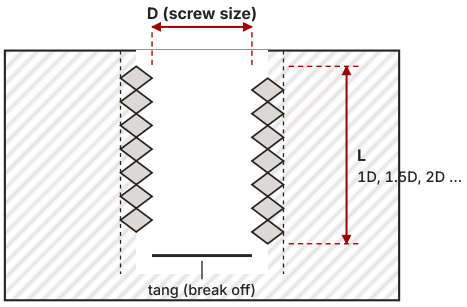
Thread Repair Insert Sizes

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J & E Supply & FASTENER CO.

Helical coil thread repair inserts: the drill for the STI tap, the tapped hole's pitch diameter, and the insert length at 1D to 3D, for inch and metric threads.

A **thread repair insert** (helical coil, often called a Heli-Coil) puts a new thread of the **original size** into a stripped or worn hole. The hole is drilled out, tapped with an **STI tap** (screw thread insert tap: the same pitch as the screw, a larger diameter), and the coil is wound in. The insert's length is a multiple of the screw's diameter: 1D, 1.5D, 2D, 2.5D or 3D.



1. Drill (the STI drill)
2. Tap with the STI tap
3. Wind the insert in, 1/4 to 1/2 turn below the surface
4. Break off the tang

The screw now fits size D.

An installed insert: D is the screw size it gives back, L its length. Not to scale.

Inch thread repair inserts — STI drill and tapped hole

THREAD	SERIES	STI DRILL	DRILL (IN)	PITCH DIA. 3B MIN (IN)	PITCH DIA. 3B MAX (IN)
#2-56	UNC	—	—	0.0976	—
#3-56	UNF	—	—	0.1106	0.1119
#3-48	UNC	—	—	—	—
#4-48	UNF	—	—	—	—
#4-40	UNC	#31	0.1200″	—	—
#5-40	UNC	—	—	—	—
#6-40	UNF	—	—	—	—
#6-32	UNC	—	—	0.1583	0.1601
#8-36	UNF	—	—	—	—
#8-32	UNC	—	—	0.1843	0.1862
#10-32	UNF	—	—	0.2103	0.2123
#10-24	UNC	—	—	—	—
#12-24	UNC	—	—	—	—
1/4-28	UNF	—	—	0.2732	0.2754
1/4-20	UNC	—	—	0.2825	0.2851
5/16-24	UNF	21/64″	0.3281″	0.3395	0.3421
5/16-18	UNC	—	—	0.3486	0.3515
3/8-24	UNF	25/64″	0.3906″	0.4020	0.4047
3/8-16	UNC	—	—	0.4156	0.4189
7/16-20	UNF	29/64″	0.4531″	0.4700	0.4731
7/16-14	UNC	29/64″	0.4531″	0.4839	0.4875
1/2-20	UNF	33/64″	0.5156″	0.5325	0.5357
1/2-13	UNC	—	—	0.5499	0.5537
9/16-18	UNF	37/64″	0.5781″	0.5986	0.6020
9/16-12	UNC	—	—	0.6167	0.6208
5/8-18	UNF	41/64″	0.6406″	0.6611	0.6646
5/8-11	UNC	21/32″	0.6562″	0.6841	0.6885
3/4-16	UNF	49/64″	0.7656″	0.7906	0.7945
3/4-10	UNC	25/32″	0.7812″	0.8149	0.8196
7/8-14	UNF	57/64″	0.8906″	0.9214	0.9257
7/8-9	UNC	29/32″	0.9062″	0.9471	0.9522
1-14	UNF	—	—	—	—

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THREAD	SERIES	STI DRILL	DRILL (IN)	PITCH DIA. 3B MIN (IN)	PITCH DIA. 3B MAX (IN)
1-12	UNF	—	—	1.0542	1.0589
1-8	UNC	1-1/32"	1.0312"	1.0812	1.0868
1-1/8-12	UNF	—	—	1.1792	1.1841
1-1/8-8	8UN	—	—	—	—
1-1/8-7	UNC	—	—	1.2178	1.2239
1-1/4-12	UNF	—	—	1.3042	1.3092
1-1/4-8	8UN	—	—	—	—
1-1/4-7	UNC	—	—	1.3428	1.3490
1-3/8-12	UNF	—	—	1.4292	1.4343
1-3/8-8	8UN	—	—	—	—
1-3/8-6	UNC	—	—	1.4832	1.4900
1-1/2-12	UNF	—	—	1.5542	1.5595
1-1/2-8	8UN	—	—	—	—
1-1/2-6	UNC	—	—	1.6082	1.6151
1-5/8-8	8UN	—	—	—	—
1-3/4-8	8UN	—	—	—	—
1-7/8-8	8UN	—	—	—	—
2-8	8UN	—	—	—	—

STI drill: printed only where every drill Heli-Coil names for the thread (its kit drill and its aluminum and steel table drills) and the drill on Recoil's tapped-hole table are the same. Drill decimal from our drill size chart (fractions computed). Pitch diameter of the STI-tapped hole, class 3B, where both makers print the same limit. A dash: the two makers differ, or only one lists it.

