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THORLABS

99943 - SEP 25, 2019

Item # 99943 was discontinued on SEP 25, 2019. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

DRILL BIT KIT AND TAPS

- **Individual Imperial & Metric Plug Taps**
- **60-Piece Drill Bit Kit**
- **Tap Guides Help Ensure Tapped Holes are Perpendicular to Flat Surfaces**

TTT001
Tap Guide for Optical Tables and Breadboards

TW25
Tap Wrench

71529
1/4"-80 Tap

DK3
60-Piece Drill Bit Kit

OVERVIEW

Features

- Wide Selection of Plug Taps Including Thorlabs' SM05 (0.535"-40) and SM1 (1.035"-40) Standards
- Drill Kit Includes 60 Drill Bits in an Embossed Steel Case
- Universal Tap Wrench is an Essential Tool for Custom Applications
- Table and Breadboard Tapping Guide for Repairing Damaged Tapped Holes

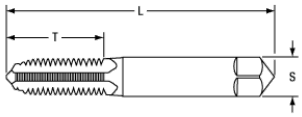
The items on this webpage can be used to add taps in user-selected locations and repair damaged tapped holes on breadboards and optical tables.

Click to Enlarge
The 83373 Imperial Tap for Tapping Thorlabs' SM05 Standard Threads

Click to Enlarge
The 97355 Imperial Tap for Tapping Thorlabs' SM1 Standard Threads

Specialty Taps - Imperial

- Specialized Plug Taps
- Covers SM05, SM1, and Most Other Threads Used by Thorlabs
- Material: High-Speed Steel



Click to Enlarge
Diagram of a Standard Tap

These specialty taps aid in the integration of our optomechanical components into your custom-built devices. Our imperial taps selection includes many of the thread standards used by Thorlabs, including our SM05 (0.535"-40) and SM1 (1.035"-40) standards. Please see below for our metric taps.

Tapping Recommendations

To tap a hole, first machine a pilot bore, using the table below to find the recommended pilot bore diameter. The bore can be made using a drill bit or an end mill. For fine pitch threads, the pilot bore should be tightly toleranced because of the shallow thread depth; a reamer is also recommended in this case.

Next, secure the tap into a tap wrench, drill press, or lathe to create the threads. Lubricant or tapping fluid should be used to create the hole. If resistance is felt while tapping, carefully rotate the tap backwards to remove it, as broken taps are exceptionally difficult to remove.

If using these specialty taps for production, precision ring and plug gauges should be used to verify hole diameters. For additional details on threading and taps, please consult the *Machinery's Handbook*, available in many machine shops and bookstores.

