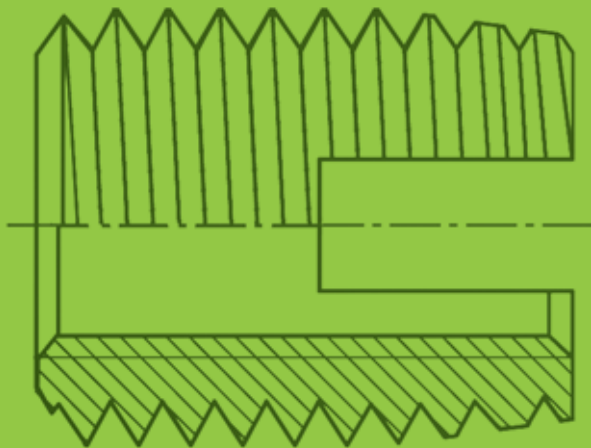


Threaded inserts for metal

Ensat®
Mubux®-Z
Mubux®-M0



Technical publication

No.20



Fastening technology from KerbKonus is in successful application in a wide variety of different industrial sectors around the world.

State-of-the-art production facilities provide our customers with the assurance of quality and reliable delivery, and sophisticated fastening solutions for every conceivable field of application are implemented by our own Research and Development Department.

Close cooperation and exchange of experience and expertise on an international level ensure that our company stays at the cutting edge of technological development.

With independent branches and agencies operating in a number of countries around the world we are a truly reliable partner when it comes to secure fastening technology.

... our products and services

Depending on the required anchoring method in the material, KerbKonus offers a variety of threaded insert options:

- self-tapping threaded inserts for metal, wood and plastics,
- Threaded inserts for cold embedding
- Threaded inserts for hot or ultrasound embedding
- Threaded inserts for screwing into an internal thread
- Threaded inserts for riveting

Alongside its long-standing, proven spectrum of threaded inserts for a wide variety of applications, KerbKonus also offers a range of fastening technology-related products and services:

- Punched rivet system for thin mouldings
- Screw locking
- Thread sealing systems
- Insulating plastic coating

If you have a specific problem related to the field of fastening technology - with its rich fund of expertise and comprehensive product range, KerbKonus has the solution for you.

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Technical details of KerbKonus products are provided on our website: www.kerbkonus.de

To access design data, go to the download portal of our website. Here, you will be able to download product data in any required formats or as CAD files.



Dimensions

Product features

Retaining hole

Specifications

Other details

Threaded inserts from KerbKonus ...

Tested quality; Test methods	Page 2 and 3
Ensat® – the self-tapping threaded insert	Page 4
Pull-out strength	Page 5
Installation	Page 6

Installation tools / Montage

Ensat® – Installation tools	Page 7 to 9
Machine installation	Page 10
Manual installation	Page 11



Ensat®-S 302 0 / -SI 302 2 and Ensat®-SK 302 1

M2 to M30	self-tapping	Form cast	302 0	Page 12
M4 to M12	with cutting slot	or drilled	302 2	Page 13
Imperial thread			302 0	Page 14
M4 to M10			302 1	Page 15



Ensat®-SB 307 0 / 308 0 and Ensat®-SBI 307 2 / 308 2

M3 to M24	self-tapping with	Form cast	307 0 / 308 0	Page 16
M4 to M12	3 cutting bores	or drilled	307 2 / 308 2	Page 17



Ensat®-SBK 307 1 / 308 1 and Ensat®-SBKI 307 3 / 308 3

M5 to M10	self-tapping with	Form cast	307 1 / 308 1	Page 18
M5 to M10	3 cutting bores	or drilled	307 3 / 308 3	Page 19



Ensat®-SBS 337 0 / 338 0 and Ensat®-SBSI 337 2 / 338 2

M3 to M16	self-tapping with	Form cast	337 0 / 338 0	Page 20
M4 to M12	3 cutting bores	or drilled	337 2 / 338 2	Page 21
M3 to M8			337 0 / 338 0	Page 22



Ensat®-SBD 347 0 / 348 0

M3,5 to M12	self-tapping with	Form cast	347 0 / 348 0	Page 23
	3 cutting bores	or drilled		



Ensat®-SBE 307 4 / 308 4

M5 to M16	self-tapping with	Form cast	307 4 / 308 4	Page 24
	3 cutting bores	or drilled		



Ensat®-SBN 317 0 / 318 0

M4 to M16	self-tapping with	Form cast	317 0 / 318 0	Page 25
	3 cutting bores	or drilled		



Ensat®-SBT 357 0 / 358 0

M4 to M12	self-tapping with	Form cast	357 0 / 358 0	Page 26
	3 cutting bores	or drilled		



Mubux®-Z 890 0

M4 to M6	Threaded insert	Form cast	890 0	Page 27
	for embedding	or drilled		



Mubux®-M/-MO 970 0

M3 to M12	Outside coated	drilled and	970 0	Page 28 and 29
	with precote® 80 for	tapped thread		
	anti-rotation and sealing	(standard thread)		

Ensat®-assortment and Repair kit

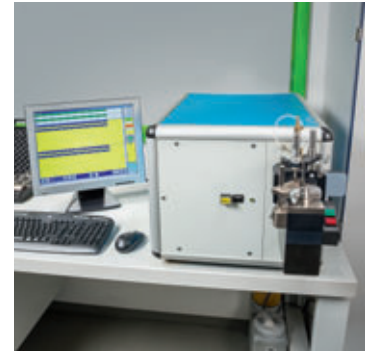
Repair kit	Page 30
Assortment	Page 31

What really counts: tested quality.

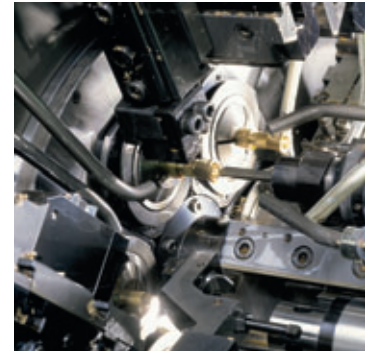


At our parent plant in Amberg, we produce threaded inserts using efficient production methods. A team of qualified and highly motivated staff guarantees a consistent, high standard of production.

The number of products manufactured over the company's history reaches into the billions. State-of-the-art automation lines manufacture around the clock in a precise and high standard of quality. The efficient and low-cost production of large-scale product series is one of the strengths on which we have based our success.

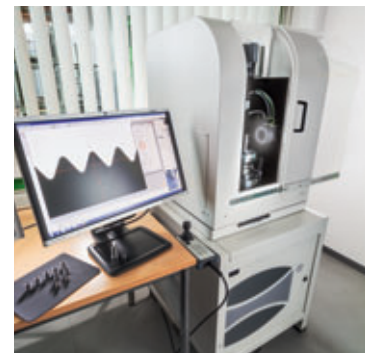


But our high-volume production output in no way compromises flexibility. We are able to quickly and efficiently produce even small batches of non-standard items.



Our state of the art stock control system permits the reliable, prompt delivery of standard products, keeping your production running to schedule at all time and helping to minimize your warehousing costs.

We are particularly proud of a cost-to-performance ratio which ensures satisfied customers the world over. This has made KerbKonus a reputable and respected partner to industry in the global marketplace.



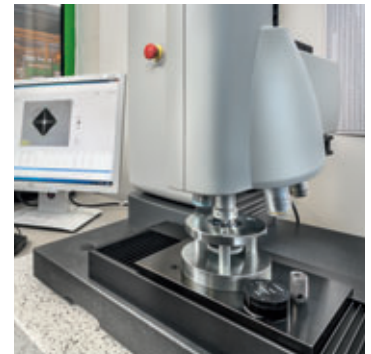
Quality consciousness is a continuous thread running through every aspect of the company's work and all its products and services. Quality is lived and breathed at KerbKonus.

As manufacturer in the metal processing industry we are aware of our responsibility for an environmentally compatible production. With this in mind we follow up a policy of sensible resource spending and environment-friendly production both in our process engineering and our product range.



Quality management system
DEKRA Certificat in accordance with
ISO 9001:2015 Reg.No. 30507428
ISO 14001:2015 Reg.No. 170507049
ISO 50001:2018 Reg.No. 181115119

Applications on the test stand ...



Threaded inserts from KerbKonus are manufactured in large piece numbers. And human lives and safety can often depend upon just these tiny components, for instance in the case of airbag retaining fasteners.

Because we bear this heavy responsibility, our products are tested and monitored in line with the most stringent directives. In the case of particularly critical applications, each and every part is exhaustively tested on state-of-the-art test equipment before it is delivered to you. For Example:

- dimensional check
- foreign particles

Test methods

The loading capacity of a thread depends in the main on the surface shell of the component which is exposed to shearing stress. By selecting just the right threaded insert for each application, maximum reliability can be achieved.

Using tried and tested, practically oriented test methods (see the table below), we provide the designer with a set of reliable specifications to ensure safe, reliable compliance with any application requirement, however unusual. In most cases, this can even be achieved using standard threaded inserts.

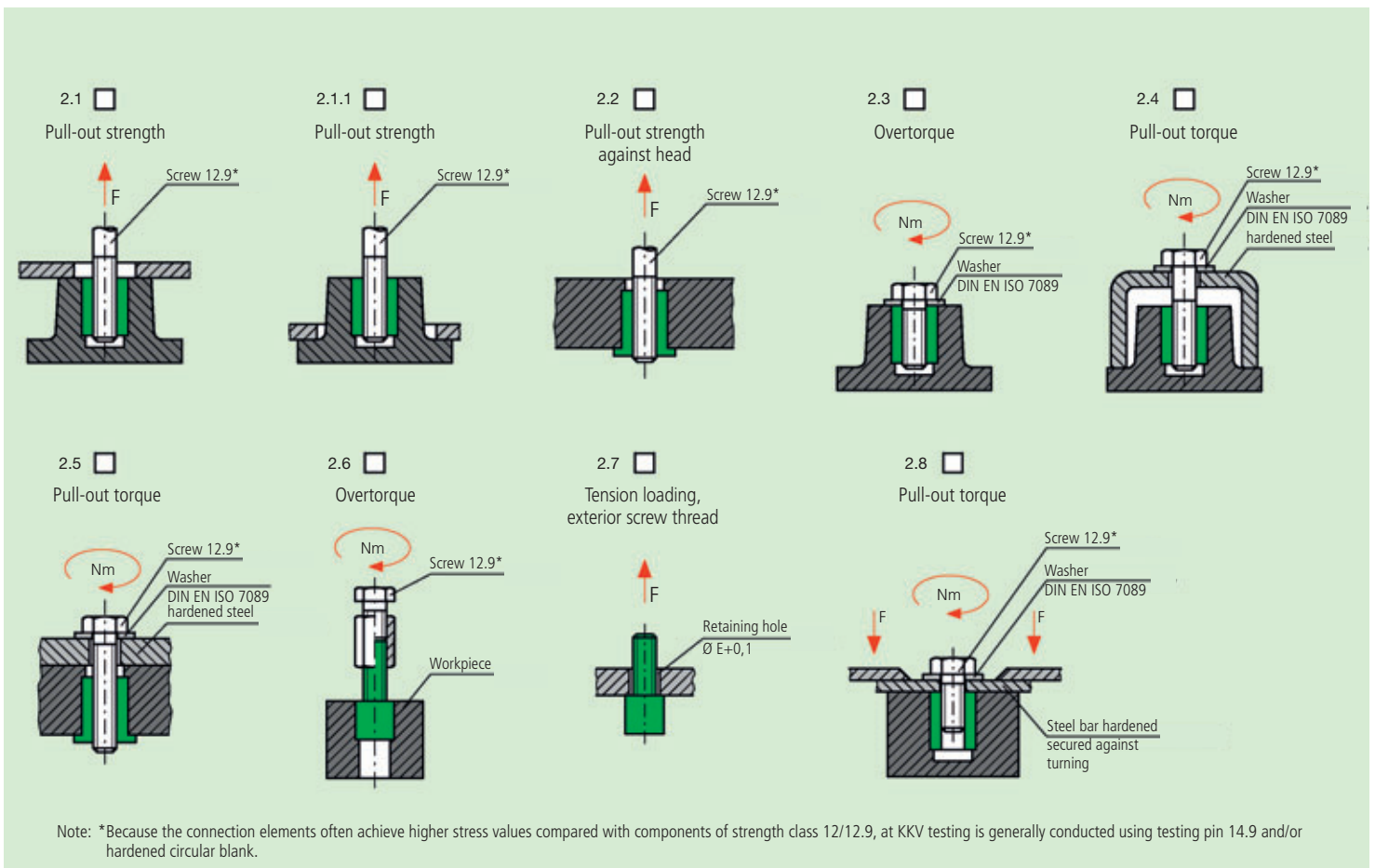
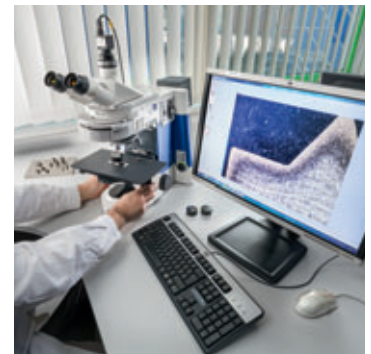


Fig. 1
20.1122

The Ensat® – self-tapping threaded insert ...



Ensat® is a self-tapping threaded insert with external and internal thread, cutting slots or cutting bores. A continuous process of further development has brought about a number of major improvements to product characteristics.

Ensat®-S 302

(with cutting slot) is recommended for most application cases. In certain materials, this Ensat® demonstrates a minimal inward springing action, so creating a certain screw locking effect. (see page 12 to page 15)
If this effect is not required, we recommend using Ensat®-SB 307/308.



Ensat®-SB 307/308

(with cutting bores) was developed for materials with difficult cutting properties. This insert has a thick wall and the cutting force is distributed over three cutting edges. The short version Ensat® 307 is particularly suitable where minimal material thicknesses are involved (see page 16 to page 19).



