

SI Product Line

Engineering Points

Categorizing SI Parts

ULTRASONIC / HEAT STAKING INSERTS

- Ultrasonic - Installed by pressing the insert into the mounting hole with ultrasonic insertion equipment while simultaneously applying a high frequency vibration. Frictional heat caused by the vibration melts the plastic surrounding the insert allowing easy insertion. When the vibration ceases, the plastic solidifies, locking the insert permanently in place.
- Heat Staking - Installed by pressing the insert into the mounting hole with a thermal press to melt the plastic surrounding the insert.

IUA, IUB, IUC (Tapered, through threaded inserts) - Page 5
 IUTA, IUTB, IUTC (Straight wall, through threaded inserts) - Page 6
 IUTFB (Flanged, Straight wall, through threaded inserts) - Page 7
 ISA, ISB, ISC (Symmetrical, through threaded inserts) - Page 8
 MSIA, MSIB (microPEM® symmetrical, through threaded inserts) - Page 9
 Performance data for ultrasonic inserts - Pages 10-11



MOLDED-IN INSERTS

- Installed during the molding process, the inserts are located in the mold cavity by core pins. When the mold opens, the core pins are withdrawn leaving the inserts permanently encapsulated in the plastic section with only the threads exposed.
- Installing the inserts during the molding process eliminates the need for secondary steps or installation equipment.

IBA, IBB, IBC (Blind threaded inserts) - Page 12
 IBLC (Self-locking blind threaded inserts) - Page 13
 ITA, ITB, ITC (Through threaded inserts) - Page 14
 STKA, STKB, STKC (Knurled inserts) - Page 15
 Performance data for molded-in inserts - Page 16



PRESS-IN INSERTS

- Installed by simply pressing the inserts into pre-molded or drilled holes. Installation is accomplished using any standard press at any time during the production process.
- Eliminates the need for molding-in inserts.
- Eliminates the need for heat or ultrasonic equipment.

NFPC, NFPA (Hexagonal, press-in inserts) - Page 17
 PPA, PPB (Through threaded inserts) - Page 18
 PFLA, PFLB (Flange-head inserts) - Page 19
 PKA, PKB (Straight knurl inserts) - Page 20
 Performance data for press-in inserts - Page 21



Can SI parts be grouped by their installation method and series?



If a customer is limited to a specific installation method, they must sift through inserts used with other installation methods to find the part they need.

Select	Image	Part #
<input type="checkbox"/>		Mfr. Part # IUTFB-M3 Mouser Part # 153-IUTFB-M3 
<input type="checkbox"/>		Mfr. Part # ITB-440 Mouser Part # 153-ITB-440
<input type="checkbox"/>		Mfr. Part # IBB-832-4 Mouser Part # 153-IBB-832-4
<input type="checkbox"/>		Mfr. Part # IBB-832-12 Mouser Part # 153-IBB-832-12
<input type="checkbox"/>		Mfr. Part # 4256 Mouser Part # 485-4256

Inserts in the catalog are categorized by their installation method



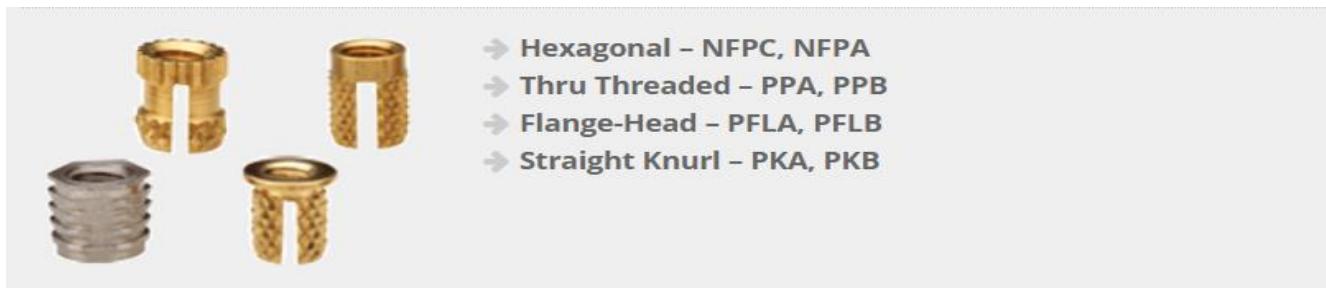
- Tapered, Thru Threaded – IUA, IUB, IUC
- Straight Wall Thru Threaded – IUTA, IUTB, IUTC
- Symmetrical, Thru Threaded – ISA, ISB, ISC
- microPEM® Inserts For Plastic – MSIA™, MSIB™
- [Setup Temperatures for Thermal Pressing Inserts](#)

