
  - TFL1220N: LPCP57 (x2), LPCP77 (x1), and LPCP107 (x2)
  - TFL1220W: LPCP57 (x1), LPCP77 (x2), and LPCP107 (x2)
- Laser Curtain Tracks, LPC01 Track Connectors, Wheel Runners, and T-Nuts
- Support Frame with Adapters to Attach to Nexus Frame or Free-Standing Shelf
- All Hardware Needed to Construct the Curtain System
- Required Hex Keys and Wrenches

For step-by-step instructions detailing how to assemble our Laser Safety Curtain Kits, please view the manual, which can be found by clicking the red docs icon ( ) below. For additional support, please contact Tech Support. It is recommended that two people work together to assemble these kits.

Note that each system will ship in a 2.2 m x 1.5 m x 0.6 m (7.2' x 4.9' x 2.0') crate.

Part Number	Description	Price	Availability
TFL1220	**Laser Curtain Kit for 1.2 m x 2 m Nexus™ Optical Table, No Walkway**	**$7,000.00**	**Lead Time**
TFL1220N	**Laser Curtain Kit for 1.2 m x 2 m Nexus™ Optical Table, Partial Walkway**	**$8,920.00**	**Today**
TFL1220W	**Laser Curtain Kit for 1.2 m x 2 m Nexus™ Optical Table, Complete Walkway**	**$9,600.00**	**Today**

Laser Curtain Kit for a 1.2 m x 2.5 m Optical Table

- Designed to Enclose 1.2 m x 2.5 m (4' x 8') Optical Tables
- Attach Directly to an Optical Table Workstation with a TFS251 Overhead Shelving Unit
- Attach Directly to a PTA281 Free-Standing Overhead Shelving Unit

When Using a Nexus Workstation

\- Or -

Laser Curtain Kit (Click for Drawing)	TFL1225 (No Walkway)		TFL1225N (Partial Walkway)		TFL1225W (Complete Walkway)	
Space Between Curtain and Table[a]	**X**	**Y**	**X**	**Y**	**X**	**Y**
1.2 m x 2.5 m Table	102.0 mm (4.02")	183.7 mm (7.23")	102.0 mm (4.02")	583.7 mm (22.98")	501.0 mm (19.72)	583.7 mm (22.98")
4' x 8' Table		174.1 mm (6.85")		574.1 mm (22.60")		574.1 mm (22.60")

- a. X corresponds to the space along the short side of the table and Y corresponds to space along the long side of the table.

Kit Components

- Laser Safety Curtains:
  - TFL1225: LPCP57 (x1), LPCP77 (x1), and LPCP107 (x2)
  - TFL1225N: LPCP57 (x2), LPCP77 (x1), and LPCP107 (x2)
  - TFL1225W: LPCP57 (x3), LPCP77 (x1), and LPCP107 (x2)
- Laser Curtain Tracks, LPC01 Track Connectors, Wheel Runners, and T-Nuts
- Support Frame with Adapters to Attach to Nexus Frame or Free-Standing Shelf
- All Hardware Needed to Construct the Curtain System
- Required Hex Keys and Wrenches

For step-by-step instructions detailing how to assemble our Laser Safety Curtain Kits, please view the manual, which can be found by clicking the red docs icon ( ) below. For additional support, please contact Tech Support. It is recommended that two people work together to assemble these kits.

Note that each system will ship in a crate that is approximately 2.82 m x 1.5 m x 0.85 m (9.2' x 4.9' x 2.8').

Part Number	Description	Price	Availability
TFL1225	**Laser Curtain Kit for 1.2 m x 2.5 m Nexus™ Optical Table, No Walkway**	**$8,000.00**	**Lead Time**
TFL1225N	**Laser Curtain Kit for 1.2 m x 2.5 m Nexus™ Optical Table, Partial Walkway**	**$8,950.00**	**Today**
TFL1225W	**Laser Curtain Kit for 1.2 m x 2.5 m Nexus™ Optical Table, Complete Walkway**	**$9,910.00**	**Today**

Curtain End Stops

- Provides a Hard Stop for Laser Safety Curtain Panels
- Attaches to the Side Channels of the Curtain Track Using the Provided M4 Cap Screw and T-Nut
- Can be Placed at Any Location Along the Curtain Track

Included Hardware
M4 Cap Screw (x2)
M4 Drop-In T-Nut (x2)
M4 Washer (x2)

Click to Enlarge
End Stop Shown Attached to the Side of a Curtain Track to Stop the Movement of the Wheel Runners

The LPC05 is used to provide a hard stop for a laser curtain mounted to a track. As shown in the image to the right, where the end stop is being used in our Modular Laser Curtain System, it is designed to attach to the side channel of the curtain track using the provided drop-in nut and M4 cap screw. The drop-in nut can be placed into the channel from anywhere on the track; it does not need to be slid in on the end of the track.

The curtain's wheel runner is in place, the end stop can be positioned with the bottom slot around the hook of the wheel runner. The end stop and held wheel runner can then be adjusted along the length of the curtain track by loosening the M4 cap screw that was securing the end stop in place.

Part Number	Description	Price	Availability
LPC05	Laser Curtain End Stops (Pack of 2)	$19.28	Today

Replacement Wheel Runners

The LPC07 contains a pack of 10 replacement wheel runners that are used to attach the laser safety curtains to a curtain track. First, insert the wheels of the LPC07 into the bottom channel of the curtain track. Then slide the hook of the wheel runner into the eyelet of the laser curtain.

Please note that Thorlabs' laser safety curtains come with one wheel runner for each eyelet in the panel.

Click to Enlarge
Wheel runners shown being added to a curtain track. Each laser curtain includes one wheel runner for each eyelet.

Part Number	Description	Price	Availability
LPC07	Replacement Wheel Runners for Laser Curtain System (Pack of 10)	$68.85	Today

T-Nuts

The LPC06 contains a pack of 10 T-Nuts that can be used in the top channel of the laser curtain tracks. These T-Nuts effectively add M8 tapped holes to the laser curtain track, which allows the track connectors, mounting rods, and wall/ceiling mounting brackets in our modular curtain system to be mounted. They can also be used to replace the T-Nuts included in our Laser Curtain Kits to connect the tracks to the main support frame.

Please note that T-Nuts are provided with each laser curtain accessory.

Click to Enlarge
M8-Threaded T-Nuts are Used in the top Channel of the Curtain Tracks to Attach Mounting Adapters and Track Connectors

Part Number	Description	Price	Availability
LPC06	T-Nuts for Laser Curtain Track, M8 Tapped Hole (Pack of 10)	$15.81	Today