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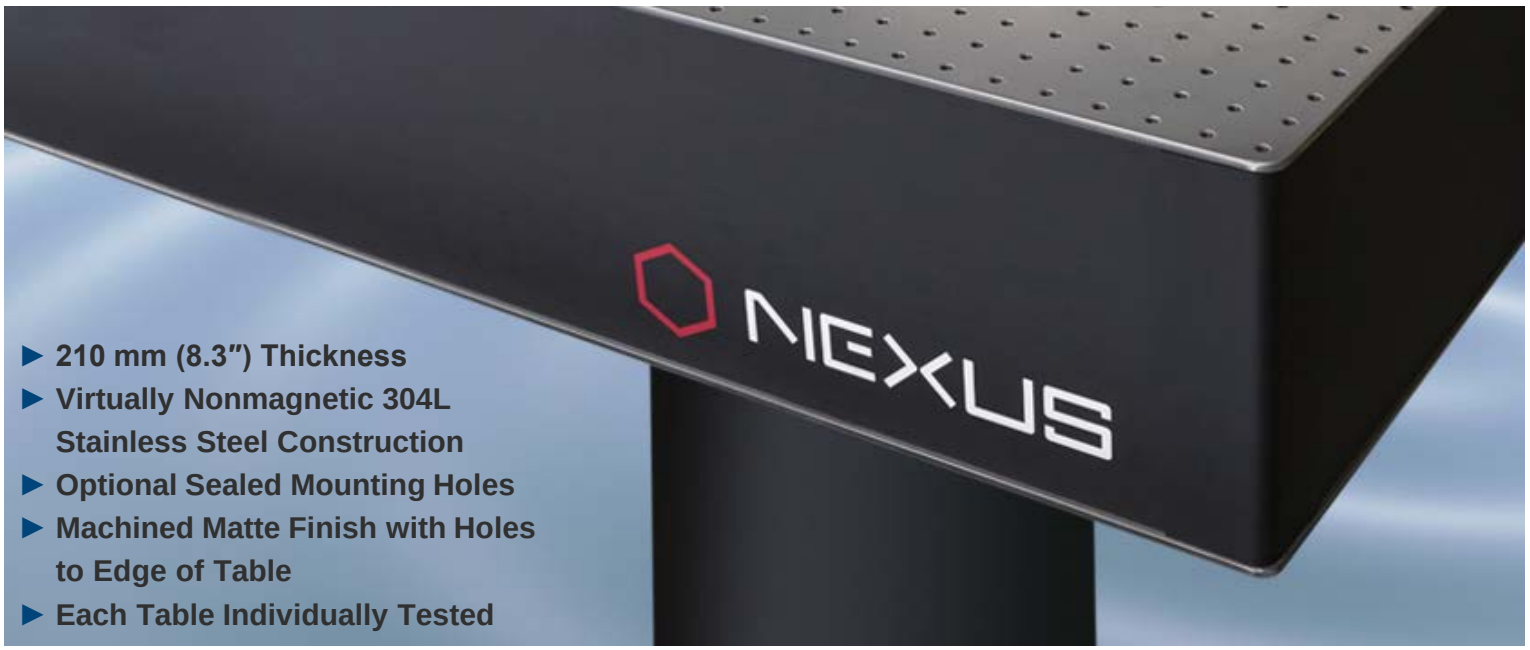
THORLABS

T48VN - May 12, 2016

Item # T48VN was discontinued on May 12, 2016. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

OPTICAL TABLES: 304L GRADE VIRTUALLY NONMAGNETIC STEEL CONSTRUCTION



Hide Overview

OVERVIEW

Features

- Thickness: 210 mm (8.3")
- Sizes from 3' x 6' (1 m x 2 m) to 4.8' x 8' (1.5 m x 2.5 m) Available
- Every Table Individually Optimized, Tested, and Shipped with Test Data Certificate
- Constructed of 304L Grade Nonmagnetic Steel
- 1/2" (12.5 mm) Hole Border for Maximum Usable Area
- Sealed Mounting Holes for Liquid Spill Management
- ±0.1 mm (±0.004") Surface Flatness over any 1 m² (11 ft²) Area
- 5 mm Stainless Steel Top and Bottom Skins with All-Steel Side Panels
- Steel-to-Steel Bonding Throughout Increases Thermal Stability

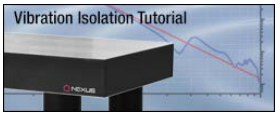
Nexus™ Optical Tables and Breadboards

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. Each size is individually optimized, and each table ships with a unique test data certificate. See the *Table 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.