Ensat®-SBS 337/338

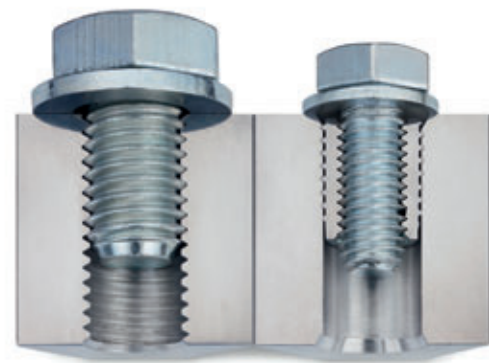
with three chip reservoirs. Used primarily wherever only a small amount of chips may be permitted to occur during the tapping process (see page 20 to page 22).

Thin-walled Ensat®-SBD 347/348

for applications involving special space conditions (residual wall thicknesses), and also suitable for driving using a thread tapping machine (same internal and external thread pitch, see page 23).

Ensat®-SBT 357/358

with closed floor for additional sealing from below. (see page 26).



Fields of application

The Ensat® is used throughout the whole of the metal and plastics processing industry.

- Automotive
- Plant and equipment construction
- Railway supply industry
- Electro-technics and laboratory techniques
- Household appliance
- Medical engineering
- Offshore

Thread reparation

Ensat® is ideally suited for the fast repair of torn and damaged threads. The same screw size can be used again.

Product features

- The Ensat® has a large effective shearing surface, so ensuring a higher degree of pull-out strength, i.e. an Ensat® M4 is often sufficient instead of a cut M5 thread (see page 5, Fig. 3).
- The Ensat® is driven subsequently into the finished workpiece. This means a higher casting machine output, no rejects due to incorrectly cast-in insert components, no moulding sand trapped in the thread.
- A pre-cast or pre-drilled retaining hole with normal tolerance requirements is sufficient for driving in the Ensat®. The thread is always precisely positioned.
- The Ensat® is insensitive to small areas of shrinkage. The Ensat®-system prevents damage caused by torn threads.



The Ensats® – pull-out resistance due to flank coverage ...

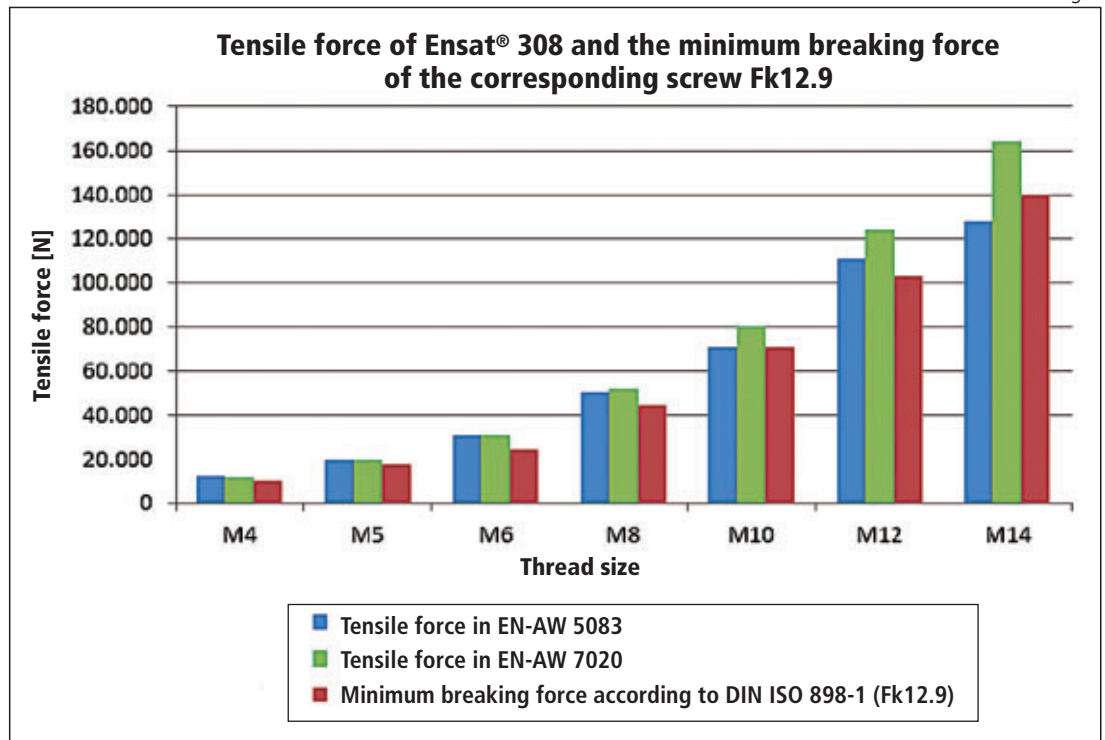


Connections using threaded insert Ensats® permit substantially smaller dimensions and consequently material and weight-saving designs.

The illustration below (Fig. 3) shows a screw connection with different screw cross-sections.

Despite the smaller screw cross-section, a screw joint with an Ensats® is capable of withstanding higher axial forces than the screw joint with larger screw cross-section; because the force – both under static and dynamic load – in the Ensats® male thread is distributed evenly over the individual thread turns of the Ensats® male thread.

Fig. 2

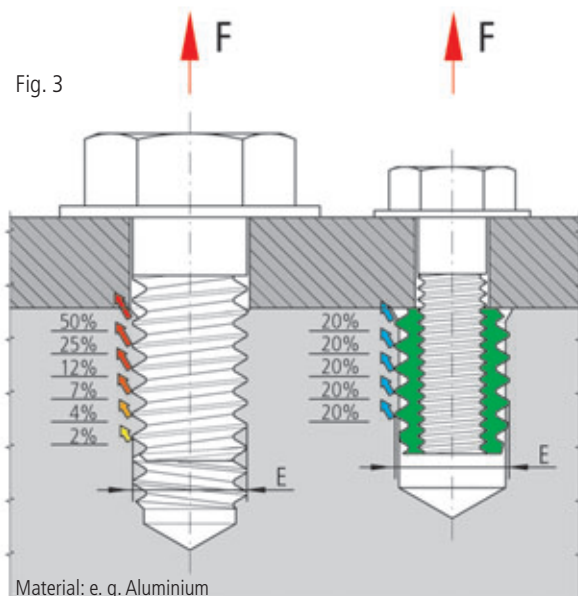


Pull-out strength

The Ensats® is capable of withstanding high loads. When used in light alloys, for example, a degree of pull-out strength is achieved which far exceeds the yield strength of the mating screw 12.9 (Fig. 2).

The values shown are mean values of a test series according to the company standard 2.1 (see page 3). The hole diameter is in the middle range of the one recommended in this publication. Depending on the base material of the workpiece, tensile forces above the minimum breaking force of the corresponding screw with strength class 12.9 can be reached. If your base material requires it, special solutions (larger outer diameter, greater length of Ensats®) are available on request.

Fig. 3



Flank coverage

Ensats®-S 302 almost reaches the maximum tensile strength at a flank coverage of only 30%.

For Ensats®-SB 308, the same procedure corresponds to a flank coverage of approx. 50% as the height of the thread flanks is lower.

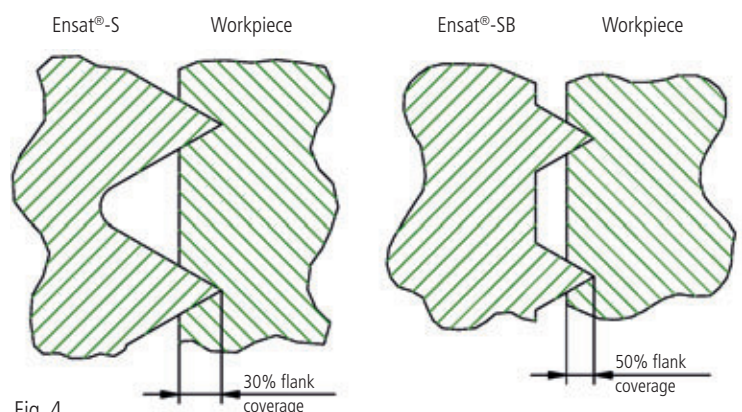


Fig. 4

The Ensat® in the workpiece ...

Installation recommendation

The Ensat® should be processed appr. 0,1 – 0,2 mm recessed (Fig. 5). After processing, the Ensat® can be immediately subjected to load. If the component material permits subsidence of the Ensat® under load, the Ensat® can only execute an axial movement of 0,1 to 0,2 mm. In other words, the pretension of the screw union is largely retained, loosening of the screw connection under dynamic load is impeded

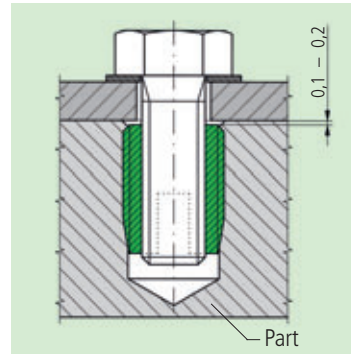


Fig. 5

In case of processing problems (e.g. markedly increased screw-in torque levels) there is generally no harm in selecting diameter data in the next highest column. In case of doubt, we advise carrying out a test.

Retaining hole

The retaining hole (L) can be simply drilled or integrated into in the casting.

Countersinking (N) the borehole (Fig. 6) is recommended in order to:

- Prevent the workpiece surface from being raised
- Permit screwing in to a greater depth
- Ensure improved initial cutting characteristics

Material thickness:

Length of the Ensat® = smallest admissible material thickness M.

Depth of the blind hole:

Minimum depth – (T) see Works Standard page 12 to 26.

Borehole diameter:

Brittle, tough and hard materials call for a larger borehole than soft or elastic materials. For guideline values, see Works Standard page 12 to 26.

Edge distance:

The smallest still admissible edge distance W (Fig. 6) depends on the planned stress level and the elasticity of the material into which the Ensat® is screwed.

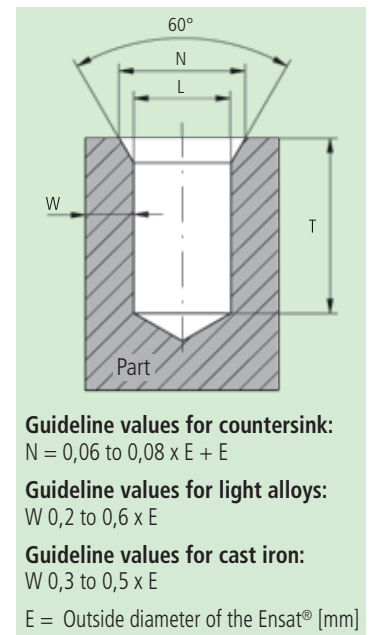


Fig. 6

Ensat® – driving tools...

On this page, you can configure the optimum tool for your application. A configuration is provided in the following as an illustrative example.

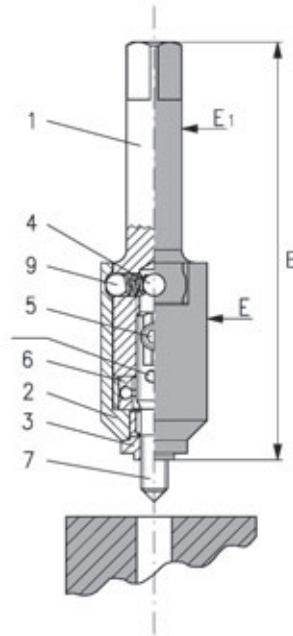
The article number is composed of two sequences of numbers and starts with the tool shank (Fig. 9) which should be selected in accordance with your output. Also encrypted in this number are the special versions for thin-walled Ensat® (620 1 and 621 1) and for very high driving torques (622 0 and 623 0) which are available as standard only as a square shank.

Other non-standard geometries can be evaluated as standard besides the tools illustrated.

The second sequence of numbers in the table (Fig. 10) indicates the thread code of the female thread. The tightened dimensions of the tools are shown on the next page.

Tool for accessible retaining boreholes (short)

- 1 Shank
- 4 Stop pin
- 9 Ball
- 5 Fixing screw
- Marking
- 6 Ball bearing
- 2 Shell
- 3 Guide bush
- 7 Stud



Tool for deep located retaining boreholes (long)

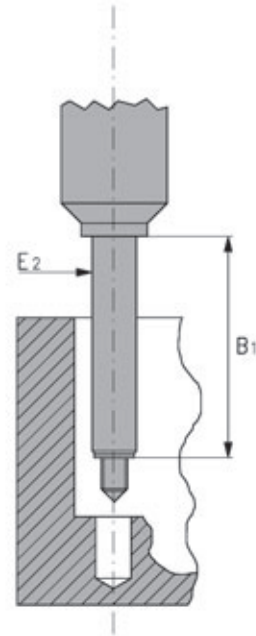


Fig. 7

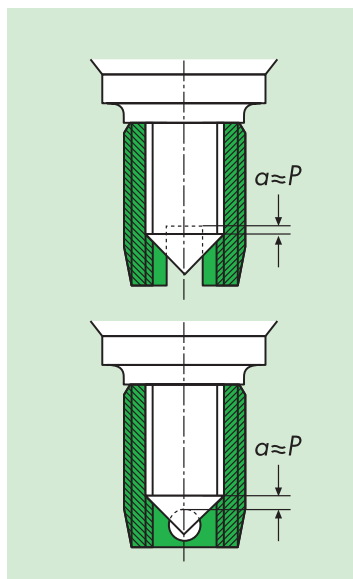


Fig. 8

The right length of the threaded pin for the Ensat® with cutting slot or with cutting bore is calculated from the pitch of the female thread (see also Fig. above; P = pitch of the female thread).