Ultrasonic/Heat staked



- Blind Threaded – IBA, IBB, IBC
- Self-Locking Blind Threaded – IBLC
- Thru Threaded – ITA, ITB, ITC
- Knurled Spacers – STKA, STKB, STKC

Molded-In

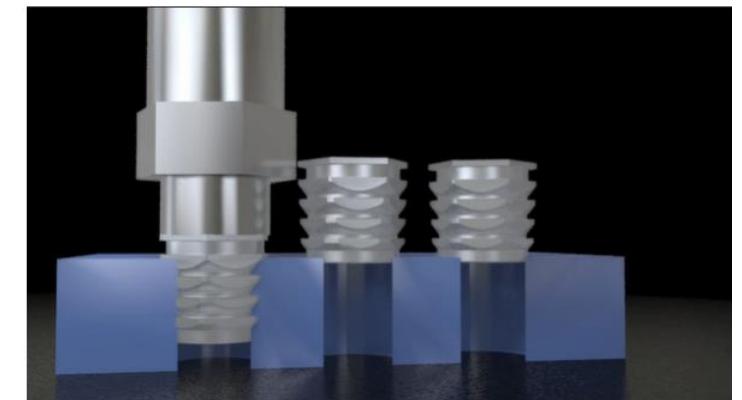
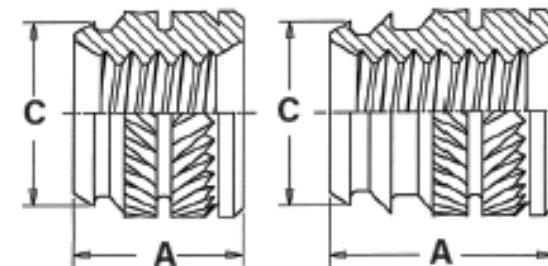


- Hexagonal – NFPC, NFPA
- Thru Threaded – PPA, PPB
- Flange-Head – PFLA, PFLB
- Straight Knurl – PKA, PKB

Cold Press-In

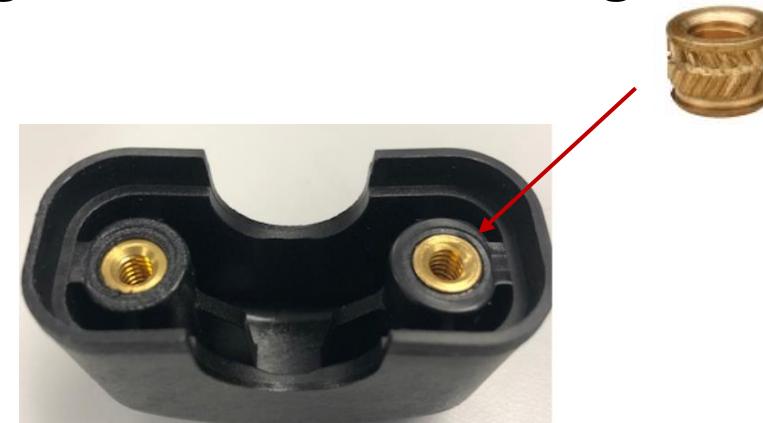
What is a Threaded Insert?

Threaded Inserts are precision machined metal components with engineered external features that secure them into plastic



Why Are Threaded Inserts Used?

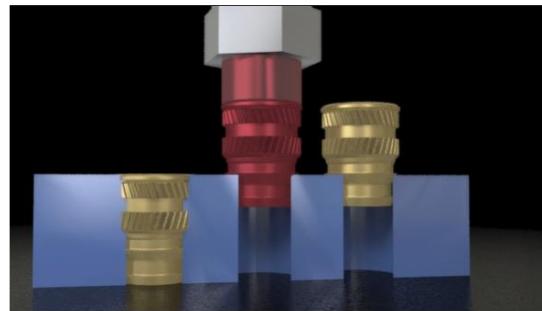
- To provide strong reusable “wear resistant” threads in plastic where assembly & disassembly is required
- To provide an electrical contact in plastic
- To provide close tolerance threads for the mating component
 - Unified: Class 2B (internal)
 - Metric: 6H (internal)
- To avoid using thread cutting screws that will degrade plastic with repeated use.