Item #	Thread Type	Thread Depth (T)	Overall Length (L)	Shank Size (S)	Pilot Bore			Example Uses
					Diameter	Tolerance[a]	Drill Size Imperial[b]	
54029	0-80	0.31"	1.63"	0.141"	0.049"	+0.003"/-0.002"	-	Locking Setscrews
54087	2-56	0.44"	1.75"	0.141"	0.070"	±0.004"	#50 (0.0700")	Miniature Translation Stage Mounting Holes
54150	4-40	0.56"	1.88"	0.141"	0.089"	±0.005"	#43 (0.0890")	Cage Rod Locking Setscrews
99943	6-80	0.69"	2.00"	0.141"	0.126"	±0.002"	1/8" (0.1250")	6-80 Adjustment Screws
54278	8-32	0.75"	2.13"	0.168"	0.135"	+0.004"/-0.005"	#29 (0.1360")	8-32 Mounting Holes
74580	3/16"-100	0.88"	2.38"	0.194"	0.177"	+0.002"/-0.001"	#16 (0.1770")	3/16"-100 Adjustment Screws
71598	1/4"-20	1.00"	2.50"	0.255"	0.202"	+0.005"/-0.006"	#7 (0.2010")	1/4"-20 Mounting Holes
71529	1/4"-80	1.00"	2.50"	0.255"	0.238"	±0.002"	B (0.2380")	1/4"-80 Adjustment Screws
99940	1/4"-100	1.00"	2.50"	0.255"	0.240"	+0.002"/-0.001"	-	1/4"-100 Adjustment Screws
60202	5/16"-32	1.13"	2.72"	0.318"	0.282"	+0.004"/-0.003"	9/32" (0.2812")	3/16"-100 Locking Bushings with 5/16"-32 External Threads
54601	3/8"-24	1.48"	3.08"	0.379"	0.335"	±0.005"	Q (0.3340")	3/8" Standard Tapped Holes
60242	3/8"-40	1.25"	2.94"	0.381"	0.348"	±0.003"	S (0.3480")	1/4"-80 Locking Bushings with 3/8"-40 External Threads
13649	3/8"-100	1.35"	3.08"	0.379"	0.365"	+0.002"/-0.001"	-	3/8"-100 Fine Adjustment Holes
83373	0.535"-40 (SM05 Standard)	1.66"	3.38"	0.367"	0.511"	±0.003"	-	Ø1/2" Lens Tubes
46720	0.800"-36 (RMS Standard)	2.00"	4.47"	0.652"	0.773"	+0.004"/-0.003"	-	RMS-Threaded Objectives
60538	1.00"-32 (C-Mount Standard)	2.50"	5.13"	0.800"	0.970"	±0.004"	-	C-Mount Extension Tubes, Machine Vision Camera Lenses
97355	1.035"-40 (SM1 Standard)	1.50"	5.13"	0.896"	1.011"	±0.003"	-	Ø1" Lens Tubes

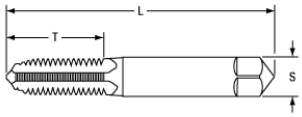
- For fine pitch threads, it is especially important to tightly tolerance the pilot bore because of the shallow thread depth.
- Item numbers with drill sizes listed are within the provided tolerance for each item. For item numbers without a corresponding standard drill size, please refer solely to the pilot bore diameter column, as drill bits in that size are not available.

Part Number	Description	Price	Availability
54029	**English (Imperial) Tap: 0-80 Thread**	**$21.64**	**5-8 Days**

54087	English (Imperial) Tap: 2-56 Thread	$16.23	5-8 Days
54150	English (Imperial) Tap: 4-40 Thread	$10.83	5-8 Days
99943	English (Imperial) Tap: 6-80 Thread	$33.16	5-8 Days
54278	English (Imperial) Tap: 8-32 Thread	$8.70	5-8 Days
74580	English (Imperial) Tap: 3/16"-100 Thread	$29.71	5-8 Days
71598	English (Imperial) Tap: 1/4"-20 Thread	$16.23	5-8 Days
71529	English (Imperial) Tap: 1/4"-80 Thread	$29.71	5-8 Days
99940	English (Imperial) Tap: 1/4"-100 Thread	$38.73	5-8 Days
60202	English (Imperial) Tap: 5/16"-32 Thread	$27.06	5-8 Days
54601	NEW! English (Imperial) Tap: 3/8"-24 Thread	$40.69	5-8 Days
60242	English (Imperial) Tap: 3/8"-40 Thread	$28.64	5-8 Days
13649	NEW! English (Imperial) Tap: 3/8"-100 Thread	$55.11	5-8 Days
83373	English (Imperial) Tap: 0.535"-40 Thread (SM05 Standard)	$93.36	Today
46720	English (Imperial) Tap: 0.800"-36 Thread (RMS Standard)	$93.36	Today
60538	English (Imperial) Tap: 1.00"-32 Thread (C-Mount Standard)	$108.21	5-8 Days
97355	English (Imperial) Tap: 1.035"-40 Thread (SM1 Standard)	$93.36	5-8 Days

Specialty Taps - Metric

- Specialized Plug Taps
- Covers Many Threads Used by Thorlabs
- Material: High-Speed Steel



Click to Enlarge
Diagram of a Standard Tap

These specialty taps aid in the integration of our optomechanical components into your custom-built devices. Our metric taps selection includes many of the thread standards used by Thorlabs. Please see above for our imperial taps, as well as taps for our SM05 (0.535"-40) and SM1 (1.035"-40) standards.