Setting or exchanging the stud

- Pull the shell (2) downwards off the shank (1).
- Release the locking screws (5).
- Screw the stud (7) in or out. Yellow colour marking indicates flattened surfaces for the locking screws.
- When assembling, tighten both screws (5) evenly.
- Insert the ball bearing (6).
- Push on the shell (2) until the ball stop locks into place. For the tool to function perfectly, the shell must be very easy to rotate. Shorten the thread of tool 610 accordingly for short Ensat®.
- Unscrew the guide bush (3) at the front if the Ensat® is to be installed deeper than 0.2 mm under the surface of the workpiece. Diameter: 0.1 to 0.2 mm smaller than Ensat® retaining hole.

For mounting thin-walled Ensat® (page 23), special guide bushes must be used (tools 620 1 and 621 1).

Conditions for flawless tool function

- Locking and unlocking the tool on the Ensat® surface is guaranteed by a thrust bearing (6).
- The stop pins (4) execute the impact at the shell (2) which unlocks the tool.
- Wear at the stud (7) can result in unlocking problems.

The components are also offered as single parts to allow you to carry out your own repairs to the tool.

Simply give us a call.

Ensat® – driving tools...



Example:

You wish to insert an Ensat® 308 000 050. 110. For the installation process, you have selected a driving tool with spindle hexagon socket to DIN ISO 1173 (E6,3) and have to mount the insert into a deep positioned borehole.

Shank:
636 0...
(long for deep positioned borehole)

Thread code:
...00 050...
(for thread M5)

Suffix numbers:
.... 000
(with always the same tools)

Order no: **636 000 050.000**

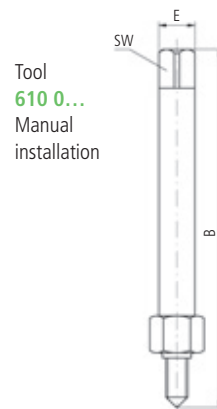
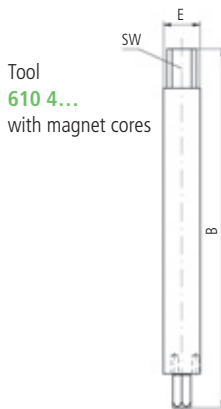
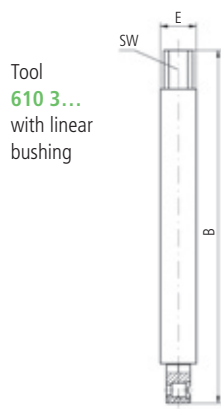
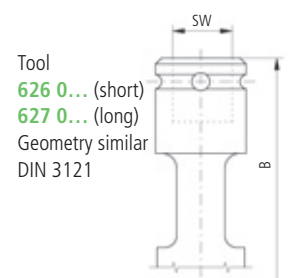
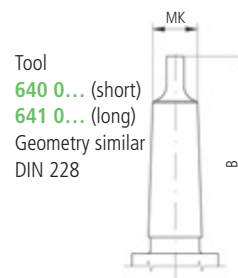
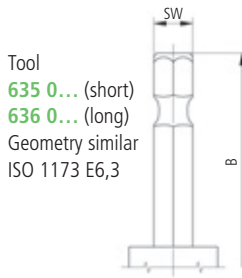
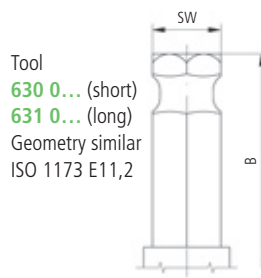
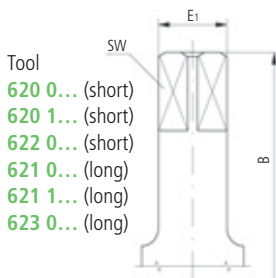


Fig. 9

Art. no.	M 2	M 2,5	M 3	M 3,5	M 4	M 5	M 6	M 8	M 10	M 12	M 14	M 16	M 18	M 20	M 22	M 24	M 27	M 30	
For Ensaf®	—	—	Nr. 4	Nr. 6	Nr. 8	Nr. 10	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	—	—	—	—	—	—	
Metric	...00 020.000	...00 025.000	...00 030.000	...00 035.000	...00 040.000	...00 050.000	...00 060.000	...00 080.000	...00 100.000	...00 120.000	...00 140.000	...00 160.000	...00 180.000	...00 200.000	...00 220.000	...00 240.000	...00 270.000	...00 300.000	
Whitworth	—	—	—	—	—	—	...00 525.000	...00 531.000	...00 537.000	...00 544.000	...00 550.000	...00 562.000	—	—	—	—	—	—	
UNC	—	—	...00 604.000	...00 606.000	...00 608.000	...00 610.000	...00 625.000	...00 631.000	...00 637.000	...00 644.000	...00 650.000	...00 662.000	—	—	—	—	—	—	
UNF	—	—	...00 704.000	...00 706.000	...00 708.000	...00 710.000	...00 725.000	...00 731.000	...00 737.000	...00 744.000	...00 750.000	...00 762.000	—	—	—	—	—	—	
Measurement table																			
Tool type 620 0... (short version), 620 1... (Variant for thin-walled ENSAF®) und 621 0... (long version), 621 1... (Variant for thin-walled ENSAF®)																			
E₁	8	8	8	8	8	12,5	12,5	12,5	16	16	25	25	25	25	25	30	30	30	
SW	6,3	6,3	6,3	6,3	6,3	10	10	10	12,5	12,5	20	20	20	20	20	25	25	25	
B	78	78	78	78	78	95	95	95	118	118	145	145	145	169	169	198	198	198	
B₁	40	40	40	40	40	50	50	50	60	60	60	60	60	60	60	60	60	60	
E	18	18	18	18	18	24	24	24	32	32	50	50	50	58	58	70	70	70	
E₂	7	7	7	7	7	9	10	12	15	18	20	22	24	26	28	32	35	38	
Tool type 622 0... (short version, reinforced version for high installation torques) and 623 0... (long version, reinforced version for high installation torques)																			
E	○	○	○	○	○	36	36	36	43	43	○	○	○	○	○	○	○	○	
Tool type 630 0... (short version, hexagonal shaft) and 631 0... (long version, hexagonal shaft)																			
SW	11,11	11,11	11,11	11,11	11,11	11,11	11,11	11,11	11,11	11,11	11,11	11,11	11,11	—	—	—	—	—	
B	71	71	71	71	71	83	83	83	98	98	118	118	118	—	—	—	—	—	
Tool type 635 0... (short version, hexagonal shaft) and 636 0... (long version, hexagonal shaft)																			
SW	6,35	6,35	6,35	6,35	6,35	6,35	6,35	6,35	6,35	6,35	—	—	—	—	—	—	—	—	
B	66	66	66	66	66	78	78	78	93	93	—	—	—	—	—	—	—	—	
Tool type 640 0... (short version, morse taper shaft) and 641 0... (long version, morse taper shaft)																			
MK	MK0	MK0	MK0	MK0	MK0	MK2	MK2	MK2	MK3	MK3	MK4	MK4	MK4	MK4	MK4	MK4	MK4	MK4	
B	○	○	○	○	○	○	○	○	○	176,5	○	222,5	○	○	○	○	○	○	
Tool type 626 0... (short version, square socket shank) and 627 0... (long version, square socket shank)																			
SW	—	—	—	—	—	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	
B	—	—	—	—	—	94,5	94,5	94,5	117,5	117,5	140,5	140,5	140,5	168,5	168,5	197,5	197,5	197,5	
Tool type 610 2..., type 610 3... (from M 8), type 610 4... (from M 6) – (for ENSAF® with hexagon socket)																			
E	—	—	—	—	6	8	10	10	12	14	16	18	—	—	—	—	—	—	
B	—	—	—	—	80	90	100	100	110	125	125	125	—	—	—	—	—	—	
SW	—	—	—	—	4,9	6,2	8	8	9	11	12	15	—	—	—	—	—	—	
Tool type 610 0..., 612 0... (manual driving tools)																			
E	—	6	6	6	6	10	10	10	16	16	16	—	—	—	—	—	—	—	
B	—	55	55	60	60	75	75	75	95	95	95	—	—	—	—	—	—	—	
SW	—	5	5	5	5	8	8	8	12,5	12,5	12,5	—	—	—	—	—	—	—	

In order to obtain the length dimension of the extended tool versions, the specified dimensions B must be added in each case to the dimension B₁.

○ = available on request

Fig. 10



Fig. 11

Machine Ensats® - installation...

Machine driving process

1. Precisely position the workpiece so that the bore and machine spindle are at right angles to each other (do not tilt).
Set the machine to the precise installation depth (appr. 0.1 to 0.2 mm below the surface of the workpiece see page 6).
2. Actuate the operating lever of the machine.
The rotatable outer shell of the tool must be resting against the outer visible stop pins at the beginning of the turning process so that it is driven by the pins in the clockwise direction.
3. Feed the Ensats® towards the tool (slot or cutting hole facing downwards) and grip for the duration of 2 to 4 revolutions.
4. Continue to actuate the operating lever of the machine and to guide the tool to the hole until the Ensats® cuts into the borehole. The remainder of the driving process takes place without actuating the feed.
5. Switch on the reversing function (depending on the type and structure of the device, this takes place automatically by means of a limit switch / depth sensor). Avoid setting the tool down hard on the workpiece as this can lead to breakage of both the tool and the Ensats®. It can also damage the play-free fit of the Ensats® and so reduce the pull-out strength. If necessary, adapt the driving speed in line with the necessary reversal time.

Machine installation takes place using the driving tools illustrated on page 8, mounted in:

1. Thread tapping machine

2. Drill press

with reversing system by means of depth stop or thread cutting head. Without guide cartridge, without feed.
Important: Do not exceed tightening torques.

3. Manual machine

With depth sensor and reversing system, see Fig. 11.

4. Single or multiple installation machines

With pneumatic or electric drive; semi or fully automatic, computer controlled (CNC).
Note different pitches.

Guideline speed values for light alloy:

Ensats® female thread	Speed rpm [min ⁻¹]
M 2,5 / M 3	650 – 900
M 4 / M 5	400 – 600
M 6 / M 8	280 – 400
M 10 / M 12	200 – 300
M 14 / M 16	150 – 200
M 18 / M 20	120 – 200
M 22 / M 24	100 – 160
M 27 / M 30	80 – 140

Fig. 12

Torque M_D

The maximum admissible torque is dependent on:

1. The axial load capacity of the tool stud
2. The pressure resistance capacity of the Ensats® in the axial direction

Guideline values for driving torques:

Ensats® M 2,5	1,5 Nm
Ensats® M 3	2,5 Nm
Ensats® M 4	5,5 Nm
Ensats® M 5	10 Nm
Ensats® M 6	15 Nm
Ensats® M 8	28 Nm
Ensats® M 10	40 Nm
Ensats® M 12	60 Nm
Ensats® M 14	100 Nm
Ensats® M 16	160 Nm
Ensats® M 18	220 Nm
Ensats® M 20	310 Nm
Ensats® M 22	420 Nm
Ensats® M 24	530 Nm
Ensats® M 27	770 Nm
Ensats® M 30	1050 Nm

Fig. 13

Lubrication

Only in the case of materials with difficult cutting properties.

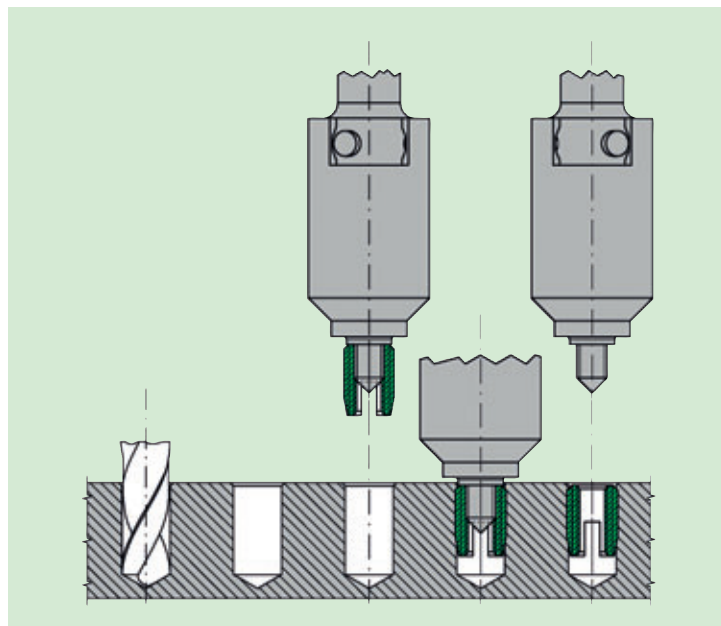


Fig. 14

Manual Ensats® - installation ...

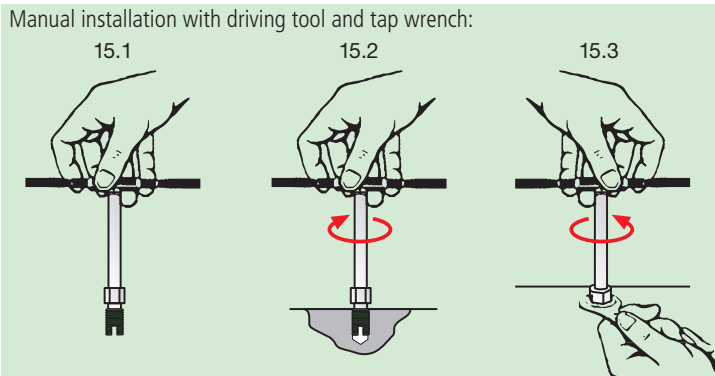


Fig. 15

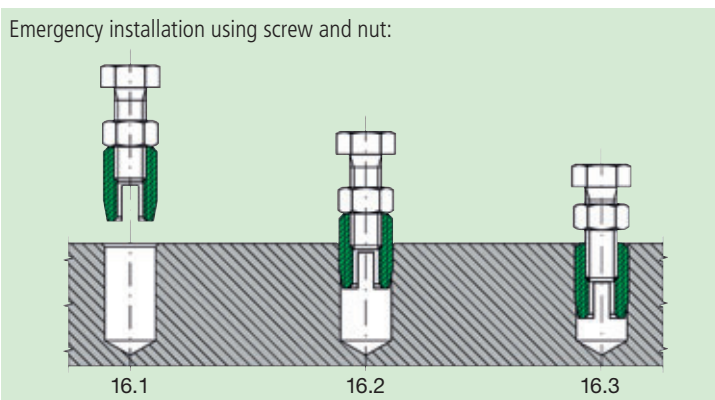


Fig. 16

Manual Insertion Process

The manual insertion is usually carried out using the manual tool 610 0 ... via the female thread or in the case of the tools 610 2... using the hexagon socket. You can of course also use power tools for the manual assembly. If doing so, it needs to be ensured that the rotatable sleeve (2, see Fig. 7) is in the corresponding correct position (see Fig. 14 procedure description).

