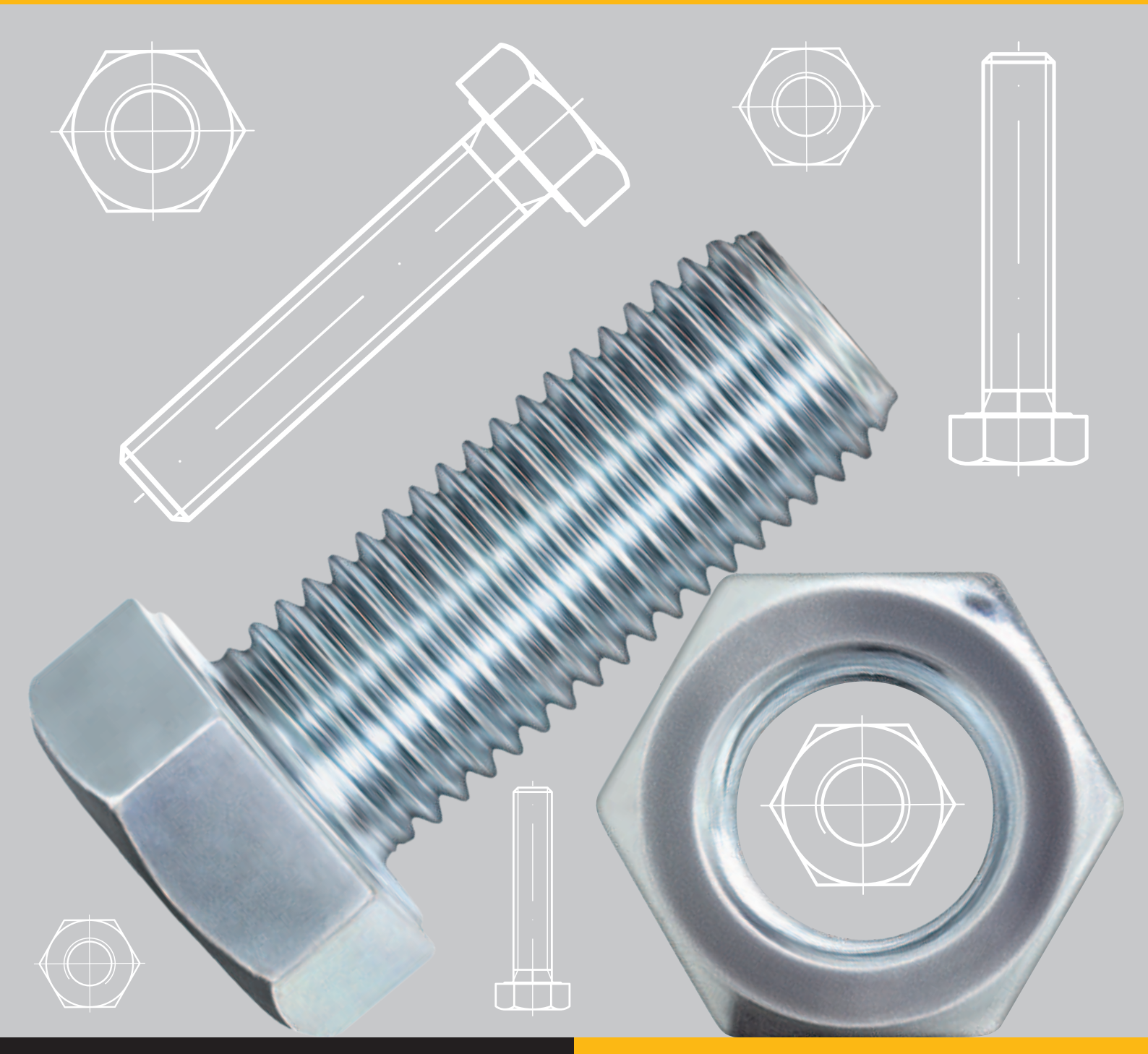
REYHER®

FASTENERS AND FIXING TECHNOLOGY

FASTENER GUIDE



REYHER-facts

- > 960 employees
- > 99% daily supply readiness
- ~ 465 million euros turnover
- > 40.000 m² total area
- 130.000 items in stock

REYHER certificates

- DIN EN ISO 9001
- VDA 6.2 (automotive)
- DIN EN ISO 14001 (environment)
- KTA 1401
- AEO F

Central location Hamburg – our gateway to the world

Contents

OUR SERVICES FOR YOU

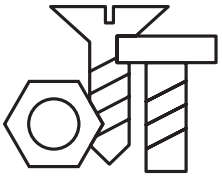
Comprehensive product range

We have 130,000 items in stock

In addition to standard fasteners we have numerous non-standards items. Our range is complemented with a large choice of fixing technology from highly reputable manufacturers. We also support you with customer-specific or engineered parts.