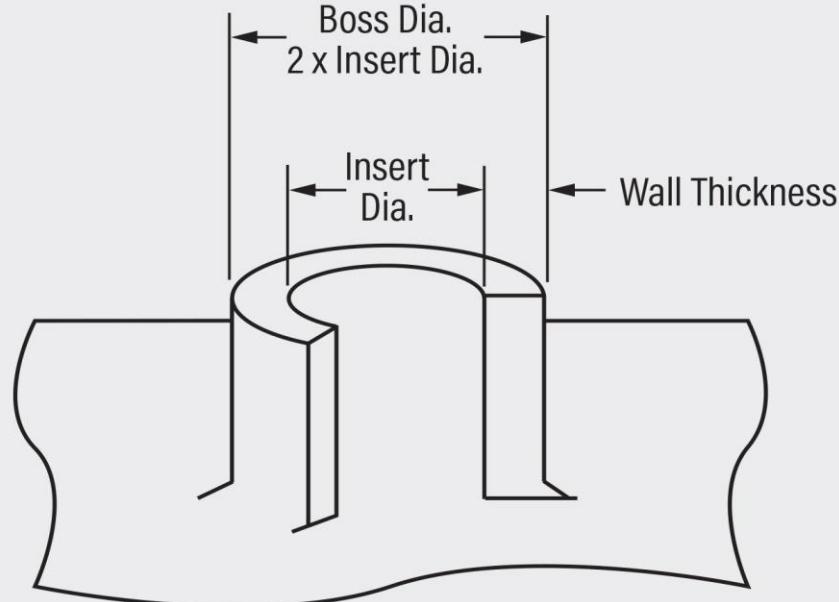
Hole Preparation during post molding installation

Installation methods include:

- Ultraasonic Insertion
- Thermal or Heat Insertion
- Cold Press Insertion



HOLE PREPARATION GUIDELINES

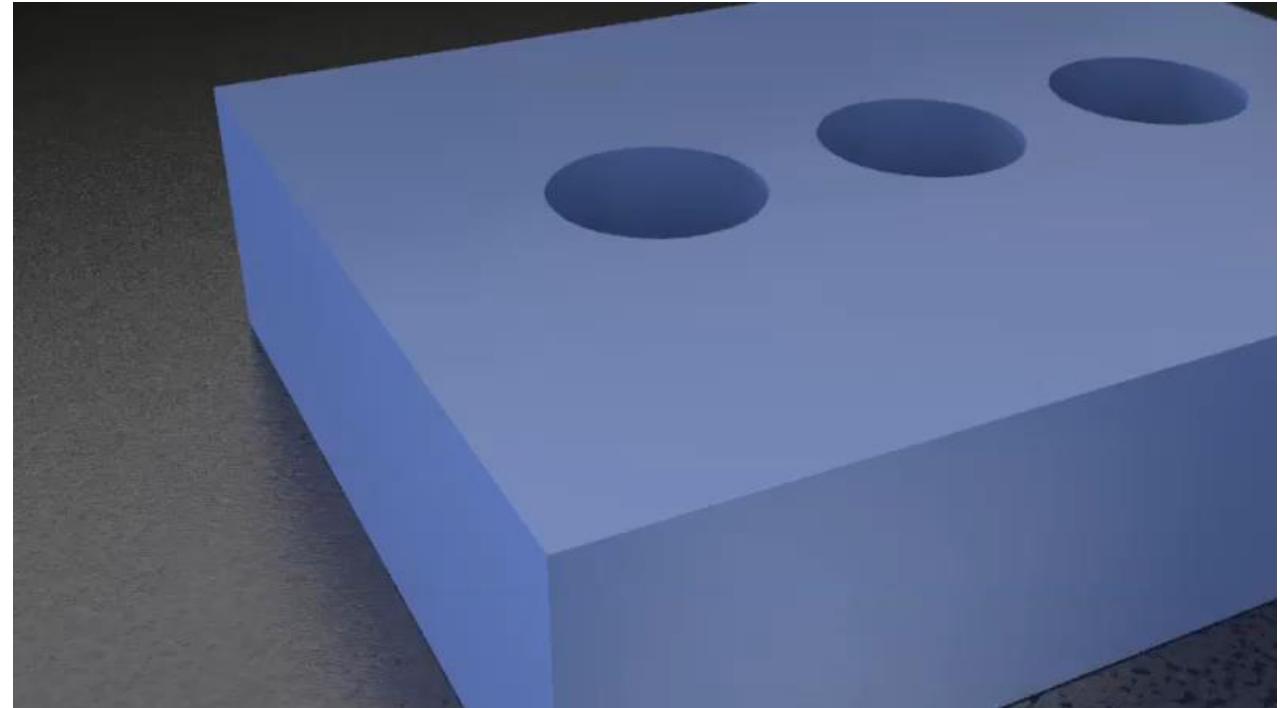


Thinner walls and bosses may be used but will affect performance.

