

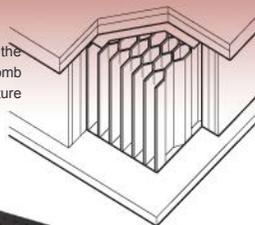
PBG11108 - February 18, 2016

Item # PBG11108 was discontinued on February 18, 2016. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

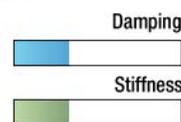
ALUMINUM BREADBOARDS: HIGH STIFFNESS, 25 MM (0.98") THICK

- ▶ All-Aluminum Construction Minimizes Thermal Instabilities
- ▶ High Strength-to-Weight Ratio
- ▶ Used for Applications Demanding a Totally Nonmagnetic Structure

Cutaway Showing the Internal Honeycomb Structure



PBG11110
 2.5' x 3' UltraLight™
 Optical Breadboard



[Hide Overview](#)

OVERVIEW

Features

- Thickness: 25 mm (0.98")
- 20% Lighter than Equivalent Surface Area Solid Aluminum Surface Plates (See Specs Tab for Weights)
- All-Aluminum Construction for Matching CTE to Reduce Thermal Effects
- Large Range of Sizes (W x L):
 - Imperial: 1' x 1' to 3' x 5'
 - Metric: 300 mm x 300 mm to 900 mm x 1500 mm
- Higher Rigidity than 0.5" Thick Solid Aluminum Breadboards (See Construction Tab for Details)
- Black Matte Painted Surface Reduces Reflectivity and Backscatter
- High-Density Honeycomb Core Provides Static and Dynamic Rigidity
- Custom Sizes Available; Contact Tech Support for Details

Key Specifications ^a		
Construction		
Breadboard Thickness	25 mm (0.98")	
Flatness	±0.15 mm (±0.006") Over Any 0.3 m ²	
Construction	Double-Plate, Single-Honeycomb Core, Athermalized Design	
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	1.0" from Table Edge on all Sides	25.0 mm from Table Edge on all Sides
Maximum Screw Depth	6 mm (0.24") from Top Surface	

a. For complete specifications that include specific breadboard dimensions and weights, see the Specs tab.

UltraLight™ Honeycomb Breadboards offer a high strength-to-weight ratio and an all-aluminum construction. Using aluminum throughout means that the breadboard will have similar coefficients of thermal expansion (CTE), which will minimize thermal instabilities. These breadboards are ideal for optical setups where portability and dynamic rigidity are important. They are typically used as replacements for aluminum, steel, or granite surface plates, as well as for applications demanding a totally nonmagnetic surface.

Choosing an Optical Breadboard

When choosing an aluminum optical breadboard, stiffness is a major consideration. For aluminum optical breadboards, Thorlabs offers two levels of stiffness: high and enhanced. Although most people associate deflection under load with thickness, it is actually the stiffness of a board that determines the deflection.

The higher the stiffness, the better the breadboard's ability to resist bending when a load or force is applied to it. Therefore, when a heavy load is placed in the center of a breadboard with high stiffness, the board will deflect more than it would if the same load were placed on an enhanced stiffness breadboard. This deflection can create misalignment between two components on opposite ends of the breadboard. This is especially important, for example, when conducting experiments that require sliding optical setups across the breadboard while maintaining a straight optical axis.

We also offer a broad selection of Nexus™ Steel Honeycomb Breadboards, which provide greater stiffness and vibration damping. For a quick comparison of our different breadboard options, please see the *BB Selection Guide* tab.

Frame and Isolation Options

We offer a number of support options for breadboards. Our standard breadboard frames are available with rigid supports, or with passive or self-leveling active vibration isolation. We also offer passive and electronic isolator feet for mounting a breadboard on top of a table.