From a total of more than 130,000 different items in stock we have around 80,000 listed in our catalogue, with further around 50,000 items in C-parts management for our customers.

We always supply the same high quality that ourcustomers expect and can always rely on. In addition to standardised or prescribed standards tests, customer-specific and agreed testing plans come into play.



RIO®
REYHER INTERNET ORDER

Diverse e-business solutions

For regular interchange of business data the solution is EDI – Electronic Data Interchange. It's fast and error-free.

Electronic catalogues for customers can be individually tailored so that REYHER item data can be entered into almost every commonly used sourcing system.

The user-friendly webshop RIO – REYHER Internet Order makes it possible to see current availability and prices, at any time for every item. Orders can be placed with a minimum of clicks.

RKP®
REYHER KITTING & PACKAGING

Individualised kitting and packaging services

RKP – REYHER Kitting & Packaging fulfils customer needs for kitting and packaging in industry and trade.

This includes packaging design and labelling as well as compiling items into sets or complex assembly kits that can be given a prioritised pack sequence as required.

We despatch just-in-time to the construction site, to production halls, or wherever fasteners and fixing technology are needed.

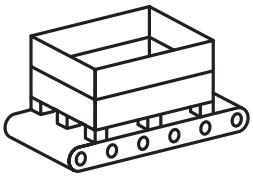
Automatic logistics centre

Our daily supply readiness is at over 99%

Several hundred tons of incoming goods and outgoing goods are daily processed. This works smoothly with our sophisticated warehouse logistics system. A total of 100,000 pallet places and 180,000 bin places are available in our modern warehouses.

The goods are for storage in our high-bay warehouses or in the small parts warehouse transported over conveying distances within our logistics centre.

For delivery, the goods are delivered via state-of-the-art sorting systems to the correct packing location. Afterwards, the goods will be on the way with our reliable shipping system – worldwide.



ROM®
REYHER ORDER MANAGEMENT

Flexible Kanban supply systems

REYHER has offered C-part management systems since 1993. Using ROM – REYHER Order Management provides our customers with the most reliable supply procedures.

Combinable modules, RFID technology, barcode systems, flexible labelling and modern data interchange form an all-round carefree package for seamless materials supply. Adapted precisely and flexibly to meet individual customer needs.

REM®
REYHER ENGINEERING MANAGEMENT

Technical expertise

We have qualified engineers and technicians in our dedicated REM – REYHER Engineering Management team. We advise our customers individually and hold training sessions. We also help to standardise the own range of products and structure it more economically.

With RRP – REYHER Rapid Prototyping, we also offer a 3D printing service that we can use to fasteners as prototypes or complete components as functional models for the component optimization.

Selection aid for corrosion protection – Coatings for steel fasteners

Coatings that are suitable in general for fasteners and which have significant market penetration are listed below for the protection of steel surfaces against corrosion. The coating options are not listed in any order in the product overview on the following pages as they are generally applicable.

Standard commercial corrosion protection coatings	
• Bronze plated	• Zinc flake coating (with and without set friction coefficient, colour variants possible)
• Browned	• Zinc-iron plated (transparent/black, with and without sealing)
• Copper plated	• Zinc-nickel plated (transparent/black, with and without sealing)
• Hot-dip galvanized	• Zinc plated (blue/transparent/yellow*/olive*/black*)
• Mechanically zinc plated (mechZn)	• Zinc plated thick layer passivated (optional with sealing)
• Nickel plated	
• Phosphated	
• Teflon coating (PTFE, Xylan)	

*contains chrome (VI)

Some coating variants are not recommended for certain product characteristics and should be taken into consideration when selecting a corrosion protection coating.