Inch thread repair inserts — insert lengths

THREAD	1D	1.5D	2D	2.5D	3D
#2-56	.086	.129	.172	.215	.258
#3-56	.099	.149	.198	.247	.297
#3-48	.099	.149	.198	.247	.297
#4-48	.112	.168	.224	.280	.336
#4-40	.112	.168	.224	.280	.336
#5-40	.125	.188	.250	.312	.375
#6-40	.138	.207	.276	.345	.414
#6-32	.138	.207	.276	.345	.414
#8-36	.164	.246	.328	.410	.492
#8-32	.164	.246	.328	.410	.492
#10-32	.190	.285	.380	.475	.570
#10-24	.190	.285	.380	.475	.570
#12-24	.216	—	.432	.540	.648
1/4-28	.250	.375	.500	.625	.750
1/4-20	.250	.375	.500	.625	.750
5/16-24	.312	.469	.625	.781	.938
5/16-18	.312	.469	.625	.781	.938
3/8-24	.375	.562	.750	.938	1.125
3/8-16	.375	.562	.750	.938	1.125
7/16-20	.438	.656	.875	1.094	1.312
7/16-14	.438	.656	.875	1.094	1.312
1/2-20	.500	.750	1.000	1.250	1.500
1/2-13	.500	.750	1.000	1.250	1.500
9/16-18	.562	.844	1.125	1.406	1.688
9/16-12	.562	.844	1.125	1.406	1.688
5/8-18	.625	.938	1.250	1.562	1.875
5/8-11	.625	.938	1.250	1.562	1.875
3/4-16	.750	1.125	1.500	1.875	2.250
3/4-10	.750	1.125	1.500	1.875	2.250
7/8-14	.875	1.312	1.750	2.188	2.625

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THREAD	1D	1.5D	2D	2.5D	3D
7/8-9	.875	1.312	1.750	2.188	2.625
1-14	1.000	1.500	2.000	2.500	3.000
1-12	1.000	1.500	2.000	2.500	3.000
1-8	1.000	1.500	2.000	2.500	3.000
1-1/8-12	1.125	1.688	2.250	2.812	3.375
1-1/8-8	1.125	1.688	2.250	2.812	3.375
1-1/8-7	1.125	1.688	2.250	2.812	3.375
1-1/4-12	1.250	1.875	2.500	3.125	3.750
1-1/4-8	1.250	1.875	2.500	3.125	3.750
1-1/4-7	1.250	1.875	2.500	3.125	3.750
1-3/8-12	1.375	2.062	2.750	3.438	4.125
1-3/8-8	1.375	2.062	2.750	3.438	4.125
1-3/8-6	1.375	2.062	2.750	3.438	4.125
1-1/2-12	1.500	2.250	3.000	3.750	4.500
1-1/2-8	1.500	2.250	3.000	3.750	4.500
1-1/2-6	1.500	2.250	3.000	3.750	4.500
1-5/8-8	1.625	2.438	3.250	4.062	4.875
1-3/4-8	1.750	2.625	3.500	4.375	5.250
1-7/8-8	1.875	2.812	3.750	4.688	5.625
2-8	2.000	3.000	4.000	5.000	6.000

Nominal insert length in inches: the multiple times the screw's nominal diameter (computed, to 3 places). A dash: Heli-Coil lists a different length for that size.

Metric thread repair inserts — STI drill and tapped hole

THREAD	STI DRILL	DRILL (IN)	PITCH DIA. MIN (MM)
M2x0.4	2.1 mm	0.0827″	2.260
M2.2x0.45	—	—	2.492
M2.5x0.45	—	—	2.792
M3x0.5	—	—	3.325
M3.5x0.6	—	—	3.890
M4x0.7	—	—	4.455
M5x0.8	—	—	5.520
M6x1	—	—	6.650
M7x1	—	—	7.650
M8x1	—	—	8.650
M8x1.25	—	—	—
M9x1.25	—	—	—
M10x1	—	—	—
M10x1.25	—	—	10.812
M10x1.5	—	—	10.974
M11x1.5	—	—	—
M12x1.25	—	—	12.812
M12x1.5	—	—	—
M12x1.75	—	—	13.137
M14x1.5	—	—	14.974
M14x2	—	—	15.299
M16x1.5	—	—	16.974
M16x2	—	—	17.299
M18x1.5	—	—	18.974
M18x2	18.5 mm	0.7283″	19.299
M18x2.5	—	—	19.624
M20x1.5	—	—	20.974
M20x2	20.5 mm	0.8071″	21.299

THREAD	STI DRILL	DRILL (IN)	PITCH DIA. MIN (MM)
M20x2.5	—	—	21.624
M22x1.5	—	—	22.974
M22x2	22.5 mm	0.8858″	23.299
M22x2.5	—	—	23.624
M24x1.5	—	—	—
M24x2	—	—	25.299
M24x3	24.75 mm	0.9744″	—
M27x2	—	—	—
M27x3	—	—	—
M30x2	—	—	—
M30x3.5	—	—	32.273
M33x2	—	—	—
M33x3.5	—	—	35.273
M36x2	—	—	—
M36x3	—	—	—
M36x4	—	—	38.598
M39x2	—	—	—
M39x3	—	—	—
M39x4	—	—	41.598

Heli-Coil's metric kits carry inch drills and Recoil lists mm drills, so most metric drills show a dash: use the drill packed in the kit or the maker's chart. Inch of a mm drill computed from 25.4 mm = 1 inch. Pitch diameter minimum of the STI-tapped hole where both makers print the same value (the maximum depends on the tolerance class, which the two makers name differently).