Image 15.1/16.1

Thread the Ensats®, cutting geometry (slit or bore) has to be pointing downward. Attention needs to be paid while doing so that the screw with nut does not face in the direction of the cutting geometry after locking with a counter nut, as the shavings are otherwise not discharged.

Image 15.2/16.2

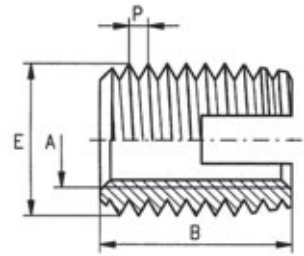
Screw in the Ensats® until approx. 0.1-0.2 mm underneath the surface of the work piece like in image 5 (during temporary assembly using screw and nut, the Ensats® should be processed until flat). Vertical assembly must be ensured.

Image 15.3/16.3

Loosen the counter nut, otherwise the Ensats® could possibly become unscrewed. Subsequently screw out the screw/screw-in tool.

Application

The threaded insert Ensat®-S with cutting slot is a self-tapping fastener for the creation of wear-free, vibration resistant screw joints with high loading capacity in materials with low shearing strength.



Dimensions in mm

Article number	Internal thread	External thread		Length	Guideline values for receiving hole diameter	Minimum borehole depth for blind holes
	A	E	P	B	L	T
302 000 020 ...	M 2	4,5	0,5	6	4,2 to 4,3	8
302 000 025 ...	M 2,5	4,5	0,5	6	4,2 to 4,3	8
302 000 030 ...	M 3	5	0,5	6	4,7 to 4,8	8
302 000 035 ...	M 3,5	6	0,75	8	5,6 to 5,7	10
302 000 040 ...	M 4	6,5	0,75	8	6,1 to 6,2	10
302 000 050 ...	M 5	8	1	10	7,5 to 7,6	13
302 000 061 ...	M 6 (a)	9	1	12	8,5 to 8,6	15
302 000 060 ...	M 6	10	1,5	14	9,2 to 9,4	17
302 000 080 ...	M 8	12	1,5	15	11,2 to 11,4	18
302 000 100 ...	M 10	14	1,5	18	13,2 to 13,4	22
302 000 120 ...	M 12	16	1,5	22	15,2 to 15,4	26
302 000 140 ...	M 14	18	1,5	24	17,2 to 17,4	28
302 000 160 ...	M 16	20	1,5	22	19,2 to 19,4	26
302 000 180 ...	M 18	22	1,5	24	21,2 to 21,4	29
302 000 200 ...	M 20	26	1,5	27	25,2 to 25,4	32
302 000 220 ...	M 22	26	1,5	30	25,2 to 25,4	36
302 000 240 ...	M 24	30	1,5	30	29,2 to 29,4	36
302 000 270 ...	M 27	34	1,5	30	33,2 to 33,4	36
302 000 300 ...	M 30	36	1,5	40	35,2 to 35,4	46

Example for finding the article number

Self-tapping threaded insert Ensat®-S to Works Standard 302 0 with internal thread A = M5 made of case-hardened, zinc plated, thick film passivated steel: Ensat®-S 302 000 050.112

Materials

- Case-hardened steel, zinc plated, blue passivated Article no. (fourth group of digits) ... 110
- Case-hardened steel, zinc plated, thick film passivated Article no. (fourth group of digits) ... 112
- Case-hardened steel, zinc-nickel plated, transparent passivated Article no. (fourth group of digits) ... 143
- Stainless steel 1.4305 Article no. (fourth group of digits) ... 500
- Brass Article no. (fourth group of digits) ... 800

Other materials, designs (e. g. fine thread) and finishes on request.

Tolerance

ISO 2768-m

Thread

Internal thread A: as per ISO 6H
External thread E: as per KKV standard
Internal thread A: UNC UNF, Whitworth, see page 14

Animation





Threaded insert
self-tapping / with hexagonal socket

Ensats®-SI
Works Standard
302 2

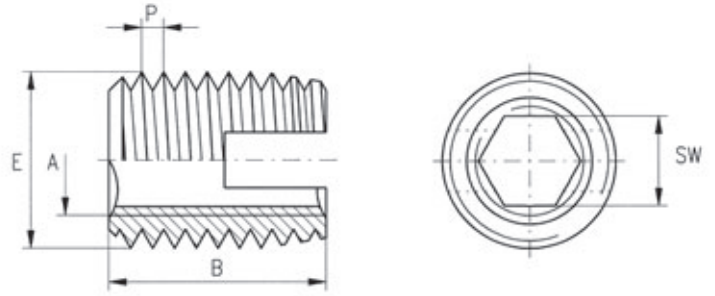
Application

The threaded insert Ensats®-SI with cutting slot is a self-tapping fastener for the creation of wear-free, vibration resistant screw joints with high loading capacity in materials with low shearing strength.

Hexagonal socket

The Ensats® is inserted via the hexagonal socket, permitting the achievement of short installation time.
Other benefits: More simple driving tools and machines which require only clockwise rotation.

The Ensats® can be extracted without problems before the recycling process.



Dimensions in mm

Article number	Internal thread	External thread		Length	Hexagonal socket	Guideline values for receiving hole diameter	Minimum borehole depth for blind holes
	A	E	P		B		
302 200 040 ...	M 4	6,5	0,75	8	3,2	6,1 to 6,2	10
302 200 050 ...	M 5	8	1	10	4,1	7,5 to 7,6	13
302 200 060 ...	M 6	10	1,5	14	4,9	9,2 to 9,4	17
302 200 080 ...	M 8	12	1,5	15	6,6	11,2 to 11,4	18
302 200 100 ...	M 10	14	1,5	18	8,3	13,2 to 13,4	22
302 200 120 ...	M 12	16	1,5	22	10,1	15,2 to 15,4	26

Example for finding the article number

Self-tapping threaded insert with hexagonal socket Ensats®-SI to Works Standard 302 2 with internal thread A = M5 made of case-hardened, zinc plated, thick film passivated steel: Ensats®-SI 302 200 050.112

Materials

- Case-hardened steel, zinc plated, blue passivated
- Case-hardened steel, zinc plated, thick film passivated
- Case-hardened steel, zinc-nickel plated, transparent passivated
- Stainless steel 1.4305 (M4 to M8)
- Brass

- Article no. (fourth group of digits) ... 110
- Article no. (fourth group of digits) ... 112
- Article no. (fourth group of digits) ... 143
- Article no. (fourth group of digits) ... 500
- Article no. (fourth group of digits) ... 800

Other materials, designs and finishes on request.

Tolerance

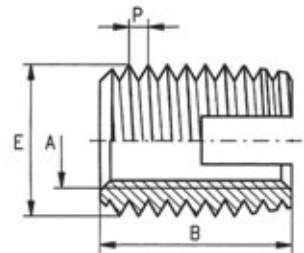
ISO 2768-m

Thread

Internal thread A: as per ISO 6H
External thread E: as per KKV standard

Application

Threaded insert with cutting slot and internal thread.
Whitworth, UNC or UNF



Dimensions in mm

	Article number	Internal thread	External thread		Length	Guideline values for receiving hole diameter	Minimum borehole depth for blind holes
		inch	mm				
		A	E	P	B	L	T
Whitworth B.S.84 Internal thread Tolerance: medium	302 000 525 ...	1/4	10	1,5	14	9,2 to 9,4	17
	302 000 531 ...	5/16	12	1,5	15	11,2 to 11,4	18
	302 000 537 ...	3/8	14	1,5	18	13,2 to 13,4	22
	302 000 544 ...	7/16	16	1,5	22	15,2 to 15,4	26
	302 000 550 ...	1/2	18	1,5	22	17,2 to 17,4	26
	302 000 562 ...	5/8	20	1,5	22	19,2 to 19,4	26
UNC Unified Coarse Thread ANSI B1.1/BS 1580 Internal thread Tolerance 2B	302 000 604 ...	4 – 40	5	0,5	6	4,7 to 4,8	8
	302 000 606 ...	6 – 32	6	0,75	8	5,6 to 5,7	10
	302 000 608 ...	8 – 32	6,5	0,75	8	6,1 to 6,2	10
	302 000 610 ...	10 – 24	8	1	10	7,5 to 7,6	13
	302 000 625 ...	1/4 – 20	10	1,5	14	9,2 to 9,4	17
	302 000 631 ...	5/16 – 18	12	1,5	15	11,2 to 11,4	18
	302 000 637 ...	3/8 – 16	14	1,5	18	13,2 to 13,4	22
	302 000 644 ...	7/16 – 14	16	1,5	22	15,2 to 15,4	26
	302 000 650 ...	1/2 – 13	18	1,5	22	17,2 to 17,4	26
302 000 662 ...	5/8 – 11	20	1,5	22	19,2 to 19,4	26	
UNF Unified Fine Thread ANSI B1.1/BS 1580 Internal thread Tolerance 2B	302 000 704 ...	4 – 48	5	0,5	6	4,7 to 4,8	8
	302 000 706 ...	6 – 40	6	0,75	8	5,6 to 5,7	10
	302 000 708 ...	8 – 36	6,5	0,75	8	6,1 to 6,2	10
	302 000 710 ...	10 – 32	8	1	10	7,5 to 7,6	13
	302 000 725 ...	1/4 – 28	10	1,5	14	9,2 to 9,4	17
	302 000 731 ...	5/16 – 24	12	1,5	15	11,2 to 11,4	18
	302 000 737 ...	3/8 – 24	14	1,5	18	13,2 to 13,4	22
	302 000 744 ...	7/16 – 20	16	1,5	22	15,2 to 15,4	26
	302 000 750 ...	1/2 – 20	18	1,5	22	17,2 to 17,4	26
	302 000 762 ...	5/8 – 18	20	1,5	22	19,2 to 19,4	26

Example for finding the article number

Self-tapping threaded insert Ensats®-S to Works Standard 302 0 with internal thread A = UNF 1/4-28 made of case-hardened, zinc plated, thick film passivated steel: Ensats®-S 302 000 725.112

Materials

Case-hardened steel, zinc plated, blue passivated	Article no. (fourth group of digits) 110
Case-hardened steel, zinc plated, thick film passivated	Article no. (fourth group of digits) 112
Case-hardened steel, zinc-nickel plated, transparent passivated	Article no. (fourth group of digits) 143
Stainless steel 1.4305	Article no. (fourth group of digits) 500
Brass	Article no. (fourth group of digits) 800

Other materials, designs (e. g. fine thread) and finishes on request.

Tolerance

ISO 2768-m

Thread

External thread E: as per KKV standard

Remark:

Female threads in imperial measurements are also available for other Ensats® types.
Example: Self-tapping thread insert Ensats®-SB (see page 16, female thread M6) with female thread A = 1/4-20 UNC in steel, case-hardened, zinc plated, thick film passivated and a length of B = 12 mm: 308 000 625.112



Threaded insert
self-tapping

Ensat®-SK
Works Standard
302 1

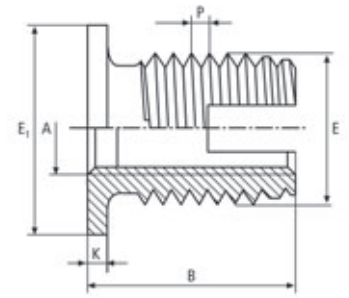
Application

Threaded insert Ensat®-SK 302 1 with cutting slot and head is a self-tapping fastener for the creation of wear-free, vibration-resistant screw joints with high loading capacity in materials with low shearing strength. Head, the pull-through force is.

It is suitable for installation in the following materials:

- Light alloys
- Cast iron, brass, bronze, NF metals
- Plastics, laminates
- Hardwoods

The head serves as a support for electrical contacts when fastening several parts simultaneously; when stress is applied against the head, the pull-through force is significantly increased.



Dimensions in mm

Article number	Internal thread	External thread		Head diameter	Head height	Length	Guideline values for receiving hole diameter	Minimum borehole depth for blind holes
	A	E	P	E ₁	K			
302 100 040 ...	M 4	6,5	0,75	9	1	9	6,1 to 6,2	10
302 100 050 ...	M 5	8	1	11	1	11	7,5 to 7,6	12
302 100 060 ...	M 6	10	1,5	13	1,5	15,5	9,2 to 9,4	16
302 100 080 ...	M 8	12	1,5	15	1,5	16,5	11,2 to 11,4	17
302 100 100 ...	M 10	14	1,5	17	1,5	19,5	13,2 to 13,4	20

Example for finding the article number

Self-tapping threaded insert Ensat®-SK to Works Standard 302 1 with internal thread A = M5 made of case-hardened, zinc plated, thick film passivated steel: Ensat®-SK 302 100 050.112

Materials

- Case-hardened steel, zinc plated, blue passivated
- Case-hardened steel, zinc plated, thick film passivated
- Case-hardened steel, zinc-nickel plated, transparent passivated
- Stainless steel 1.4305
- Brass

- Article no. (**fourth** group of digits) 110
- Article no. (**fourth** group of digits) 112
- Article no. (**fourth** group of digits) 143
- Article no. (**fourth** group of digits) 500
- Article no. (**fourth** group of digits) 800

Other materials, designs (e. g. fine thread) and finishes on request.