Tapping Recommendations

To tap a hole, first machine a pilot bore, using the table below to find the recommended pilot bore diameter. The bore can be made using a drill bit or an end mill. For fine pitch threads, the pilot bore should be tightly toleranced because of the shallow thread depth; a reamer is also recommended in this case.

Next, secure the tap into a tap wrench, drill press, or lathe to create the threads. Lubricant or tapping fluid should be used to create the hole. If resistance is felt while tapping, carefully rotate the tap backwards to remove it, as broken taps are exceptionally difficult to remove.

If using these specialty taps for production, precision ring and plug gauges should be used to verify hole diameters. For additional details on threading and taps, please consult the *Machinery's Handbook*, available in many machine shops and bookstores.

Item #	Thread Type	Thread Depth (T)	Overall Length (L)	Shank Size (S)	Pilot Bore				Example Uses
					Diameter	Tolerance[a]	Drill Size Metric[b]	Drill Size Imperial[b]	
42872	M2.5 x 0.2	12.7 mm	46.0 mm	3.6 mm	2.313 mm	±0.030 mm	2.3 mm (0.0905")	-	M2.5 x 0.2 Adjustment Screws
24564	M3 x 0.2	16.0 mm	49.3 mm	3.6 mm	2.813 mm	±0.030 mm	2.8 mm (0.1102")	#34 (0.1110")	M3 x 0.2 Adjustment Screws
99946	M3 x 0.25	16.0 mm	49.3 mm	3.6 mm	2.766 mm	±0.037 mm	2.75 mm (0.1083")	7/64" (0.1093")	M3 x 0.25 Adjustment Screws
99947	M4 x 0.25	21.3 mm	56.4 mm	4.2 mm	3.77 mm	±0.037 mm	3.75 mm (0.1476")	#26 (0.1470")	M4 Fine Adjustment Holes
54247	M4 x 0.7 (M4 Standard)	19.1 mm	54.1 mm	4.3 mm	3.332 mm	±0.090 mm	3.3 mm (0.1299")	#30 (0.1285")	M4 Mounting Holes
99833	M4.5 x 0.5	22.4 mm	60.5 mm	4.9 mm	4.029 mm	±0.070 mm	4.0 mm (0.1575")	#21 (0.1590")	M3 x 0.25 Adjuster Nut[c]
35824	M6 x 0.25	25.4 mm	63.5 mm	6.5 mm	5.575 mm	±0.0165 mm	5.6 mm (0.2205")	#2 (0.2210")	M6 x 0.25 Adjustment Screws
97368	M6 x 0.5	25.4 mm	63.5 mm	6.5 mm	5.526 mm	±0.068 mm	5.5 mm (0.2165")	7/23" (0.2187")	Aspheric Lens Housings[d]
71498	M6 x 1.0 (M6 Standard)	25.4 mm	63.5 mm	6.5 mm	5.035 mm	±0.118 mm	5.1 mm (0.2008")	#8 (0.1990")	M6 Mounting Holes
20668	M7.5 x 0.5	31.7 mm	72.0 mm	8.0 mm	7.026 mm	+0.068 mm/-0.067 mm	-	-	Retaining Rings for Ø7 mm Lens Mounts
48443	M8 x 0.5	28.7 mm	69.1 mm	8.1 mm	7.526 mm	±0.068 mm	7.5 mm (0.2953")	M (0.2950")	Aspheric Lens Housings[d]
98109	M9 x 0.5	31.8 mm	74.7 mm	9.7 mm	8.526 mm	±0.068 mm	8.5 mm (0.3346")	Q (0.3340")	Aspheric Lens Housings[d]
43122	M10 x 0.5	31.8 mm	74.7 mm	9.7 mm	9.526 mm	±0.068 mm	9.5 mm (0.3740)	3/8" (0.3750")	Aspheric Lens Housings[d]
74256	M10.5 x 0.5	37.4 mm	80.4 mm	8.2 mm	10.026 mm	+0.068 mm/-0.067 mm	-	-	Retaining Rings for Ø10 mm Lens Mounts
98110	M11 x 0.5	36.6 mm	80.3 mm	8.2 mm	10.526 mm	±0.068 mm	10.5 mm (0.4133")	Z (0.4130")	Mounted Aspheric Lens Pair Housings[d]
46152	M12 x 0.5	42.2 mm	85.9 mm	9.3 mm	11.526 mm	±0.068 mm	11.5 mm (0.4528")	29/64" (0.4531")	Aspheric Lens Housings[d]
45283	M14 x 0.5	42.2 mm	91.2 mm	10.9 mm	13.526 mm	±0.068 mm	13.5 mm (0.5315")	17/23" (0.5312")	-
29453	M20.5 x 0.5	32.0 mm	114.0 mm	16.5 mm	20.026 mm	+0.068 mm/-0.067 mm	-	-	Retaining Rings for Ø20 mm Lens Mounts
99925	M25 x 0.75 (M25 Standard)	63.5 mm	130.3 mm	20.3 mm	24.284 mm	±0.096 mm	-	-	M25-Threaded Objectives

