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# THORLABS

## OPTICAL TABLE AND ACTIVE ISOLATOR LEG BUNDLES

- ▶ 210 mm (8.3") or 310 mm (12.2") Thick Nexus™ Optical Table
- ▶ Four Self-Leveling Active Isolation Table Legs
- ▶ Optional Sealed Mounting Holes



## OVERVIEW

## Features

- Bundle Includes Nexus Optical Table and Active Isolator Table Legs
- Table Sizes from 4' x 6' (1.2 m x 2 m) to 4.8' x 10' (1.5 m x 3 m) Available
- 600 mm (23.6") or 700 mm (27.5") Tall Legs for a Standard 910 mm (35.8") Tabletop Height
- Every Table Individually Optimized, Tested, and Shipped with Test Data Certificate
- 1/2" (12.5 mm) Hole Border for Maximum Usable Area
- Optional Sealed Mounting Holes

Thorlabs' Nexus™ optical table kits feature our Nexus optical tabletops and our active isolation table legs. Kits are available with table sizes from 4' x 6' (1.2 m x 2 m) to 4.8' x 10' (1.5 m x 3 m) and table thicknesses of 210 mm (8.3") or 310 mm (12.2"). They are paired with 600 mm (23.6") or 700 mm (27.5") tall legs for a standard 910 mm (35.8") tabletop height.

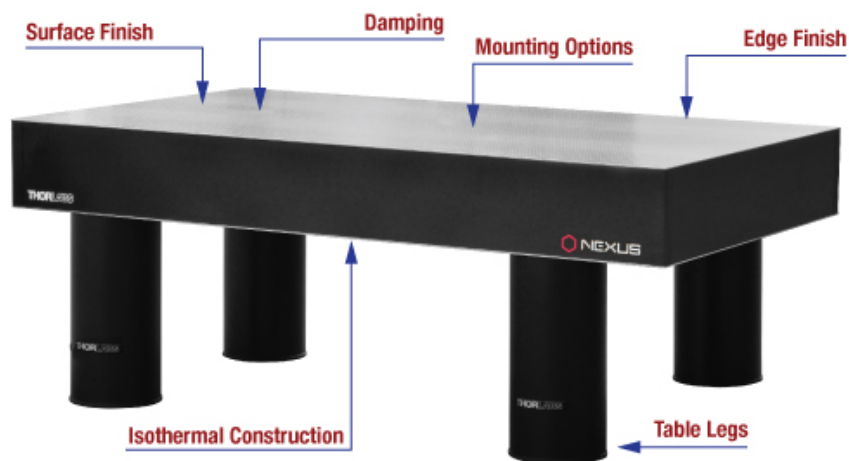
## Tabletop

Nexus tabletops feature all-steel construction, excellent thermal stability, and broadband damping optimized for each table size. The 5 mm thick stainless steel top and bottom skins have a precision-machined matte finish with surface flatness of  $\pm 0.1$  mm over any 1 m<sup>2</sup> area. The table has 1/4"-20 (M6) mounting holes on 1" (25 mm) centers with a 0.5" (12.5 mm) border at the edge of the table. Optional sealed mounting holes are available.

## Support Legs

Thorlabs' active vibration isolation optical table supports contain an isolation system that effectively isolates the optical table from vertical and horizontal vibrations throughout the critical 3 to 50 Hz frequency range since most common large-amplitude sources of vibrations found in laboratories vibrate within this range of frequencies. The vertical vibrations are isolated from the optical table by a dual-chamber pneumatic isolation system that requires a constant source of compressed air, such as an air compressor (sold separately). If the source of compressed air is removed, the optical table will lower until it securely rests on the large-diameter cylindrical optical table supports, albeit the table will no longer be isolated from floor vibrations. For all table kits sold on this page, kits ending with HK and CK are paired with our PTS603 700 mm (27.5") tall legs, and kits ending with WK and QK are sold with our PTS602 600 mm (23.6") tall legs.

See the *Nexus Guide* tab for a complete overview of the Nexus optical tables product line.



