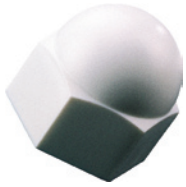
DUBOSCHWEITZER® GmbH

Locking, protecting and insulating screw-type connections with plastic materials



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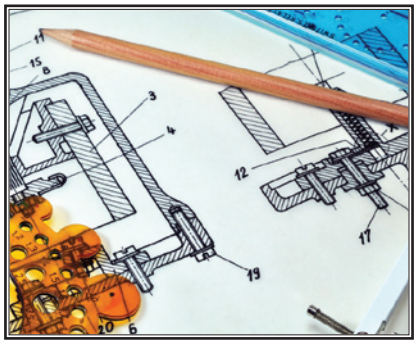
Reliable partners of industry for more than 50 years

Our catalogue provides you with an excerpt from our wide standard range of technical plastic products and connecting elements.

By virtue of a well-dimensioned storage stocking, we can provide therapid and reliable processing of your orders.



Far in excess of our catalogue range, we offer many items for you in the desired quality of the most diverse materials in lathed and tapered designs.

We have been working with plastic products for more than 50 years and have become a worldwide recognised partner of industry. The continuous monitoring and improvement of our quality is ensured by our quality management system according to DIN EN ISO 9001.

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Screw-locking devices

made of polyamide 6

for hexagon head screws and round head screws as well as for cheese-head screws with hexagon sockets.

The DUBOSCHWEITZER® screw locking devices are the ideal way to lock, seal and insulate your screw-type connections.

A tried and tested concept that has been used for more than 55 years in many industrial sectors!

Multiple forms of locking and sealing, because screw-locking devices

- can be pressed into the threads of the screw bolt and the nut,
- provide especially active frictional locking with the bolt and therefore prevent the locking ring from rotating around the bolt,
- place themselves around the hexagon of the nut and therefore prevent the nut form becoming undone on its own,
- help prevent any leakage losses by filling in all dead spaces

Noise absorption and durability, because screw-locking devices

- absorb the vibrations occuring in the screw connection
- posses plastic-elastic behaviour,
- do not age or wear out and can therefore always be used again without affecting any of the above-mentioned advantages.

Insulation and material surface protection, because screw-locking devices

- are chemically resistant to alkaline liquids, solutions of inorganic neutral salts, oils, fats, benzenes, benzol, alcohol, acetone, diluted acids, and seawater, prevent electrolytic corrosion between the joined
- parts and bolt material fatigue.

Data on physical, mechanical and electric properties, as well as the chemical resistance of the material polyamide 6 are available from us.

Assembly instruction:

In order to achieve perfect screw-locking and sealing results, it is important to take the following items into account for the assembly work:

- During the assembly procedure, tighten down the nut until the external reinforcement of the ring is deformed and has wrapped itself around nut. The bolt then usually has the correct pre-tension. Since the ring slides over the supporting surface of the affected structure, it seems as if the nut must still be re-tightended. This, however, is not necessary. The required pre-tension is achieved immediately following the deformation and the nut is then completely locked!
- A surface quality finfer than ▼▼ on the contact surface of the workpiece increased the locking and sealing results.
- For each thread diameter, the fitting locking ring should be used. In order to achieve complete sea ling results, the specifications for screw holes in accordance with DIN 69 medium or fine must be observed.
- During the application of the screw-locking device and the fitting toothed lock washer, the screw can be tightened down using lock washer, the screw can be tightened down using the tightening torque applicable in each use.

Convince yourself and ask for your free samples now!

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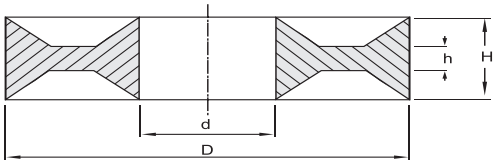
Screw-locking devices



for hexagon head screws and round head screws

dimensions in mm

Nominal size	Order no.	D	d	H	h	weight*
M 3	000019800	8,0	3,1	2,2	0,7	0,07
M 4	000019900	9,5	4,1	2,6	0,9	0,11
M 5	000020000	10,8	5,1	3,0	1,1	0,16
M 6	000020100	13,0	6,2	3,6	1,3	0,24
M 8	000020300	16,4	8,1	4,1	1,5	0,50
M 10	000020500	19,8	10,2	4,6	1,7	0,80
M 12	000020700	23,8	12,2	5,1	1,9	1,30
1/2“	000020800	25,4	12,8	5,0	2,0	1,30
M 14	000020900	25,6	14,2	5,5	2,0	1,40
M 16	000021100	29,5	16,2	6,0	2,1	2,10
M 18	000021300	35,0	18,1	6,4	2,2	2,90
M 20	000021500	35,8	20,3	7,0	2,3	3,20
M 22	000021700	41,7	22,5	7,6	2,4	4,70
M 24	000021900	41,6	24,4	7,9	2,5	4,80
M 27	000022200	47,2	27,2	8,6	2,6	6,80
M 30	000022500	53,3	30,3	8,7	2,7	8,10
M 33	000022800	57,6	33,1	8,9	2,9	8,90
M 36	000023100	63,4	36,1	10,1	3,1	13,50
M 39	000023400	69,2	39,1	10,9	3,3	16,50
M 42	000023700	73,9	42,1	12,9	3,7	20,50
M 45	000024000	80,7	45,1	15,9	4,1	34,00
M 48	000024300	86,4	48,1	16,9	4,4	43,00
M 52	000024700	92,3	52,2	16,9	4,5	49,00

*ca. weight in kg/1.000 pcs.

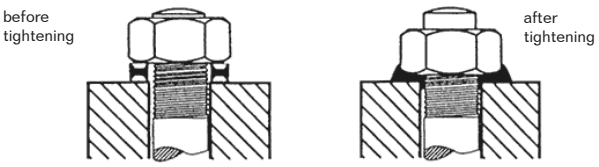
for cheese-head screws with hexagon socket

dimensions in mm

Nominal size	Order no.	D	d	H	h	weight*
M 4	000029900	7,9	4,0	2,0	0,7	0,05
M 5	000030000	9,8	5,1	3,0	1,1	0,12
M 6	000030100	10,6	6,4	3,1	1,2	0,13
M 8	000030300	14,2	8,0	3,4	1,4	0,27
M 10	000030500	17,0	10,1	3,8	1,4	0,40
M 12	000030700	19,0	12,1	4,4	1,9	0,55
M 14	000030900	23,3	14,1	5,3	1,9	1,00
M 16	000031100	25,2	15,9	5,7	1,9	1,20
M 18	000031300	28,2	18,4	6,2	2,2	1,70
M 20	000031500	31,5	20,1	6,5	2,4	2,10
M 22	000031700	34,7	22,5	6,8	2,7	2,80
M 24	000031900	37,6	24,4	7,0	2,9	3,10

*ca. weight in kg/1.000 pcs.

Application example:



Material: PA 6 (polyamide 6)
PTFE (Teflon) and PVDF on request

Color: nature (black on request)

Version: injection-moulded

Tolerances: ± 0,2 mm

Data on chemical resistance as well as on physical, electric and mechanical porperties are available on request

Note: screw-locking devices with strength properties from 8.8 should be used in addition toothed lock washers of steel or double locking device

Toothed lock washers

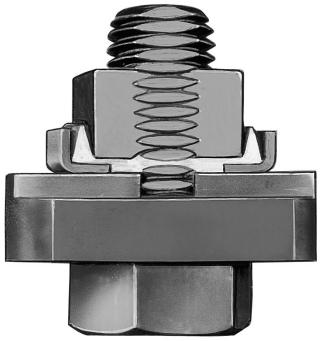
made of steel

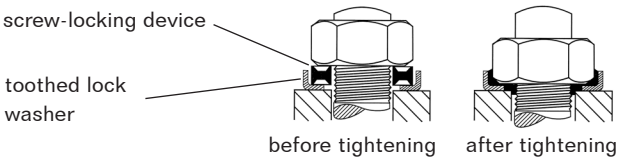
for screw-locking devices

Additional item for the screw-locking device for high bolt forces!

In combination with the well-known screw-locking device made of polyamide, the toothed lock washer made of steel is a valuable further development for the use of bolts made of high-grade steel. This combination permits any desired bolt force without damaging the screw-locking device as a result of subjecting the bolt and nut to high stress.

During the assembly procedure, the locking device is placed in the toothed lock washer. When the nut is being tightened, the locking device becomes deformed, whereby the external reinforcement of the cross-sectional double-T-shaped locking device is pressed against the extemal wall of the toothed lock washer which then prevents further evasion toward the outside. The internal reinforcement is pressed under high pressure into the threads of the bolt which results in high frictional locking and simultaneous sealing. Due to the combination of the screwlocking device and the toothed lock washer, a high coefficient of friction is created between the supporting surface and the nut when these parts are tightened down. This also increases the locking effect considerably. At the places where the teeth of the toothed lock washer are located, the locking device is perforated under high pressure so that the nut comes into contact with the steel teeth. The result is a partially rigid connection of steel on steel and plastic that is capable of absorbing any desired bolt force. Due to the material of the screw-locking device pressed into the semicircular recesses of the toothed lock washer, a longlasting elastic effect is provided.





Following its assembly with the toothed lock washer and the nut, the screw-locking device forms a unit that can be used several times. The locking effect, however, is not lost since the deformed locking device remains elastic.

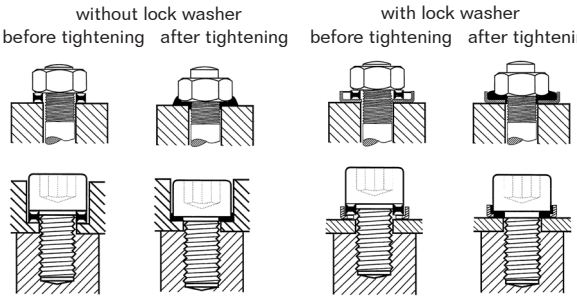
Advantages for the combined use with the toothed lock washer:

- The screw-locking device can absorb any desired bolt force (e.g. strength properties 8.8).
- Any kind of nut can be transformed into a locking nut.
- Multiple use possible.
- The locking device material is located underneath the nut => damping, sealing, locking at constant bolt force.
- Due to the combination of steel teeth and screw-locking device, high coefficient of frictions are created.
- Metallic contact (ground) is achieved.

Applications examples:

for hexagon head screw-locking devices:

for cheese-head screw-locking devices in accordance with DIN 912:



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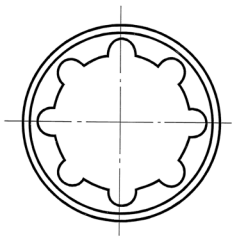
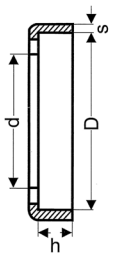
Toothed lock washers

for screw-locking devices made of PA 6





Material - WU St 37-2, electrogalvanised:

dimensions in mm

Nominal size	Order no.	D	d	h	s	weight*
M 4-5	000040400	11,1	6,7	2,1	0,55	0,53
M 6	000040600	13,1	8,9	2,7	0,65	0,67
M 8	000040800	17,1	11,9	2,9	1,00	1,00
M 10	000041000	21,2	13,4	3,1	1,50	1,58
M 12	000041200	24,4	15,4	3,4	1,50	2,26
M 16	000041600	31,2	20,9	4,1	1,75	4,00
M 18-20	000041800	37,4	25,9	5,4	1,75	6,56
M 22-24	000042200	43,9	30,4	5,9	2,00	11,14

*ca. weight in kg/1.000 pcs.

Material - 1.4401 stainless high-grade steel:

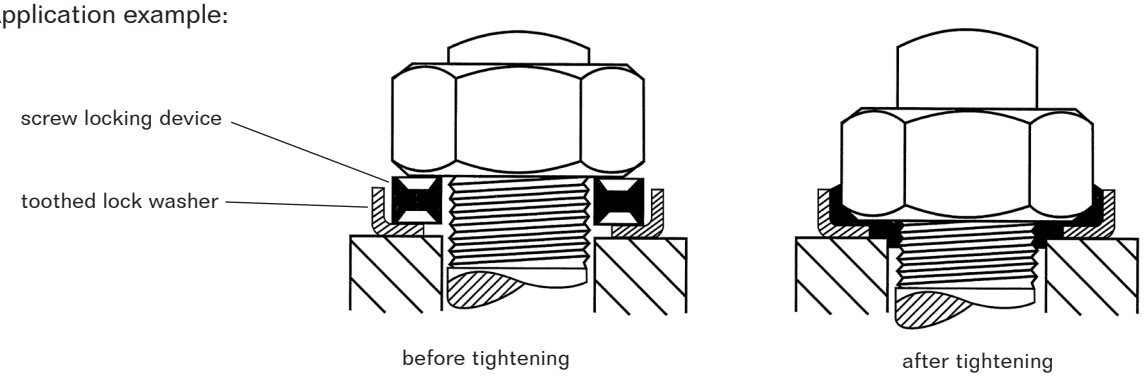
dimensions in mm

Nominal size	Order no.	D	d	h	s	weight*
M 4-5	000090400	11,1	6,7	2,1	0,55	0,53
M 6	000090600	13,1	8,9	2,7	0,65	0,67
M 8	000090800	17,1	11,9	2,9	1,00	1,00
M 10	000091000	21,2	13,4	3,1	1,50	1,58
M 12	000091200	24,4	15,4	3,4	1,50	2,26
M 16	000091600	31,2	20,9	4,1	1,75	4,00
M 18-20	000091800	37,4	25,9	5,4	1,75	6,56

*ca. weight in kg/1.000 pcs.

Material:	WU St 37-2 or 1.4401
Version:	burr-free punched
Surface protection:	electrogalvanised
Tolerances:	± 0,3 mm

Application example:



Double locking device „DSL“

made of polyamide 6 + spring steel

The „DSL“- double locking device is a locking element that, due to a design-related from of elasticity with respect to its height dimension, prevents the loosening of screw connections resulting from a yielding deformation of the screws or workpiece. Simultaneously, a high degree of sealed-tightness of the connection is also achieved.