Tolerance

ISO 2768-m

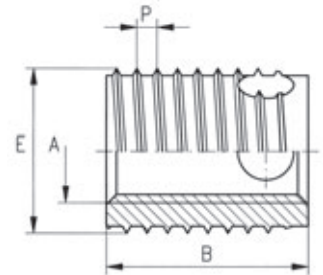
Thread

Internal thread A: as per ISO 6H
External thread E: as per KKV standard
Internal thread UNC, UNF, Whitworth on request

Application

Threaded insert Ensat®-SB with cutting bores is a selftapping fastener for the creation of wear-free, vibration resistant

screw joints with high loading capacity in materials with higher shearing strength.



Dimensions in mm

Article number	Internal thread	External thread Special thread		Length B	Guideline values for receiving hole diameter	Minimum borehole depth for blind holes
	A	E	P		L	T
307 000 030 ...	M 3	5	0,6	4	4,7 to 4,8	6
308 000 030 ...	M 3	5	0,6	6	4,7 to 4,8	8
307 000 035 ...	M 3,5	6	0,8	5	5,6 to 5,7	7
308 000 035 ...	M 3,5	6	0,8	8	5,6 to 5,7	10
307 000 040 ...	M 4	6,5	0,8	6	6,1 to 6,2	8
308 000 040 ...	M 4	6,5	0,8	8	6,1 to 6,2	10
307 000 050 ...	M 5	8	1	7	7,6 to 7,7	9
308 000 050 ...	M 5	8	1	10	7,6 to 7,7	13
307 000 060 ...	M 6	10	1,25	8	9,5 to 9,6	10
308 000 060 ...	M 6	10	1,25	12	9,5 to 9,6	15
307 000 080 ...	M 8	12	1,5	9	11,3 to 11,5	11
308 000 080 ...	M 8	12	1,5	14	11,3 to 11,5	17
307 000 100 ...	M 10	14	1,5	10	13,3 to 13,5	13
308 000 100 ...	M 10	14	1,5	18	13,3 to 13,5	22
307 000 120 ...	M 12	16	1,75	12	15,2 to 15,4	15
308 000 120 ...	M 12	16	1,75	22	15,2 to 15,4	26
307 000 140 ...	M 14	18	2	14	17,2 to 17,4	17
308 000 140 ...	M 14	18	2	24	17,2 to 17,4	28
307 000 160 ...	M 16	20	2	14	19,2 to 19,4	17
308 000 160 ...	M 16	20	2	24	19,2 to 19,4	28
307 000 180 ...	M 18	22	2	18	21,2 to 21,4	21
308 000 180 ...	M 18	22	2	24	21,2 to 21,4	28
308 000 200 ...	M 20	26	2	27	25,2 to 25,4	31
308 000 220 ...	M 22	26	2	30	25,2 to 25,4	34
308 000 240 ...	M 24	30	2	30	29,2 to 29,4	34

Example for finding the article number

Self-tapping threaded insert Ensat®-SB to Works Standard 307 0 with internal thread A = M5 made of case-hardened, zinc plated, thick film passivated steel: Ensat®-SB 307 000 050.112

Short design Long design

Works Standard 307
Works Standard 308

Materials

Case-hardened steel, zinc plated, blue passivated
Case-hardened steel, zinc plated, thick film passivated
Case-hardened steel, zinc-nickel plated, transparent passivated
Stainless steel 1.4305
Brass

Article no. (**fourth** group of digits) ... 110
Article no. (**fourth** group of digits) ... 112
Article no. (**fourth** group of digits) ... 143
Article no. (**fourth** group of digits) ... 500
Article no. (**fourth** group of digits) ... 800

Other materials, designs (e. g. fine thread) and finishes on request.

Tolerance

ISO 2768-m

Thread

Internal thread A: as per ISO 6H
External thread E: Special thread with flattened thread root, as per KKV standard.
Internal thread UNC, UNF, Whitworth on request

Animation





Threaded insert
self-tapping / with hexagonal socket

Ensats®-SBI
Works Standard
307 2 and 308 2

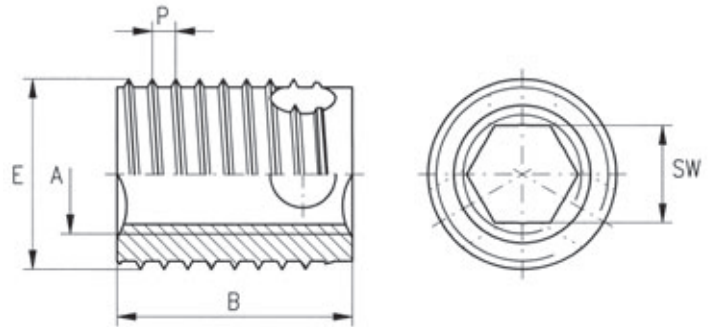
Application

Threaded insert Ensats®-SBI with cutting bores is a self-tapping fastener for the creation of wear-free, vibration resistant screw joints with high loading capacity in materials with higher shearing strength.

Hexagonal socket

The Ensats® is inserted via the hexagonal socket, permitting the achievement of short installation time.
Other benefits: More simple driving tools and machines which require only clockwise rotation.

The Ensats® can be extracted without problems before the recycling process.



Dimensions in mm

Article number	Internal thread	External thread Special thread		Length B	Hexagonal socket	Guideline values for receiving hole diameter	Minimum borehole depth for blind holes
	A	E	P		SW +0,1	L	T
307 200 040 ...	M 4	6,5	0,8	6	3,2	6,1 to 6,2	8
308 200 040 ...	M 4	6,5	0,8	8	3,2	6,1 to 6,2	10
307 200 050 ...	M 5	8	1	7	4,1	7,6 to 7,7	9
308 200 050 ...	M 5	8	1	10	4,1	7,6 to 7,7	13
307 200 060 ...	M 6	10	1,25	8	4,9	9,5 to 9,6	10
308 200 060 ...	M 6	10	1,25	12	4,9	9,5 to 9,6	15
307 200 080 ...	M 8	12	1,5	9	6,6	11,3 to 11,5	11
308 200 080 ...	M 8	12	1,5	14	6,6	11,3 to 11,5	17
307 200 100 ...	M 10	14	1,5	10	8,3	13,3 to 13,5	13
308 200 100 ...	M 10	14	1,5	18	8,3	13,3 to 13,5	22
307 200 120 ...	M 12	16	1,75	12	10,1	15,2 to 15,4	15
308 200 120 ...	M 12	16	1,75	22	10,1	15,2 to 15,4	26

Example for finding the article number

Self-tapping threaded insert with hexagonal socket Ensats®-SBI to Works Standard 307 2 with internal thread A = M5 made of case-hardened, zinc plated, thick film passivated steel: Ensats®-SBI 307 200 050.112

Short design
Long design

Works Standard 307
Works Standard 308

Materials

Case-hardened steel, zinc plated, blue passivated
Case-hardened steel, zinc plated, thick film passivated
Case-hardened steel, zinc-nickel plated, transparent passivated
Stainless steel 1.4305 (M4 to M8)
Brass

Article no. (fourth group of digits) ... 110
Article no. (fourth group of digits) ... 112
Article no. (fourth group of digits) ... 143
Article no. (fourth group of digits) ... 500
Article no. (fourth group of digits) ... 800

Other materials, designs and finishes on request.

Tolerance

ISO 2768-m

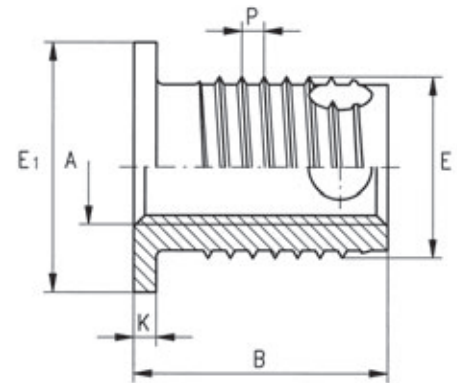
Thread

Internal thread A: as per ISO 6H
External thread E: Special thread with flattened thread root, as per KKV standard

Application

The Threaded insert Ensats[®]-SBK based on the part geometry of the threaded insert Ensats[®]-SB.

The head serves as a support for electrical contacts when fastening several parts simultaneously; when stress is applied against the head, the pull-through force is significantly increased.



Dimensions in mm

Article number	Internal thread	External thread Special thread		Head diameter	Head height	Length	Guideline values for receiving hole diameter	Minimum borehole depth for blind holes
	A	E	P	E ₁	K	B	L	T
307 100 050 ...	M 5	8	1	11	1	8	7,6 to 7,7	9
308 100 050 ...	M 5	8	1	11	1	11	7,6 to 7,7	13
307 100 060 ...	M 6	10	1,25	13	1,5	9,5	9,5 to 9,6	10
308 100 060 ...	M 6	10	1,25	13	1,5	13,5	9,5 to 9,6	15
307 100 080 ...	M 8	12	1,5	15	1,5	10,5	11,3 to 11,5	11
308 100 080 ...	M 8	12	1,5	15	1,5	15,5	11,3 to 11,5	17
307 100 100 ...	M 10	14	1,5	17	1,5	11,5	13,3 to 13,5	13
308 100 100 ...	M 10	14	1,5	17	1,5	19,5	13,3 to 13,5	22

Example for finding the article number

Self-tapping threaded insert Ensats[®]-SBK to Works Standard 307 1 with internal thread A = M5 made of case-hardened, zinc plated, thick film passivated steel: Ensats[®]-SBK 307 100 050.112

Short design
Long design

Works Standard 307
Works Standard 308

Materials

Case-hardened steel, zinc plated, blue passivated
Case-hardened steel, zinc plated, thick film passivated
Case-hardened steel, zinc-nickel plated, transparent passivated
Brass

Article no. (**fourth** group of digits) 110
Article no. (**fourth** group of digits) 112
Article no. (**fourth** group of digits) 143
Article no. (**fourth** group of digits) 800

Other materials, designs (e. g. fine thread) and finishes on request.

Tolerance

ISO 2768-m

Thread

Internal thread A: as per ISO 6H
External thread E: Special thread with flattened thread root, as per KKV standard
Internal thread UNC, UNF, Whitworth on request



Threaded insert
self-tapping / with hexagonal socket

Ensat®-SBKI
Works Standard
307 3 and 308 3

Application

The Threaded insert Ensat®-SBKI based on the part geometry of the threaded insert Ensat®-SB.

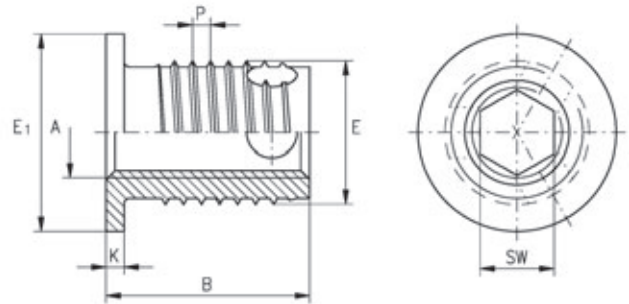
The head serves as a support for electrical contacts when fastening several parts simultaneously; when stress is applied against the head, the pull-through force is significantly increased.

Hexagonal socket

The Ensat® is inserted via the hexagonal socket, permitting the achievement of short installation time.

Weitere Vorteile: einfachere Ein
Other benefits: More simple driving tools and machines which require only clockwise rotation.

The Ensat® can be extracted without problems before the recycling process, resulting in lower costs.



Dimensions in mm

Article number	Internal thread	External thread Special thread		Head diameter	Head height	Length	Hexagonal socket	Guideline values for receiving hole diameter	Minimum borehole depth for blind holes
	A	E	P	E ₁	K	B	SW +0,1	L	T
307 300 050 ...	M 5	8	1	11	1	8	4,1	7,6 to 7,7	9
308 300 050 ...	M 5	8	1	11	1	11	4,1	7,6 to 7,7	13
307 300 060 ...	M 6	10	1,25	13	1,5	9,5	4,9	9,5 to 9,6	10
308 300 060 ...	M 6	10	1,25	13	1,5	13,5	4,9	9,5 to 9,6	15
307 300 080 ...	M 8	12	1,5	15	1,5	10,5	6,6	11,3 to 11,5	11
308 300 080 ...	M 8	12	1,5	15	1,5	15,5	6,6	11,3 to 11,5	17
307 300 100 ...	M 10	14	1,5	17	1,5	11,5	8,3	13,3 to 13,5	13
308 300 100 ...	M 10	14	1,5	17	1,5	19,5	8,3	13,3 to 13,5	22

Example for finding the article number

Self-tapping threaded insert hexagonal socket Ensat®-SBKI to Works Standard 307 3 with internal thread A = M5 made of case-hardened, zinc plated, thick film passivated steel: Ensat®-SBKI 307 300 050.112

**Short design
Long design**

Works Standard 307
Works Standard 308

Materials

Case-hardened steel, zinc plated, blue passivated
Case-hardened steel, zinc plated, thick film passivated
Case-hardened steel, zinc-nickel plated, transparent passivated
Brass

Article no. (**fourth** group of digits) ... 110
Article no. (**fourth** group of digits) ... 112
Article no. (**fourth** group of digits) ... 143
Article no. (**fourth** group of digits) ... 800

Other materials, designs and finishes on request.

Tolerance

ISO 2768-m

Thread

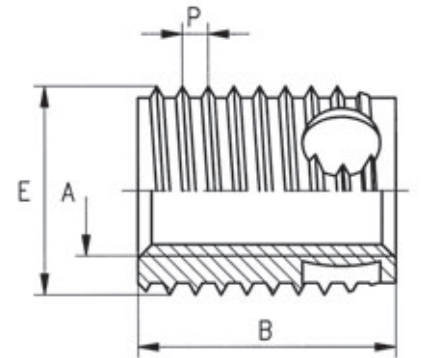
Internal thread A: as per ISO 6H
External thread E: Special thread with flattened thread root, as per KKV standard

Application

This special insert Ensat®-SBS was developed primarily for applications in which chips – created by the self-tapping process – exert a detrimental effect and could cause serious damage or failure during subsequent operation of the installed assembly – for example in electronic equipment.