[Hide Specs](#)

SPECS

Specifications		
Construction		
Breadboard Thickness	25 mm (0.98")	
Flatness	±0.15 mm (±0.006") Over Any 0.3 m ²	
Construction		
Double-Plate, Single-Honeycomb Core, Athermalized Design		
Top and Bottom Plates		
Matched Materials for Athermalized Design Top Plate: 6 mm Thick, Bottom Plate: 3 mm Thick		
Core Construction		
High-Density Plated Aluminum Honeycomb		
Side Panels		
Black-Laminated Aluminum, Slightly Inset		
Finish		
Painted, Matte Black		
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	1.0" from Table Edge on all Sides	25.0 mm from Table Edge on all Sides
Maximum Screw Depth	6 mm from Top Surface	

Imperial Breadboard Dimensions and Weights					
Item #	Dimensions (W x L x H)	Unpackaged Mass ^a	Unpackaged Weight ^a	Packaged Shipping Mass ^a	Packaged Shipping Weight ^a
PBG11101	12" x 12" x 0.98"	3.17 kg	7.00 lbs	7.00 kg	15.40 lbs
PBG11119	12" x 18" x 0.98"	3.80 kg	8.38 lbs	8.99 kg	19.84 lbs
PBG11102	12" x 24" x 0.98"	5.00 kg	11.02 lbs	11.00 kg	24.20 lbs
PBG11103	12" x 36" x 0.98"	9.07 kg	20.00 lbs	15.03 kg	33.07 lbs
PBG11104	12" x 48" x 0.98"	10.00 kg	22.05 lbs	20.00 kg	44.09 lbs
PBG11120	18" x 18" x 0.98"	5.70 kg	12.57 lbs	12.00 kg	26.46 lbs
PBG11118	18" x 24" x 0.98"	7.71 kg	17.00 lbs	16.00 kg	35.20 lbs
PBG11105	24" x 24" x 0.98"	9.07 kg	20.00 lbs	20.00 kg	44.00 lbs
PBG11106	24" x 36" x 0.98"	13.15 kg	29.00 lbs	27.94 kg	61.60 lbs
PBG11107	24" x 48" x 0.98"	20.41 kg	45.00 lbs	33.93 kg	74.80 lbs
PBG11108	24" x 60" x 0.98"	24.00 kg	52.91 lbs	37.92 kg	83.60 lbs
PBG11110	30" x 36" x 0.98"	15.90 kg	35.00 lbs	32.93 kg	72.60 lbs
PBG11111	30" x 48" x 0.98"	25.00 kg	55.00 lbs	41.91 kg	92.40 lbs
PBG11112	36" x 36" x 0.98"	21.00 kg	46.30 lbs	38.91 kg	85.80 lbs
PBG11113	36" x 48" x 0.98"	30.94 kg	68.20 lbs	50.90 kg	112.20 lbs
PBG11114	36" x 60" x 0.98"	40.92 kg	90.20 lbs	62.90 kg	138.60 lbs

a. These weights are approximate and are subject to change. The information is only to be used as a guideline.

Metric Breadboard Dimensions and Weights					
Item #	Dimensions (W x L x H)	Unpackaged Mass ^a	Unpackaged Weight ^a	Packaged Shipping Mass ^a	Packaged Shipping Weight ^a
PBG51501	300 mm x 300 mm x 25 mm	3.17 kg	7.00 lbs	6.99 kg	15.40 lbs
PBG51523	300 mm x 450 mm x 25 mm	3.70 kg	8.16 lbs	8.99 kg	19.84 lbs
PBG51502	300 mm x 600 mm x 25 mm	5.00 kg	11.00 lbs	11.00 kg	24.20 lbs
PBG51503	300 mm x 900 mm x 25 mm	7.50 kg	16.53 lbs	15.03 kg	33.00 lbs
PBG51524	450 mm x 450 mm x 25 mm	5.50 kg	12.12 lbs	12.00 kg	26.46 lbs
PBG51522	450 mm x 600 mm x 25 mm	8.16 kg	18.00 lbs	15.31 kg	33.75 lbs
PBG51505	600 mm x 600 mm x 25 mm	10.43 kg	23.00 lbs	20.00 kg	44.00 lbs
PBG51506	600 mm x 900 mm x 25 mm	15.00 kg	33.00 lbs	25.90 kg	57.00 lbs
PBG51507	600 mm x 1200 mm x 25 mm	16.78 kg	37.00 lbs	33.93 kg	74.80 lbs
PBG51508	600 mm x 1500 mm x 25 mm	24.00 kg	52.91 lbs	40.00 kg	88.18 lbs
PBG51509	750 mm x 750 mm x 25 mm	14.00 kg	30.86 lbs	26.00 kg	57.20 lbs
PBG51510	750 mm x 900 mm x 25 mm	18.14 kg	40.00 lbs	31.93 kg	70.40 lbs
PBG51511	750 mm x 1200 mm x 25 mm	25.00 kg	55.00 lbs	39.92 kg	88.00 lbs
PBG51512	900 mm x 900 mm x 25 mm	23.13 kg	51.00 lbs	36.92 kg	81.40 lbs
PBG51513	900 mm x 1200 mm x 25 mm	29.94 kg	66.00 lbs	50.90 kg	112.20 lbs
PBG51514	900 mm x 1500 mm x 25 mm	39.92 kg	88.00 lbs	56.88 kg	125.40 lbs