[Click for Details](#)

## Nexus™ Optical Tables and Breadboards

## One High Quality Level

Nexus is a single high-quality grade of tables and breadboards manufactured in various sizes by Thorlabs. They are suitable for photonics, imaging, and microscopy applications and provide quality and vibration isolation performance that exceeds the highest level of our former product line. Each size is individually optimized, and each table ships with a unique test data certificate. See the *Vibration Isolation* and *Construction* tabs for more details.

## More Options

See the *Nexus Guide* tab for a complete overview of our optical tables product line.

## Nexus Optical Tables Quick Links

210 mm (8.3") Thick	310 mm (12.2") Thick
210 mm (8.3") Thick, Sealed Holes	310 mm (12.2") Thick, Sealed Holes
304L Nonmagnetic Steel	Optical Table and Leg Kits
All Nexus Breadboards	

## TABLE SPECS

Specifications		
<b>Construction</b>		
Table Thickness	210 mm (8.3") or 310 mm (12.2")	
Flatness	±0.1 mm (±0.004") Over Any 1 m <sup>2</sup>	
Construction	Symmetrical Isotropic Construction in All Axes	
Top and Bottom Plates	5 mm (3/16") Thick Stainless Steel, 430 Grade Working Surface	
Core Construction	High-Density Plated Steel Honeycomb, 0.26 mm Thick	
Damping	Proprietary Optimized Broadband Damping	
Side Panels	Rigid Steel Box Section	
Side Trim Finish	Matte Black Linoleum, 2 mm Inset from Table Surface	
Top Surface Finish	Machined Matte Finish	
<b>Mounting Holes</b>	<b>Imperial</b>	<b>Metric</b>
Threads and Spacing	1/4"-20 Tapped Holes on 1" Centers	M6 Tapped Holes on 25 mm Centers
Distance from Edge to First Holes	0.5" from Table Edge on all Sides	12.5 mm from Table Edge on all Sides
Maximum Screw Depth	Standard Holes: Total Table Thickness Minus 5 mm (23.5 mm for Outer Border Holes) Sealed Holes: 25 mm (23.5 mm for Outer Border Holes)	
<b>Performance<sup>a</sup></b>		
Maximum Dynamic Deflection Coefficient <sup>b</sup>	<0.4 x 10 <sup>-3</sup>	
Maximum Relative Tabletop Motion <sup>b</sup>	<0.14 nm (5.5 x 10 <sup>-9</sup> in.)	
Deflection Under Load (Stiffness) <sup>b, c</sup>	210 mm (8.3") Thick Table: <1.7 µm for a 150 kg (330 lb) Load 310 mm (12.2") Thick Table: <1.2 µm for a 150 kg (330 lb) Load	

- Measured on a 3' x 6' x 210 mm (W x L x H) table, load placed centrally, load footprint 300 mm x 300 mm (11.8" x 11.8").
  - See below for definitions.
- Measured on a 3' x 6' (W x L) table, load placed centrally, load footprint 300 mm x 300 mm (11.8" x 11.8").

**Unpackaged Table Weights****Unpacked Imperial Table Dimensions & Weight**

Item #	Dimensions (W x L x H)	Weight	Mass
T46HK	4' x 6' x 8.3"	932.6 lbs	423 kg
T48HK	4' x 8' x 8.3"	1175 lbs	533 kg
T48WK	4' x 8' x 12.2"	1307 lbs	593 kg
T510WK	4.8' x 10' x 12.2"	1786 lbs	810 kg

**Unpacked Metric Table Dimensions & Mass**

Item #	Dimensions (W x L x H)	Mass	Weight
T1020CK	1 m x 2 m x 210 mm	397 kg	875.2 lbs
T1220CK	1.2 m x 2 m x 210 mm	445 kg	981.1 lbs
T1225QK	1.2 m x 2.5 m x 310 mm	600 kg	1323 lbs
T1530QK	3 m x 1.5 m x 310 mm	816 kg	1799 lbs

**Dynamic Deflection Coefficient**

The dynamic deflection coefficient is a figure of merit for optical tables that is derived from the measurement of the optical table's compliance. Physically, the dynamic deflection coefficient can be interpreted as a measure of the table's motion when subjected to vibrations.

$$\text{Dynamic Deflection Coefficient} = \sqrt{\frac{Q}{f^3}}$$

where Q is the amplification of the tables response to a vibrational source at a specific frequency (f) of the optic table. Q is calculated by dividing the compliance at the optical table resonance frequency by the theoretical compliance of an ideal rigid body. The maximum dynamic deflection coefficient is usually due to the response of the optical table at its first natural resonance frequency. Nexus optical tables feature proprietary optimized damping mechanisms to limit the value of Q at the table's natural resonances.