The basis for the development of this product was the integration of the advantages of two materials and two strengths.

The function of the steel locking element enclosed by the tough, hard polyamide is to provide a steel-to-steel connection between the nut or bolt head and workpiece that is able to absorb the enormously high pretensioning forces when the parts are being screwed together.

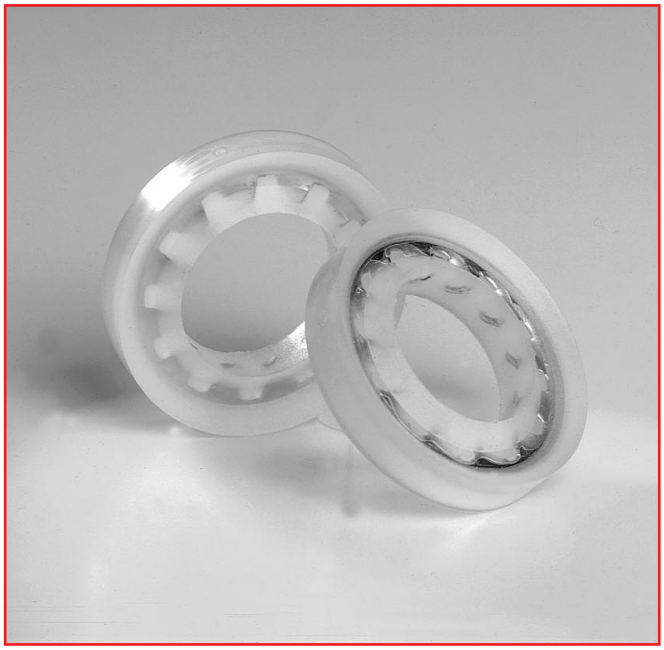
Due to the bending, distorting and penetrating of the tooth-shaped projections into the surface of the involved surface areas, the friction is increased and results in a form-fit connection.

The plastic material enclosing the steel locking element adapts itself to these deformations flowingly and protects the locking element against corrosion for a long time.

The second locking element of this DSL-double locking device is the enclosing plastic washer made of polyamide.

The effect of this design shape is based on the fact that the friction between the comparably hard surface of the nut or bolt head as well as of the workpiece and of the slightly deformable plastic piece is increased accordingly, and on the fact that the plastic material adapts itself to the unevenness of the supporting surface of the nuts or bolt head and workpiece and on the fact that the plastic material is pressed outward and downward due to its initial shape in order to place itself there around the external surface of the nuts or bolt heads of hexagon head screws and hexagon socket screws and then penetrates into the threads.

Here an additional higher degree of friction locking is produced which results in the double effect of this elastic, highly loadable locking device.



In addition, the elasticity of the plastic material provides a tolerance of the locking device versus the yielding of other parts of the connection.
Furthermore, the plastic material flows into the screw bore due to the pressure applied by means of the tightening torque. Depending on the tightening torque in each case, the plastic material embeds the threads over several courses of the threads which protects the connection against the penetration of liquids.

Advantages:

- suitable for universal use with respect to the arising pretensioning forces
- for screw strength up to 12.9
- can be stored as a component
- no corrosion of the sprayed steel locking element and the threads
- can be loosened and tightened several times
- ideal for series production and machine-powered tightening of the screw connection
- simplified handling during assembly
- high sealed-tightness of the screw connection
- safe electric connection between the upper and lower surface
- the hexagon piece remains clear for inserting the wrench

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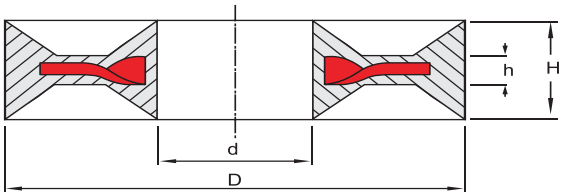
Double locking device „DSL“



for hexagon head screws and round head screws

dimensions in mm

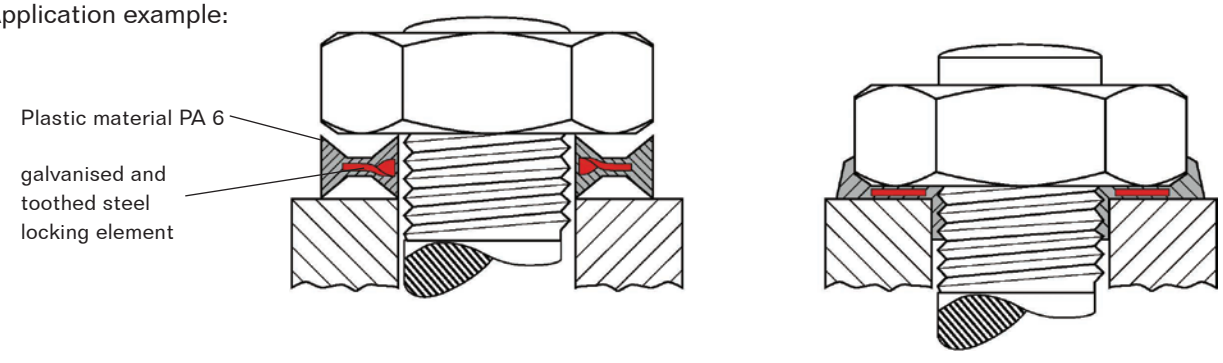
Nominal Size	Order no.	D	d	H	h	weight*
M 5	000025000	10,7	5,2	3,0	1,1	0,3
M 6	000025100	12,7	6,3	3,5	1,3	0,5
M 8	000025300	16,7	8,3	4,0	1,5	1,0
M 10	000025500	19,7	10,4	4,5	1,7	1,6
M 12	000025700	23,7	12,5	5,0	1,9	2,3
M 16	000026100	29,7	16,5	6,0	2,1	4,0
M 20	000026500	35,7	20,5	7,0	2,3	6,6
M 24	000026900	41,7	24,5	8,0	2,5	11,1
M 30	000027500	53,4	30,4	8,8	2,8	16,0

*ca. weight in kg/1.000 pcs.

Material: PA 6 (polyamide 6) + galvanised spring steel
Color: natural
Version: injection-moulded
Tolerance: on request

Further technical information on request!

Application example:

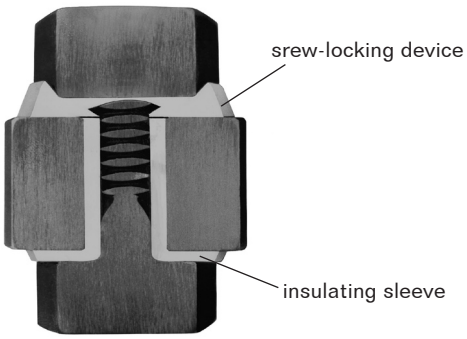


Insulating sleeves

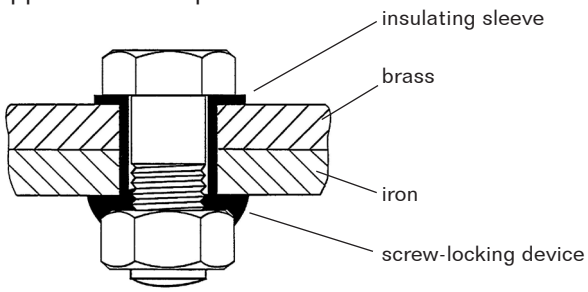
made of polyamide - protect against corrosion

When two metal pieces are connected to another and moisture accumulates between the metal pieces, the exchange of ions will result in electrolytic corrosion which attacks the material.

This can be prevented by using the insulation sleeves made of polyamide which, among others, are recommended for the following metal combinations:
aluminium – steel, iron – copper, iron – lead,
brass – iron, eloxal oxide layers – iron, zinc – tin



Application example:



In connection with protective caps and screw-locking devices, insulation sleeves guarantee absolute protection for your screw-type connection!

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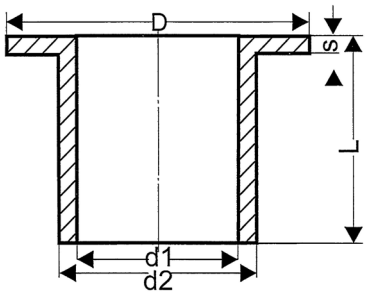
Insulating sleeves



for screw-type connections with metric thread

dimensions in mm

Nominal size	Order no.	L	d1	d2	D	s
M 4 x 5	000504051	5	4,2	5,7	9,4	0,9
M 4 x 6	000504061	6	4,2	5,7	9,4	0,9
M 4 x 7	000504071	7	4,2	5,7	9,4	0,9
M 4 x 8	000504081	8	4,2	5,7	9,4	0,9
M 4 x 9	000504091	9	4,2	5,7	9,4	0,9
M 4 x 10	000504101	10	4,2	5,7	9,4	0,9
M 4 x 11	000504111	11	4,2	5,7	9,4	0,9
M 4 x 12	000504121	12	4,2	5,7	9,4	0,9
M 4 x 13	000504131	13	4,2	5,7	9,4	0,9
M 4 x 14	000504141	14	4,2	5,7	9,4	0,9
M 4 x 15	000504151	15	4,2	5,7	9,4	0,9
M 4 x 16	000504161	16	4,2	5,7	9,4	0,9
M 4 x 17	000504171	17	4,2	5,7	9,4	0,9
M 4 x 18	000504181	18	4,2	5,7	9,4	0,9
M 4 x 19	000504191	19	4,2	5,7	9,4	0,9
M 4 x 20	000504201	20	4,2	5,7	9,4	0,9
M 4 x 21	000504211	21	4,2	5,7	9,4	0,9
M 4 x 22	000504221	22	4,2	5,7	9,4	0,9
M 4 x 23	000504231	23	4,2	5,7	9,4	0,9
M 4 x 24	000504241	24	4,2	5,7	9,4	0,9
M 4 x 25	000504251	25	4,2	5,7	9,4	0,9

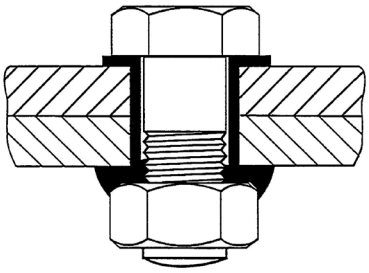
for screw-type connections with metric thread

dimensions in mm

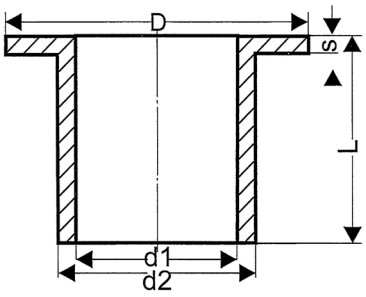
Nominal size	Order no.	L	d1	d2	D	s
M 5 x 5	000505051	5	5,2	6,7	11,9	0,9
M 5 x 6	000505061	6	5,2	6,7	11,9	0,9
M 5 x 7	000505071	7	5,2	6,7	11,9	0,9
M 5 x 8	000505081	8	5,2	6,7	11,9	0,9
M 5 x 9	000505091	9	5,2	6,7	11,9	0,9
M 5 x 10	000505101	10	5,2	6,7	11,9	0,9
M 5 x 11	000505111	11	5,2	6,7	11,9	0,9
M 5 x 12	000505121	12	5,2	6,7	11,9	0,9
M 5 x 13	000505131	13	5,2	6,7	11,9	0,9
M 5 x 14	000505141	14	5,2	6,7	11,9	0,9
M 5 x 15	000505151	15	5,2	6,7	11,9	0,9
M 5 x 16	000505161	16	5,2	6,7	11,9	0,9
M 5 x 17	000505171	17	5,2	6,7	11,9	0,9
M 5 x 18	000505181	18	5,2	6,7	11,9	0,9
M 5 x 19	000505191	19	5,2	6,7	11,9	0,9
M 5 x 20	000505201	20	5,2	6,7	11,9	0,9
M 5 x 21	000505211	21	5,2	6,7	11,9	0,9
M 5 x 22	000505221	22	5,2	6,7	11,9	0,9
M 5 x 23	000505231	23	5,2	6,7	11,9	0,9
M 5 x 24	000505241	24	5,2	6,7	11,9	0,9
M 5 x 25	000505251	25	5,2	6,7	11,9	0,9

Material: PA 6 (polyamide 6) (glassfiber reinforcement on request)
Color: nature (black available on request)
Version: injection-moulded
Tolerances: ± 0,2 mm

Technical information on the material polyamid 6 available on request!