Thorlabs' 210 mm (8.3") thick Nexus™ optical tables are offered in a variety of lengths and widths from 3' x 6 ' (1 m x 2 m) to 4.8' x 8' (1.5 m x 2.5 m). They feature 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 ±0.1 mm over any 1 m^2 area. The table has sealed 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.

Virtually Nonmagnetic Construction

These optical tables are constructed of 304L grade stainless steel. This alloy of steel contains less iron than typical stainless steel, which reduces its

ferromagnetic properties. 304L steel is usually referred to as "virtually nonmagnetic" since weak magnetic properties are still present.

Nonmagnetic optical tables are built to order with a typical lead time of 4 - 6 weeks. Custom sizes and options are also available with a typical lead time of 6 - 8 weeks. See the *Nexus Guide* tab for a complete overview of the Nexus optical tables product line.

Support Options
Our optical tables require table legs (sold separately). We sell rigid table legs as well as legs with either active or passive isolators. We also offer earthquake restraints for lab safety in earthquake zones and a selection of other optical table accessories.


Click for Details

Nexus Optical Tables Selection Guide	
All Nexus Breadboards	
Optical Table and Leg Kits	
210 mm (8.3") Thick Tables	
Unsealed Mounting Holes	Sealed Mounting Holes
Two Through Ports	304L Nonmagnetic Steel
310 mm (12.2") Thick Tables	
Unsealed Mounting Holes	Sealed Mounting Holes
460 mm (18.1") Thick Tables	
Unsealed Mounting Holes	Sealed Mounting Holes

Service & Installation

Thorlabs provides assistance with organizing table installation. Contact techsupport@thorlabs.com or your local sales office for more information.

Hide Specs

SPECS

Specifications		
Construction		
Table Thickness	210 mm (8.3")	
Flatness	±0.1 mm (±0.004") Over Any 1 m^2	
Construction	Symmetrical Isotropic Construction in All Axes	
Top and Bottom Plates	Matched 304L Grade Stainless Steel for Athermalized Design, 5 mm (3/16") Thick	
Core Construction	High-Density Plated 304L Grade Steel Honeycomb, 0.26 mm Thick	
Damping	Proprietary Optimized Broadband Damping	
Side Panels	Rigid 304L Grade Steel Box Section	
Side Trim Finish	Matte Black Linoleum, 2 mm Inset from Table Surface	
Top Surface Finish	Machined Matte Finish	
Compatible Mounting Legs	Rigid Legs, Passive Isolators, Active Isolators	
Mounting Holes	**Imperial**	**Metric**
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	205 mm (23.5 mm for Outer Border Holes)	
Performance[a]		
Maximum Dynamic Deflection Coefficient[b]	$<0.4 \times 10^{-3}$	
Maximum Relative Tabletop Motion[b]	<0.14 nm (5.5×10^{-9} in.)	
Deflection Under Load (Stiffness)[b]	<1.7 µm for a 150 kg (330 lb) Load	

a. Measured on a 3' x 6' x 8.3" (W x L x H) table, load placed centrally, load footprint 300 mm x 300 mm (11.8" x 11.8").
Complete performance test data is available on the *Vibration Isolation* tab.
b. See below for definitions.

