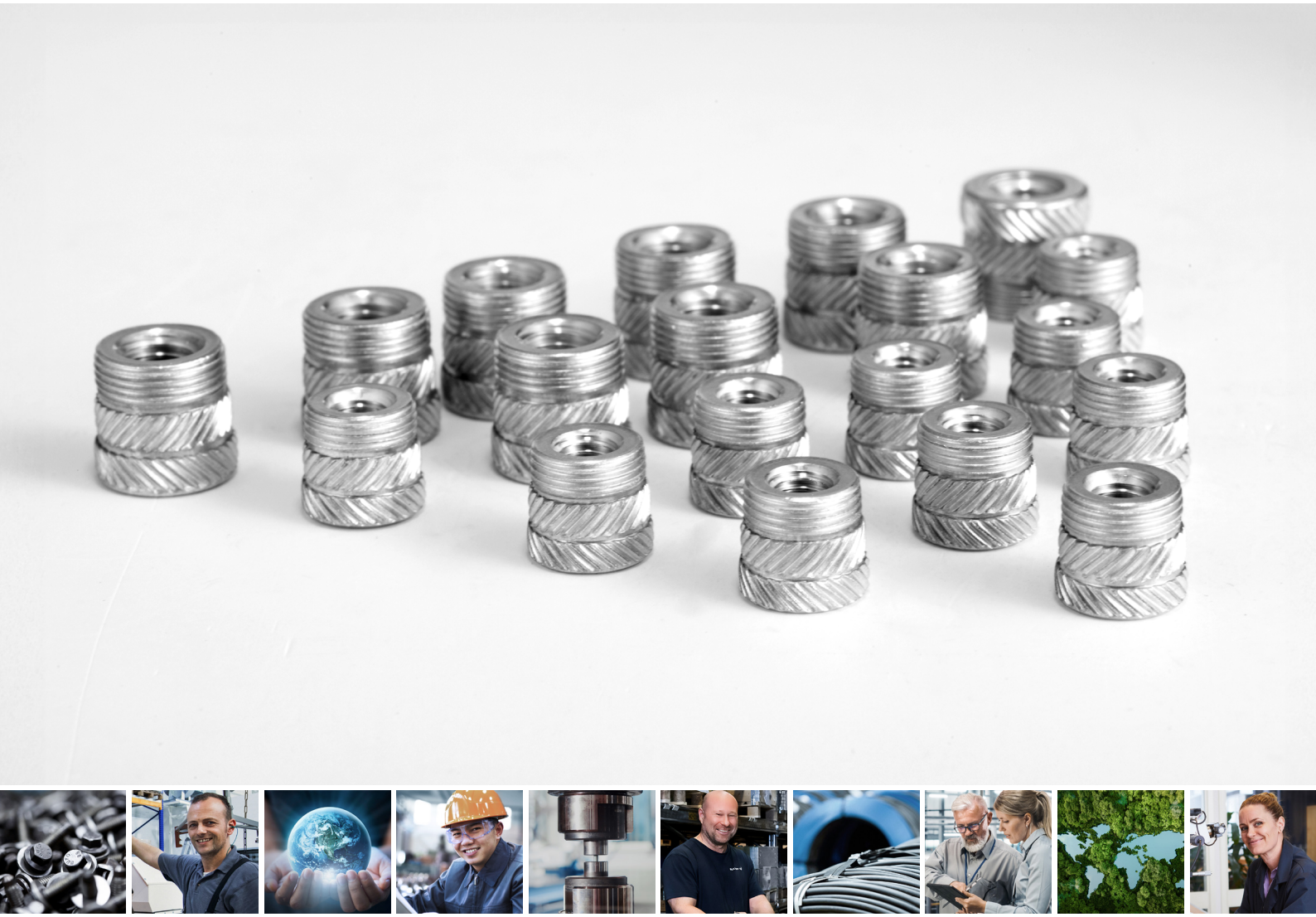
BULTEN

TRI-STEP™ INSERTS

LOWER YOUR “INSTALLED COST” BY AS MUCH AS 30% WITH BULTEN’S NEW TRI-STEP™ INSERTS.