Insulating sleeves



for screw-type connections with metric thread

dimensions in mm

Nominal size	Order no.	L	d1	d2	D	s
M 6 x 5	000506051	5	6,4	7,9	12,9	1,0
M 6 x 6	000506061	6	6,4	7,9	12,9	1,0
M 6 x 7	000506071	7	6,4	7,9	12,9	1,0
M 6 x 8	000506081	8	6,4	7,9	12,9	1,0
M 6 x 9	000506091	9	6,4	7,9	12,9	1,0
M 6 x 10	000506101	10	6,4	7,9	12,9	1,0
M 6 x 11	000506111	11	6,4	7,9	12,9	1,0
M 6 x 12	000506121	12	6,4	7,9	12,9	1,0
M 6 x 13	000506131	13	6,4	7,9	12,9	1,0
M 6 x 14	000506141	14	6,4	7,9	12,9	1,0
M 6 x 15	000506151	15	6,4	7,9	12,9	1,0
M 6 x 16	000506161	16	6,4	7,9	12,9	1,0
M 6 x 17	000506171	17	6,4	7,9	12,9	1,0
M 6 x 18	000506181	18	6,4	7,9	12,9	1,0
M 6 x 19	000506191	19	6,4	7,9	12,9	1,0
M 6 x 20	000506201	20	6,4	7,9	12,9	1,0
M 6 x 21	000506211	21	6,4	7,9	12,9	1,0
M 6 x 22	000506221	22	6,4	7,9	12,9	1,0
M 6 x 23	000506231	23	6,4	7,9	12,9	1,0
M 6 x 24	000506241	24	6,4	7,9	12,9	1,0
M 6 x 25	000506251	25	6,4	7,9	12,9	1,0

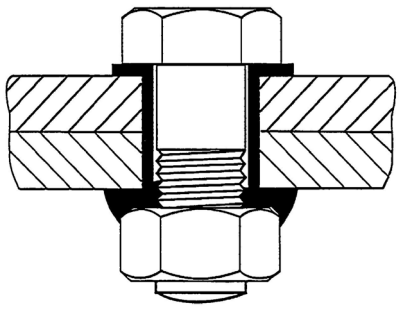
for screw-type connections with metric thread

dimensions in mm

Nominal size	Order no.	L	d1	d2	D	s
M 8 x 5	000508051	5	8,1	10,3	17,9	1,0
M 8 x 6	000508061	6	8,1	10,3	17,9	1,0
M 8 x 7	000508071	7	8,1	10,3	17,9	1,0
M 8 x 8	000508081	8	8,1	10,3	17,9	1,0
M 8 x 9	000508091	9	8,1	10,3	17,9	1,0
M 8 x 10	000508101	10	8,1	10,3	17,9	1,0
M 8 x 11	000508111	11	8,1	10,3	17,9	1,0
M 8 x 12	000508121	12	8,1	10,3	17,9	1,0
M 8 x 13	000508131	13	8,1	10,3	17,9	1,0
M 8 x 14	000508141	14	8,1	10,3	17,9	1,0
M 8 x 15	000508151	15	8,1	10,3	17,9	1,0
M 8 x 16	000508161	16	8,1	10,3	17,9	1,0
M 8 x 17	000508171	17	8,1	10,3	17,9	1,0
M 8 x 18	000508181	18	8,1	10,3	17,9	1,0
M 8 x 19	000508191	19	8,1	10,3	17,9	1,0
M 8 x 20	000508201	20	8,1	10,3	17,9	1,0
M 8 x 21	000508211	21	8,1	10,3	17,9	1,0
M 8 x 22	000508221	22	8,1	10,3	17,9	1,0
M 8 x 23	000508231	23	8,1	10,3	17,9	1,0
M 8 x 24	000508241	24	8,1	10,3	17,9	1,0
M 8 x 25	000508251	25	8,1	10,3	17,9	1,0

Material: PA 6 (polyamide 6) (glassfiber reinforcement on request!)
Color: nature (black available on request)
Version: injection-moulded
Tolerances: ± 0,2 mm

Technical information on the material polyamide 6 available on request!



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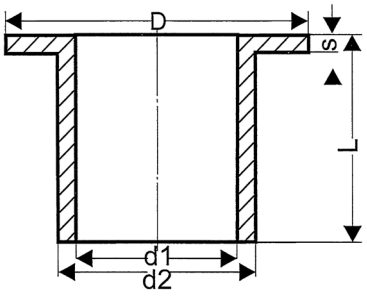
Insulating sleeves



for screw-type connections with metric thread

dimensions in mm

Nominal size	Order no.	L	d1	d2	D	s
M 10 x 5	000510051	5	10,1	12,4	20,9	1,2
M 10 x 6	000510061	6	10,1	12,4	20,9	1,2
M 10 x 7	000510071	7	10,1	12,4	20,9	1,2
M 10 x 8	000510081	8	10,1	12,4	20,9	1,2
M 10 x 9	000510091	9	10,1	12,4	20,9	1,2
M 10 x 10	000510101	10	10,1	12,4	20,9	1,2
M 10 x 11	000510111	11	10,1	12,4	20,9	1,2
M 10 x 12	000510121	12	10,1	12,4	20,9	1,2
M 10 x 13	000510131	13	10,1	12,4	20,9	1,2
M 10 x 14	000510141	14	10,1	12,4	20,9	1,2
M 10 x 15	000510151	15	10,1	12,4	20,9	1,2
M 10 x 16	000510161	16	10,1	12,4	20,9	1,2
M 10 x 17	000510171	17	10,1	12,4	20,9	1,2
M 10 x 18	000510181	18	10,1	12,4	20,9	1,2
M 10 x 19	000510191	19	10,1	12,4	20,9	1,2
M 10 x 20	000510201	20	10,1	12,4	20,9	1,2
M 10 x 21	000510211	21	10,1	12,4	20,9	1,2
M 10 x 22	000510221	22	10,1	12,4	20,9	1,2
M 10 x 23	000510231	23	10,1	12,4	20,9	1,2
M 10 x 24	000510241	24	10,1	12,4	20,9	1,2
M 10 x 25	000510251	25	10,1	12,4	20,9	1,2

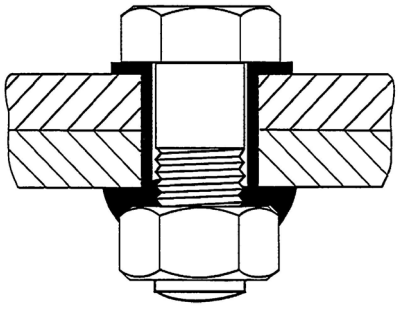
for screw-type connections with metric thread

dimensions in mm

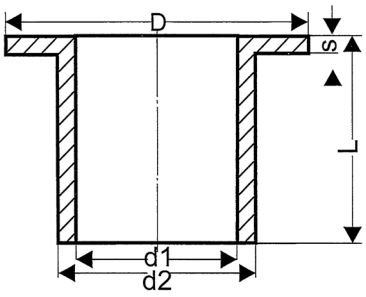
Nominal size	Order no.	L	d1	d2	D	s
M 12 x 5	000512051	5	12,2	14,9	23,9	1,2
M 12 x 6	000512061	6	12,2	14,9	23,9	1,2
M 12 x 7	000512071	7	12,2	14,9	23,9	1,2
M 12 x 8	000512081	8	12,2	14,9	23,9	1,2
M 12 x 9	000512091	9	12,2	14,9	23,9	1,2
M 12 x 10	000512101	10	12,2	14,9	23,9	1,2
M 12 x 11	000512111	11	12,2	14,9	23,9	1,2
M 12 x 12	000512121	12	12,2	14,9	23,9	1,2
M 12 x 13	000512131	13	12,2	14,9	23,9	1,2
M 12 x 14	000512141	14	12,2	14,9	23,9	1,2
M 12 x 15	000512151	15	12,2	14,9	23,9	1,2
M 12 x 16	000512161	16	12,2	14,9	23,9	1,2
M 12 x 17	000512171	17	12,2	14,9	23,9	1,2
M 12 x 18	000512181	18	12,2	14,9	23,9	1,2
M 12 x 19	000512191	19	12,2	14,9	23,9	1,2
M 12 x 20	000512201	20	12,2	14,9	23,9	1,2
M 12 x 21	000512211	21	12,2	14,9	23,9	1,2
M 12 x 22	000512221	22	12,2	14,9	23,9	1,2
M 12 x 23	000512231	23	12,2	14,9	23,9	1,2
M 12 x 24	000512241	24	12,2	14,9	23,9	1,2
M 12 x 25	000512251	25	12,2	14,9	23,9	1,2

Material: PA 6 (polyamide 6) (fiberglass reinforcement on request!)
Color: nature (black available on request)
Version: injection moulded
Tolerances: ± 0,2 mm

Technical information on the material polyamide 6 available on request!



Insulating sleeves



for screw-type connections with metric thread

dimensions in mm

Nominal size	Order no.	L	d1	d2	D	s
M 14 x 5	000514051	5	14,1	17,4	28,7	1,4
M 14 x 6	000514061	6	14,1	17,4	28,7	1,4
M 14 x 7	000514071	7	14,1	17,4	28,7	1,4
M 14 x 8	000514081	8	14,1	17,4	28,7	1,4
M 14 x 9	000514091	9	14,1	17,4	28,7	1,4
M 14 x 10	000514101	10	14,1	17,4	28,7	1,4
M 14 x 11	000514111	11	14,1	17,4	28,7	1,4
M 14 x 12	000514121	12	14,1	17,4	28,7	1,4
M 14 x 13	000514131	13	14,1	17,4	28,7	1,4
M 14 x 14	000514141	14	14,1	17,4	28,7	1,4
M 14 x 15	000514151	15	14,1	17,4	28,7	1,4
M 14 x 16	000514161	16	14,1	17,4	28,7	1,4
M 14 x 17	000514171	17	14,1	17,4	28,7	1,4
M 14 x 18	000514181	18	14,1	17,4	28,7	1,4
M 14 x 19	000514191	19	14,1	17,4	28,7	1,4
M 14 x 20	000514201	20	14,1	17,4	28,7	1,4
M 14 x 21	000514211	21	14,1	17,4	28,7	1,4
M 14 x 22	000514221	22	14,1	17,4	28,7	1,4
M 14 x 23	000514231	23	14,1	17,4	28,7	1,4
M 14 x 24	000514241	24	14,1	17,4	28,7	1,4
M 14 x 25	000514251	25	14,1	17,4	28,7	1,4

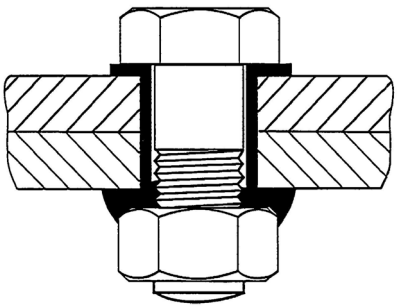
for screw-type connections with metric thread

dimensions in mm

Nominal size	Order no.	L	d1	d2	D	s
M 16 x 5	000516051	5	16,2	19,2	29,9	1,9
M 16 x 6	000516061	6	16,2	19,2	29,9	1,9
M 16 x 7	000516071	7	16,2	19,2	29,9	1,9
M 16 x 8	000516081	8	16,2	19,2	29,9	1,9
M 16 x 9	000516091	9	16,2	19,2	29,9	1,9
M 16 x 10	000516101	10	16,2	19,2	29,9	1,9
M 16 x 11	000516111	11	16,2	19,2	29,9	1,9
M 16 x 12	000516121	12	16,2	19,2	29,9	1,9
M 16 x 13	000516131	13	16,2	19,2	29,9	1,9
M 16 x 14	000516141	14	16,2	19,2	29,9	1,9
M 16 x 15	000516151	15	16,2	19,2	29,9	1,9
M 16 x 16	000516161	16	16,2	19,2	29,9	1,9
M 16 x 17	000516171	17	16,2	19,2	29,9	1,9
M 16 x 18	000516181	18	16,2	19,2	29,9	1,9
M 16 x 19	000516191	19	16,2	19,2	29,9	1,9
M 16 x 20	000516201	20	16,2	19,2	29,9	1,9
M 16 x 21	000516211	21	16,2	19,2	29,9	1,9
M 16 x 22	000516221	22	16,2	19,2	29,9	1,9
M 16 x 23	000516231	23	16,2	19,2	29,9	1,9
M 16 x 24	000516241	24	16,2	19,2	29,9	1,9
M 16 x 25	000516251	25	16,2	19,2	29,9	1,9

Material: PA 6 (polyamide 6) (glassfiber reinforcement on request!)
Color: nature (black available on repuest)
Version: injection-moulded
Tolerances: ± 0,2 mm

Technical information on the material polyamide 6 available on request!



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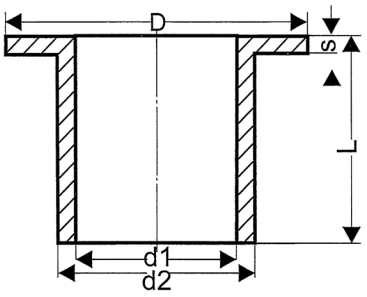
Insulating sleeves



for screw-type connections with metric thread

dimensions in mm

Nominal size	Order no.	L	d1	d2	D	s
M 20 x 5	000520051	5	20,2	23,2	35,9	2,0
M 20 x 6	000520061	6	20,2	23,2	35,9	2,0
M 20 x 7	000520071	7	20,2	23,2	35,9	2,0
M 20 x 8	000520081	8	20,2	23,2	35,9	2,0
M 20 x 9	000520091	9	20,2	23,2	35,9	2,0
M 20 x 10	000520101	10	20,2	23,2	35,9	2,0
M 20 x 11	000520111	11	20,2	23,2	35,9	2,0
M 20 x 12	000520121	12	20,2	23,2	35,9	2,0
M 20 x 13	000520131	13	20,2	23,2	35,9	2,0
M 20 x 14	000520141	14	20,2	23,2	35,9	2,0
M 20 x 15	000520151	15	20,2	23,2	35,9	2,0
M 20 x 16	000520161	16	20,2	23,2	35,9	2,0
M 20 x 17	000520171	17	20,2	23,2	35,9	2,0
M 20 x 18	000520181	18	20,2	23,2	35,9	2,0
M 20 x 19	000520191	19	20,2	23,2	35,9	2,0
M 20 x 20	000520201	20	20,2	23,2	35,9	2,0
M 20 x 21	000520211	21	20,2	23,2	35,9	2,0
M 20 x 22	000520221	22	20,2	23,2	35,9	2,0
M 20 x 23	000520231	23	20,2	23,2	35,9	2,0
M 20 x 24	000520241	24	20,2	23,2	35,9	2,0
M 20 x 25	000520251	25	20,2	23,2	35,9	2,0

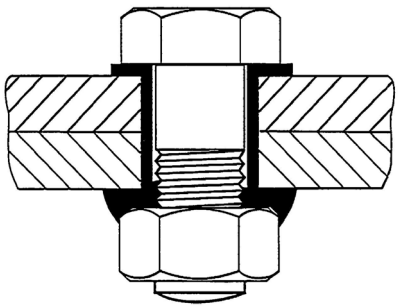
for screw-type connections with metric thread

dimensions in mm

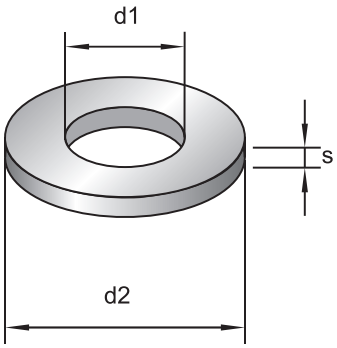
Nominal size	Order no.	L	d1	d2	D	s
M 24 x 30	000524301	30	24,6	26,6	42,9	2,0
M 24 x 40	000524401	40	24,6	26,6	42,9	2,0
M 27 x 30	000527301	30	27,6	29,6	49,9	2,0
M 30 x 30	000530301	30	30,7	32,6	54,9	2,0
M 33 x 35	000533351	35	33,7	35,7	58,9	2,0
M 36 x 40	000536401	40	36,7	38,7	62,0	2,0

Material: PA 6 (polyamide 6) (glassfiber reinforcement on request!)
Color: nature (black available on request)
Version: injection-moulded
Tolerances: ± 0,2 mm

Technical information on the material polyamide 6 available on request!