- For fine pitch threads, it is especially important to tightly tolerance the pilot bore because of the shallow thread depth.
- Item numbers with drill sizes listed are within the provided tolerance for each item. For item numbers without a corresponding standard drill size, please refer solely to the pilot bore diameter column, as drill bits in that size are not available.
- The N250L3P M3 x 0.25 Adjuster Nut is externally M4.5 x 0.5 threaded. The 99833 Tap can be used to tap a mounting hole for this adjuster nut.
- The webpages for our mounted aspheric lenses indicate the external thread of the lens housing.

Part Number	Description	Price	Availability
42872	**Metric Tap: M2.5 x 0.2 Thread**	**$53.05**	**5-8 Days**
24564	**Metric Tap: M3 x 0.2 Thread**	**$54.11**	**5-8 Days**
99946	**Metric Tap: M3 x 0.25 Thread**	**$38.73**	**5-8 Days**
54247	**Metric Tap: M4 x 0.7 Thread (M4 Standard)**	**$10.83**	**5-8 Days**
99947	**Metric Tap: M4 x 0.25 Thread**	**$39.91**	**Lead Time**
99833	**Metric Tap: M4.5 x 0.5 Thread**	**$34.22**	**Lead Time**
35824	**Metric Tap: M6 x 0.25 Thread**	**$38.73**	**5-8 Days**
97368	**Metric Tap: M6 x 0.5 Thread**	**$28.64**	**5-8 Days**
71498	**Metric Tap: M6 x 1.0 Thread (M6 Standard)**	**$13.05**	**5-8 Days**
20668	**NEW! Metric Tap: M7.5 x 0.5 Thread**	**$42.49**	**Lead Time**
48443	**Metric Tap: M8 x 0.5 Thread**	**$33.16**	**5-8 Days**
98109	**Metric Tap: M9 x 0.5 Thread**	**$43.50**	**5-8 Days**
43122	**Metric Tap: M10 x 0.5 Thread**	**$50.13**	**5-8 Days**
74256	**NEW! Metric Tap: M10.5 x 0.5 Thread**	**$61.29**	**5-8 Days**
98110	**Metric Tap: M11 x 0.5 Thread**	**$51.46**	**5-8 Days**
46152	**Metric Tap: M12 x 0.5 Thread**	**$52.25**	**5-8 Days**
45283	**Metric Tap: M14 x 0.5 Thread**	**$60.47**	**Lead Time**
29453	**NEW! Metric Tap: M20.5 x 0.5 Thread**	**$115.45**	**5-8 Days**
99925	**Customer Inspired! Metric Tap: M25 x 0.75 Thread (M25 Standard)**	**$146.40**	**5-8 Days**