A STRONGER SOLUTION

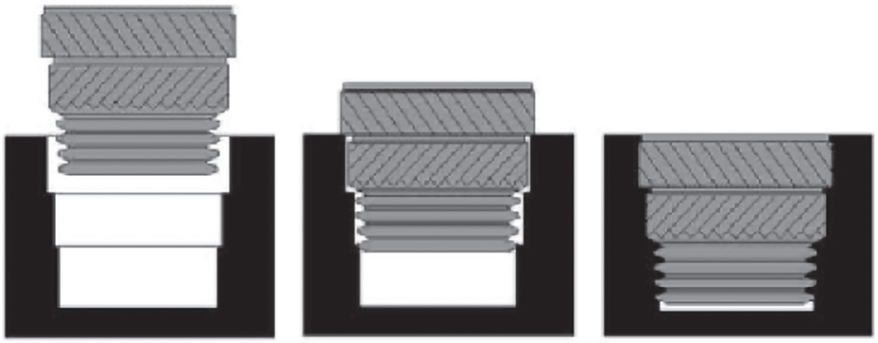
WWW.BULTEN.COM

TRI-STEP™ INSERTS

TRI-STEP™ Inserts freely locate more than two-thirds into the hole, reducing the installation stroke by 60%.

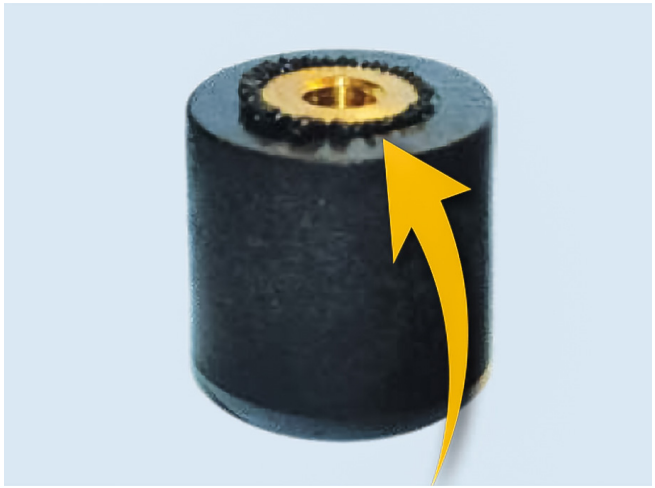
Additionally, TRI-STEP™ requires little to no dwell time and produces no spring-back, further increasing productivity.

Aluminum versions maximize cost reduction without sacrificing performance.



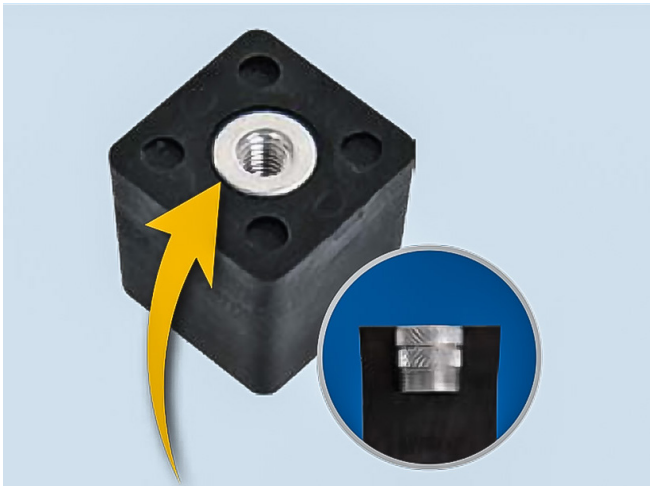
TRI-STEP™ Inserts provide the ease-of-location and hole-centering benefits of a tapered insert, while eliminating the inherent drawbacks of a tapered design.

CONVENTIONAL TAPERED INSERTS



Tapered inserts often produce plastic flash, resulting in secondary de-burring processes and added costs.

NEW TRI-STEP™ INSERTS



TRI-STEP™ Inserts are installed quickly and efficiently, and do not produce plastic flash.

TRI-STEP™ INSERTS

FAQ ABOUT BULTEN'S TRI-STEP™ INSERTS

HOW ARE TRI-STEP™ INSERTS DIFFERENT FROM OTHER INSERTS FOR PLASTICS?