Flat washers



DIN 125

dimensions in mm

Nominal size	Order no.	d1	d2	s	DIN
M 2	001022501	2,2	5,0	0,3	125
M 2,5	001027601	2,7	6,0	0,5	125
M 3	001032701	3,2	7,0	0,5	125
M 3,5	001037801	3,7	8,0	0,5	125
M 4	001043901	4,3	9,0	0,8	125
M 5	001053101	5,3	10,0	1,0	125
M 6	001064122	6,4	12,0	1,6	125
M 8	001084161	8,4	16,0	1,6	125
M 10	001105201	10,5	20,0	2,0	125
M 12	001130241	13,0	24,0	2,5	125
M 14	001150281	15,0	28,0	2,5	125
M 16	001170301	17,0	30,0	3,0	125
M 18	001190341	19,0	34,0	3,0	125
M 20	001210371	21,0	37,0	3,0	125
M 22	001230391	23,0	39,0	3,0	125
M 24	001254401	25,0	44,0	4,0	125
M 27	001280501	28,0	50,0	4,0	125
M 30	001310561	31,0	56,0	4,0	125
M 33	001340601	34,0	60,0	5,0	125
M 36	001370661	37,0	66,0	5,0	125
M 39	001400721	40,0	72,0	6,0	125
M 42	001430781	43,0	78,0	7,0	125
M 45	001460851	46,0	85,0	7,0	125
M 48	001500921	50,0	92,0	8,0	125
M 50	001520921	52,0	92,0	8,0	125

DIN 9021

dimensions in mm

Nominal size	Order no.	d1	d2	s	DIN
M 3	001032903	3,2	9,0	0,8	9021
M 4	001043123	4,3	12,0	1,0	9021
M 5	001053151	5,3	15,0	1,2	9021
M 6	001064181	6,4	18,0	1,6	9021
M 8	001084241	8,4	24,0	2,0	9021
M 10	001105301	10,5	30,0	2,5	9021
M 12	001130371	13,0	37,0	3,0	9021
M 14	001150441	15,0	44,0	3,0	9021
M 16	001170501	17,0	50,0	3,0	9021
M 18	001200561	20,0	56,0	4,0	9021
M 20	001220601	22,0	60,0	4,0	9021
M 24	001260721	26,0	72,0	5,0	9021

DIN 433

dimensions in mm

Nominal size	Order no.	d1	d2	s	DIN
M 3	001032601	3,2	6,0	0,5	433
M 4	001043801	4,3	8,0	0,5	433
M 5	001053951	5,3	9,5	1,0	433
M 6	001064111	6,4	11,0	1,6	433
M 8	001084151	8,4	15,0	1,6	433
M 10	001105181	10,5	18,0	1,6	433
M 12	001130201	13,0	20,0	2,0	433
M 16	001170271	17,0	28,0	2,5	433
M 20	001210341	21,0	34,0	2,5	433

Material: PA 6 (polyamide 6)
Color: nature (black and more colours available on request)

Additional sizes and versions available on request!

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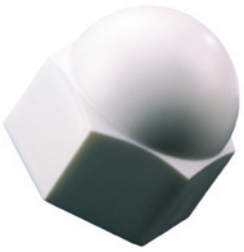
Hexagon head protective caps



for hexagon head screws and hexagon nuts

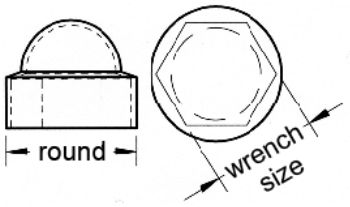
dimensions in mm

Nominal size	Wrench size	Colours	Order no.
M 4	7	white	000060401
M 4	7	grey	000060402
M 4	7	black	000060403
M 5	8	white	000060501
M 5	8	grey	000060502
M 5	8	black	000060503
M 6	10	white	000060601
M 6	10	grey	000060602
M 6	10	black	000060603
M 8	13	white	000060801
M 8	13	grey	000060802
M 8	13	black	000060803
M 10	17	white	000061001
M 10	17	grey	000061002
M 10	17	black	000061003
M 12	19	white	000061201
M 12	19	grey	000061202
M 12	19	black	000061203
M 16	24	white	000061601
M 16	24	grey	000061602
M 16	24	black	000061603
M 20	30	white	000062001
M 20	30	grey	000062002
M 20	30	black	000062003

Material: PE (polyethylen)
Color: white, grey and black
Version: injection-moulded
Tolerances: ± 0,2 mm

Additional sizes and versions available on request!

Hexagon head protective caps



for hexagon head screws and hexagon nuts

dimensions in mm

Nominal Size	Wrench size	Colors	Order no.
M 3	5,5	white/grey/black	006130030
M 4	7	white/grey/black	006130040
M 5	8	white/grey/black	006130050
M 6	10	white/grey/black	006130060
M 8	13	white/grey/black	006130080
M 10	17	white/grey/black	006130100
M 10 (ISO)	16	white/grey/black	006130110
M 12	19	white/grey/black	006130120
M 12 (ISO)	18	white/grey/black	006130130
M 14	22	white/grey/black	006130140
M 16	24	white/grey/black	006130160
M 18	27	white/grey/black	006130180
M 20	30	white/grey/black	006130200
M 22	32	white/grey/black	006130220
M 24	36	white/grey/black	006130240
M 27	41	white/grey/black	006130270
M 30	46	white/grey/black	006130300
M 33	50	white/grey/black	006130330
M 36	55	white/grey/black	006130360
M 39	60	white/grey/black	006130390
M 45	70	white/grey/black	006130450

Material: PE (polyethylen)
Color: white, grey and black
Version: injection-moulded
Tolerances: ± 0,2 mm

Additional sizes and versions available on request!

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Snap-on caps

for hexagon-, cheesehead-, round head screws and rivets

Snap-on caps offer a simple, suitable and functional solution for protecting many different kinds of fastenings.

What are snap-on caps?

Snap-on caps serve the purpose of covering fastening elements, such as bolts, screws, rivets, self-tapping screws, etc. This combination which consists of a washer and protective cap offers excellent sealing results and protects against corrosion. Snap-on caps are very easy to install and are suitable for universal use.
The shape always provides an aesthetic appearance and meets functional requirements. Dimensions and versions have been selected so that no special screws are required. Commercially available standard-type screws can be used.

Why snap-on caps?

Due to aesthetic, functional, climatic, optical or other reasons, it is absolutely necessary to cover many different kinds of fastening elements. With the snap-on cap, this can be achieved quite easily. Due to the special shape of the bottom part, a sealing effect is achieved along the screw. This high external edge is designed so that the external diameter remains unchanged during the assembly procedure and therefore the snap-on cap is impermeable to water after the cap has been pressed on.

The washer (a) can be used for practically all bolts, screws, rivets etc. A comprehensive inspection of al the relevant standards has resulted in the present design of dimensions and shapes so that the snap-on caps are suitable for about 90% of all standardised bolts, screws, etc. The washer is provided with three small knobs (d) that ensure correct centring of the washer. At the same time, these knobs also serve as loss protection during the assembly procedure. The internal side of the washer has an additional reinforcement (c), the so-called sealing lip. This reinforcement is deformed when the screw is tightened down so that a sealing effect is achieved along the screw (g).
At the same time, the contact pressure of the screw is evenly distributed. The curvature on the upper edge of the washer prevents any change in the dimension of the external diameter.
As a result, precise snug fitting and sealing of the cap is therefore guaranteed.

The cap (e) forms a harmonious unit with the washer. An ideal combination between practical and aesthetic form is achieved. For the upper part, the importance of good sealing results was emphasised. The internal diameter, directly above the snap-on edge (b), is smaller than the snap-on edge diameter (b) of the washer. This results in a clamping effect. The radius of the opposite snap-on edge of the cap is bigger than the radius of the snap-on edge of the washer. Following the assembly procedure, a small contact surface area (f) with relatively high pressure between the cap and the washer is created.

The assembly of the snap-on cap

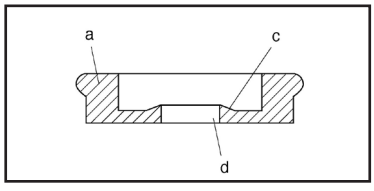
is very simple. The washer, with the flat side facing downward, is placed on the screw. After the screw has been tightened, the cap is pressed onto the washer.

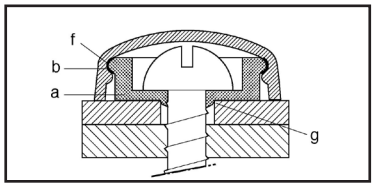
Properties of the snap-on caps

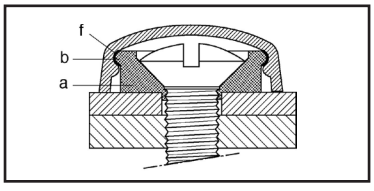
- The high snap-on edge guarantees perfect fit.
- Due to the universal design of dimensions, the use of snap-on caps is practically unlimited.
- The snap-on caps are injection-moulded from UV-stabilised plastic material and therefore waterproof.
- The combination of the bottom part and cap offers excellent sealing and protection.

Advantages of the snap-on caps

- Unlimited application possibilities.
- Complete corrosion protection.
- Waterproof sealing.
- Electric insulation.
- Aesthetic, functional version.
- Special screws made of stainless steel or brass are no longer required.
- Protection of the surface treatment (e.g. enamel, lacquer).
- Very simplified assembly.

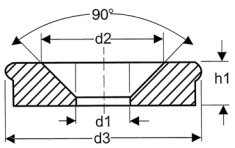




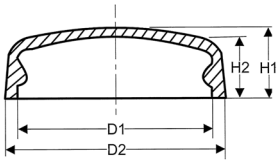


Snap-on caps

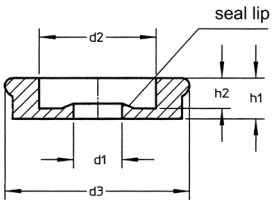
for hexagon-, cheesehead-, round head-, countersunk-head screws and rivets



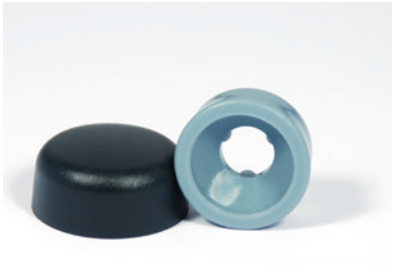
Type VZK



cap



Type CLK



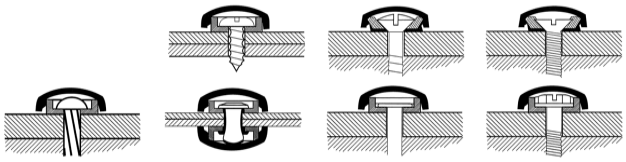
dimensions in mm

Nominal Size	Type	Color	Order no.	d1	d2	d3	h1	h2	D1	D2	H1	H2
M 4	VZK	grey	000140300	4,0	7,9	10,4	3,7					
M 4	CLK	white	000140400	4,0	7,9	10,4	3,7	2,9				
M 4	cap	white	000140401						10,9	12,4	5,3	4,3
M 4	cap	grey	000140402						10,9	12,4	5,3	4,3
M 4	cap	black	000140403						10,9	12,4	5,3	4,3
M 5	VZK	grey	000140500	5,0	9,9	12,6	4,4					
M 5	CLK	white	000140600	5,0	9,9	12,6	4,4	3,4				
M 5	cap	white	000140501						12,9	14,9	6,4	5,4
M 5	cap	grau	000140502						12,9	14,9	6,4	5,4
M 5	cap	schwarz	000140503						12,9	14,9	6,4	5,4
M 6	VZK	grey	000140700	6,0	11,9	14,9	5,9					
M 6	CLK	white	000140800	6,0	11,9	14,9	5,9	4,4				
M 6	cap	white	000140601						15,2	17,4	8,2	6,9
M 6	cap	grey	000140602						15,2	17,4	8,2	6,9
M 6	cap	black	000140603						15,2	17,4	8,2	6,9
M 8	VZK	grey	000141100	8,1	15,9	18,1	6,1					
M 8	CLK	white	000141200	8,1	15,9	18,1	6,1	5,1				
M 8	cap	white	000140801						18,4	20,7	8,5	7,5
M 8	cap	grau	000140802						18,4	20,7	8,5	7,5
M 8	cap	black	000140803						18,4	20,7	8,5	7,5

Material: Cap = PP (polypropylene), Bottom Part = PA 6 (polyamide 6)
Colors: white, grey oder black
Version: injection-moulded
Tolerances: ± 0,2 mm

Additional colors and material available on request!