Product/ Product characteristic	Note
Property class 12.9, case-hardened and spring strength fasteners	Electroplated coatings should not be used. There is a high risk of hydrogen-induced stress cracking corrosion (hydrogen embrittlement). Also see page 81. Alternatively, the following coatings are available: • Zinc flake coating (flZn) • Mechanically plated (mechZn)
Screws with internal drives	If dip coating, which includes hot dip galvanizing and even zinc flake coating, is used on internal drives such as hexagon sockets, hexalobular sockets and even cross slots, it is possible that scooping occurs which could "clog" the internal drive. The coating material flows into the recess and remains there. Smaller dimensions in particular are affected by this. In individual cases, it is possible to check whether production can be made feasible by using cleverly designed spinning mechanisms.
Thread tolerances/ thread mating	A high layer thickness (over 50 µm) is usually applied in the case of hot dipped fasteners and this must be taken into account for the functionality of the thread mating. Other thread tolerances must therefore be necessary when producing the uncoated screws and nuts. Hot dipping of uncoated existing stocks is not possible for this reason. This may also apply to zinc flake coating and electroplated applied coatings if the required layer thickness is greater than 10 µm. A test is necessary here, dependent on the nominal thread diameter.
Tapping screws, self-drilling screws, self-threading screws, thread-forming screws	Tapping screws are those screws that form their own counter threads. The thread area is therefore highly stressed mechanically. The relatively soft coatings are damaged more or less severely during installation which in turn can affect the required corrosion protection in the thread area

Further information and technical notes regarding corrosion can be found on pages 77-83.
Our REM team will be happy to advise you on technical aspects at +49 40 85363-999.

Briefly explained...

The following pages indicate the **standardised fasteners listed in order of increasing standard number.**
The **non-standardised fasteners** are sorted by category.

The coloured bars facilitate the selection of the materials:

gray	=	Fasteners made of steel/steel with coating
blue	=	Fasteners made of stainless steels
yellow	=	Fasteners made of non-ferrous materials
orange	=	Fastening technology

A whole series of the listed DIN standards have now been replaced by the Deutschen Institut für Normung with ISO standards (DIN ISO or DIN EN ISO*) or EN standards (DIN EN*). The replacement standards are listed under the DIN standards and also included in the chronological listing.

Other DIN standards were withdrawn without replacements as they are seen as technically outdated; these standards are marked with ①.

As products remain in demand for some time and are therefore kept in stock even after the standards have been withdrawn, they have been kept in the list.

* See the Technical information – Changes in standards, pages 75–76.

Materials glossary

4.6 – 12.9	Property classes for screws	Cu alloys/CuNiSi	Copper alloys
5–12 / 04, 05	Property classes for nuts	D 6 (–100)	Stainless Duplex-steel
11 H – 45 H	Hardness classes	MCI	Malleable cast iron
A 1–A 5 / (–70, –80)	Stainless steels / (property class)	Ni	Nickel
Al	Aluminium	P	Plastic
Br	Brass	SSt	Spring steel
Cr	Chromium	St	Steel
CuSn/CuNiSi	Bronze	Ti	Titanium
Cu	Copper		

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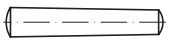
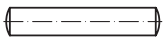
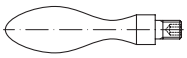
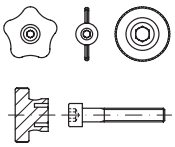
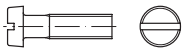
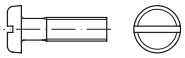
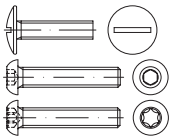
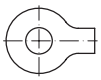
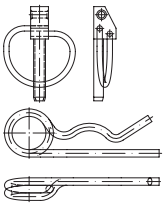
Materials glossary

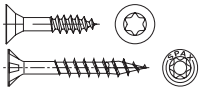
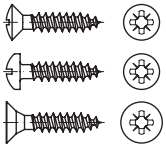
4.6 – 12.9	Property classes for screws	Cu alloys/CuNiSi	Copper alloys
5–12 / 04, 05	Property classes for nuts	D 6 (–100)	Stainless Duplex-steel
11 H – 45 H	Hardness classes	MCI	Malleable cast iron
A 1–A 5 / (–70, –80)	Stainless steels / (property class)	Ni	Nickel
Al	Aluminium	P	Plastic
Br	Brass	SSt	Spring steel
Cr	Chromium	St	Steel
CuSn/CuNiSi	Bronze	Ti	Titanium
Cu	Copper		