Ultrasonic Insertion

During this process, the insert is placed into a molded or predrilled hole

- The insert is hit with an ultrasonic welding horn at 20KHZ (vibrating 20,000 times per second).
- Vibrations travel thru. the insert and frictional heat is generated melting the plastic in a localized area as the insert is driven into the part.
- Ultrasonic vibrations cease, the plastic re-solidifies and the insert is bonded into the plastic.



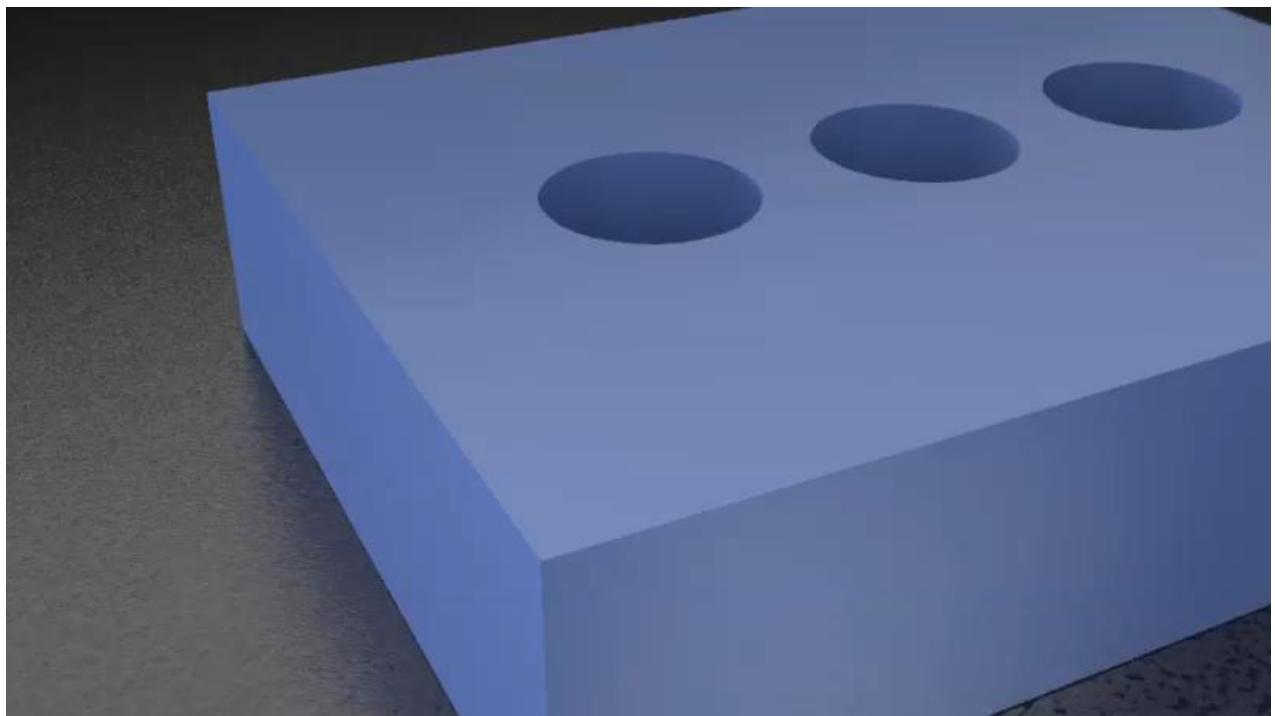
Ultrasonic insertion is noisy. Hearing protection required.



Thermal Heat Staking Insertion

During this process, the insert is placed into a molded or predrilled hole.

- A heated probe contacts the insert heating it to at or above the melt temperature of the plastic.
- Localized melting occurs as the insert is driven into place.
- The probe is retracted and the plastic re-solidifies around the insert.