a. These weights are approximate and are subject to change. The information is only to be used as a guideline.

[Hide Construction](#)

CONSTRUCTION

UltraLight™ Honeycomb Aluminum Breadboard Construction

Thorlabs UltraLight™ optical breadboards offer high strength-to-weight ratio and excellent thermal stability. These breadboards are ideal for optical setups where portability and dynamic rigidity are important.



Click to Enlarge Construction Features

As shown in the diagram to the right, these breadboards incorporate a double-plate, single-honeycomb design, providing excellent stiffness

and dynamic rigidity (see test performed below). The top layer consists of a 6 mm aluminum top plate. The second layer adds the main aluminum honeycomb structure and the 3 mm aluminum bottom plate. The main honeycomb core is fabricated from strips of precision-formed plated aluminum, which is bonded together with a high tensile strength epoxy adhesive.

Excellent Surface Flatness

Breadboard flatness is critically important during many experimental setups. Lack of local flatness requires readjustment of components for height variations across the breadboard and can cause component "wobble". Thorlabs breadboards offer an unsurpassed flatness of ± 0.15 mm (± 0.006 ") over any 0.3 m² area due to the high-precision aluminum plates which are specially handled to maintain superior flatness throughout the manufacturing process. A unique thermal bonding process ensures that stress is not induced during manufacture, thereby retaining the flatness of the top plate.

Athermalized Design

Thorlabs breadboards have matched aluminum for both the top and bottom plates. This unique athermalized design eliminates thermal bowing effects caused by temperature variations.

Stiffness Comparison Testing: Honeycomb Aluminum Breadboards vs. Solid Aluminum Breadboards

Purpose: Show that an UltraLight PBG51507 breadboard measuring 600 mm x 1200 mm x 25 mm with an unpackaged mass of 16.78 kg has a greater stiffness than the equivalent size MB60120/M solid aluminum breadboard that is 0.5" thick and has an unpackaged mass of 23.00 kg.

Procedure: As shown in Figure 1 below, each table was supported by fulcrum points that were spaced 1 m apart. Then, various loads were applied uniformly across the center of the breadboard and the amount of deflection was measured. From the data collected, a plot of Force vs. Displacement was created as shown to the right.

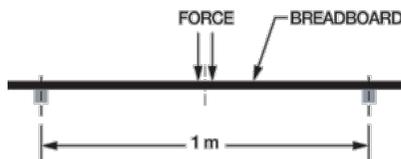


Figure 1: Both breadboards were reinforced at two defined fulcrum points. A uniform force was then applied to the center of each board and deflection measured.

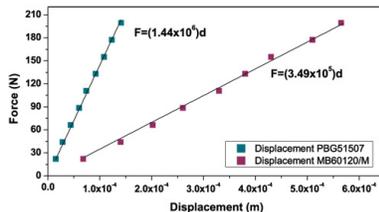


Figure 2: Plot Showing the Overall Displacement of the PBG51507 and MB60120/M After a Uniform Force was Applied to the Center of the Breadboard (See Diagram to the Left)

Results: The result shown in figure 2 shows that the PBG51507 honeycomb aluminum breadboard, which is 27% lighter than the MB60120/M solid aluminum breadboard, is 4.1 times stiffer. This can be found by dividing the two stiffness values, 1.44×10^6 and 3.49×10^5 .