Imperial Table Dimensions & Weight

Item #	Dimensions (W x L x H)	Unpacked Weight	Packaged Shipping Weight	Packed Dimensions
T48HN	4' x 8' x 8.3"	893.42 lbs	1194.82 lbs	8.4' x 4.5' x 19.2"
T48VN	4' x 8' x 8.3"	902.88 lbs	1204.28 lbs	8.4' x 4.5' x 19.2"

Metric Table Dimensions & Mass

Item #	Dimensions (W x L x H)	Unpacked Mass	Packaged Shipping Mass	Packed Dimensions
T1225CN	1.2 m x 2.5 m x 210 mm	415.40 kg	546.40 kg	2.6 m x 1.3 m x 490 mm
T1225PN	1.2 m x 2.5 m x 210 mm	439.70 kg	570.70 kg	2.6 m x 1.3 m x 490 mm

Dynamic Deflection Coefficient


Click for Details

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.

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

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 $<10^{-9}$ g^2/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.

Hide Table Vibration Isolation

TABLE VIBRATION ISOLATION

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) or 18.1" (460 mm) thickness for stability. Smaller sizes are available in both 8.3" (210 mm) and 12.2" (310 mm) thicknesses; they can be custom ordered in larger sizes.

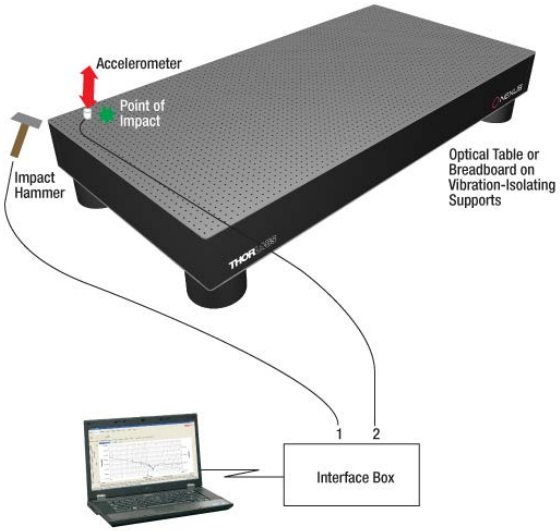
Compliance

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.



Click to Enlarge
Compliance Test Schematic

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
Nexus Table Compliance Testing

Test Results

210 mm Thick Tables		
Item #	Table Size (W x L)	Compliance Curve (Click to View)[a]
T36H / T36HH / T36V	3' x 6'	
T38H / T38V	3' x 8'	
T46H / T46HH / T46V	4' x 6'	
T48H / T48HH / T48HN / T48V / T48VN	4' x 8'	
T58H / T58V	4.8' x 8'	
T1020C / T1020CH / T1020P	1 m x 2 m	
T1025C / T1025P	1 m x 2.5 m	
T1220C / T1220CH / T1220P	1.2 m x 2 m	
T1225C / T1225CH / T1225CN / T1225P /T1225PN	1.2 m x 2.5 m	
T1525C / T1525P	1.5 m x 2.5 m	

310 mm Thick Tables		
Item #	Table Size (W x L)	Compliance Curve (Click to View)[a]
T36J / T36W	3' x 6'	
T38J / T38W	3' x 8'	
T46J / T46W	4' x 6'	
T48J / T48W	4' x 8'	
T410J / T410W	4' x 10'	
T58J / T58W	4.8' x 8'	
T510J / T510W	4.8' x 10'	
T514J / T514W	4.8' x 14'	
T1020D / T1020Q	1 m x 2 m	
T1025D / T1025Q	1 m x 2.5 m	
T1220D / T1220Q	1.2 m x 2 m	
T1225D / T1225Q	1.2 m x 2.5 m	
T1230D / T1230Q	1.2 m x 3 m	
T1525D / T1525Q	1.5 m x 2.5 m	
T1530D / T1530Q	1.5 m x 3 m	
T1540D / T1540Q	1.5 m x 4 m	

460 mm Thick Tables		
Item #	Table Size (W x L)	Compliance Curve (Click to View)[a]
T46K / T46X	4' x 6'	
T48K / T48X	4' x 8'	
T58K / T58X	4.8' x 8'	
T510K / T510X	4.8' x 10'	
T514K / T514X	4.8' x 14'	
T1220E / T1220R	1.2 m x 2 m	
T1225E / T1225R	1.2 m x 2.5 m	
T1525E / T1525R	1.5 m x 2.5 m	
T1530E / T1530R	1.5 m x 3 m	
T1540E / T1540R	1.5 m x 4 m	

a. 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.