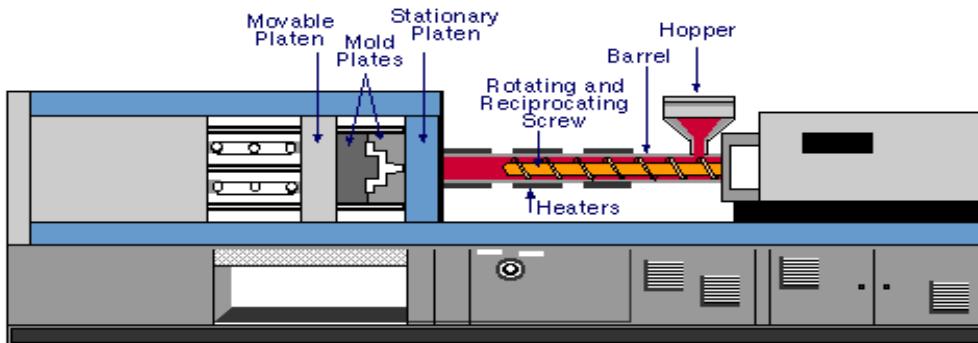


Molded In

Inserts are installed during the injection mold operation

The insert is placed on a core pin in the injection mold and the plastic is molded around the insert.

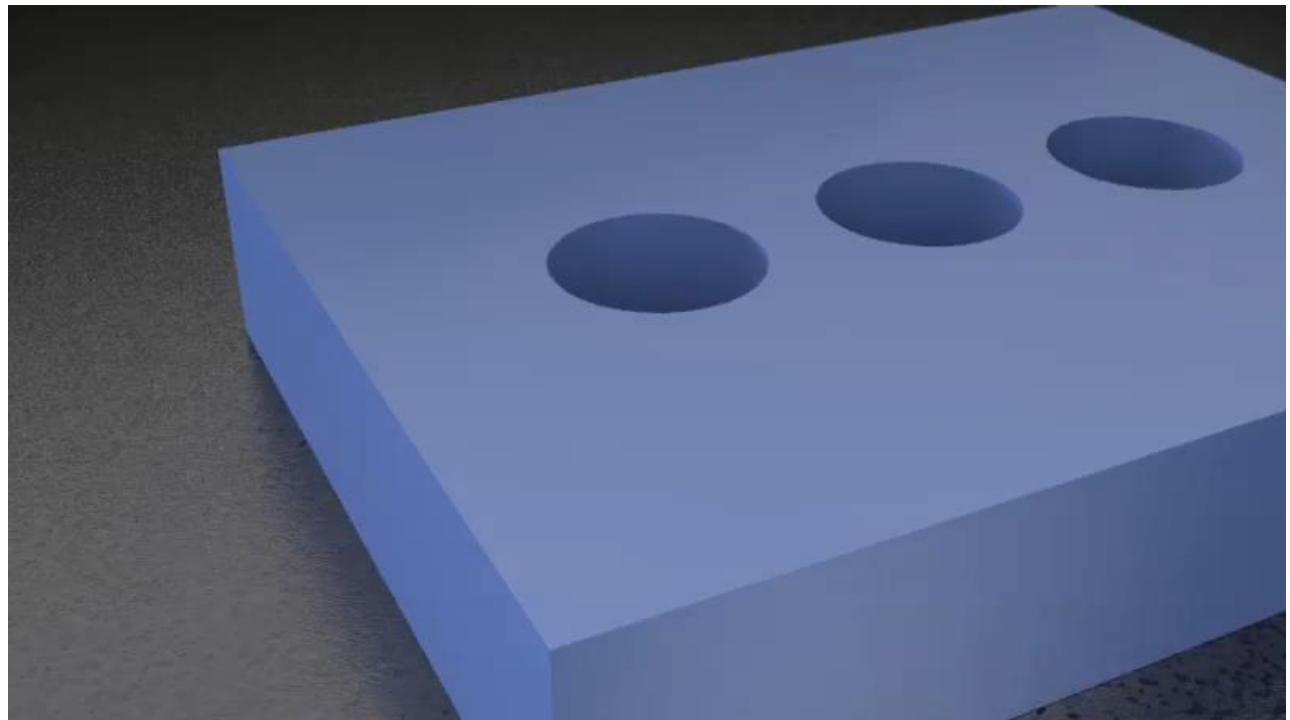
Proper pin size is important to retain insert in place.