**Relative Tabletop Motion**

The relative tabletop motion is the relative displacement of any two points on the optical table surface due to environmental vibrations transmitted through the optical table supports. The maximum relative tabletop motion is the worst case relative displacement; for a rectangular optical table, the two points that produce the worst case results are generally located at the corners of the optical table. The measurement reported in the specifications table was taken in a quiet laboratory environment (PSD <10<sup>-9</sup> g<sup>2</sup>/Hz). The optical table supports used to support the optical table had a transmissibility less than 0.01 for frequencies greater than 10 Hz.

### **Deflection Under Load**

The deflection under load is a measure of the stiffness of the optical table. The stiffness of an optical table can be quantified by placing a load at the center of the optical table and measuring the deflection of the optical table surface, which will have a parabolic shape. The specification reported in the table is the relative vertical displacement between the center and edge of the optical table.

## SUPPORT SPECS

## Specification Data

Active Vibration Isolators	
Vertical Resonant Frequency	1.25 Hz
Horizontal Resonant Frequency	1.0 Hz
Vertical Transmissibility at Resonance	10 dB
Horizontal Transmissibility at Resonance	12 dB
Vertical Transmissibility at 5Hz	-20 dB (90%)
Horizontal Transmissibility at 5Hz	-24 dB (94%)
Vertical Transmissibility at 10Hz	-32.5 dB (97.5%)
Horizontal Transmissibility at 10Hz	-30 dB (97%)
Maximum Load Capacity (set of four)	5500 lb (2500 kg)
Height Adjustment Range	-0.51", +0.2" (-13 mm, +5 mm)
Self Leveling Repeatability	±0.02" (0.5 mm)
Height	23.6" and 27.5" (600 and 700 mm)
Air Pressure (Maximum)	80 psi (551 kPa)
Finish	Black Paint

\*The specification data above was measured under a 600 kg load (24% of maximum).

### Transmissibility

An optical table system is subjected to continuous vibrational impulses from the laboratory floor. These vibrations may be caused by large machinery within the building or even by wind or traffic-excited building resonances (swaying). Transmissibility is a measure of the isolators efficiency at damping out these vibrations and is defined as the ratio of the amplitude of the transmitted vibration to that of the forcing vibration.

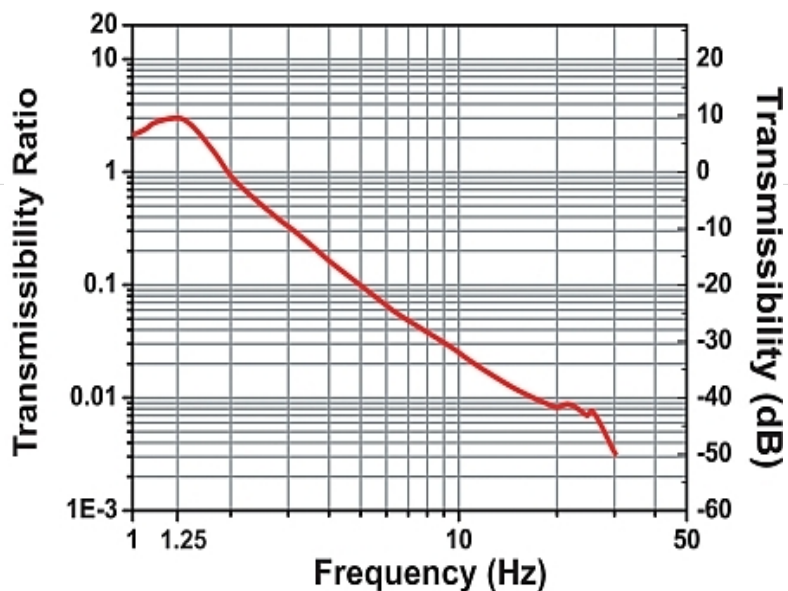
Other common ways to represent this ratio are:

**Percent of isolation** = (1 - transmissibility ratio) x 100 or

**Isolation in dB** = 20 x log(transmissibility ratio).

At resonance, the system amplifies the input vibration so that the transmissibility ratio is greater than one. The transmissibility ratio is dependent on several factors; for instance the ratio will be dependent on the load placed on the isolators. Remember that the isolators only damp vibrations transmitted through the legs of the frame from the floor; air handling systems are often a significant source of vibration that is transmitted to the work surface through the air. As a result, in applications particularly sensitive to vibrations a comprehensive evaluation of the environment is recommended before choosing a vibration isolation platform. For more information on this topic please see our Vibration Isolation Tutorial.

#### Vertical Transmissibility Plot



#### Common Vibration Sources

## TABLE PERFORMANCE

## Optimized Damping

### Broadband Damping

The most important feature of an optical table or breadboard is its resonant frequency. Since resonant frequency and vibration amplitude are inversely related, the resonant frequency should be as high as possible to minimize vibration intensity. Nexus tables and breadboards are broadband damped over a specific range of frequencies. For improved performance, the damping is optimized for each size of table and breadboard offered.

We have performed extensive testing to optimize the thickness/size ratio of our tables. Larger sized tables (at least 10' or 3 m long) are offered with a standard 12.2" (310 mm) thickness for stability. Smaller sizes are available in both 8.3" (210 mm) and 12.2" (310 mm) thicknesses, and can be custom ordered in larger sizes.

## Compliance

The most widely used transfer function for the vibrational response of an optical table is compliance. In the case of a constant (static) force, compliance is defined as the ratio of the linear or angular displacement to the magnitude of the applied force. In the case of a dynamically varying force (vibration), compliance is defined as the ratio of the excited vibrational amplitude (angular or linear displacement) to the amplitude of the force causing the vibration. Any deflection of the tabletop is evident by the change in relative position of the components mounted on the table surface. Therefore, by definition, the lower the compliance value is, the closer the optical table is to meeting the primary goal of optical table design: minimized deflection. Compliance is frequency dependent and is measured in units of displacement per unit force (meters per Newton).

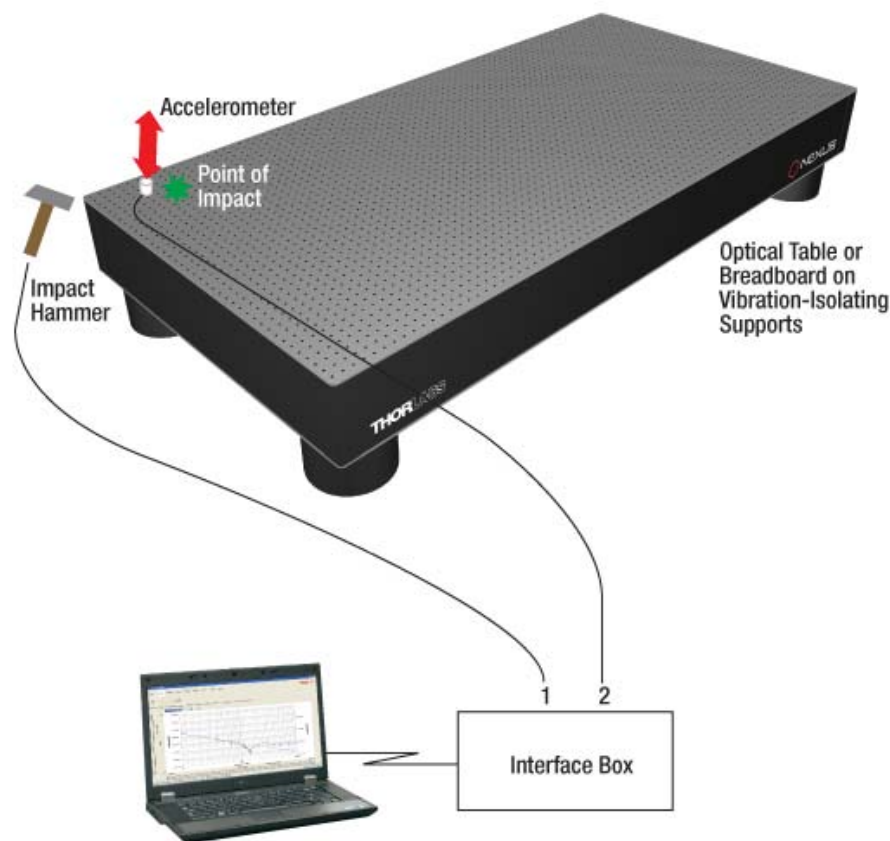
See the Vibration Isolation Tutorial for more information on compliance.