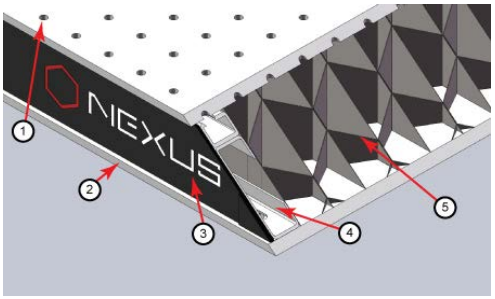
CONSTRUCTION

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.



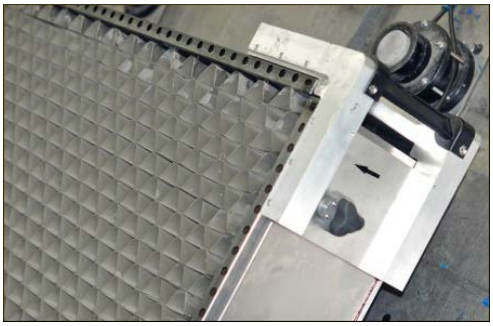
Click to Enlarge
Nexus Table / Breadboard Cross Section, showing the (1) Top Skin, (2) Bottom Skin, (3) Side Finishing Trim, (4) Side Panels, and (5) Honeycomb Core

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.

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 ±0.1 mm (±0.004") flatness over 1 m^2 (11 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.

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

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.

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

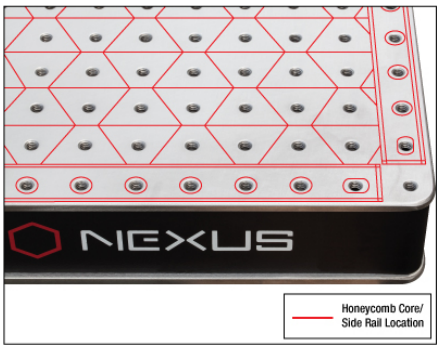
models, see below). This ensures that each hole is completely free from any adhesive material. The vinyl film is easily punctured when using a hole for the first time. Cap screws can be finger tightened into the mounting holes of all Nexus tables and breadboards.

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.

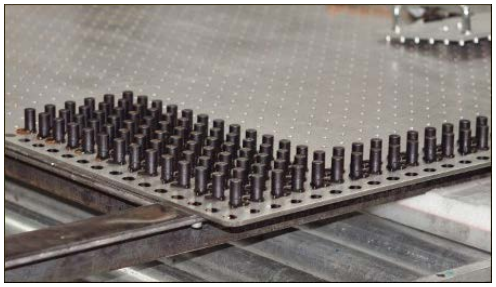
Increased Screw Depth and Optional Sealed Holes
Our custom-designed core maker produces precision formed and welded honeycomb core strips. The core is shaped and installed so that it does not intersect with any screw holes (see photo below, to right), allowing screws to be inserted far into the table, 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

Hide Imperial Optical Tables, Built to Order, Shipped from the UK

Imperial Optical Tables, Built to Order, Shipped from the UK

Currently, T48VN is not available for purchase.

Part Number	Description	Price	Availability
T48HN	Nexus Nonmagnetic Optical Table, 8' x 4' x 8.3"	$7,520.19	Lead Time
T48VN	Nexus Nonmagnetic Optical Table, 8' x 4' x 8.3", Sealed Holes	$8,366.21	Lead Time

Hide Metric Optical Tables, Built to Order, Shipped from the UK

Metric Optical Tables, Built to Order, Shipped from the UK

Currently, T1225PN is not available for purchase.

Part Number	Description	Price	Availability
T1225CN	Nexus Nonmagnetic Optical Table, 2500 mm x 1200 mm x 210 mm	$7,520.19	Lead Time
T1225PN	Nexus Nonmagnetic Optical Table, 2500 mm x 1200 mm x 210 mm, Sealed Holes	$8,366.21	Lead Time

http://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=1868