Metric thread repair inserts — insert lengths

THREAD	1D	1.5D	2D	2.5D	3D
M2x0.4	2	3	4	5	6
M2.2x0.45	2.2	3.3	4.4	5.5	6.6
M2.5x0.45	2.5	3.75	5	6.25	7.5
M3x0.5	3	4.5	6	7.5	9
M3.5x0.6	3.5	5.25	7	8.75	10.5
M4x0.7	4	6	8	10	12
M5x0.8	5	7.5	10	12.5	15
M6x1	6	9	12	15	18
M7x1	7	10.5	14	17.5	21
M8x1	8	12	16	20	24
M8x1.25	8	12	16	20	24
M9x1.25	9	13.5	18	22.5	27
M10x1	10	15	20	25	30
M10x1.25	10	15	20	25	30
M10x1.5	10	15	20	25	30
M11x1.5	11	16.5	22	27.5	33
M12x1.25	12	18	24	30	36
M12x1.5	12	18	24	30	36
M12x1.75	12	18	24	30	36
M14x1.5	14	21	28	35	42
M14x2	14	21	28	35	42
M16x1.5	16	24	32	40	48
M16x2	16	24	32	40	48
M18x1.5	18	27	36	45	54
M18x2	18	27	36	45	54
M18x2.5	18	27	36	45	54
M20x1.5	20	30	40	50	60
M20x2	20	30	40	50	60
M20x2.5	20	30	40	50	60

THREAD	1D	1.5D	2D	2.5D	3D
M22x1.5	22	33	44	55	66
M22x2	22	33	44	55	66
M22x2.5	22	33	44	55	66
M24x1.5	24	36	48	60	72
M24x2	24	36	48	60	72
M24x3	24	36	48	60	72
M27x2	27	40.5	54	67.5	81
M27x3	27	40.5	54	67.5	81
M30x2	30	45	60	75	90
M30x3.5	30	45	60	75	90
M33x2	33	49.5	66	82.5	99
M33x3.5	33	49.5	66	82.5	99
M36x2	36	54	72	90	108
M36x3	36	54	72	90	108
M36x4	36	54	72	90	108
M39x2	39	58.5	78	97.5	117
M39x3	39	58.5	78	97.5	117
M39x4	39	58.5	78	97.5	117

Nominal insert length in mm: the multiple times the nominal diameter (computed). A dash: Heli-Coil lists a different length for that size. M24×1.5: Heli-Coil does not list it; its lengths are where V-COIL and Recoil agree (drill and pitch diameter: a dash).

Good to know

Use the STI tap, not a regular tap. The insert is bigger than the hole until it is wound in, so the hole needs the STI tap for the same thread. Recoil: “They have a larger diameter but the same pitch as a standard tap in order to accommodate the wire insert.” Heli-Coil: “Heli-Coil inserts are larger in diameter before installation than the tapped hole.”

Wind it in below the surface. Heli-Coil: “Wind the insert into the hole until the top coil is 1/4 to 1/2 turn below the top surface.” Recoil: “Wind insert in with light downward pressure until 1/4 to 1/2 turn below the surface.” Then break off the tang (the bent end that drives it).

Check the tapped hole with an STI thread plug gauge. It checks the pitch diameter of the tapped hole; if the hole gauges right, the installed insert gives the screw’s own thread.

A dash on the drill means our maker sources don’t all name the same drill (Heli-Coil’s kit and table drills differ for many sizes): use the drill in the kit, or the maker’s chart.

Quick answers

What drill size do I use for a thread repair insert (Helicoil)?
Where every Heli-Coil and Recoil drill agrees: 7/16-14 **29/64″**, 5/8-11 **21/32″**, 3/4-10 **25/32″**, 3/8-24 **25/64″**, then the STI tap. For sizes such as 1/4-20 the makers’ charts name more than one drill — use the drill packed in the kit.

Can I use a regular tap for a thread repair insert?
No. The insert needs an STI (screw thread insert) tap: same pitch as the screw but a larger diameter, so the coil fits in it. Heli-Coil and Recoil both say to use their STI taps.

What does 1.5D mean on a thread repair insert?
The insert’s length is 1.5 times the screw’s diameter. A 1/2-13 × 1.5D insert is **.750″** long; a 1/4-20 × 2D is **.500″**.

What drill for an M8 × 1.25 thread repair insert?
Our two maker sources name different drills for most metric sizes, so the chart shows a dash: use the drill packed in the kit, or the insert maker’s own chart.

How far down does a thread repair insert go?
Wind it in until the top coil is 1/4 to 1/2 turn below the surface, then break off the tang (both makers).

Reference values drawn from the governing standards. For critical applications, confirm against the standard and the manufacturer’s published data. Technical information disclaimer →