Cold Press Insertion

Press-in Inserts for Plastics

- Install by simply pressing the insert into pre-molded or drilled holes.
- Eliminates the need for heat or ultrasonic equipment.
- No melting of plastic. Holding values may be lower.



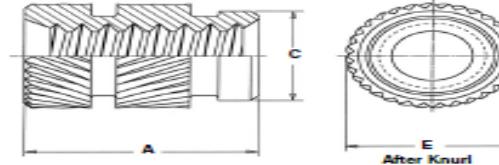
Featured Product Series – IUTB, IUTC and IUTA straight wall insert



ULTRASONIC / HEAT STAKING INSERTS

Straight Wall, Thru-Threaded, IUTA™, IUTB™ and IUTC™ Inserts

- Self-aligning lead-in of insert provides for accurate alignment prior to installation.
- Aluminum inserts ideal for light weight designs.
- Aluminum and stainless steel inserts offer lead-free alternative.



All dimensions are in inches.

UNIFIED	Thread Size	Type			Thread Code (I)	Length Code	A $\pm .005$	E $\pm .005$	C $\pm .005$	Hole Size in Material	
		Aluminum	Brass	Stainless Steel						Min. Hole Depth	Hole Dia. +.003 -.000
.086-56 (#2-56)	IUTA	IUTB	IUTC		256	125	.125	.147	.121	.155	.127
						—	.157			.187	
.112-40 (#4-40)	IUTA	IUTB	IUTC		440	135	.135	.179	.152	.165	.158
						—	.226			.256	
.138-32 (#6-32)	IUTA	IUTB	IUTC		632	150	.150	.210	.183	.180	.189
						—	.281			.311	
.164-32 (#8-32)	IUTA	IUTB	IUTC		832	185	.185	.243	.217	.215	.223
						—	.321			.351	
.190-24 (#10-24)	IUTA	IUTB	IUTC		024	225	.225	.273	.247	.255	.253
						—	.375			.405	
.190-32 (#10-32)	IUTA	IUTB	IUTC		032	225	.225	.273	.247	.255	.253
						—	.375			.405	
.250-20 (1/4-20)	IUTA	IUTB	IUTC		0420	300	.300	.342	.310	.330	.316
						312	.312			.530	
.250-28 (1/4-28)	IUTA	IUTB	IUTC		0428	—	.500	.342	.310	.530	
						—	.500			.530	
.313-18 (5/16-18)	IUTA	IUTB	IUTC		0518	—	.500	.406	.374	.530	.378
						—	.500			.530	
.313-24 (5/16-24)	IUTA	IUTB	IUTC		0524	—	.500	.406	.374	.530	.378
						—	.500			.530	
.375-16 (3/8-16)	IUTA	IUTB	IUTC		0616	—	.500	.509	.462	.530	.468
						—	.500			.530	
.375-24 (3/8-24)	IUTA	IUTB	IUTC		0624	—	.500	.509	.462	.530	

All dimensions are in millimeters.

METRIC	Thread Size	Type			Thread Code (I)	Length Code	A ± 0.13	E ± 0.13	C ± 0.13	Hole Size in Material	
		Aluminum	Brass	Stainless Steel						Min. Hole Depth	Hole Dia. +.08
M2 x 0.4	IUTA	IUTB	IUTC		M2	318	3.18	3.73	3.07	3.94	3.23
						—	4			4.76	
M2.5 x 0.45	IUTA	IUTB	IUTC		M2.5	—	5.74	4.55	3.86	6.5	4.01
						—	5.74			4.19	
M3 x 0.5	IUTA	IUTB	IUTC		M3	343	3.43	4.55	3.86	6.5	4.01
						—	5.74			4.19	
M3.5 x 0.6	IUTA	IUTB	IUTC		M3.5	—	7.04	5.33	4.65	7.9	4.81
						—	8.15			8.91	
M4 x 0.7	IUTA	IUTB	IUTC		M4	470	4.7	6.17	5.51	5.46	5.67
						—	8.15			8.91	
M5 x 0.8	IUTA	IUTB	IUTC		M5	572	5.72	6.93	6.27	6.48	6.43
						—	9.52			10.28	
M6 x 1	IUTA	IUTB	IUTC		M6	762	7.62	8.69	7.87	8.38	8.03
						—	12.7			13.46	
M8 x 1.25	IUTA	IUTB	IUTC		M8	—	12.7	10.31	9.5	13.46	9.6