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 1 (ISO 2339**)	 Taper pins	St	A 1-A 5	Br
DIN 7 (ISO 2338**)	 Parallel pins	St	A 1-A 5	Br
DIN 39	 Fixed ball handles	St		Al plastic
	 Plastic knobs for hexagon socket screws - tommy screws - star grips - palm grips			plastic
DIN 84 (ISO 1207**)	 Slotted cheese head screws	4.8 5.8 8.8	A 1-A 5	Br bronze Al plastic
DIN 85 (ISO 1580**)	 Slotted pan head screws	4.8 5.8 8.8	A 1-A 5	Br bronze Al plastic
(DIN 34805-1) (ISO 7380-1) (ISO 14583)	 Mushroom head screws with slot, hexagon or hexalobular socket - "slotted cup head bolts" art. 88107 - with hexagon socket - with hexalobular socket	4.6 5.8 8.8 10.9 12.9	A 1-A 5	Br
	 Cap bolts (article 88981/88003), bolts for number plates and balcony with caps	4.8 St hard.	A 2	Br
DIN 93 ①	 Tap washers with a long tap	St	A 2 A 4	Br Cu Al
DIN 94 (ISO 1234*)	 Split pins	St	A 2 A 4	Br Cu Al
DIN 94	 Article 82094 Split pins assortment	St		
	 Linch pins, spring cotter pins (→ DIN 11023/11024)	St	A 2 A 4	
DIN 95	 Slotted raised countersunk head wood screws	St	A 2 A 4	Br bronze Cu Al
DIN 96	 Slotted round head wood screws	St	A 2 A 4	Br bronze Cu Al

* DIN: ISO/EN identical = interchangeable
** DIN: ISO/EN mostly interchangeable
*** DIN: ISO/EN changes of dimension/form (see Technical Information from page 74)

① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 97		Slotted countersunk head wood screws	St	A 2 A 4	Br bronze Cu Al
		Article 88110 Theft resistant screws = half round wood screws with hexagon socket and rivet pin	St		
"ISR"		Countersunk wood screws, countersunk head wood screws up to 12 x 600, with hexalobular drive/head – chipboard screws (article 89098) – SPAX screws (article 88091) – SPAX special screws (article 88192–88197)	St hard. waxed	A 2 A 4	
		Article 88312 Cheese head screws with hexagon socket or hexalobular drive, wood screws/taper screws thread	St hard.	A 2 A 4	
		Article 88092–88099, 89096–89097 Chipboard screws/SPAX screws with cross recess – raised countersunk head – round head – countersunk head	St hard. waxed	A 2	Br
		Article 89021 SPAX screws assortment	St hard. waxed		
		Chipboard screws/SPAX screws, magazined (banded)			
~ DIN 97		Slotted countersunk head wood screws with inner hole	St	A 2 A 4	Br
		Article 88099 Chipboard screws/SPAX screws, countersunk head with cross recess and inner hole	St hard. waxed		
		Article 88000–88003 Caps for wood screws and chipboard screws with inner hole or with cross recess, flat, flat round, rustic			plastic
DIN 98		Rotatable ball handles	St		Al plastic

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Driving features:
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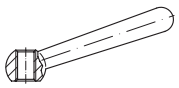
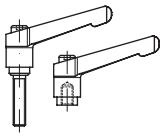
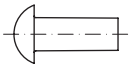
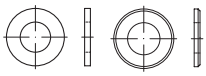
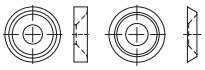
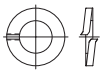
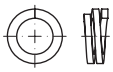
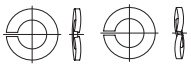
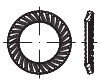
		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 99	 Tapered handles	St	A 2	
	 Clamping lever and tension lever	St		Zn/plastic plastic
DIN 123 DIN 124 (ISO 1051)	 Round rivets, nominal diameter 10–36 mm	St		
DIN 125 (ISO 7089**/7090**)	 Plain washers type A = no chamfer, type B = with chamfer plain washers, hardened (ISO 7089/7090) plain washers (article 83125/ANSI B18.22.1)	St hard.	A 2 A 4	Br Cu Al plastic
DIN 125 DIN 125/127	 Article 82125/82127 Washers assortment, washers/spring lock washers assortment	St hard.		
DIN 126 (ISO 7091*)	 Plain washers (article 88100)	St		
	 Article 88499/88965 Collar washers	St	A 2 A 4	Br Al
DIN 127 ①	 Spring lock washers	SSt	1.4310 A 4	bronze
	 Spring lock washers, double	SSt		
DIN 128 ①	 Spring washers (mandrel spring washers)	SSt	1.4310 A 4	bronze
DIN 137 ①	 Spring washers type A = convex, type B = corrugated	SSt	1.4310	bronze
	 Article 88123–88129 TECKENTRUP lock washers for hexagon head screws and hexagon socket head cap screws	SSt	1.4568	
	 Article 88130/88131 Lock rings	SSt	1.4310	bronze
	 Article 88120, 88121 SCHNORR locking washers, serrated both sides, S, VS	St hard.	A 2 A 4	