### Compliance Measurement Procedure

An impulse hammer is used to apply a measured force to the top surface of the table or breadboard, and transducers attached to the surface detect the resultant vibrations (see diagram to the right). The signals from the transducers are interpreted by the analyzer and used to produce a frequency response spectrum (i.e., a compliance curve). During the development phase of an optical table, compliance curves are recorded at many points on the tabletop; however, the compliance is always greatest at the corners. The compliance curves and data published by Thorlabs are taken with the sensor located approximately 6" (150 mm) from the corner of the tabletop (closer to the edge for small breadboards), with the point of impact just inboard of the sensor. This test location represents the worst case data.

### Unique Test Data Certificate

Each individual Nexus product is tested and shipped with a unique test data certificate and compliance curve. This provides more accurate data compared to the industry standard of using a single size-specific compliance curve to represent the entire product line. The compliance curves and data published by Thorlabs are from sensors located on the corner of the table and therefore represent the worst case data.



Click to Enlarge  
Compliance Test Schematic



Click to Enlarge  
Nexus Table Compliance Testing










### Test Results

#### 210 mm Thick Tables

Item #	Table Size (W x L x H)	Compliance Curve (Click to View) <sup>a</sup>
T36H / T36V	3' x 6' x 8.3"	
T38H / T38V	3' x 8' x 8.3"	
T46H / T46V	4' x 6' x 8.3"	
T48H / T48HN / T48V / T48VN	4' x 8' x 8.3"	
T58H / T58V	4.8' x 8' x 8.3"	
T1020C / T1020P	1 m x 2 m m 210 mm	
T1025C / T1025P	1 m x 2.5 m x 210 mm	
T1220C / T1220P	1.2 m x 2 m x 210 mm	
T1225C / T1225CN / T1225P / T1225PN	1.2 m x 2.5 m x 210 mm	
T1525C / T1525P	1.5 m x 2.5 m x 210 mm	

#### 310 mm Thick Tables

Item #	Table Size (W x L x H)	Compliance Curve (Click to View) <sup>a</sup>
T36J / T36W	3' x 6' x 12.2"	
T38J / T38W	3' x 8' x 12.2"	
T46J / T46W	4' x 6' x 12.2"	
T48J / T48W	4' x 8' x 12.2"	
T410J / T410W	4' x 10' x 12.2"	
T58J / T58W	5' x 8' x 12.2"	
T510J / T510W	5' x 10' x 12.2"	

Item #	Table Size (W x L x H)	Compliance Curve (Click to View) <sup>a</sup>
T514J / T514W	5' x 14' x 12.2"	
T1020D / T1020Q	1 m x 2 m x 310 mm	
T1025D / T1025Q	1 m x 2.5 m x 310 mm	
T1220D / T1220Q	1.2 m x 2 m x 310 mm	
T1225D / T1225Q	1.2 m x 2.5 m x 310 mm	
T1230D / T1230Q	1.2 m x 3 m x 310 mm	
T1525D / T1525Q	1.5 m x 2.5 m x 310 mm	
T1530D / T1530Q	1.5 m x 3 m x 310 mm	
T1540D / T1530Q	1.5 m x 4 m x 310 mm	

- The compliance curves here are typical, and slight variations may occur between individual tables. Each table is individually tested before shipment and includes a certificate with the individual test data and compliance curve (see *Unique Test Data Certificate* section, above).

Note: Compliance data will be available soon for models with a greyed out plot icon. Compliance data is measured for each table, and thus will be included with these models upon purchase.