Application examples



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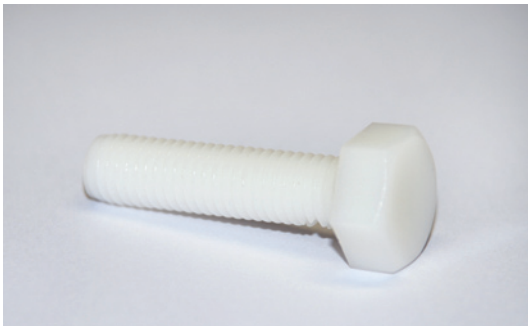
Hexagon head screws

DIN 933



dimensions in mm

Order no.	Nominal size	Wrench size
002330304	M 3 x 4	5,5
002330305	M 3 x 5	5,5
002330306	M 3 x 6	5,5
002330308	M 3 x 8	5,5
002330310	M 3 x 10	5,5
002330312	M 3 x 12	5,5
002330316	M 3 x 16	5,5
002330320	M 3 x 20	5,5
002330325	M 3 x 25	5,5
002330330	M 3 x 30	5,5
002330408	M 4 x 8	7
002330410	M 4 x 10	7
002330412	M 4 x 12	7
002330416	M 4 x 16	7
002330420	M 4 x 20	7
002330425	M 4 x 25	7
002330430	M 4 x 30	7
002330440	M 4 x 40	7
002330506	M 5 x 6	8
002330508	M 5 x 8	8
002330510	M 5 x 10	8
002330512	M 5 x 12	8
002330516	M 5 x 16	8
002330520	M 5 x 20	8
002330525	M 5 x 25	8
002330530	M 5 x 30	8
002330535	M 5 x 35	8
002330540	M 5 x 40	8
002330545	M 5 x 45	8

dimensions in mm

Order no.	Nominal size	Wrench size
002330550	M 5 x 50	8
002330608	M 6 x 8	10
002330610	M 6 x 10	10
002330612	M 6 x 12	10
002330616	M 6 x 16	10
002330620	M 6 x 20	10
002330625	M 6 x 25	10
002330630	M 6 x 30	10
002330635	M 6 x 35	10
002330640	M 6 x 40	10
002330645	M 6 x 45	10
002330650	M 6 x 50	10
002330660	M 6 x 60	10
002330670	M 6 x 70	10
002330810	M 8 x 10	13
002330812	M 8 x 12	13
002330816	M 8 x 16	13
002330820	M 8 x 20	13
002330825	M 8 x 25	13
002330830	M 8 x 30	13
002330835	M 8 x 35	13
002330840	M 8 x 40	13
002330850	M 8 x 50	13
002330860	M 8 x 60	13
002330870	M 8 x 70	13
002331010	M 10 x 10	17
002331012	M 10 x 12	17
002331016	M 10 x 16	17
002331020	M 10 x 20	17

dimensions in mm

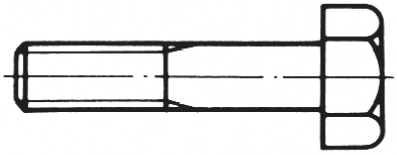
Order no.	Nominal size	Wrench size
002331025	M 10 x 25	17
002331030	M 10 x 30	17
002331035	M 10 x 35	17
002331040	M 10 x 40	17
002331045	M 10 x 45	17
002331050	M 10 x 50	17
002331060	M 10 x 60	17
002331070	M 10 x 70	17
002331080	M 10 x 80	17
002331220	M 12 x 20	19
002331225	M 12 x 25	19
002331230	M 12 x 30	19
002331235	M 12 x 35	19
002331240	M 12 x 40	19
002331245	M 12 x 45	19
002331250	M 12 x 50	19
002331260	M 12 x 60	19
002331270	M 12 x 70	19
002331620	M 16 x 20	24
002331630	M 16 x 30	24
002331640	M 16 x 40	24
002331650	M 16 x 50	24
002331660	M 16 x 60	24
002331670	M 16 x 70	24
002331680	M 16 x 80	24
002331690	M 16 x 90	24
0023316100	M 16 x 100	24

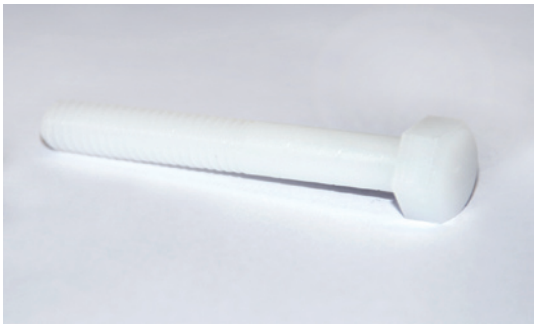
Material: PA 6.6 (polyamide 66)
Color: nature

Additional sizes and versions (e.g. PP, PVDF, PEEK) available on request!

Hexagon head screws with shank

DIN 931





dimensions in mm

Order no.	Nominal size	Wrench size
002310450	M 4 x 50	7
002310560	M 5 x 60	8
002310580	M 5 x 80	8
002310675	M 6 x 75	10
002310680	M 6 x 80	10
002310690	M 6 x 90	10
0023106100	M 6 x 100	10
002310870	M 8 x 70	13
002310880	M 8 x 80	13
0023108100	M 8 x 100	13
0023108110	M 8 x 110	13
002311045	M 10 x 45	17
002311060	M 10 x 60	17
002311080	M 10 x 80	17
002311280	M 12 x 80	19
0023112100	M 12 x 100	19
002311655	M 16 x 55	24
002311665	M 16 x 65	24
002311690	M 16 x 90	24

Material: PA 6.6 (polyamide 66)
Color: nature

Additional sizes and versions (e.g. PP, PVDF, PEEK) available on request!

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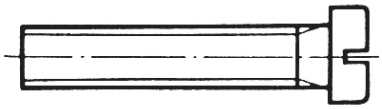
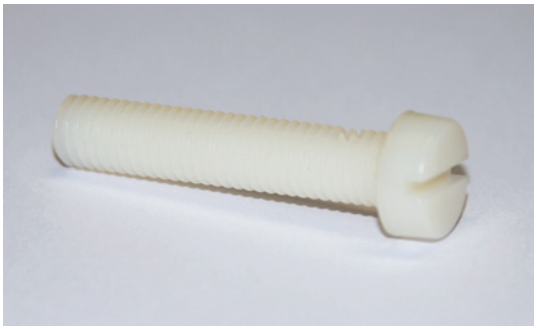
Slotted cheese-head screws

DIN 84





dimensions in mm

Order no.	Nominal size
002840204	M 2 x 4
002840205	M 2 x 5
002840206	M 2 x 6
002840208	M 2 x 8
002840210	M 2 x 10
002840216	M 2 x 16
002840220	M 2 x 20
002840225	M 2 x 25
0028402506	M 2,5 x 6
0028402508	M 2,5 x 8
0028402510	M 2,5 x 10
0028402516	M 2,5 x 16
0028402520	M 2,5 x 20
002840304	M 3 x 4
002840305	M 3 x 5
002840306	M 3 x 6
002840308	M 3 x 8
002840310	M 3 x 10
002840312	M 3 x 12
002840316	M 3 x 16
002840320	M 3 x 20
002840322	M 3 x 22
002840325	M 3 x 25
002840330	M 3 x 30
002840335	M 3 x 35

dimensions in mm

Order no.	Nominal size
002840340	M 3 x 40
002840405	M 4 x 5
002840406	M 4 x 6
002840408	M 4 x 8
002840410	M 4 x 10
002840412	M 4 x 12
002840416	M 4 x 16
002840418	M 4 x 18
002840420	M 4 x 20
002840425	M 4 x 25
002840430	M 4 x 30
002840435	M 4 x 35
002840440	M 4 x 40
002840450	M 4 x 50
002840506	M 5 x 6
002840508	M 5 x 8
002840510	M 5 x 10
002840512	M 5 x 12
002840516	M 5 x 16
002840520	M 5 x 20
002840525	M 5 x 25
002840530	M 5 x 30
002840535	M 5 x 35
002840540	M 5 x 40
002840550	M 5 x 50

dimensions in mm

Order no.	Nominal size
002840560	M 5 x 60
002840605	M 6 x 5
002840606	M 6 x 6
002840608	M 6 x 8
002840610	M 6 x 10
002840612	M 6 x 12
002840616	M 6 x 16
002840620	M 6 x 20
002840625	M 6 x 25
002840630	M 6 x 30
002840635	M 6 x 35
002840640	M 6 x 40
002840645	M 6 x 45
002840650	M 6 x 50
002840655	M 6 x 55
002840660	M 6 x 60
002840670	M 6 x 70
002840810	M 8 x 10
002840812	M 8 x 12
002840816	M 8 x 16
002840820	M 8 x 20
002840825	M 8 x 25
002840830	M 8 x 30
002840835	M 8 x 35
002840840	M 8 x 40

dimensions in mm

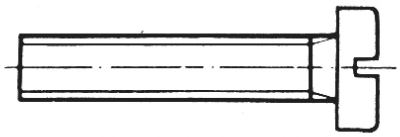
Order no.	Nominal size
002840845	M 8 x 45
002840850	M 8 x 50
002840860	M 8 x 60
002840870	M 8 x 70
002840880	M 8 x 80
002841010	M 10 x 10
002841016	M 10 x 16
002841020	M 10 x 20
002841025	M 10 x 25
002841030	M 10 x 30
002841035	M 10 x 35
002841040	M 10 x 40
002841050	M 10 x 50
002841060	M 10 x 60
002841070	M 10 x 70
002841080	M 10 x 80
002841216	M 12 x 16
002841220	M 12 x 20
002841225	M 12 x 25
002841230	M 12 x 30
002841240	M 12 x 40
002841250	M 12 x 50
002841260	M 12 x 60
002841270	M 12 x 70

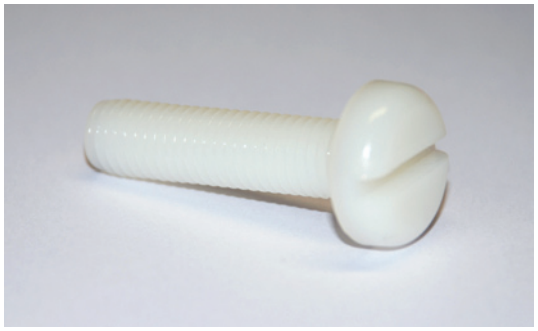
Material: PA 6.6 (polyamide 66)
Color: nature

Additional sizes and versions (e.g. PP, PVDF, PEEK) available on request!

Slotted flat head screws

DIN 85





dimensions in mm

Order no.	Nominal size
002850305	M 3 x 5
002850306	M 3 x 6
002850308	M 3 x 8
002850310	M 3 x 10
002850312	M 3 x 12
002850316	M 3 x 16
002850320	M 3 x 20
002850322	M 3 x 22
002850325	M 3 x 25
002850330	M 3 x 30
002850335	M 3 x 35
002850340	M 3 x 40
002850405	M 4 x 5
002850406	M 4 x 6
002850408	M 4 x 8
002850410	M 4 x 10
002850412	M 4 x 12
002850416	M 4 x 16
002850418	M 4 x 18
002850420	M 4 x 20
002850425	M 4 x 25
002850430	M 4 x 30

dimensions in mm

Order no.	Nominal size
002850435	M 4 x 35
002850440	M 4 x 40
002850450	M 4 x 50
002850506	M 5 x 6
002850508	M 5 x 8
002850510	M 5 x 10
002850512	M 5 x 12
002850516	M 5 x 16
002850520	M 5 x 20
002850525	M 5 x 25
002850530	M 5 x 30
002850535	M 5 x 35
002850540	M 5 x 40
002850550	M 5 x 50
002850560	M 5 x 60
002850605	M 6 x 5
002850606	M 6 x 6
002850608	M 6 x 8
002850610	M 6 x 10
002850612	M 6 x 12
002850616	M 6 x 16
002850620	M 6 x 20

dimensions in mm

Order no.	Nominal size
002850625	M 6 x 25
002850630	M 6 x 30
002850635	M 6 x 35
002850640	M 6 x 40
002850645	M 6 x 45
002850650	M 6 x 50
002850655	M 6 x 55
002850660	M 6 x 60
002850670	M 6 x 70
002850810	M 8 x 10
002850812	M 8 x 12
002850816	M 8 x 16
002850820	M 8 x 20
002850825	M 8 x 25
002850830	M 8 x 30
002850835	M 8 x 35
002850840	M 8 x 40
002850845	M 8 x 45
002850850	M 8 x 50
002850860	M 8 x 60
002850870	M 8 x 70
002850880	M 8 x 80

dimensions in mm

Order no.	Nominal size
002851010	M 10 x 10
002851016	M 10 x 16
002851020	M 10 x 20
002851025	M 10 x 25
002851030	M 10 x 30
002851035	M 10 x 35
002851040	M 10 x 40
002851050	M 10 x 50
002851060	M 10 x 60
002851070	M 10 x 70
002851080	M 10 x 80
002851216	M 12 x 16
002851220	M 12 x 20
002851225	M 12 x 25
002851230	M 12 x 30
002851240	M 12 x 40
002851250	M 12 x 50
002851260	M 12 x 60
002851270	M 12 x 70

Material: PA 6.6 (polyamide 66)
Color: nature

Additional sizes and versions (e.g. PP, PVDF, PEEK) available on request!