Drill Bit Kit

- 60 Number-Sized Drill Bits Ranging from #1 Bit to #60 Bit
- Bit Material: High-Speed Steel
- 135° Point Angle
- Sizes Embossed in Steel Case

The DK3 Drill Bit Kit includes 60 drill bits of standard jobber length. The bits are constructed from high-speed steel and have a 135° point angle. This kit holds the bits in a compact, all-steel index case, with the bit sizes, tap sizes, tap drill sizes, and body drill (clearance) sizes embossed in the case.

Part Number	Description	Price	Availability
DK3	**60-Piece Drill Bit Kit**	**$130.49**	**Today**

Universal Tap Wrench

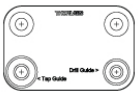
- Universal Ratcheting Tap Wrench with Sliding Crossbar
- Accommodates Taps from #0 to 1/4" or M2 to M6
- Shank Size from 0.141" to 0.255" or 3.6 mm to 6.5 mm

This machinist-quality Hand Tap Wrench is ideally suited for everyday tapping requirements. The rugged stainless steel design provides durability and long life, and the crossbar conveniently slides to provide extra torque when required. Ratcheting in either direction can be selected using the knob at the top of the wrench (see photo to the right). The Hand Tap Wrench can accommodate taps as small as #0 or 2 mm and as large as 1/4" or 6 mm.

Click to Enlarge
Ratcheting Selector Knob and Sliding Crossbar

Part Number	Description	Price	Availability
TW25	**Hand Tap Wrench**	**$61.95**	**Today**

Table Tapping Guide



Click for Details
TTT001(/M) Tap Guide Dimensions

- Repair 1/4"-20 or M6 Holes in Optical Tables and Breadboards
- Bushings Help Ensure Tapped Holes are Perpendicular to the Work Surface
- Two 1/4"-20 or M6 Countersunk Mounting Screws Supplied

The TTT001(/M) Tap Guide is designed to assist in the re-drilling and re-tapping of an optical table or breadboard damaged by broken screws or cross threading. Two countersunk mounting screws (also known as flat head socket cap screws) are supplied for bolting the guide to the existing 1/4"-20- or M6-threaded hole matrix. A toughened, tool-grade steel bushing insert acts as a precise guide for drilling the broken screw out of the damaged hole. Another steel bushing guides the tap into the drilled-out hole, restoring the threads and ensuring that the resulting tapped hole is perpendicular to the work surface.

Repairing a Damaged Tapped Hole

Click to Enlarge
To repair a hole with the TTT001(/M) guide, first secure it to the optical table using the included countersunk screws. These screws are designed to center the steel bushing over the damaged hole.

Click to Enlarge
Once the TTT001(/M) guide is properly aligned over the hole, use the TW25 Hand Tap Wrench with a 1/4"-20 tap (Item # 71598) or an M6 tap (Item # 71498) to restore the threads.

The main cause of tap breakage is unwanted sideways motion when the operator attempts to rotate the tap while simultaneously applying a force not purely parallel to the drill axis. This device discourages this costly error. We advise the use of a sharp, carbide-tipped drill bit to drill out the broken screw. When mounting the tap guide, care should be taken not to overtighten the countersunk mounting screws.

Part Number	Description	Price	Availability
TTT001/M	**Table Tapping Guide for M6 Threads**	**$60.87**	**Today**
TTT001	**Table Tapping Guide for 1/4"-20 Threads**	**$60.87**	**Today**

Visit the *Drill Bit Kit and Taps* page for pricing and availability information:
https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=1189