## TABLE CONSTRUCTION

## Nexus Tables and Breadboards Construction Details

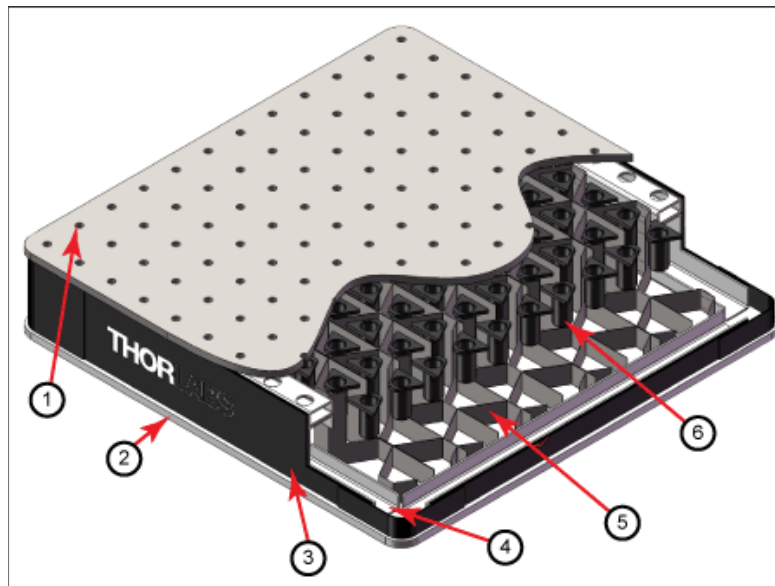
## Precision Steel Construction for Thermal Stability

## All Steel Construction

Thorlabs' Nexus tables and breadboards feature all-steel construction, including 5 mm thick top and bottom skins and a 0.26 mm thick precision formed and welded steel honeycomb core. The core is geometrically formed using accurate pressing tools, and geometric pitch is retained by using welded flat shims. The honeycomb core in our Nexus tables and breadboards extends from the top skin to the bottom skin without intermediate layers, leading to a stiffer, more thermally stable product.

## Thermal Stability

The key aspect of the thermally stable Nexus design is symmetrical isotropic steel construction in all axes. Steel components expand and contract similarly, maintaining flatness during changes in temperature. The steel core extends from top to bottom skin without intermediate plastic or aluminum spill management structures that reduce the overall stiffness of the product and introduce a higher coefficient of thermal expansion. Steel side panels are used rather than wood, which can introduce environmental instability due to susceptibility to moisture.

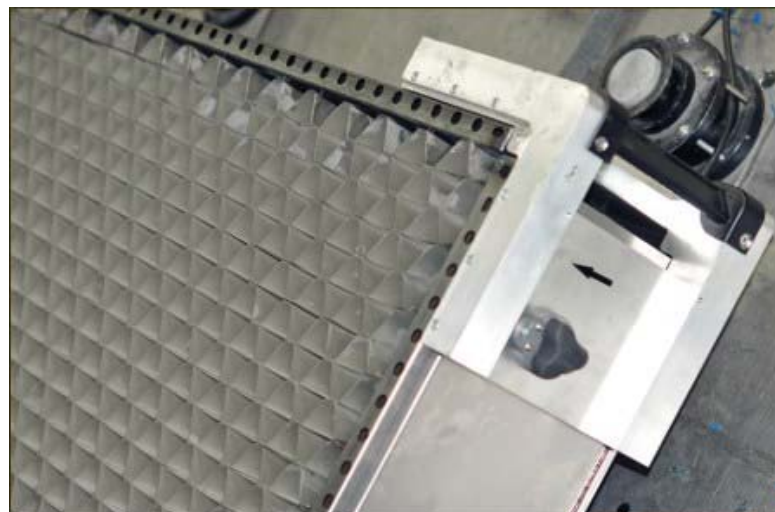


[Click to Enlarge](#)

Nexus Table / Breadboard Cross Section, showing the (1) Top Skin, (2) Bottom Skin, (3) Side Finishing Trim, (4) Side Panels, (5) Honeycomb Core, and (6) Optional Sealing Cups

## Nexus Components

Note: For Illustrative Purposes Only. Not a representation of the Nexus Tables Construction Sequence



[Click to Enlarge](#)

Honeycomb Core of a Nexus Table During Manufacturing

## Machined Finish

## Automated Finishing Process

Our Nexus tables and breadboards feature an automated orbital machined matte finish that is significantly smoother and flatter than our previous product line. The improved surface finish achieves  $\pm 0.1$  mm ( $\pm 0.004$ " ) flatness over  $1 \text{ m}^2$  ( $11 \text{ ft}^2$ ), providing a solid contact surface for mounting components and reducing the need for stoning the top surface.