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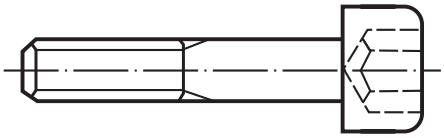
Cheese-head screws with hexagon sockets

DIN 912



dimensions in mm

Order no.	Nominal size
002120510	M 5 x 10
002120525	M 5 x 25
002120610	M 6 x 10
002120612	M 6 x 12
002120616	M 6 x 16
002120620	M 6 x 20
002120625	M 6 x 25
002120630	M 6 x 30
002120640	M 6 x 40
002120650	M 6 x 50
002120816	M 8 x 16
002120820	M 8 x 20
002120825	M 8 x 25
002120830	M 8 x 30
002120840	M 8 x 40
002120850	M 8 x 50
002120860	M 8 x 60
002120865	M 8 x 65
002120870	M 8 x 70
002120880	M 8 x 80
002121020	M 10 x 20
002121030	M 10 x 30
002121040	M 10 x 40
002121050	M 10 x 50
002121060	M 10 x 60

dimensions in mm

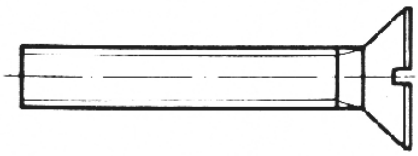
Order no.	Nominal size
002121070	M 10 x 70
002121080	M 10 x 80
002121220	M 12 x 20
002121225	M 12 x 25
002121230	M 12 x 30
002121240	M 12 x 40
002121250	M 12 x 50
002121260	M 12 x 60
002121270	M 12 x 70
002121630	M 16 x 30
002121640	M 16 x 40
002121660	M 16 x 60
002121670	M 16 x 70

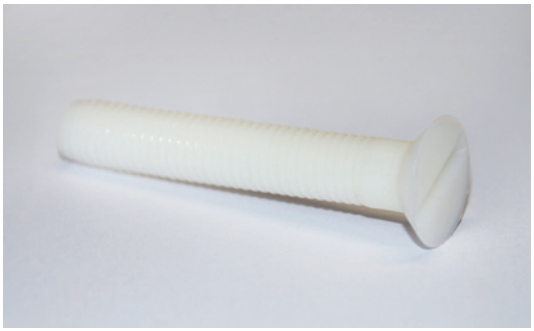
Material: PA 6.6 (polyamide 66)
Color: nature

Additional sizes and versions (e.g. PP, PVDF, PEEK) available on request!

Slotted countersunk-head screws

DIN 963





dimensions in mm

Order no.	Nominal size
002630204	M 2 x 4
002630205	M 2 x 5
002630206	M 2 x 6
002630208	M 2 x 8
002630210	M 2 x 10
002630216	M 2 x 16
002630220	M 2 x 20
002630225	M 2 x 25
0026302506	M 2,5 x 6
0026302508	M 2,5 x 8
0026302510	M 2,5 x 10
0026302516	M 2,5 x 16
0026302520	M 2,5 x 20
002630305	M 3 x 5
002630306	M 3 x 6
002630308	M 3 x 8
002630310	M 3 x 10
002630312	M 3 x 12
002630316	M 3 x 16
002630320	M 3 x 20
002630325	M 3 x 25
002630330	M 3 x 30
002630406	M 4 x 6
002630408	M 4 x 8
002630410	M 4 x 10

dimensions in mm

Order no.	Nominal size
002630412	M 4 x 12
002630416	M 4 x 16
002630420	M 4 x 20
002630425	M 4 x 25
002630430	M 4 x 30
002630435	M 4 x 35
002630440	M 4 x 40
002630508	M 5 x 8
002630510	M 5 x 10
002630512	M 5 x 12
002630516	M 5 x 16
002630518	M 5 x 18
002630520	M 5 x 20
002630525	M 5 x 25
002630530	M 5 x 30
002630535	M 5 x 35
002630540	M 5 x 40
002630545	M 5 x 45
002630550	M 5 x 50
002630608	M 6 x 8
002630610	M 6 x 10
002630612	M 6 x 12
002630616	M 6 x 16
002630620	M 6 x 20
002630625	M 6 x 25

dimensions in mm

Order no.	Nominal size
002630630	M 6 x 30
002630635	M 6 x 35
002630640	M 6 x 40
002630650	M 6 x 50
002630660	M 6 x 60
002630816	M 8 x 16
002630820	M 8 x 20
002630825	M 8 x 25
002630830	M 8 x 30
002630835	M 8 x 35
002630840	M 8 x 40
002630845	M 8 x 45
002630850	M 8 x 50
002630860	M 8 x 60
002630870	M 8 x 70
002630880	M 8 x 80
002631016	M 10 x 16
002631020	M 10 x 20
002631025	M 10 x 25
002631030	M 10 x 30
002631040	M 10 x 40
002631050	M 10 x 50
002631060	M 10 x 60

Material: PA 6.6 (polyamide 66)
Color: nature

Additional sizes and versions (e.g. PP, PVDF, PEEK) available on request!

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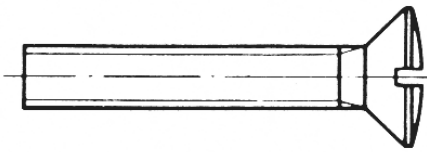
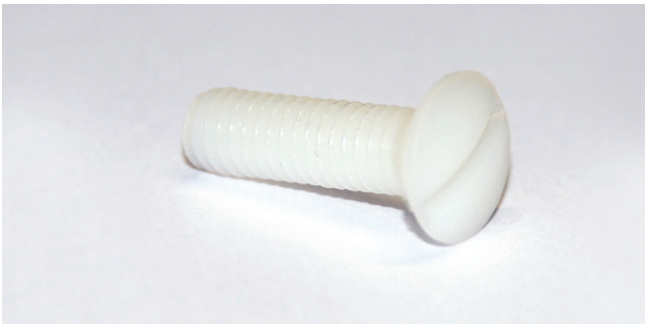
Slotted raised countersunk-head screws

DIN 964





dimensions in mm

Order no.	Nominal size
002640306	M 3 x 6
002640310	M 3 x 10
002640312	M 3 x 12
002640320	M 3 x 20
002640405	M 4 x 5
002640406	M 4 x 6
002640408	M 4 x 8
002640410	M 4 x 10
002640412	M 4 x 12
002640416	M 4 x 16
002640420	M 4 x 20
002640425	M 4 x 25
002640430	M 4 x 30
002640435	M 4 x 35
002640440	M 4 x 40
002640510	M 5 x 10
002640512	M 5 x 12
002640516	M 5 x 16
002640520	M 5 x 20
002640530	M 5 x 30
002640540	M 5 x 40
002640550	M 5 x 50
002640608	M 6 x 8
002640610	M 6 x 10
002640616	M 6 x 16

dimensions in mm

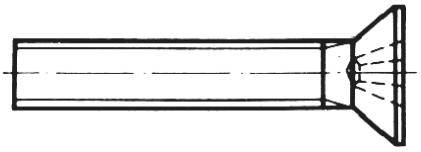
Order no.	Nominal size
002640620	M 6 x 20
002640625	M 6 x 25
002640630	M 6 x 30
002640640	M 6 x 40
002640650	M 6 x 50
002640660	M 6 x 60
002640680	M 6 x 80
002640810	M 8 x 10
002640816	M 8 x 16
002640820	M 8 x 20
002640825	M 8 x 25
002640830	M 8 x 30
002640840	M 8 x 40
002640850	M 8 x 50
002640860	M 8 x 60
002640870	M 8 x 70

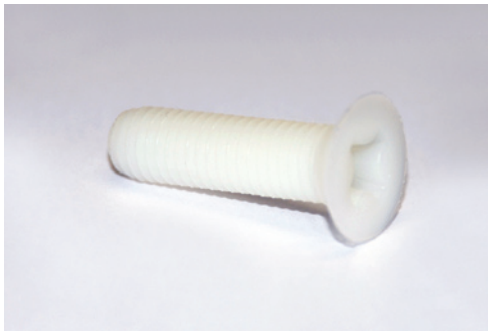
Material: PA 6.6 (polyamide 66)
Color: nature

Additional sizes and versions (e.g. PP, PVDF, PEEK) available on request!

Phillips countersunk-head screws

DIN 965





dimensions in mm

Order no.	Nominal size
002650306	M 3 x 6
002650308	M 3 x 8
002650310	M 3 x 10
002650312	M 3 x 12
002650316	M 3 x 16
002650320	M 3 x 20
002650325	M 3 x 25
002650406	M 4 x 6
002650408	M 4 x 8
002650410	M 4 x 10
002650412	M 4 x 12
002650416	M 4 x 16
002650420	M 4 x 20
002650425	M 4 x 25
002650430	M 4 x 30
002650435	M 4 x 35
002650440	M 4 x 40
002650510	M 5 x 10
002650512	M 5 x 12
002650516	M 5 x 16
002650520	M 5 x 20
002650530	M 5 x 30
002650540	M 5 x 40
002650550	M 5 x 50
002650610	M 6 x 10

dimensions in mm

Order no.	Nominal size
002650616	M 6 x 16
002650620	M 6 x 20
002650625	M 6 x 25
002650630	M 6 x 30
002650640	M 6 x 40
002650650	M 6 x 50

Material: PA 6.6 (polyamide 66)

Color: nature

Additional sizes and versions (e.g. PP, PVDF, PEEK) available on request!

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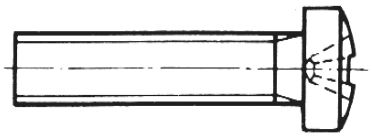
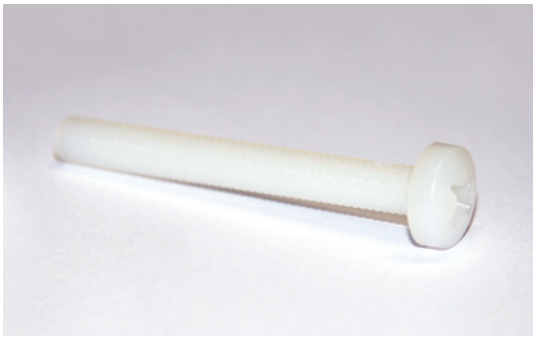
Phillips raised countersunk-head screws

DIN 7985





dimensions in mm

Order no.	Nominal size
00279850304	M 3 x 4
00279850305	M 3 x 5
00279850306	M 3 x 6
00279850308	M 3 x 8
00279850310	M 3 x 10
00279850312	M 3 x 12
00279850316	M 3 x 16
00279850320	M 3 x 20
00279850325	M 3 x 25
00279850405	M 4 x 5
00279850406	M 4 x 6
00279850408	M 4 x 8
00279850410	M 4 x 10
00279850412	M 4 x 12
00279850416	M 4 x 16
00279850420	M 4 x 20
00279850425	M 4 x 25
00279850430	M 4 x 30
00279850510	M 5 x 10
00279850516	M 5 x 16
00279850520	M 5 x 20
00279850525	M 5 x 25
00279850530	M 5 x 30
00279850540	M 5 x 40
00279850610	M 6 x 10

dimensions in mm

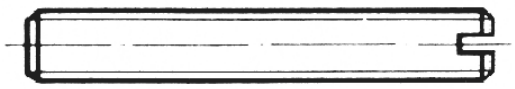
Order no.	Nominal size
00279850616	M 6 x 16
00279850620	M 6 x 20
00279850625	M 6 x 25
00279850630	M 6 x 30
00279850640	M 6 x 40
00279850650	M 6 x 50
00279850810	M 8 x 10
00279850816	M 8 x 16
00279850820	M 8 x 20
00279850830	M 8 x 30
00279850840	M 8 x 40
00279850850	M 8 x 50
00279850860	M 8 x 60

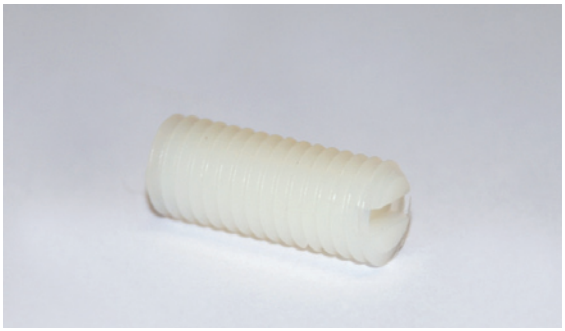
Material: PA 6.6 (polyamide 66)
Color: nature

Additional sizes and versions (e.g. PP, PVDF, PEEK) available on request!

Slotted setscrews

DIN 551





dimensions in mm

Order no.	Nominal size
0025103035	M 3 x 3,5
002510305	M 3 x 5
002510306	M 3 x 6
0025103086	M 3 x 8,6
002510310	M 3 x 10
002510316	M 3 x 16
002510404	M 4 x 4
002510405	M 4 x 5
002510406	M 4 x 6
002510408	M 4 x 8
002510410	M 4 x 10
002510412	M 4 x 12
002510416	M 4 x 16
002510505	M 5 x 5
002510506	M 5 x 6
002510508	M 5 x 8
002510510	M 5 x 10
002510512	M 5 x 12
002510516	M 5 x 16
002510521	M 5 x 21
002510531	M 5 x 31
002510605	M 6 x 5
002510606	M 6 x 6
002510608	M 6 x 8
002510610	M 6 x 10

dimensions in mm

Order no.	Nominal size
002510612	M 6 x 12
002510616	M 6 x 16
002510620	M 6 x 20
002510625	M 6 x 25
002510630	M 6 x 30
002510636	M 6 x 36
002510805	M 8 x 5
002510806	M 8 x 6
002510808	M 8 x 8
002510810	M 8 x 10
002510812	M 8 x 12
002510814	M 8 x 14
002510816	M 8 x 16
002510820	M 8 x 20
002510825	M 8 x 25
002510830	M 8 x 30
002510832	M 8 x 32
002510840	M 8 x 40
002510870	M 8 x 70
002511008	M 10 x 8
002511010	M 10 x 10
002511012	M 10 x 12
002511014	M 10 x 14
002511016	M 10 x 16
002511020	M 10 x 20

dimensions in mm

Order no.	Nominal size
002511026	M 10 x 26
002511030	M 10 x 30
002511210	M 12 x 10
002511212	M 12 x 12
002511216	M 12 x 16
002511220	M 12 x 20
002511225	M 12 x 25
002511615	M 16 x 15
002511620	M 16 x 20
002512016	M 20 x 16
002512020	M 20 x 20
002512025	M 20 x 25
002512030	M 20 x 30
002512040	M 20 x 40

Material: PA 6.6 (polyamide 66)
Color: nature

Additional sizes and versions (e.g. PP, PVDF, PEEK) available on request!