TRI-STEP™ Inserts feature an opposing helical knurl pattern along with a series of annular vanes. This unique design is the basis for the performance benefits of the TRI-STEP™.

WHAT ARE THE BENEFITS OF TRI-STEP™ INSERTS?

TRI-STEP™ Inserts provide reduced installation time & cost – in addition to higher performance – compared with conventional inserts.

HOW WILL TRI-STEP™ INSERTS LOWER MY COST?

70% of the TRI-STEP™ Insert freely locates into the stepped hole, reducing insertion travel by 60%, and increasing the speed of installation. When using aluminum, there is also a dwell time savings compared to conventional brass inserts. TRI-STEP™ produces no plastic flash, so any secondary de-burring processes are eliminated, further lowering cost.

ARE THERE DIFFERENT TYPES OF TRI-STEP™ INSERTS?

Yes! TRI-STEP™ Inserts are available in a High Strength version (TST) and a Thin Walled version (TTW).
The TRI-STEP™ TST is ideal for automotive & industrial applications requiring the highest strength performance.
The TRI-STEP™ TTW can replace the majority of commonly used parallel and tapered inserts, including our industry standards as well as commercial equivalents.
Additionally, the TTW is available in a Mini Aluminum version that is ideal for notebooks and other hand-held consumer electronics. (Mini Aluminum Insert data is available on our website.)

WHAT MATERIAL ARE TRI-STEP™ INSERTS AVAILABLE IN?

The most common materials would be brass and aluminum. Our automotive customers have been switching from brass to aluminum because it offers maximum installation cost reduction; 40% higher thermal conductivity means it heats quicker and cools quicker. Aluminum also offers a 66% weight reduction.

HOW ARE TRI-STEP™ INSERTS INSTALLED?

TRI-STEP™ Inserts are designed for post-molded installation into thermoplastics. Bulten recommends heat for post-molded installation. However, they can also be installed ultrasonically.

I HAVE AN EXISTING APPLICATION. HOW EASY IS IT TO SWITCH FROM MY CURRENT INSERT TO A TRI-STEP™ INSERT?

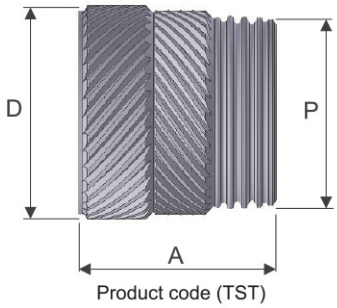
In most instances, it would be as easy as switching to a stepped pin in your plastic mold.

We would be pleased to review your insert application and propose the most cost-effective solution. Please contact Bulten or your local representative.

TRI-STEP™ INSERTS

DIMENSIONS

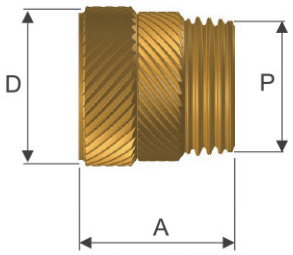
HIGH STRENGTH



Product code (TST)

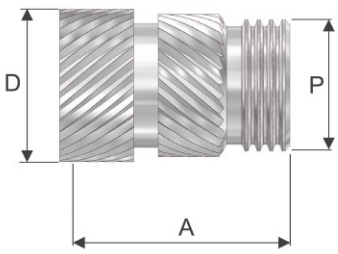
THIN WALLED

SHORT SERIES



Product code (TTW)

LONG SERIES



Product code (TTW)

AVAILABLE MATERIALS

- Aluminium (A)
- Brass (B)
- Steel - Zinc Nickel Plated (S)
- Stainless Steel (STST)

METRIC HIGH STRENGTH (TST)

Thread Size	A	D	P
M4	8.1	9.07	7.75
M5	10.0	10.50	9.15
M6	11.0	11.97	10.7
M8	13.5	14.00	12.7

MERTIC THIN WALLED (TTW)

Thread Size	Short Series A	Long Series A	D	P
M2	3.0	4.0	4.50	3.17
M3	4.5	5.7	5.70	4.37
M3.5	5.3	7.1	6.20	4.87
M4	6.0	8.1	6.90	5.57
M5	7.5	9.5	7.90	6.50
M6	9.0	12.7	9.00	7.80
M8	12.7	-	11.00	9.80