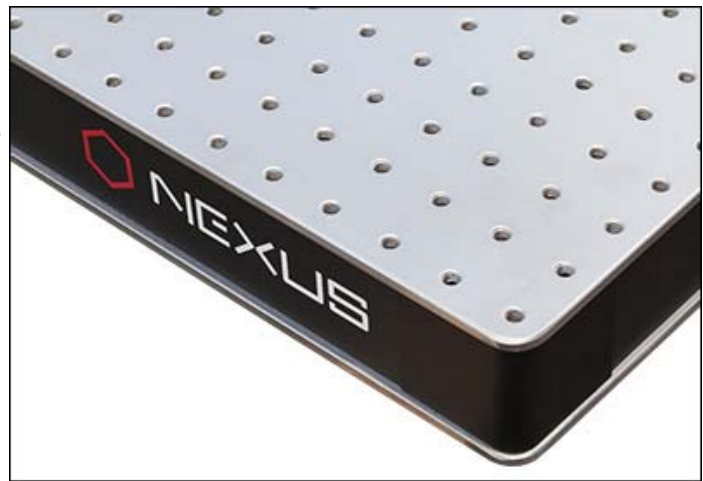
## Large Radii Corners

Large radius corners are incorporated into the design, resulting in less pointed edges for lab safety.

## Minimized Contamination

### Sealed edges with anti-static packaging

This optional finishing and packaging service is suitable for customers that want to minimize the presence of airborne contaminants on the interior and exterior surfaces of the table or breadboard. The gap-free edge panel construction prevents dust from entering the product. The anti-static packaging, which includes a metallic foil inner layer protected by a heat shrink film outer cover, reduces static charge and minimizes the attraction of dust to the product.



[Click to Enlarge](#)

Nexus Tables and Breadboards Feature a Precision Machined Matte Finish, Holes that Extend to the Edge of the Tabletop, and Large Radius Corners

## Flexible Mounting Options

### Individually Tapped, Countersunk Mounting Holes

Prior to bonding the components of the table, each mounting hole in the top surface is tapped and slightly countersunk to ensure that components mounted to the table sit flat. The mounting holes are then cleaned and sealed on the bottom with vinyl film discs (non-sealed models) or sealing cups (sealed hole models, see below). This ensures that each hole is completely free from any adhesive material. The vinyl film is easily punctured when using a hole for the first time. Cap screws can be finger tightened into the mounting holes of all Nexus tables and breadboards.

### Reduced Hole Pattern Border

Our new top surface hole patterns extend to the edge of the table or breadboard with only a 12.5 mm (0.5") border, equal to half of a hole spacing. This increases the usable area of the table and improves mounting option flexibility.

### Increased Screw Depth and Optional Sealed Holes

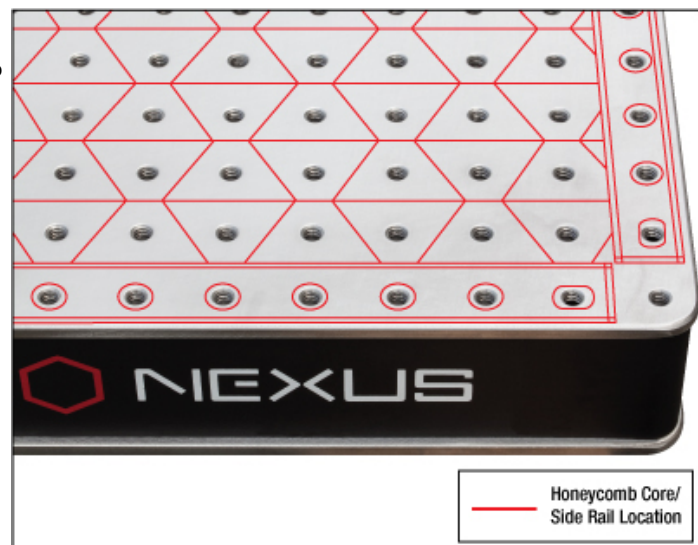
Our custom-designed core maker produces precision formed and welded honeycomb core strips. The core is shaped and installed so that it does not intersect with any screw holes (see photo below, to right), allowing screws to be inserted far into the table, all the way to the bottom skin (for non-sealed-hole models). See the *Specs* tab for specific screw depth specifications, including outer border holes.