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Setscrews with hexagon sockets

DIN 913

dimensions in mm

Order no.	Nominal size
0029130506	M 5 x 6
0029130508	M 5 x 8
0029130510	M 5 x 10
0029130606	M 6 x 6
0029130610	M 6 x 10
0029130616	M 6 x 16
0029130620	M 6 x 20
0029130625	M 6 x 25
0029130805	M 8 x 5
0029130810	M 8 x 10
0029130816	M 8 x 16
0029130820	M 8 x 20
0029130825	M 8 x 25

Material: PA 6.6 (polyamide 66)
Color: nature

Additional sizes and versions (e.g. PP, PVDF, PEEK) available on request!

Threaded rods

DIN 975

Length: 1.000 mm

dimensions in mm

Order no.	Nominal size
002975031	M 3
002975041	M 4
002975051	M 5
002975061	M 6
002975081	M 8
002975101	M 10
002975121	M 12
002975161	M 16
002975201	M 20

Material: PA 6.6 (polyamide 66)
Color: nature

Length: 1.000 mm

dimensions in mm

Order no.	Nominal size
002975061PP	M 6
002975081PP	M 8
002975101PP	M 10
002975121PP	M 12
002975161PP	M 16
002975201PP	M 20

Material: PP (polypropylene)
Color: grey

Length: 1.000 mm

dimensions in mm

Order no.	Nominal size
002975051PVDF	M 5
002975061PVDF	M 6
002975081PVDF	M 8
002975101PVDF	M 10
002975121PVDF	M 12
002975161PVDF	M 16
002975201PVDF	M 20

Material: PVDF (polyvinylidene fluoride)
Color: nature

Additional sizes and versions available on request!

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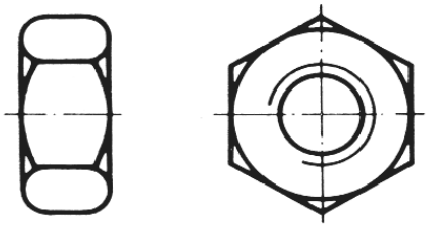
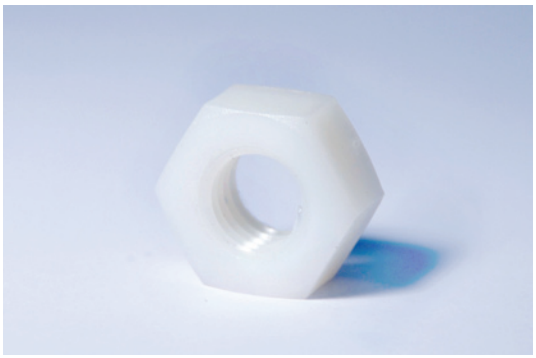
Hexagon nuts

DIN 934





dimensions in mm

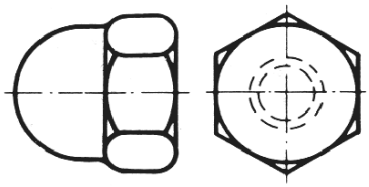
Order no.	Nominal size	Wrench size
002934021	M 2	4
0029340251	M 2,5	5
002934031	M 3	5,5
002934041	M 4	7
002934051	M 5	8
002934061	M 6	10
002934081	M 8	13
002934101	M 10	17
002934121	M 12	19
002934141	M 14	22
002934161	M 16	24
002934181	M 18	27
002934201	M 20	30
002934221	M 22	32
002934241	M 24	36
002934271	M 27	41
002934301	M 30	46

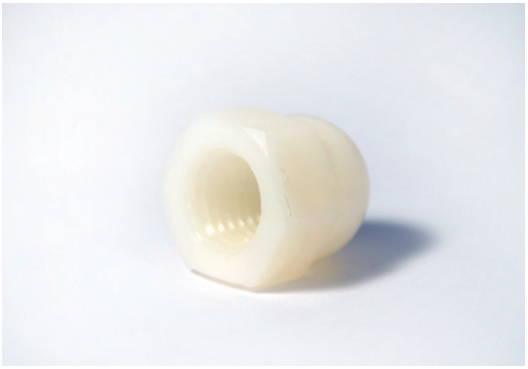
Material: PA 6.6 (polyamide 66)
Color: nature

Additional sizes and versions (e.g. PP, PVDF, PEEK) available on request!

Hexagon cap nuts

DIN 1587





dimensions in mm

Order no.	Nominal size	Wrench size
002158703	M 3	5,5
002158704	M 4	7
002158705	M 5	8
002158706	M 6	10
002158708	M 8	13
002158710	M 10	17
002158712	M 12	19
002158716	M 16	24
002158720	M 20	30

Material: PA 6.6 (polyamide 66)
Color: nature

Additional sizes and versions (e.g. PP, PVDF, PEEK) available on request!

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High-strength plastic screws - Tensile 200®

Tensile 200® is a high-strength plastic screw of the latest generation, which offers new solutions for fastening problems by virtue of its unique materialproperties. The field of application can be expanded by the selection from a range of basic materials, meanwhile polyamide 6.6 (PA 6.6) is completely sufficient in most cases. In the case of increased thermal or chemical loads, polypropylene (PP) or polyvinylidene fluoride (PVDF) may also be used.

Tensile 200® is produced according to a process, which prevents any interfering mould parting lines from being formed. In addition, it is now possible to avoid an interruption of the fibre orientation of the material in production, so to minimise the notch effect on the thread flanks. By means of this production process, the formation of shrinkages (air bubbles) is also greatly minimised so that the full cross-section surface remains preserved. Knowing to the combination of these factors, a tensile strength is achieved that is above average for plastic screws. The use of two nuts and respectively one thread depth of twice the screw diameter is recommended!

Tensile 200® has a significantly greater tensile force than other common retail plastic screws because of its special admixture. The elongation at fracture can thereby also be reduced. The absorption of water is very high with polyamide in the normal case, whereby the material bulges. But this is much reduced by the Tensile 200®, which is why the thread remains functional permanently.

Tensile 200® is manufactured in the tolerance quality 8, according to the DIN standards for metal screws. Applicable as tolerance fields for the outer diameter is 8e, for the flank diameter 8g and for the core diameter 8g.

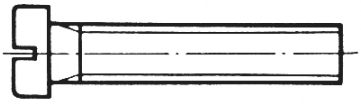
The following dimensions of the Tensile 200® are available:

		M 5	M 6	M 8	M 10	M 12
DIN 84	length from	10 mm	10 mm	16 mm	16 mm	20 mm
	to	90 mm	90 mm	110 mm	110 mm	110 mm
DIN 912	length from		10 mm	20 mm	20 mm	20 mm
	to		90 mm	100 mm	100 mm	110 mm
DIN 931	length from	10 mm	10 mm	16 mm	16 mm	20 mm
	to	90 mm	90 mm	110 mm	110 mm	110 mm
DIN 933	length from	10 mm	10 mm	16 mm	16 mm	20 mm
	to	90 mm	90 mm	110 mm	110 mm	110 mm

Tensile 200®- as a novel type of connecting element - has a diverse range of applications. They are used with great success in industry. The use of the Tensile 200® must in any case be checked as to strain caused by forces, temperature and other environmental factors. This technical information is intended merely as non-binding advice. In the case of application, no warranty, obligation or liability can be derived from it.

High-strength plastic screws - Tensile 200®

Partially threaded slotted cheese-head screws - DIN 84



dimensions in mm

Order no.	Nominal size
002840510TEN	M 5 x 10
002840512TEN	M 5 x 12
002840516TEN	M 5 x 16
002840520TEN	M 5 x 20
002840525TEN	M 5 x 25
002840530TEN	M 5 x 30
002840535TEN	M 5 x 35
002840540TEN	M 5 x 40
002840545TEN	M 5 x 45
002840550TEN	M 5 x 50
002840555TEN	M 5 x 55
002840610TEN	M 6 x 10
002840616TEN	M 6 x 16
002840620TEN	M 6 x 20
002840625TEN	M 6 x 25
002840630TEN	M 6 x 30
002840635TEN	M 6 x 35
002840640TEN	M 6 x 40
002840645TEN	M 6 x 45
002840650TEN	M 6 x 50
002840655TEN	M 6 x 55
002840660TEN	M 6 x 60
002840816TEN	M 8 x 16
002840820TEN	M 8 x 20
002840825TEN	M 8 x 25

dimensions in mm

Order no.	Nominal size
002840830TEN	M 8 x 30
002840835TEN	M 8 x 35
002840840TEN	M 8 x 40
002840845TEN	M 8 x 45
002840850TEN	M 8 x 50
002840855TEN	M 8 x 55
002840860TEN	M 8 x 60
002840870TEN	M 8 x 70
002840880TEN	M 8 x 80
002840890TEN	M 8 x 90
002841020TEN	M 10 x 20
002841030TEN	M 10 x 30
002841040TEN	M 10 x 40
002841050TEN	M 10 x 50
002841060TEN	M 10 x 60
002841070TEN	M 10 x 70
002841080TEN	M 10 x 80
0028410100TEN	M 10 x 100

Material: PA 6.6 (polyamide 66) + 50% glassfiber reinforced
Color: nature

Thread up to bolt head available on request!

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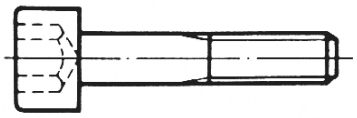
High-strength plastic screws - Tensile 200®

Partially threaded cheese-head screws with hexagon sockets - DIN 912



dimensions in mm

Order no.	Nominal size
002120614TEN	M 6 x 14
002120616TEN	M 6 x 16
002120620TEN	M 6 x 20
002120625TEN	M 6 x 25
002120630TEN	M 6 x 30
002120635TEN	M 6 x 35
002120640TEN	M 6 x 40
002120645TEN	M 6 x 45
002120650TEN	M 6 x 50
002120655TEN	M 6 x 55
002120660TEN	M 6 x 60
002120670TEN	M 6 x 70
002120680TEN	M 6 x 80
002120690TEN	M 6 x 90
002120816TEN	M 8 x 16
002120818TEN	M 8 x 18
002120820TEN	M 8 x 20
002120825TEN	M 8 x 25
002120830TEN	M 8 x 30
002120835TEN	M 8 x 35
002120840TEN	M 8 x 40
002120845TEN	M 8 x 45
002120850TEN	M 8 x 50
002120860TEN	M 8 x 60
002121020TEN	M 10 x 20

dimensions in mm

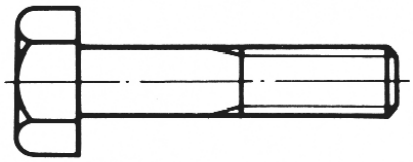
Order no.	Nominal size
002121030TEN	M 10 x 30
002121040TEN	M 10 x 40
002121050TEN	M 10 x 50
002121060TEN	M 10 x 60
002121070TEN	M 10 x 70
002121080TEN	M 10 x 80
002121230TEN	M 12 x 30
002121240TEN	M 12 x 40
002121250TEN	M 12 x 50
002121260TEN	M 12 x 60
002121270TEN	M 12 x 70
002121280TEN	M 12 x 80
0021212100TEN	M 12 x 100

Material: PA 6.6 (polyamide 66) + 50% glassfiber reinforced
Color: nature

Thread up to bolt head available on request!

High-strength plastic screws - Tensile 200®

Hexagon head screws with shank - DIN 931



dimensions in mm

Order no.	Nominal size	Wrench size
002310535TEN	M 5 x 35	8
002310540TEN	M 5 x 40	8
002310550TEN	M 5 x 50	8
002310620TEN	M 6 x 20	10
002310630TEN	M 6 x 30	10
002310640TEN	M 6 x 40	10
002310650TEN	M 6 x 50	10
002310660TEN	M 6 x 60	10
002310665TEN	M 6 x 65	10
002310670TEN	M 6 x 70	10
002310685TEN	M 6 x 85	10
002310690TEN	M 6 x 90	10
002310840TEN	M 8 x 40	13
002310850TEN	M 8 x 50	13
002310860TEN	M 8 x 60	13
002310870TEN	M 8 x 70	13
002310880TEN	M 8 x 80	13
002310890TEN	M 8 x 90	13
0023108100TEN	M 8 x 100	13
0023108110TEN	M 8 x 110	13
002311040TEN	M 10 x 40	17
002311050TEN	M 10 x 50	17
002311060TEN	M 10 x 60	17
002311070TEN	M 10 x 70	17
002311250TEN	M 12 x 50	19
002311260TEN	M 12 x 60	19
002311280TEN	M 12 x 80	19

Material: PA 6.6 (polyamide 66) + 50% glassfiber reinforced
Color: nature

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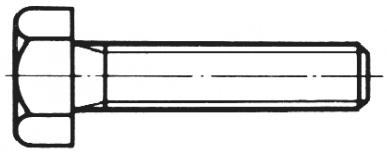
High-strength plastic screws - Tensile 200®

Hexagon head screws - DIN 933



dimensions in mm

Order no.	Nominal size	Wrench size
002330510TEN	M 5 x 10	8
002330520TEN	M 5 x 20	8
002330525TEN	M 5 x 25	8
002330530TEN	M 5 x 30	8
002330540TEN	M 5 x 40	8
002330550TEN	M 5 x 50	8
002330610TEN	M 6 x 10	10
002330612TEN	M 6 x 12	10
002330616TEN	M 6 x 16	10
002330620TEN	M 6 x 20	10
002330625TEN	M 6 x 25	10
002330630TEN	M 6 x 30	10
002330640TEN	M 6 x 40	10
002330650TEN	M 6 x 50	10
002330660TEN	M 6 x 60	10
002330670TEN	M 6 x 70	10
002330690TEN	M 6 x 90	10
002330816TEN	M 8 x 16	13
002330820TEN	M 8 x 20	13
002330825TEN	M 8 x 25	13
002330830TEN	M 8 x 30	13
002330835TEN	M 8 x 35	13
002330840TEN	M 8 x 40	13
002330845TEN	M 8 x 45	13
002330850TEN	M 8 x 50	13
002330855TEN	M 8 x 55	13
002330860TEN	M 8 x 60	13