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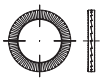
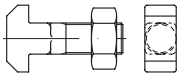
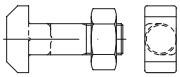
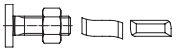
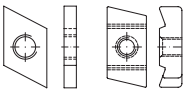
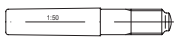
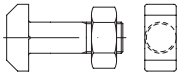
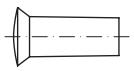
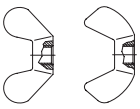
			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
		Article 88132 NORD-LOCK washers, standard = normal outer diameter SP = enlarged outer diameter SC = for HV-connections X-series = wedge lock washers	St	A 4	
		Article 88032 HEICO-LOCK wedge lock washers	St	A 4	
		Article 88033 HEICO-LOCK ring lock washers	St		
		Article 88035 HEICO-LOCK Combi-Washers	St	A 4	
		Article 88119 LOCKTIX-washers	St		
DIN 186		T-head bolts with square neck	St	A 2 A 4	
DIN 188		T-head bolts with double nip	St	A 2 A 4	
		Article 88928-88950 T-head bolts/hook bolts for profile	4.6	A 2 A 4	
		Article 88951-88955 T-head/hook head threaded plates (slide nuts) for profiles	St	A 2 A 4	
DIN 258		Taper pins with external thread, constant taper length	St	A 1 A 2	
DIN 261		T-head bolts	St	A 2 A 4	
DIN 268 ① DIN 271 ①		Tangential keys	St		
DIN 302 (ISO 1051)		Countersunk rivets, nominal diameter 10-36 mm	St		
DIN 314 DIN 315		Wing nuts, rounded or edged wings	St MCI	A 2 A 4	Br plastic
		Article 88215 Wing nuts, small "American" version	St MCI	A 2 A 4	Br plastic

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(see Technical Information from page 74)

① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 316 DIN 318	Wing screws, rounded or edged wings	St MCI	A 2	Br plastic
DIN 319	Ball knobs	St		plastic
DIN 338 DIN 340	Twist drills with straight shank	St hard.		
DIN 388 DIN 390	Hand wheels	MCI		plastic Al
DIN 404	Slotted capstan screws	St	A 1-A 5	Br
DIN 417 (ISO 7435*)	Slotted grub screws with full dog point	14 H	A 1-A 5	Br
DIN 427 (ISO 2342*)	Slotted headless screws with chamfered end	14 H	A 1-A 5	Br
DIN 431	Pipe nuts	14 H	A 1-A 5	Br
DIN 432 ①	Washers with external tap	St	A 2 A 4	Br Cu
DIN 433 (ISO 7092**)	Washers for cheese head screws	St hard.	A 2 A 4	Br
DIN 434	Square taper washers for U-sections (taper 8%)	St	A 2 A 4	
DIN 435	Square taper washers for double-T-sections (taper 14%)	St	A 2 A 4	
DIN 436	Square washers	St	A 2 A 4	
DIN 438 (ISO 7436*)	Slotted grub screws with cup point	14 H	A 1-A 5	Br
DIN 439 (ISO 4035/8675***)	Hexagon thin nuts, type A = without chamfer, type B = with chamfer	04, 11 H 05, 14 H	A 1-A 5	Br
DIN 440 (ISO 7094**)	Washers for wood constructions, type R = round hole, type V = square hole	St		
DIN 442 DIN 443	Sealing push-in type caps	St		