The three cutting bores distributed around the periphery are formed as chip reservoirs.

The coarse chips created during the installation process are stored in these reservoirs and cannot drop into sensitive equipment components.



Dimensions in mm

Article number	Internal thread	External thread Special thread		Length	Borehole diameter guideline value	Minimum borehole depth for blind holes
	A	E	P		L -0,1	T
337 000 030 ...	M 3	5	0,6	4	4,8	6
338 000 030 ...	M 3	5	0,6	6	4,8	8
337 000 035 ...	M 3,5	6	0,8	5	5,7	7
338 000 035 ...	M 3,5	6	0,8	8	5,7	10
337 000 040 ...	M 4	6,5	0,8	6	6,2	8
338 000 040 ...	M 4	6,5	0,8	8	6,2	10
337 000 050 ...	M 5	8	1	7	7,7	9
338 000 050 ...	M 5	8	1	10	7,7	13
337 000 060 ...	M 6	10	1,25	8	9,6	10
338 000 060 ...	M 6	10	1,25	12	9,6	15
337 000 080 ...	M 8	12	1,5	9	11,5	11
338 000 080 ...	M 8	12	1,5	14	11,5	17
337 000 100 ...	M 10	14	1,5	10	13,5	13
338 000 100 ...	M 10	14	1,5	18	13,5	22
337 000 120 ...	M 12	16	1,75	12	15,4	15
338 000 120 ...	M 12	16	1,75	22	15,4	26
337 000 140 ...	M 14	18	2	14	17,4	17
338 000 140 ...	M 14	18	2	24	17,4	28
337 000 160 ...	M 16	20	2	14	19,4	17
338 000 160 ...	M 16	20	2	24	19,4	28

Example for finding the article number

Self-tapping threaded insert Ensat®-SBS to Works Standard 337 0 with internal thread A = M5 made of case-hardened, zinc plated, thick film passivated steel: Ensat®-SBS 337 000 050.112

Short design
Long design

Works Standard 337
Works Standard 338

Materials

Case-hardened steel, zinc plated, blue passivated
Case-hardened steel, zinc plated, thick film passivated
Case-hardened steel, zinc-nickel plated, transparent passivated
Stainless steel 1.4305
Brass

Article no. (fourth group of digits) 110
Article no. (fourth group of digits) 112
Article no. (fourth group of digits) 143
Article no. (fourth group of digits) 500
Article no. (fourth group of digits) 800

Other materials, designs (e. g. fine thread) and finishes on request.

Tolerance

ISO 2768-m

Thread

Internal thread A: as per ISO 6H
External thread E: Special thread with flattened thread root, as per KKV standard
Internal thread UNC, UNF, Whitworth on request



Threaded insert
self-tapping with chip reservoirs
and hexagonal socket

Ensat®-SBSI
Works Standard
337 2 and 338 2

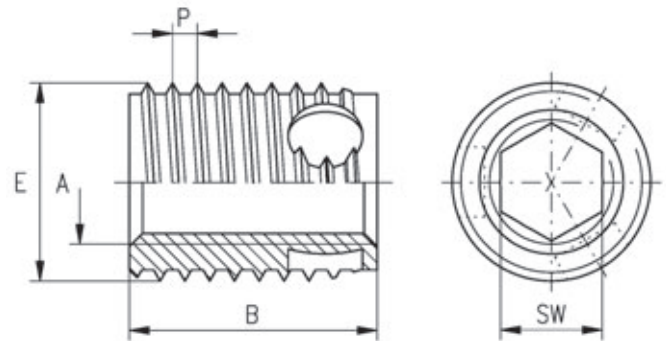
Application

The Threaded insert Ensat®-SBSI based on the part geometry of the threaded insert Ensat®-SBSI additionally with hexagonal socket.

Hexagonal socket

The Ensat® is inserted via the hexagonal socket, permitting the achievement of short installation time.
Other benefits: More simple driving tools and machines which require only clockwise rotation.

The Ensat® can be extracted without problems before the recycling process, resulting in lower costs.



Dimensions in mm

Article number	Internal thread	External thread Special thread		Length B	Hexagonal socket	Borehole diameter guideline value	Minimum borehole depth for blind holes
	A	E	P		SW +0,1	L -0,1	T
337 200 040 ...	M 4	6,5	0,8	6	3,2	6,2	8
338 200 040 ...	M 4	6,5	0,8	8	3,2	6,2	10
337 200 050 ...	M 5	8	1	7	4,1	7,7	9
338 200 050 ...	M 5	8	1	10	4,1	7,7	13
337 200 060 ...	M 6	10	1,25	8	4,9	9,6	10
338 200 060 ...	M 6	10	1,25	12	4,9	9,6	15
337 200 080 ...	M 8	12	1,5	9	6,6	11,5	11
338 200 080 ...	M 8	12	1,5	14	6,6	11,5	17
337 200 100 ...	M 10	14	1,5	10	8,3	13,5	13
338 200 100 ...	M 10	14	1,5	18	8,3	13,5	22
337 200 120 ...	M 12	16	1,75	12	10,1	15,4	15
338 200 120 ...	M 12	16	1,75	22	10,1	15,4	26

Example for finding the article number

Self-tapping threaded insert with hexagonal socket Ensat®-SBSI to Works Standard 337 2 with internal thread A = M5 made of case-hardened, zinc plated, thick film passivated steel: Ensat®-SBSI 337 200 050.112

**Short design
Long design**

Works Standard 337
Works Standard 338

Materials

Case-hardened steel, zinc plated, blue passivated
Case-hardened steel, zinc plated, thick film passivated
Case-hardened steel, zinc-nickel plated, transparent passivated
Stainless steel 1.4305 (M4 to M8)
Brass

Article no. (fourth group of digits) ... 110
Article no. (fourth group of digits) ... 112
Article no. (fourth group of digits) ... 143
Article no. (fourth group of digits) ... 500
Article no. (fourth group of digits) ... 800

Other materials, designs and finishes on request.

Tolerance

ISO 2768-m

Thread

Internal thread A: as per ISO 6H
External thread E: Special thread with flattened thread root, as per KKV standard

Animation



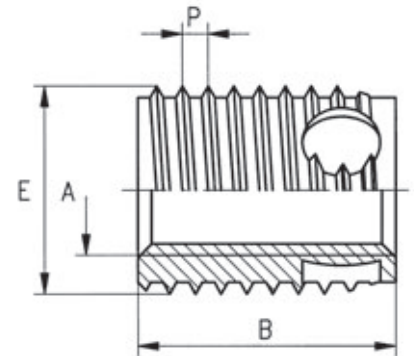
Application

Particularly where a connecting element is required to offer a high level of resistance to acids and corrosion, the Ensats®-SBS made of the material **1.4404** provides an important missing link in the field of stainless steels.

Due to its extremely good material properties – **good resistance to most media containing chloride and non-oxidizing acids** – this threaded insert offers additional scope for application.

The three cutting bores distributed around the periphery are shaped to create a chip reservoir. The coarse chips created during the screw-in process rest there and cannot drop into sensitive collect equipment parts.

Before application we fundamentally recommended performing tests under operating conditions, with regard to acid and corrosion resistance.



Dimensions in mm

Article number	Internal thread	External thread Special thread		Length	Borehole diameter guideline value	Minimum borehole depth for blind holes
	A	E	P	B	L -0,1	T
337 000 030 504	M 3	5	0,6	4	4,8	6
338 000 030 504	M 3	5	0,6	6	4,8	8
337 000 040 504	M 4	6,5	0,8	6	6,2	8
338 000 040 504	M 4	6,5	0,8	8	6,2	10
337 000 050 504	M 5	8	1	7	7,7	9
338 000 050 504	M 5	8	1	10	7,7	13
337 000 060 504	M 6	10	1,25	8	9,6	10
338 000 060 504	M 6	10	1,25	12	9,6	15
337 000 080 504	M 8	12	1,5	9	11,5	11
338 000 080 504	M 8	12	1,5	14	11,5	17

Example for finding the article number

Self-tapping threaded insert Ensats®-SBS to Works Standard 337 0 with internal thread A = M5 made of, acid and rust-resistant steel: Ensats®-SBS 337 000 050.504

Short design Long design

Works Standard 337
Works Standard 338

Materials

Acid and rust-resistant steel 1.4404 (optimised for machining - deviating to standard analysis)
On request:
Acid and rust-resistant steel 1.4404 (according to standard analysis)

Other, designs (e. g. fine thread) on request.

Tolerance

ISO 2768-m

Thread

Internal thread A: as per ISO 6H
External thread E: Special thread with flattened thread root, as per KKV standard
Internal thread UNC, UNF, Whitworth on request





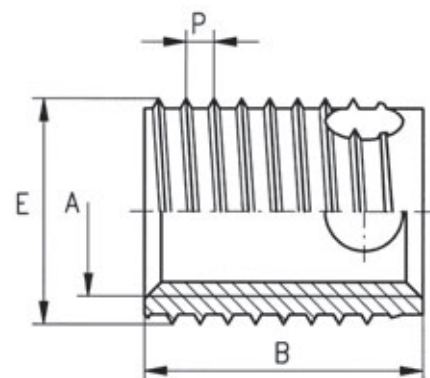
Thin-walled threaded insert
self-tapping, with cutting bores

Ensat®-SBD
Works Standard
347 0 and 348 0

Application

Threaded insert Ensat®-SBD with three cutting bores in a special thinwalled version developed primarily for applications with thin residual walls and for light-weight constructions.
These version are designed primarily for processing on thread tapping machines, as the pitch of the outside and inside thread is identical.

For processing thinwalled inserts in metal, the tensile strength / hardness of the base material is always the determining factor. In critical cases, we recommend lubricating with suitable media in order to prevent fracture of the thinwalled inserts.



Dimensions in mm

Article number	Internal thread	External thread Special thread		Length	Guideline values for receiving hole diameter	Minimum borehole depth for blind holes
	A	E	P			
347 000 035 ...	M 3,5	5	0,6	5	4,7 to 4,8	7
348 000 035 ...	M 3,5	5	0,6	8	4,7 to 4,8	10
347 000 040 ...	M 4	6	0,7	6	5,6 to 5,7	8
348 000 040 ...	M 4	6	0,7	8	5,6 to 5,7	10
347 000 050 ...	M 5	6,5	0,8	7	6,1 to 6,2	9
348 000 050 ...	M 5	6,5	0,8	10	6,1 to 6,2	13
347 000 060 ...	M 6	8	1	8	7,5 to 7,7	10
348 000 060 ...	M 6	8	1	12	7,5 to 7,7	15
347 000 080 ...	M 8	10	1,25	9	9,4 to 9,6	11
348 000 080 ...	M 8	10	1,25	14	9,4 to 9,6	17
347 000 100 ...	M 10	12	1,5	10	11,2 to 11,5	13
348 000 100 ...	M 10	12	1,5	18	11,2 to 11,5	22
347 000 120 ...	M 12	14	1,75	12	13,2 to 13,5	15
348 000 120 ...	M 12	14	1,75	22	13,2 to 13,5	26

Example for finding the article number

Self-tapping thin-walled threaded insert Ensat®-SBD to Works Standard 347 0 with internal thread A = M5 made of case-hardened, zinc plated, thick film passivated steel: Ensat®-SBD 347 000 050.112

Short design
Long design

Works Standard 347
Works Standard 348

Materials

Case-hardened steel, zinc plated, blue passivated
Case-hardened steel, zinc plated, thick film passivated
Case-hardened steel, zinc-nickel plated, transparent passivated
Stainless steel 1.4305 (M3,5 to M8)

Article no. (**fourth** group of digits) 110
Article no. (**fourth** group of digits) 112
Article no. (**fourth** group of digits) 143
Article no. (**fourth** group of digits) 500

Other materials, designs and finishes on request.

Tolerance

ISO 2768-m

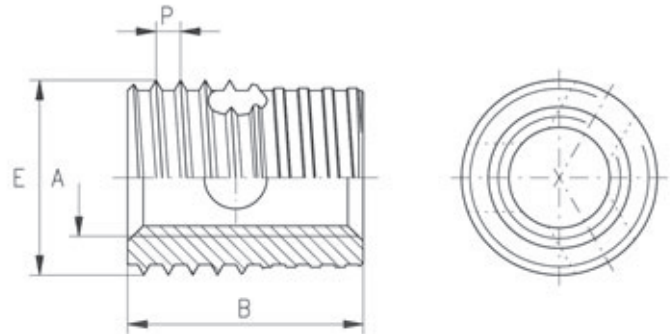
Thread

Internal thread A: as per ISO 6H
External thread E: Special thread with flattened thread root, as per KKV standard
Internal thread UNC, UNF, Whitworth on request

Application

The special threaded insert Ensat®-SBE with cutting bore and pilot thread is a self-tapping connecting element for the creation of wear-proof and vibration-proof screw connections with a high loading capacity in materials with high shear strength.

The Ensat®-SBE was developed to reliably prevent skewing during manual installation. The special threaded insert is particularly suitable for processing positions in which automated processing is not possible.