UNIFIED HIGH STRENGTH (TST)

Thread Size	A	D	P
8-32	0.319	0.357	0.305
10-32	0.394	0.414	0.361
1/4-20	0.433	0.472	0.425
5-16-18	0.532	0.552	0.504

UNIFIED THIN WALLED (TTW)

Thread Size	Short Series A	Long Series A	D	P
2-56	0.118	0.158	0.177	0.125
4-40	0.177	0.225	0.225	0.172
6-32	0.209	0.280	0.244	0.192
8-32	0.236	0.319	0.272	0.219
10-32	0.296	0.374	0.311	0.256
1/4-20	0.355	0.500	0.355	0.307
5/16-18	0.500	-	0.433	0.386

HOW TO SPECIFY (METRIC EXAMPLES)

	TST	**TTW** (Short)	**TTW** (Long)
Product code	**TST**-S-M6	**TTW**-B-M6-9.0	**TTW**-A-M6-12.7
Material code	TST-**S**-M6	TTW-**B**-M6-9.0	TTW-**A**-M6-12.7
Thread size	TST-S-**M6**	TTW-B-**M6**-9.0	TTW-A-**M6**-12.7
Length	TST-S-M6	TTW-B-M6-**9.0**	TTW-A-M6-**12.7**

TRI-STEP™ INSERTS

DESIGN GUIDE

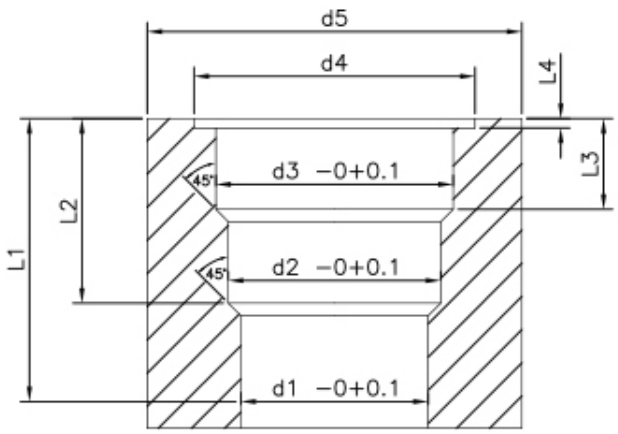
INSTALLATION

The insert may be installed using either a pre-heating process or by using heat generated by Ultrasonics. An insert at the correct temperature should soften the plastic without melting, allowing plastic to flow into the knurls and vanes. Excessive heat can affect insert performance and generate plastic flash on the top surface of the boss. Inserts should be installed flush to slightly proud, relative to the top surface of the boss, never sub-flush.

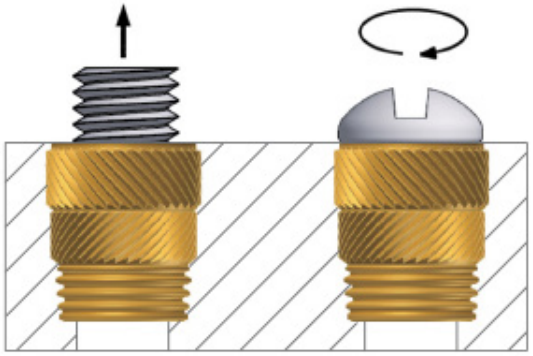
HOLE PREPARATION

The specified hole diameters apply at the bottom of each bore, with a tolerance of -0.00 / +0.10mm. The hole depth should ideally exceed the insert length by 0.5mm. A 1 ° inclusive moulding taper must be used, slightly increasing the hole diameter at the top of each bore.