Conclusions: As can be seen in Figure 2, it is clear that the PBG51507 UltraLight honeycomb aluminum breadboards, though lighter by 6.22 kg, have a greater stiffness than the MB60120/M 0.5" thick solid aluminum breadboards. Therefore, our UltraLight series of breadboards is an excellent choice if you are looking for a light-weight breadboard with extremely good rigidity.

[Hide BB Selection Guide](#)

BB SELECTION GUIDE					
Breadboards	Nexus, Optimized Damping	Intrinsically Damped	Aluminum Honeycomb	Solid Aluminum	Optically Clear Acrylic
Construction					
Breadboard Thickness	60 mm (2.4") 110 mm (4.3")	58 mm (2.28")	25 mm (0.98") 55 mm (2.2")	12.7 mm (0.5")	12.7 mm (0.5")
Working Surface	430 Grade Stainless Steel Top Plate		Aluminum	Solid Aluminum Anodized or Unanodized	Acrylic
Top Skin	5 mm (0.20")	5 mm (0.20")	6 mm (0.24")	N/A	N/A
Bottom Skin	5 mm (0.20")	3 mm (0.12")	3 mm (0.12")	N/A	N/A
Core Design	High-Density Plated Steel Honeycomb, 0.26 mm Thick		High-Density Plated Aluminum Honeycomb	N/A	N/A
Side Panels	Rigid Steel Box Section	Moisture-Resistant Medium Density Fiberboard (MDF)	Black Laminated Aluminum Sides	N/A	N/A
Ferromagnetism	Magnetic or Non-Magnetic Options		Magnetic	Non-Magnetic	
Sealed Holes	Sealed (25 mm Depth) or Non-Sealed Options		Non-Sealed		N/A
Threads and Spacing	1/4"-20 (M6) Tapped Holes on 1" (25 mm) Centers or Untapped Top Plate		1/4"-20 (M6) Tapped Holes on 1" (25 mm) Centers		1/4"-20 Tapped Holes on 0.5" (12.7 mm) Centers
Distance from Edge to First Holes	0.5" (12.5 mm) on all Sides	1.5" (37.5 mm) on all Sides	1.0" (25 mm) on all Sides	0.5" (12.5 mm) on all Sides	1.0" (25.4 mm) on all Sides
Performance^a					
Damping				N/A	N/A



a. The damping and stiffness performance shown here is qualitative and does not relate to exact specifications of each breadboard.

[Hide Imperial Breadboards \(Stocked in the USA\)](#)

Imperial Breadboards (Stocked in the USA)

Part Number	Description	Price	Availability
PBG11119	UltraLight High-Stiffness Breadboard, 12" x 18" x 0.98", 1/4"-20 Taps	\$468.00	Today
PBG11102	UltraLight High-Stiffness Breadboard, 12" x 24" x 0.98", 1/4"-20 Taps	\$520.00	Today
PBG11103	UltraLight High-Stiffness Breadboard, 12" x 36" x 0.98", 1/4"-20 Taps	\$626.00	Today
PBG11120	UltraLight High-Stiffness Breadboard, 18" x 18" x 0.98", 1/4"-20 Taps	\$548.00	Today
PBG11118	UltraLight High-Stiffness Breadboard, 18" x 24" x 0.98", 1/4"-20 Taps	\$627.00	Today
PBG11105	UltraLight High-Stiffness Breadboard, 24" x 24" x 0.98", 1/4"-20 Taps	\$734.00	Today
PBG11106	UltraLight High-Stiffness Breadboard, 24" x 36" x 0.98", 1/4"-20 Taps	\$945.00	Today
PBG11107	UltraLight High-Stiffness Breadboard, 24" x 48" x 0.98", 1/4"-20 Taps	\$1,160.00	Today
PBG11110	UltraLight High-Stiffness Breadboard, 30" x 36" x 0.98", 1/4"-20 Taps	\$1,100.00	Today
PBG11111	UltraLight High-Stiffness Breadboard, 30" x 48" x 0.98", 1/4"-20 Taps	\$1,370.00	Today
PBG11112	UltraLight High-Stiffness Breadboard, 36" x 36" x 0.98", 1/4"-20 Taps	\$1,260.00	Today
PBG11113	UltraLight High-Stiffness Breadboard, 36" x 48" x 0.98", 1/4"-20 Taps	\$1,580.00	Today

[Hide Imperial Breadboards \(Custom Order\)](#)

Imperial Breadboards (Custom Order)

The price box below lists commonly requested breadboard sizes. If another size is required, please contact Tech Support.