Dimensions in mm

Article number	Internal thread	External thread Special thread		Length	Guideline values for receiving hole diameter	Minimum borehole depth for blind holes
	A	E	P	B	L	T
307 400 050 ...	M 5	8	1	9	7,6 to 7,7	12
308 400 050 ...	M 5	8	1	12	7,6 to 7,7	15
307 400 060 ...	M 6	10	1,25	12	9,5 to 9,6	15
308 400 060 ...	M 6	10	1,25	16	9,5 to 9,6	19
307 400 080 ...	M 8	12	1,5	13	11,3 to 11,5	16
308 400 080 ...	M 8	12	1,5	18	11,3 to 11,5	21
307 400 100 ...	M 10	14	1,5	14	13,3 to 13,5	17
308 400 100 ...	M 10	14	1,5	22	13,3 to 13,5	26
307 400 120 ...	M 12	16	1,75	16	15,2 to 15,4	19
308 400 120 ...	M 12	16	1,75	26	15,2 to 15,4	30
307 400 140 ...	M 14	18	2	18	17,2 to 17,4	21
308 400 140 ...	M 14	18	2	28	17,2 to 17,4	32
308 400 160 ...	M 16	20	2	28	19,2 to 19,4	32

Example for finding the article number

Self-tapping threaded insert Ensat®-SBE to Works Standard 307 4 with internal thread A = M5 made of case-hardened, zinc plated, thick film passivated steel: Ensat®-SBE 307 400 050.112

Short design
Long design

Works Standard 307
Works Standard 308

Materials

Case-hardened steel, zinc plated, blue passivated
Case-hardened steel, zinc plated, thick film passivated
Case-hardened steel, zinc-nickel plated, transparent passivated
Stainless steel 1.4305

Article no. (**fourth** group of digits) 110
Article no. (**fourth** group of digits) 112
Article no. (**fourth** group of digits) 143
Article no. (**fourth** group of digits) 500

Other materials, designs (e. g. fine thread) and finishes on request.

Tolerance

ISO 2768-m

Thread

Internal thread A: as per ISO 6H
External thread E: Special thread with flattened thread root, as per KKV standard
Internal thread UNC, UNF, Whitworth on request



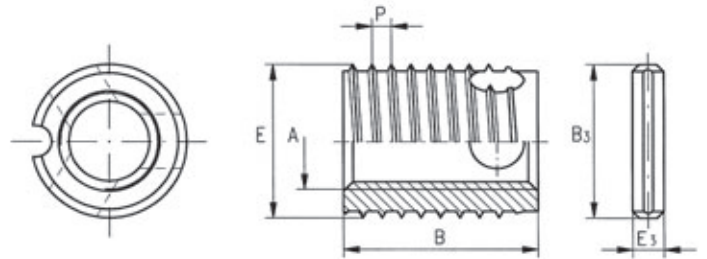
Threaded insert
self-tapping with safety groove

Ensat®-SBN
Works Standard
317 and 318

Application

This special threaded insert is used to absorb extreme torsional and vibration stress.

The antirotation function is achieved by means of a parallel notched stud to DIN EN ISO 8740 (pre-drill with diameter E_3 , depth = $B_3+1\text{mm}$).



Dimensions in mm

Article number	Internal thread	External thread Special thread		Length B	Guideline values for receiving hole diameter	Minimum borehole depth for blind holes T	Notched stud	
	A	E	P		L		B ₃	E ₃
317 000 040 ...	M 4	6,5	0,8	6	6,1 to 6,2	8	4	2
318 000 040 ...	M 4	6,5	0,8	8	6,1 to 6,2	10	6	2
317 000 050 ...	M 5	8	1	7	7,6 to 7,7	9	4	2
318 000 050 ...	M 5	8	1	10	7,6 to 7,7	13	6	2
317 000 060 ...	M 6	10	1,25	8	9,5 to 9,6	10	6	2
318 000 060 ...	M 6	10	1,25	12	9,5 to 9,6	15	10	2
317 000 080 ...	M 8	12	1,5	9	11,3 to 11,5	11	6	2
318 000 080 ...	M 8	12	1,5	14	11,3 to 11,5	17	10	2
317 000 100 ...	M 10	14	1,5	10	13,3 to 13,5	13	6	2
318 000 100 ...	M 10	14	1,5	18	13,3 to 13,5	22	16	2
317 000 120 ...	M 12	16	1,75	12	15,2 to 15,4	15	10	2
318 000 120 ...	M 12	16	1,75	22	15,2 to 15,4	26	16	2
317 000 140 ...	M 14	18	2	14	17,2 to 17,4	17	10	2
318 000 140 ...	M 14	18	2	24	17,2 to 17,4	28	16	2
317 000 160 ...	M 16	20	2	14	19,2 to 19,4	17	10	2
318 000 160 ...	M 16	20	2	24	19,2 to 19,4	28	16	2

Example for finding the article number

Self-tapping threaded insert Ensat®-SBN to Works Standard 317 0 with safety groove and internal thread A = M5 made of case-hardened, zinc plated, thick film passivated steel: Ensat®-SBN 317 000 050.112

Short design
Long design

Works Standard 317
Works Standard 318

Materials

Case-hardened steel, zinc plated, blue passivated
Case-hardened steel, zinc plated, thick film passivated
Case-hardened steel, zinc-nickel plated, transparent passivated
Stainless steel 1.4305

Article no. (**fourth** group of digits) 110
Article no. (**fourth** group of digits) 112
Article no. (**fourth** group of digits) 143
Article no. (**fourth** group of digits) 500

Other materials, designs (e. g. fine thread) and finishes on request.

Material of the notched stud: Ensat® made of steel = Steel, zinc plated
Ensat® made of stainless steel = Stainless steel

Tolerance

ISO 2768-m

Thread

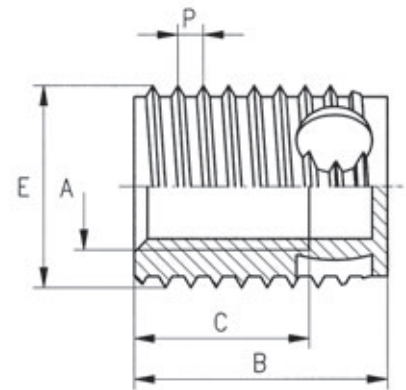
Internal thread A: as per ISO 6H
External thread E: Special thread with flattened thread root, as per KKV standard.
Internal thread UNC, UNF, Whitworth on request

Application

This special Ensat®-SBT was developed primarily for applications in which chips – created by self-tapping process – exert a detrimental effect and could cause serious damage or failure during subsequent operation of the installed assembly – for example in electronic equipment.

The chips created during the installation process are stored in these reservoirs and cannot drop into sensitive equipment components.

The closed floor additionally prevents the penetration of chips into the female thread.



The three cutting bores distributed as chip reservoirs.

Dimensions in mm

Article number	Internal thread	External thread Special thread		Length	Thread depth min.	Borehole diameter guideline value	Minimum borehole depth for blind holes
	A	E	P	B	C	L -0,1	T
357 000 040 ...	M 4	6,5	0,8	6	3,2	6,2	8
358 000 040 ...	M 4	6,5	0,8	8	4,5	6,2	10
357 000 050 ...	M 5	8	1	7	4	7,7	9
358 000 050 ...	M 5	8	1	10	6	7,7	13
357 000 060 ...	M 6	10	1,25	8	4,8	9,6	10
358 000 060 ...	M 6	10	1,25	12	7	9,6	15
358 000 080 ...	M 8	12	1,5	14	8,8	11,5	17
358 000 100 ...	M 10	14	1,5	18	11	13,5	22
358 000 120 ...	M 12	16	1,75	22	14	15,4	26

Example for finding the article number

Self-tapping threaded insert Ensat®-SBT with chip reservoir and closed floor, to Works Standard 357 0 with internal thread A = M5 made of case-hardened, zinc plated, thick film passivated steel: Ensat®-SBT 357 000 050.112

**Short design
Long design**

Works Standard 357
Works Standard 358

Materials

Case-hardened steel, zinc plated, thick film passivated
Case-hardened steel, zinc-nickel plated, transparent passivated
Stainless steel 1.4305 (M4 to M8)
Brass

Article no. (**fourth** group of digits) 112
Article no. (**fourth** group of digits) 143
Article no. (**fourth** group of digits) 500
Article no. (**fourth** group of digits) 800

Other materials, designs (e. g. fine thread) and finishes on request.

Tolerance

ISO 2768-m

Thread

Internal thread A: as per ISO 6H
External thread E: Special thread with flattened thread root, as per KKV standard
Internal thread UNC, UNF, Whitworth on request

Mubux®-Z – press-in threaded inserts ...



Mubux®-Z is a press-in threaded insert made of hardened and zinc-plated steel with helical annular gear around the outside.

Application range

For screw fasteners in cast components made of NF metal – primarily light alloy, for through holes and blind holes.

Mounting

Mubux®-Z is simply pressed into a normal borehole. The retaining hole is drilled or provided for during the casting processes.

Mubux®-Z is inserted with the guiding shoulder pointing downwards into the borehole. The press die should be smooth (if applicable polished) in order not to impede the rotary movement of the Mubux®-Z during the pressin process.

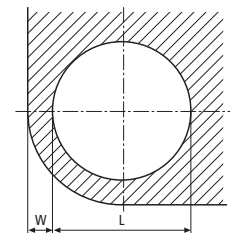
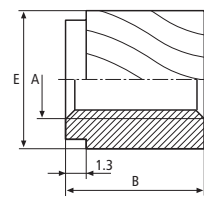
Product features

- simple assembly
- limited assembly costs thanks to press-in operations
- wear-resistant female thread
- no reaming

	<h2>Press-in threaded insert</h2>	<h2>Mubux®-Z</h2> <p>Works Standard 890</p>
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Application

For the creation of wear-resistant screw joints with high load capability in cast alloy components. Suitable for through holes and blind holes.



Dimensions in mm

Article number	Internal thread A	External diameter E	Length B	Recommended retaining hole ¹⁾ L +0,1	Minimum spacing W
890 000 040.112	M 4	7,7	6,9	7,2	2,4
890 000 050.112	M 5	7,7	6,9	7,2	2,4
890 000 060.112	M 6	10,3	9,5	9,6	3,0

¹⁾ Reference values only. Trials on the resp. materials are recommended.

Example for finding the article number

Press-in threaded insert Mubux®-Z with internal thread A = M4 made of hardened, zinc plated, thick film passivated steel: Mubux®-Z 890 000 040.112

Material

Hardened steel, zinc plated, thick film passivated

Tolerances

ISO 2768-m

Thread

Internal thread: ISO 6H

Mubux[®]-MO – the coated threaded insert ...

Threaded insert Mubux[®]-MO is made of zinc-plated steel, with internal and external threads. It is coated on the outside with precote[®] 80.

Application range

Mubux[®]-MO is used wherever a vibration-free firm fit and extremely good sealing properties are required in addition to a high thread load capacity and wear resistance. It is suitable for a wide range of different materials from plastic to steel, for minimal wall thicknesses and extremely brittle materials.

Product features

- Low installation costs
- Simple installation without the need for costly special tools
- Exchange of threaded inserts without tool damage

precote[®] 80 coating

precote[®] 80 is a microcapsule acrylic-based pre-coating. When screwed into a nut thread, the capsules break open and the plastic flux begins to harden. This creates a firm, water-tight joint. Hand-tight after approx. 20 minutes, full loading capability after 24 hours.

precote[®] 80 coating is also available in different kind of colours.

Other coating variants for screw locking and thread sealing are described in more detail in our publication no. 60.

Installation

1. Drill the retaining hole.
2. Tap the thread with a standard thread tap.
3. Screw in the MO with simple tools; either manually, semi-automatically or fully automatic.

All Ensats[®] driving tools and machines can also be used for Mubux[®]-MO.

Installing under pre-tension increases the breakaway torque.

Important: The parts must be free of oil and grease prior to installation.





Threaded insert
coated with precote® 80 microcapsules
recommended lengths

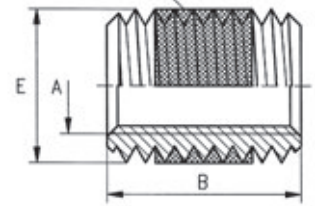
Mubux®-M/MO
Works Standard
970

Application

For the creation of wear-resistant screw joints with good load capability in formend components made of light alloy, cast iron and steel.

Suitable for through holes and blind holes.

360° precote® 80 coated



Dimensions in mm

Article number first group of digits	Length ¹⁾ B	Article number second and third group of digits	Internal thread A	External thread E	Standard length ¹⁾ B			
					1 A	1,5 A	2 A	2,5 A
971	1 A	... 000 030 ...	M 3	M 5		4,5	6	
972	1,5 A	... 000 040 ...	M 4	M 6		6	8	10
973	2 A	... 000 050 ...	M 5	M 7		7,5	10	12,5
974	2,5 A	... 000 060 ...	M 6	M 8		9	12	15
		... 000 080 ...	M 8	M 12		12	16	20
		... 000 100 ...	M 10	M 14		15	20	25
		... 000 120 ...	M 12	M 16	12	18	24	30

¹⁾ Tolerance ±0,25 mm

Example for finding the article number

Threaded insert Mubux®-MO with internal thread A = M6, length B = 12 mm made of zinc plated and blue passivated steel and coated with microcapsule-based adhesive precote® 80: Mubux®-MO 973 000 060.101, without coating: Mubux®-M 973 000 060.110

Materials

Zinc plated, blue passivated steel; coated with precote® 80
Zinc plated, blue passivated steel; without coating

Article no. (**fourth** group of digits) 101
Article no. (**fourth** group of digits) 110

Other materials, designs (e. g. fine thread) and finishes on request.

Thread

Internal thread A: as per ISO 6H • External thread E: screwable in standard thread

Coating

Microcapsule pre-coating on an acrylic basis precote® 80, maximum storage capability 4 years at room temperature.

Recommended length

Dimensions in mm

Workpiece shear strength N/mm²	Tensile strength of screw	Recommended length				
		M 3	M 4	M 5	M 6/M 8/M 10	M 12
≥ 70	4.8	2 A	1,5 A	2 A	2 A	–
≥ 140	4.8	2 A	1,5 A	2 A	1,5 A	1 A
	6.8	2 A	1,5 A	2 A	1,5 A	1,5 A
	8.8	2 A	1,5 A	2 A	2 A	2 A
≥ 210	6.8	2 A	1,5 A	2 A	1,5 A	1 A
	8.8	2 A	1,5 A	2 A	1,5 A	1,5 A
	12.9	2 A	1,5 A	2 A	1,5 A	2 A
	14.9	2 A	2 A	2 A	2 A	2,5 A
≥ 280	6.8	2 A	1,5 A	2 A	1,5 A	1 A
	8.8/12.9	2 A	1,5 A	2 A	1,5 A	1,5 A
	14.9	2 A	1,5 A	2 A	1,5 A	2 A

Example

Shearing strength of the workpiece appr. 140 N/mm², screw M6, strength class 8.8
Recommended length: 2A = 2x6 mm = 12 mm.