HOLE DIMENSIONS



PULL OUT DIRECT TORQUE



Test conducted using PA6 GF30 Nominal values shown at failure

TRI-STEP™ INSERTS

METRIC	d1	d2	d3	d4	d5	L 1	L2	L3	L4	PULL OUT N	DIRECT TORQUE Nm
TST-M4	7.25	7.90	8.55	10.00	13.00	8.10	5.20	2.40	0.50	4000	10.0
TST-M5	8.65	9.35	10.00	11.50	15.00	10.00	6.45	3.20	0.50	5700	16.0
TST-M6	10.25	10.90	11.50	13.00	18.00	11.00	7.10	3.50	0.50	7000	24.0
TST-M8	12.30	12.90	13.50	15.00	22.00	13.50	8.70	4.30	0.50	8200	38.0
TTW-M2-3.0	2.90	3.42	4.04	-	6.20	3.00	2.00	0.90	-	590	1.0
TTW-M2-4.0	2.90	3.42	4.04	-	6.20	4.00	2.70	1.35	-	900	1.2
TTW-M3-4.5	3.85	4.62	5.24	-	7.50	4.50	3.00	1.50	-	1400	2.9
TTW-M3-5.7	3.85	4.62	5.24	-	7.50	5.70	3.80	1.90	-	1750	3.3
TTW-M3.5-5.3	4.35	5.12	5.74	-	8.80	5.30	3.60	1.80	-	2150	4.2
TTW-M3.5-7.1	4.35	5.12	5.74	-	8.80	7.10	4.60	2.30	-	2900	5.6
TTW-M4-6.0	5.05	5.82	6.44	-	9.80	6.00	4.00	2.00	-	2700	6.0
TTW-M4-8.1	5.05	5.82	6.44	-	9.80	8.10	5.35	2.70	-	3300	7.7
TTW-M5-7.5	6.15	6.72	7.45	-	11.50	7.50	5.05	2.50	-	3700	10.0
TTW-M5-9.5	6.15	6.72	7.45	-	11.50	9.50	6.40	3.35	-	4500	12.8
TTW-M6-9.0	7.35	7.95	8.55	-	13.50	9.00	6.10	3.30	-	4600	14.5
TTW-M6-12.7	7.35	7.95	8.55	-	13.50	12.70	8.60	4.65	-	6000	17.0
TTW-M8-12.7	9.35	9.95	10.55	-	16.00	12.70	8.60	4.65	-	6500	28.0

UNIFIED	d1	d2	d3	d4	d5	L 1	L2	L3	L4	PULL OUT lbs	DIRECT TORQUE lbs-ft
TST-8-32	0.286	0.311	0.337	0.394	0.512	0.319	0.205	0.095	0.020	900	7.4
TST-10-32	0.341	0.368	0.394	0.453	0.591	0.394	0.254	0.126	0.020	1280	11.8
TST-1/4-20	0.404	0.429	0.453	0.512	0.709	0.433	0.280	0.138	0.020	1570	17.7
TST-5/16-18	0.485	0.508	0.532	0.591	0.867	0.532	0.343	0.169	0.020	1840	28.0
TTW-2-56-118	0.114	0.135	0.159	-	0.244	0.118	0.079	0.035	-	130	0.7
TTW-2-56-158	0.114	0.135	0.159	-	0.224	0.158	0.106	0.053	-	200	0.9
TTW-4-40-177	0.152	0.182	0.206	-	0.296	0.177	0.118	0.059	-	315	2.1
TTW-4-40-225	0.152	0.182	0.206	-	0.296	0.225	0.150	0.075	-	390	2.4
TTW-6-32-209	0.171	0.202	0.226	-	0.346	0.209	0.142	0.071	-	2150	4.2
TTW-6-32-280	0.171	0.202	0.226	-	0.346	0.280	0.181	0.096	-	2900	5.6
TTW-8-32-236	0.199	0.229	0.254	-	0.386	0.236	0.158	0.079	-	600	4.4
TTW-8-32-319	0.199	0.229	0.254	-	0.386	0.319	0.211	0.103	-	740	5.7
TTW-10-32-296	0.242	0.265	0.294	-	0.453	0.296	0.199	0.099	-	830	7.4
TTW-10-32-374	0.242	0.265	0.294	-	0.453	0.374	0.252	0.132	-	1010	9.4
TTW-1/4-20-355	0.290	0.313	0.337	-	0.532	0.355	0.240	0.130	-	1030	10.7
TTW-1/4-20-500	0.290	0.313	0.337	-	0.532	0.500	0.339	0.183	-	1350	12.5
TTW-5/16-18-500	0.368	0.392	0.416	-	0.630	0.500	0.339	0.183	-	1460	20.7