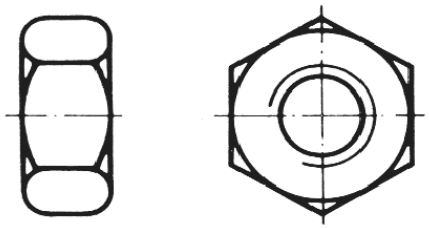
dimensions in mm

Order no.	Nominal size	Wrench size
002330870TEN	M 8 x 70	13
002330880TEN	M 8 x 80	13
002331016TEN	M 10 x 16	17
002331020TEN	M 10 x 20	17
002331030TEN	M 10 x 30	17
002331040TEN	M 10 x 40	17
002331050TEN	M 10 x 50	17
002331060TEN	M 10 x 60	17
002331070TEN	M 10 x 70	17
002331080TEN	M 10 x 80	17
0023310100TEN	M 10 x 100	17
0023310110TEN	M 10 x 110	17
002331220TEN	M 12 x 20	19
002331230TEN	M 12 x 30	19
002331235TEN	M 12 x 35	19
002331240TEN	M 12 x 40	19
002331250TEN	M 12 x 50	19
002331260TEN	M 12 x 60	19
002331270TEN	M 12 x 70	19
002331280TEN	M 12 x 80	19
0023312110TEN	M 12 x 110	19
002331620TEN	M 16 x 20	24
002331630TEN	M 16 x 30	24
002331640TEN	M 16 x 40	24
002331650TEN	M 16 x 50	24
002331660TEN	M 16 x 60	24
002331680TEN	M 16 x 80	24

Material: PA 6.6 (polyamide 66) + 50% glassfiber reinforced
Color: nature

High-strength plastic hexagon nuts - Tensile 200®

DIN 555



dimensions in mm

Order no.	Nominal size	Wrench size
002555051TEN	M 5	8
002555061TEN	M 6	10
002555081TEN	M 8	13
002555101TEN	M 10	17
002555121TEN	M 12	19
002555161TEN	M 16	24
002555201TEN	M 20	30

Material: PA 6.6 (polyamide 66) + 50% glassfiber reinforced
Color: nature

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General Terms of Sale and Delivery

Status September 2009

In respect of the contractual relationship, exclusively the following terms and conditions apply, unless agreed otherwise in writing. Terms and conditions of the Buyer stating the contrary shall not apply, unless the Supplier had explicitly agreed to their applicability in writing. The following terms and conditions shall also apply if the Supplier has completed the delivery to the Buyer without reservations in awareness of terms contrary to or deviating from the Supplier's own. Solely the German language applies.

1. Contract conclusion and scope of delivery, provision of goods

a) An order will only be deemed accepted once it is confirmed in writing by the Supplier or when the goods have been delivered. Until then the Supplier's quote will be considered non-binding and subject to change.
b) The Buyer shall assume the sole responsibility for the documentation to be provided by it, such as drawings, samples or similar. It shall be accountable for the working drawings submitted by it being free from infringements on the rights of third parties.
c) The written order confirmation from the Supplier shall be authoritative for the scope of delivery. The confirmed piece number may be exceeded or fallen short of by ten percent for special productions.
d) Insofar as the Buyer provides goods, these shall be delivered free of charges to our factory, including packaging and insurance. Any risk of damage and loss shall be insured by the Buyer. This shall also apply to tools and other provisions, which concern objects that are in the possession of the Buyer and provided to the Supplier for the short or long term.

2. Prices - packaging - payment

a) Deliveries are generally made ex-storage at the list prices as valid on the order date. The prices apply ex-factory, however excluding packaging, freight, postage and insurance and plus value added tax.
b) A return of the packaging will only be accepted if a mandatory obligation under the law requires such. The return will only be accepted if the delivery is free of charge.
c) Our commercial invoices shall be payable by bank transfer within 14 days as of the receipt of the invoice with 2% discount or within 30 days in the net amount without discounts. One-off tool cost shares as well as the full costs for tools are costs expended by us and shall always be payable in the net amount without discounts and without any deductions. For the purpose of the full costs of tools, the tools will transfer to the possession of the Buyer, which is why the liability for a loss of any kind shall also be insured
by the Buyer.
Unfortunately we cannot accept bills of exchange. The assignment of claims is permitted.
For payment by cheque, the Buyer shall bear the costs of encashment.
If the Buyer is in default of payment, interest in the amount of 10% plus base interest rate of the ECB shall be charged as of
the 31st day of default for the compensation of costs.
d) If the Buyer withdraws from the contract prior to the delivery of goods, we will be entitled to invoice the costs incurred.

3. Shipment and transfer of risk, acceptance

a) If no method of shipment has been agreed upon, it shall be decided at the Supplier's discretion.
b) Partial deliveries are permitted. The costs shall be borne by the recipient.
c) The risk will transfer to the Buyer when the object of delivery leaves the factory, even in cases where partial deliveries are made or if the Supplier has also assumed other payments or services, e.g. the shipment costs or delivery. The Buyer may not refuse the acceptance for reasons of an insignificant defect being present. If the shipment or the acceptance is delayed or does not take place due to circumstances that are not attributable to the Supplier, the risk shall transfer to the Buyer on the day of the notification of the shipment or the readiness for acceptance. The Supplier holds a transport insurance policy.

4. Offsetting and withholding

Rights to offset shall only be in the Buyer's entitlement if its counter-claims have been validly recognised, or if they are uncontested or acknowledged by the Supplier. Furthermore, the Buyer will only be entitled to withholding if its counter-claim is based on the same contract.

5. Period of delivery

a) The period of delivery shall begin when the order confirmation is sent out and is generally only indicated as the calendar week. It is deemed observed if the object of delivery has left the factory by expiration of the period.
b) The period of delivery shall prolong appropriately in the event of actions in the context of labour disputes, in particular strike and lock-out, as well as in the event of acts of god, which are outside of the Supplier's will (e.g. disruptions in operations, belated supply with raw materials, etc.), to the extent as such hindrances have substantial impact on the completion or shipment of the object of delivery. This shall also apply if these circumstances arise at the enterprises of subcontractors.
c) If the Supplier is in default and if the Buyer suffers a damage in consequence thereof, the latter shall have the right to demand a lump-sum payment as default compensation in exclusion of further claims. This default compensation shall amount 0.5% in total for each complete week of delay, at most however 5% of the value of the part of the complete delivery, which cannot be used on time or not in accordance with the contract for reasons of the delay.

6. Retention of title

We make our deliveries exclusively subject to a comprehensive, prolonged and expanded retention of title. In this regard the "Special Terms of Contract regarding the Retention of Title of the company DUBOSCHWEITZER GmbH, Status 2009" shall apply.

7. Warranty

The information, drawings, illustrations, technical values, etc. that are contained in this catalogue or the documents that are part of a quote have been drafted to our best knowledge. They do not release the Buyer in any way from the obligation to inspect the goods as to their correctness.
The Supplier provides a warranty for material and legal defects of the delivery in exclusion of further claims - subject to Section 8 - as follows:

Material defects

a) All the parts that prove to be deficient in consequence of a circumstances arisen prior to the transfer of risk shall, at the Supplier's discretion and free of charge, either be reworked or replaced by parts that are free from defects. The discovery of such defects shall be notified immediately in writing to the Supplier. Replaced parts shall become the property of the Supplier.
b) The Buyer shall provide the necessary time and opportunity to the Supplier to implement reworking and deliver replacements, as deemed necessary by the Supplier; otherwise the Supplier shall be released from the liability for the consequences resulting thereof. Solely in urgent cases of impending danger to the operational safety or for the aversion of disproportionately large damages, whereas the Supplier must be informed immediately in such cases, the Buyer shall have the right to remove the defect personally or assign third parties with the removal and shall be entitled to demand compensation of the necessary expenses from the Supplier.
c) Any costs incurred directly by the reworking or replacement delivery shall be borne by the Supplier and - insofar as the complaint proves to be justified - the costs of the replacement part including shipment. It shall furthermore assume the costs for disassembly and assembly as well as the costs for the possibly necessary provision of required assemblers and assistants, including travel costs, provided no disproportionate burden is created thereby for the Supplier.
d) The Buyer has a right to withdrawal from the contract within the scope of the legal regulations if the Supplier - in consideration of the statutory cases of exception - lets a grace period pass idly, which has been set to it for reworking or replacement delivery due to a material defect. If merely an insignificant defect is present, the Buyer shall merely have a right to a reduction of the contract price. The right to reduction of the contract price remains excluded in other respects.
e) No warranty is assumed specifically in the following cases: Unsuitable or improper use, faulty assembly or start-up of operations by the Buyer or third parties, natural wear and tear, faulty or negligent treatment, improper maintenance, unsuitable tools and materials, chemical and electro-chemical or electrical effects - insofar as they are outside of the Supplier's responsibility.
f) In the case of a sale of used objects, such as machines, the delivery will be made in exclusion of any warranty.
g) If the Buyer or a third party performs reworking improperly, the Supplier shall not have any liability for the consequences resulting thereof. The same applies to any modifications made to the object of delivery without the prior consent of the Supplier. If the material defect is caused by defective parts having been provided by the Buyer, no claim to warranty shall apply.

Legal defects

h) If the use of the object of delivery leads to an infringement on industrial property rights or copyrights, the Supplier shall generally obtain the right for further use at its own costs for the Buyer or modify the object of delivery in a way that is acceptable for the Buyer, so that the proprietary rights infringement will be eliminated.
If this is not possible to economically appropriate conditions or within an appropriate period, the Buyer shall have a right to withdrawal from the contract. On the said conditions, the Supplier shall also have a right to withdrawal from the contract.
In addition, the Supplier shall indemnify the Buyer from undisputed or validly recognised claims of the relevant owners of the proprietary rights.
i) The Supplier's obligations stated in Section 7 g) are final, subject to the reservation of Section 8 b), in the case of an infringement on industrial property rights and copyrights.

These claims are only established if

- the Buyer informs the Supplier immediately of the claimed infringements on industrial property rights and copyrights;
- the Buyer supports the Supplier to appropriate extent in the defence against the claims made or enables the Supplier to carry out modification measures according to Section 7 g);
- all measures of defence, including out-of-court settlements, remain reserved for the Supplier;
- the legal defect is not based on an instruction given by the Buyer. An instruction of this kind given by the Buyer is present in specific if a production has followed a process according to a drawing or a model of the Buyer.

and

- the legal defect was not caused in that the Buyer has modified the object of delivery at its own initiative after receipt or if it has used it in a manner that is not in accordance with the contract.

B. Liability

a) If the object of delivery cannot be used in accordance with the contract by the Buyer at the fault of the Supplier in consequence of omitted or faulty implementation of proposals and consultations made before or after the close of contract or if such was caused by a breach of other secondary contractual obligations - in particular the instruction for operation and maintenance of the object of delivery - the provisions of Sections 7 and 8 b) shall apply accordingly in exclusion of additional claims of the Buyer.
b) The Supplier shall be liable for damages that are not caused on the object of delivery itself - for whichever legal reasons - only

- in cases of intent,
- gross negligence on the part of the proprietor/committees or managerial staff,
- in the event of culpable injury to life, body and health,
- in the case of defects having been maliciously concealed by the Supplier or if the absence of such defects has been guaranteed by it.

In the event of a culpable violation of essential contractual obligations, the Supplier shall also be liable in cases of gross negligence of non-managerial staff and in cases of simple negligence, whereas in case of the latter the liability shall be limited to the damage that is typical for the contract and reasonably predictable. Further claims are excluded. The liability under the Product Liability Act shall not be affected by the foregoing provisions.

9. Limitations applicable to forwarding deliveries

The Buyer undertakes to refrain from forwarding deliveries of the goods procured from the Supplier to countries outside of the European Union. It shall also obligate its customers accordingly.

In case liability claims are made against the Supplier, regardless of their legal reason, which result from its products having been forwarded to countries outside of the European Union, be it directly by the Buyer or one of its customers, the Buyer undertakes to indemnify the Supplier from these claims. This indemnification obligation also includes the possibly necessary costs of legal defence.

10. Limitation

All claims of the Buyer - for whichever legal reasons - will become time-barred in 12 months. The statutory periods apply to the damage compensation claims pursuant to Section 8 b).

11. Place of fulfilment, place of jurisdiction, applicable law, language of the contract

a) The place of fulfilment is Haltern am See.
b) The place of jurisdiction for all disputes arising from this contract is Hamm if the Buyer is a general merchant, a legal entity of public law or a public-law special fund. The Supplier is also entitled to file suit at the place of the Buyer's registration.
c) Exclusively the German law applies, in particular concerning international sales and in exclusion of the UN Convention on Contracts for the International Sale of Goods (CISG). The language of the contract is German.

12. Miscellaneous

a) The invalidity of individual provisions of the contract shall not affect the validity of the remaining contract. If a provision is invalid, the accordant statutory provision shall apply.
b) The return of goods to us always requires an agreement in advance. In no case will we accept a return shipment at costs. The Buyer must grant us the possibility to have the goods be picked up by our general freight forwarder.
c) Orders confirmed by us as call-offs must be accepted accordingly within the agreed period. After a period of 1 month, we will have the right to deliver the parts that have not been accepted yet.

In the context of the business relationship we store the customer's data by means of electronic data processing systems.

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Status: January 2011

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