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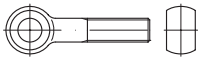
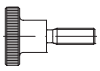
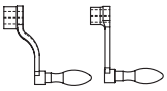
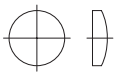
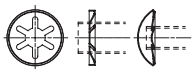
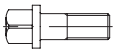
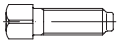
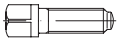
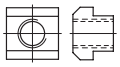
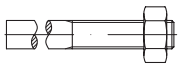
Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 444	 Eye bolts	St	A 1-A 5	Br
DIN 462	 Internal tab washers (for slotted nuts DIN 1804)	St	A 2 A 4	Br Cu
DIN 463 ①	 Washers with 2 taps	St	A 2 A 4	Br Cu
DIN 464	 Knurled thumb screws	St	A 1-A 5	Br Al plastic
DIN 466	 Knurled nuts, high type	5	A 1-A 5	Br Al plastic
DIN 467	 Knurled nuts, low type	5	A 1-A 5	Br Al
DIN 468 DIN 469	 Crank handles	MCI St		
DIN 470	 Sealing discs	St		
DIN 471	 Retaining rings for shafts, normal type/heavy type	SSt	1.4034 1.4122 1.4310 1.4568	bronze
DIN 471	 Article 82471 Assortment of retaining rings for shafts	SSt		
	 Article 88122 Axle clamping rings, quick fastener-springs/caps (QUICKLOCK/STARLOCK)	SSt		
DIN 472	 Retaining rings for bores, normal type/heavy type	SSt	1.4034 1.4122 1.4310 1.4568	
DIN 478	 Square head bolts with collar	5.8 8.8 10.9		
DIN 479	 Square head bolts with dog point	5.8 8.8 10.9		
DIN 480	 Square head bolts with collar, short dog point and rounded end	5.8 8.8 10.9		
DIN 508	 T-slot nuts	St-QT		
DIN 525	 Studs for welding	3.6	A 2 A 4	

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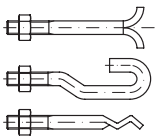
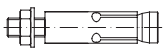
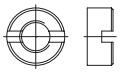
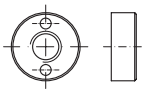
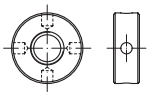
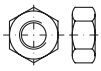
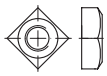
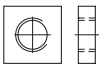
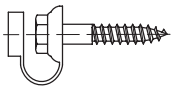
Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 529	 Masonry bolts (anchor bolts)	St	A 2 A 4	
	 Masonry bolts (anchor bolts) → Fixing systems	St		
DIN 546	 Slotted round nuts	St	A 1–A 5	Br Al
DIN 547	 Double-pin nuts	St	A 1–A 5	Br Al
DIN 548	 Capstan nuts	St	A 1–A 5	Br Al
DIN 551 (ISO 4766*)	 Slotted grub screws with flat point	14 H	A 1–A 5	Br plastic
DIN 553 (ISO 7434*)	 Slotted grub screws with cone point	14 H	A 1–A 5	Br plastic
DIN 555 (ISO 4034***)	 Hexagon nuts, product grade C – with metric thread M – with inch thread WW	5 5–2		plastic
DIN 557	 Square nuts	5		
DIN 558 (ISO 4018***)	 Hexagon head screws, thread up to head, product grade C	4.6		plastic
DIN 561	 Hexagon head set screws with dog point	14 H 22 H	A 1–A 5	
DIN 562	 Square thin nuts, low type	04 11 H	A 2 A 4	Br Al
DIN 564	 Hexagon head set screws with short dog point and flat cone end	14 H 22 H	A 1–A 5	
DIN 571	 Hexagon head wood screws	St	A 2 A 4	Br
	 Article 88005 Plastic sealings/caps for hexagon head wood screws for corrugated roof panels			plastic
	 Article 89571 Hexagon wood screws, CE according to EN 14592	St		