Part Number	Description	Price	Availability
PBG11101	UltraLight High-Stiffness Breadboard, 12" x 12" x 0.98", 1/4"-20 Taps	\$415.00	Lead Time
PBG11104	UltraLight High-Stiffness Breadboard, 12" x 48" x 0.98", 1/4"-20 Taps	\$734.00	Today
PBG11108	UltraLight High-Stiffness Breadboard, 24" x 60" x 0.98", 1/4"-20 Taps	\$1,510.00	Lead Time
PBG11114	UltraLight High-Stiffness Breadboard, 36" x 60" x 0.98", 1/4"-20 Taps	\$1,890.00	Lead Time

[Hide Metric Breadboards \(Stocked in the UK\)](#)

Metric Breadboards (Stocked in the UK)

Part Number	Description	Price	Availability
PBG51501	UltraLight High-Stiffness Breadboard, 300 x 300 x 25 mm, M6 Taps	\$415.00	2 Weeks
PBG51523	UltraLight High-Stiffness Breadboard, 300 x 450 x 25 mm, M6 Taps	\$468.00	Lead Time
PBG51502	UltraLight High-Stiffness Breadboard, 300 x 600 x 25 mm, M6 Taps	\$520.00	Today
PBG51503	UltraLight High-Stiffness Breadboard, 300 x 900 x 25 mm, M6 Taps	\$626.00	2 Weeks
PBG51524	UltraLight High-Stiffness Breadboard, 450 x 450 x 25 mm, M6 Taps	\$548.00	Lead Time
PBG51522	UltraLight High-Stiffness Breadboard, 450 x 600 x 25 mm, M6 Taps	\$627.00	2 Weeks
PBG51505	UltraLight High-Stiffness Breadboard, 600 x 600 x 25 mm, M6 Taps	\$734.00	Today
PBG51506	UltraLight High-Stiffness Breadboard, 600 x 900 x 25 mm, M6 Taps	\$945.00	Lead Time
PBG51507	UltraLight High-Stiffness Breadboard, 600 x 1200 x 25 mm, M6 Taps	\$1,160.00	2 Weeks
PBG51510	UltraLight High-Stiffness Breadboard, 750 x 900 x 25 mm, M6 Taps	\$1,100.00	2 Weeks
PBG51511	UltraLight High-Stiffness Breadboard, 750 x 1200 x 25 mm, M6 Taps	\$1,370.00	2 Weeks
PBG51512	UltraLight High-Stiffness Breadboard, 900 x 900 x 25 mm, M6 Taps	\$1,260.00	2 Weeks
PBG51513	UltraLight High-Stiffness Breadboard, 900 x 1200 x 25 mm, M6 Taps	\$1,580.00	2 Weeks
PBG51514	UltraLight High-Stiffness Breadboard, 900 x 1500 x 25 mm, M6 Taps	\$1,890.00	2 Weeks

[Hide Metric Breadboards \(Custom Order\)](#)

Metric Breadboards (Custom Order)

The price box below lists commonly requested breadboard sizes. If another size is required, please contact Tech Support.

Part Number	Description	Price	Availability
PBG51508	UltraLight High-Stiffness Breadboard, 600 x 1500 x 25 mm, M6 Taps	\$1,338.34	Lead Time
PBG51509	UltraLight High-Stiffness Breadboard, 750 x 750 x 25 mm, M6 Taps	\$1,060.00	Today

Visit the [Aluminum Breadboards: High Stiffness, 25 mm \(0.98"\) Thick](#) page for pricing and availability information:
http://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=1876