### Sealed Mounting Holes

Tables and breadboards can be manufactured with nylon sealing cups glued to the underside of the top skin (see photo below) for liquid spill management. Sealed hole tables are available in all sizes and thicknesses, and the maximum screw depth is 1" (25.4 mm).

### Mounting Holes on the Bottom Skin

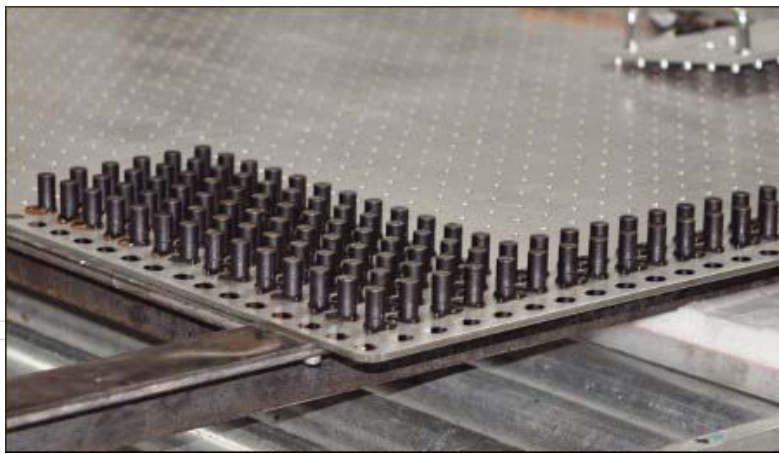
Our breadboards feature at least four mounting holes in the base skin, permitting the secure attachment of standard or vibration isolating feet and allowing more flexibility for integrating breadboards onto tables or into setups in addition to using breadboard stands..



[Click to Enlarge](#)

Nexus breadboard showing the location of the honeycomb core and side panels, which do not intersect with any screw holes.

When sealing cups are not present, the maximum screw depth is equivalent to the thickness of the table or breadboard minus 5 mm. Sealed holes have a screw depth of 1" (25.4 mm) for both tables and breadboards. Border holes are 13.5 mm for breadboards and 23.5 mm for tables.



Click to Enlarge  
Nylon Sealing Cups Installation During Manufacturing

### Imperial Optical Table / Active Leg Kits, Shipped from the US

Part Number	
T46HK	Nexus Optical Table, 4' x 6' x 8.3"
T48HK	Nexus Optical Table, 4' x 8' x 8.3"
T48WK	Nexus Optical Table with Sealed H

### Imperial Optical Table / Active Leg Kits, Built to Order, Shipped from the UK

Part Number	Description	Price	Availability
T510WK	Nexus Optical Table with Sealed Holes, 4.8' x 10' x 12.2", with 600 mm Tall Active Isolator Legs	€ 9.936,03	Lead Time

### Metric Optical Table / Active Leg Kits, Shipped from the UK

Part Number	Description	Price	Availability
T1020CK	Nexus Optical Table, 1 m x 2 m x 210 mm, with 700 mm Tall Active Isolator Legs	€ 4.954,64	Lead Time
T1220CK	Nexus Optical Table, 1.2 m x 2 m x 210 mm, with 700 mm Tall Active Isolator Legs	€ 5.530,90	Lead Time
T1225QK	Nexus Optical Table with Sealed Holes, 1.2 m x 2.5 m x 310 mm, with 600 mm Tall Active Isolator Legs	€ 7.357,06	Lead Time
T1530QK	Nexus Optical Table with Sealed Holes, 3 m x 1.5 m x 310 mm, with 600 mm Tall Active Isolator Legs	€ 9.936,03	Lead Time

Visit the *Optical Table and Active Isolator Leg Bundles* page for pricing and availability information:  
[http://www.thorlabs.de/newgrouppage9.cfm?objectgroup\\_id=5930](http://www.thorlabs.de/newgrouppage9.cfm?objectgroup_id=5930)