Thread repair with Ensat® ...



The Ensat® repair set

The Ensat® repair set was put together specifically for repairing broken threads.

It comprises:

- 1 tap wrench
- 1 HSS drill
- 1 manual driving tool
- 10 threaded inserts

Available with the following Ensat® types

- Ensat®-SB* M 4 to M 12
- Ensat®-SBE* M 5 to M 12

*Information: Ensat®-SB see page 16; Ensat®-SBE see page 24

	Ensats® repair set	Ensats® Works Standard 300																																			
	<table border="1"> <thead> <tr> <th>Article number (repair set)</th> <th>Thread</th> <th>Length B</th> <th>Number of threaded inserts</th> <th>Article number (Threaded insert)</th> </tr> </thead> <tbody> <tr><td>300 308 040 ...</td><td>M 4</td><td>8</td><td>10</td><td>308 000 040 ...</td></tr> <tr><td>300 308 050 ...</td><td>M 5</td><td>10</td><td>10</td><td>308 000 050 ...</td></tr> <tr><td>300 308 060 ...</td><td>M 6</td><td>12</td><td>10</td><td>308 000 060 ...</td></tr> <tr><td>300 308 080 ...</td><td>M 8</td><td>14</td><td>10</td><td>308 000 080 ...</td></tr> <tr><td>300 308 100 ...</td><td>M 10</td><td>18</td><td>10</td><td>308 000 100 ...</td></tr> <tr><td>300 308 120 ...</td><td>M 12</td><td>22</td><td>10</td><td>308 000 120 ...</td></tr> </tbody> </table>	Article number (repair set)	Thread	Length B	Number of threaded inserts	Article number (Threaded insert)	300 308 040 ...	M 4	8	10	308 000 040 ...	300 308 050 ...	M 5	10	10	308 000 050 ...	300 308 060 ...	M 6	12	10	308 000 060 ...	300 308 080 ...	M 8	14	10	308 000 080 ...	300 308 100 ...	M 10	18	10	308 000 100 ...	300 308 120 ...	M 12	22	10	308 000 120 ...	
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Thread	Female thread: ISO 6H																																				
Tolerances	ISO 2768-m																																				



Ensat® assortment box

Ensat®
Works Standard 300

The Ensat® assortment box comprises 315 different threaded inserts type Ensat®-S of Works Standard series 302 in 12 dimensions from M2,5 to M16.



Article number	Thread	Length B	Number of threaded inserts	Thread	Length B	Number of threaded inserts	Thread	Length B	Number of threaded inserts
300 000 003 ...	M 2,5	6	50	M 5	10	40	M 10	18	8
	M 3	6	50	M 6(a)	12	25	M 12	22	5
	M 3,5	8	50	M 6	14	20	M 14	24	3
	M 4	8	50	M 8	15	12	M 16	22	2

Materials Case-hardened steel, zinc plated, blue passivated
Stainless steel 1.4305

Article no. (**fourth** group of digits) 110
Article no. (**fourth** group of digits) 500

Thread Female thread: ISO 6H

Tolerances ISO 2768-m



Ensat® installation assortment box

Ensat®
Works Standard 300

The Ensat® installation assortment box comprises 260 different threaded inserts type Ensat®-S of Works Standard series 302, in 4 dimensions from M4 to M8 with the relevant driving tool.



Article number	Thread	Length B	Number of threaded inserts	Tool	Tap wrench
300 000 007 ...	M 4	8	80	1	1
	M 5	10	80	1	
	M 6	14	50	1	
	M 8	15	50	1	

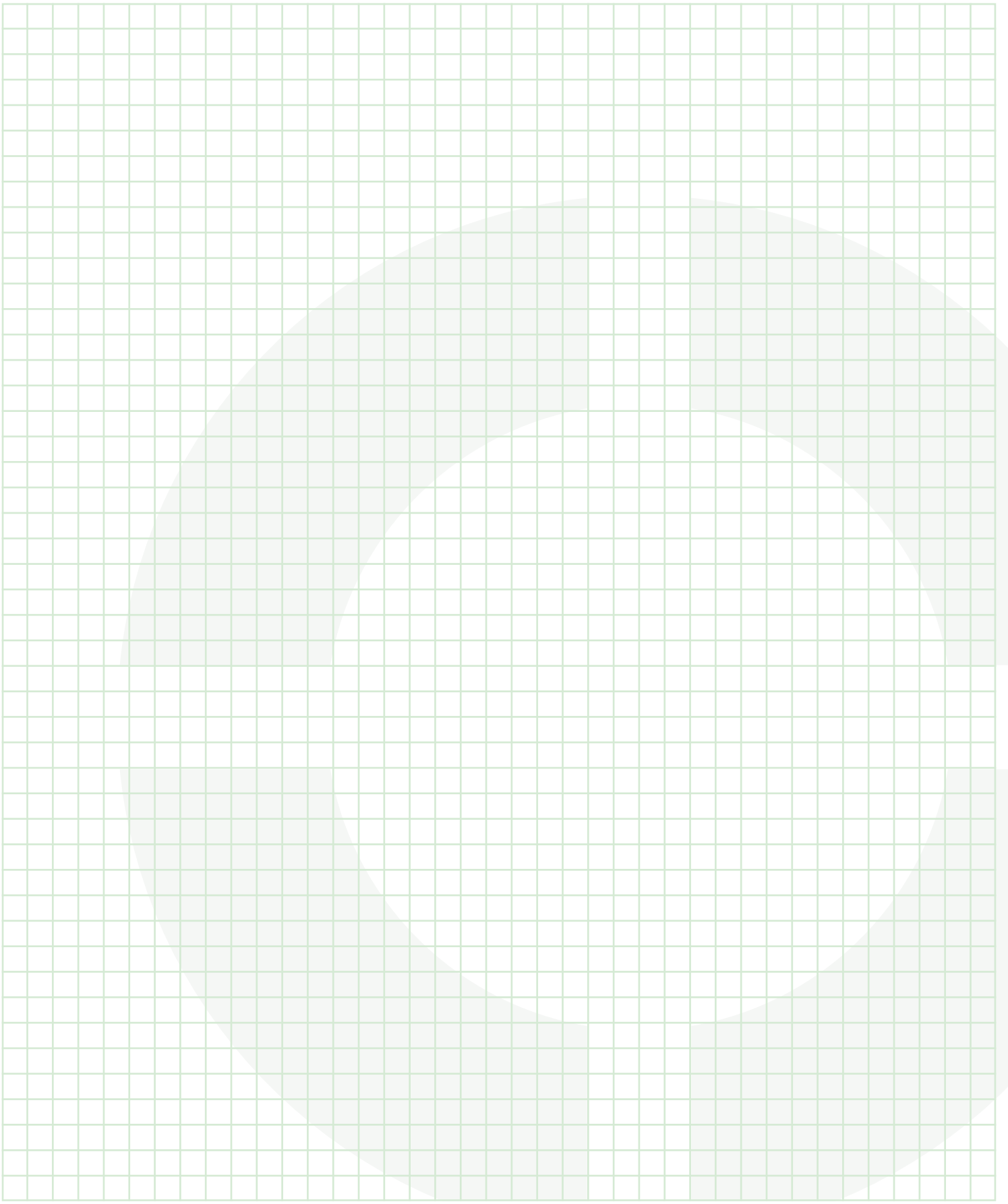
Materials Case-hardened steel, zinc plated, blue passivated
Stainless steel 1.4305

Article no. (**fourth** group of digits) 110
Article no. (**fourth** group of digits) 500

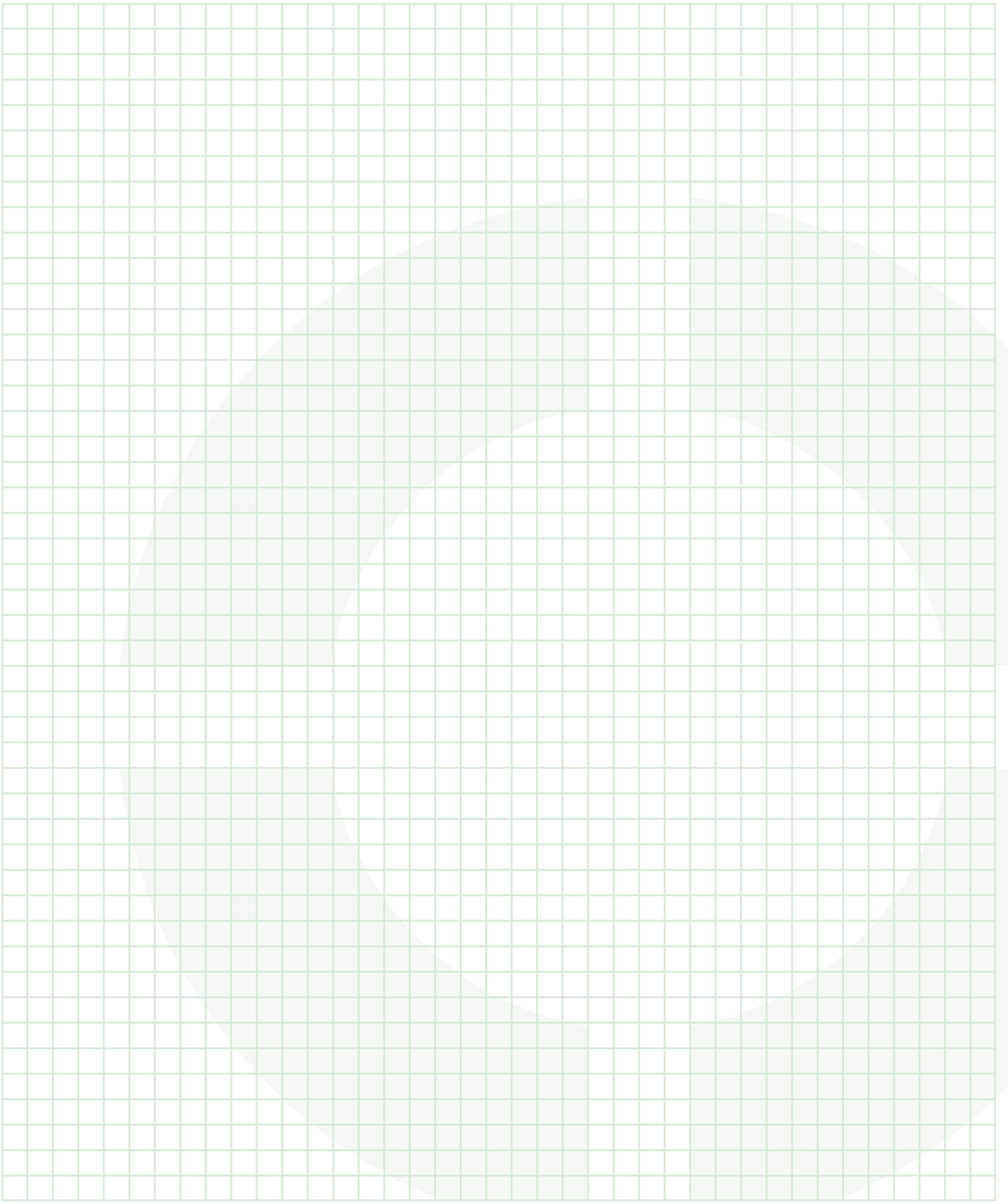
Thread Female thread: ISO 6H

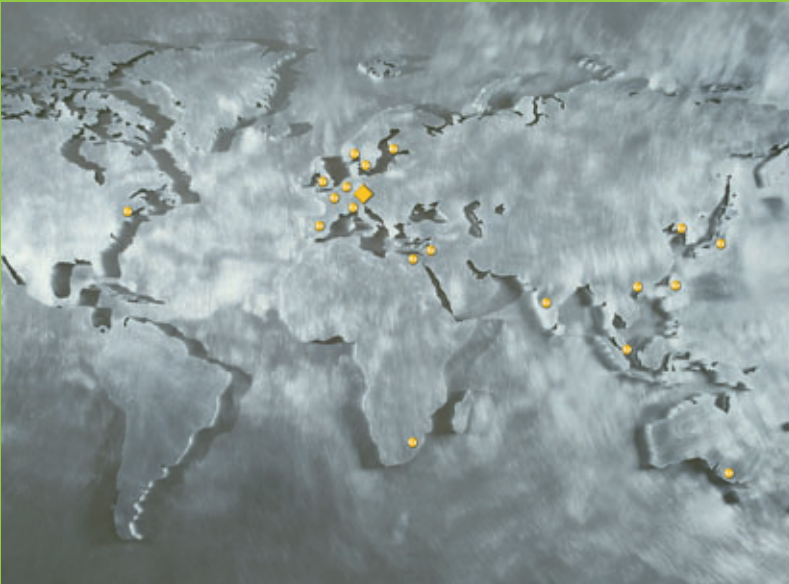
Tolerances ISO 2768-m

Notes



Notes

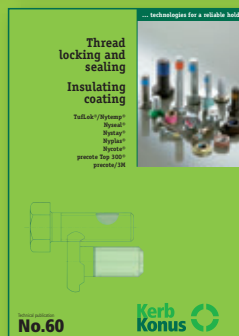
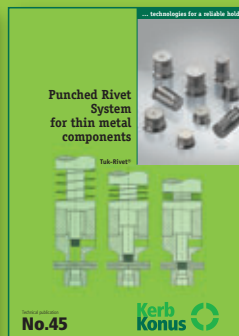
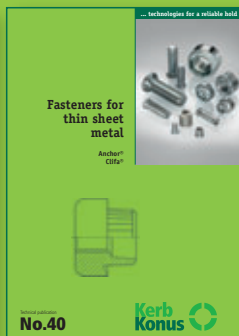




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