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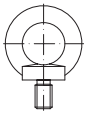
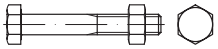
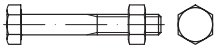
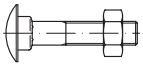
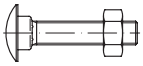
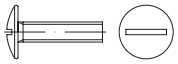
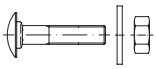
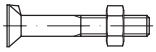
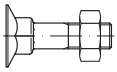
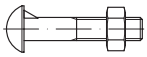
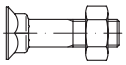
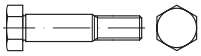
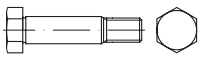
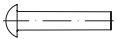
Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 580	 Lifting eye bolts	C 15 E	A 2-A 5	
DIN 582	 Lifting eye nuts	C 15 E	A 2-A 5	
DIN 601 (ISO 4016***)	 Hexagon head bolts with shank, product grade C	4.6		
	 Article 89601 Bolts with hexagon nut, CE according to EN 14592	4.8		
DIN 603	 Cup head square neck bolts	3.6 4.6 8.8	A 2 A 4	Br plastic
~ DIN 603	 Cup head square neck bolts, thread up to square neck	St		
	 Article 88107 Slotted mushroom head screws	4.6 5.8	A 1-A 5	Br
	 Article 89804 Frame screws with hexagon nut and washer	St		
DIN 604	 Flat countersunk nib bolts	4.6 8.8		
DIN 605	 Flat countersunk square neck bolts	4.6		
DIN 607	 Cup head nib bolts	4.6		
DIN 608	 Flat countersunk square neck bolts with short square	4.6 8.8		
DIN 609	 Hexagon fit bolts with long threaded pin	5.6 8.8 10.9	A 2 A 4	
DIN 610 ①	 Hexagon fit bolts with short threaded pin	5.6 8.8 10.9	A 2 A 4	
DIN 653	 Knurled thumb screws, low type	St	A 1-A 5	Br
DIN 660 (ISO 1051*)	 Round head rivets	St	A 2 A 4	Br Cu
DIN 661 (ISO 1051*)	 Countersunk head rivets	St	A 2 A 4	Br Cu
	 Mower knife rivets, half-round or countersunk	St		

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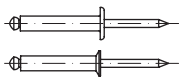
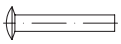
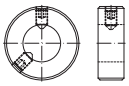
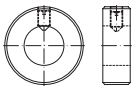
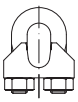
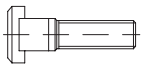
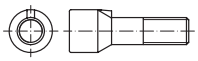
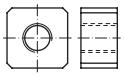
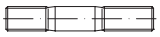
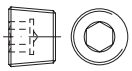
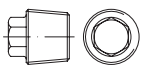
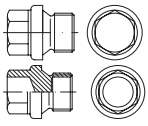
Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
		Blind rivets → DIN 7337 → Fixing systems	St	A 2 A 4	Cu Al-alloy plastic
DIN 662 (ISO 1051*)		Mushroom head rivets (sheet metal rivets)	St	A 2	Br Cu
DIN 674 DIN 675 (ISO 1051*)		Flat round head rivets, flat countersunk rivets	St		Br Cu Al
DIN 703 ①		Adjusting rings, heavy range	St	A 1-A 5	
DIN 705		Adjusting rings, light range	St	A 1-A 5	
~ DIN 741 (EN 13411***)		U-bolt wire rope grips	St		
DIN 787		T-slot screws	St-QT 12.9		
DIN 792		Countersunk cheese head screws	4.6 5.6		
DIN 797		Anchor bolts	3.6		
DIN 798		Anchor nuts	5		
DIN 835		Studs, metal end ≈ 2 d	5.6 5.8 8.8 10.9	A 1-A 5	Br
DIN 906		Hexagon socket pipe plugs with taper thread	St	A 1-A 5	Br bronze
		Hexagon socket pipe plugs, taper thread according to USA-/BS-Standard, types: NPTF, PTF, BSPT	St hard.	A 1-A 5	Br
DIN 908		Hexagon socket screw plugs with cylindrical thread	St	A 1-A 5	Br bronze
DIN 909		Hexagon head pipe plugs with taper thread	St	A 1-A 5	Br bronze
DIN 910		Hexagon head screw plugs with cylindrical thread, regular type or light type	St	A 1-A 5	Br bronze

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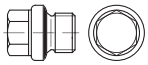
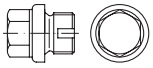
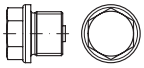
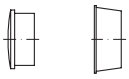
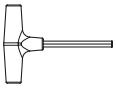
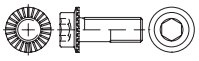
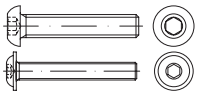
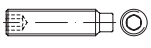
*** DIN: ISO/EN changes of dimension/form
(see Technical Information from page 74)

① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
		Screw plugs with sealing ring – with hexagon (DIN 910/DIN 5586), – with hexagon socket (DIN 908)	St		
		Hexagon head pipe plugs with collar and ventilation, with melted sealing (~ DIN 5586)	St	A 1–A 5	bronze
		Hexagon head pipe plugs with magnet "PM"	St		
		Protective plugs, sleeves, caps for pipe end and workpiece orifice			plastic
		Hexagon screw driver with handle	St-QT		handle = plastic
"ISR"		Hexalobular socket screw keys (socket wrench) for hexalobular socket screws	St-QT		
		Wrench keys assortment	St-QT		
DIN 912 (ISO 4762*/12474*)		Hexagon socket head cap screws – with metric thread M – with metric fine pitch thread M – with inch thread UNC/UNF (article 83912/ASME B18.3)	8.8 10.9 12.9 A 574	A 2–A 5	Br
~ DIN 912		Hexagon socket head cap screws with thread up to head	8.8 10.9 12.9	A 2 A 4	
~ DIN 912 ISR (ISO 14579)		Hexalobular socket head cap screws	8.8 12.9	A 2 A 4	
		Article 88912 Hexagon socket cap screws with flange, lock ribs under the flange	100 12.9		
"ISR" (ISO 7380-1/-2/ ISO 14583)		Pan head/mushroom head screws – with hexagon socket – with hexalobular socket	4.6 8.8 10.9	A 2–A 5	Br
DIN 913 (ISO 4026*)		Hexagon socket set screws with flat point	45 H	A 1–A 5	
DIN 914 (ISO 4027*)		Hexagon socket set screws with cone point	45 H	A 1–A 5	
DIN 915 (ISO 4028*)		Hexagon socket set screws with full dog point	45 H	A 1–A 5	
DIN 916 (ISO 4029*)		Hexagon socket set screws with cup point	45 H	A 1–A 5	

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(see Technical Information from page 74)

① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
	Spring thrust pads with hexagon socket	5.8	A 2	
DIN 917	Hexagon cap nuts, low type	6 AU 8	A 1-A 5	Br Al
DIN 920	Slotted small cheese head screws	5.8	A 1-A 5	Br
DIN 921	Slotted large cheese head screws	5.8	A 1-A 5	Br
	Article 88107 Slotted mushroom head screws	4.6 5.8	A 1-A 5	Br
DIN 922	Slotted mushroom head screws, small head and pin	5.8	A 1-A 5	Br
DIN 923	Slotted cheese head shoulder screws	5.8	A 1-A 5	Br
DIN 924	Slotted raised countersunk head screws with cone	5.8	A 1-A 5	Br
DIN 925	Slotted countersunk head screws with cone	5.8	A 1-A 5	Br
DIN 926	Slotted set screws with dog point	14 H	A 1-A 5	Br
DIN 927	Slotted shoulder screws	14 H	A 1-A 5	Br
DIN 928	Square weld nuts	St	A 1 A 2	
	Article 88109 Square caged nuts	St		
DIN 929	Hexagon weld nuts	St	A 1-A 5	
	Weld nuts	St		
DIN 931 (ISO 4014*/***)	Hexagon head bolts with shank - with metric thread M - with inch thread UNC/UNF (article 83931/ASME B18.2.1) - for container construction as per AD regulations	5.6 8.8 10.9 12.9 Grade 5/8 1.7709 1.7218	A 2-A 5 A 2-70 A 4-70 A 2-80 A 4-80	Br bronze Al plastic
	Hexalobular head screws/bolts (→ DIN 34800, 34801)	8.8 10.9		

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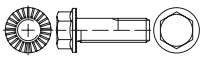
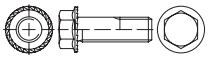
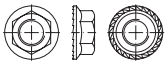
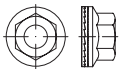
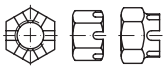
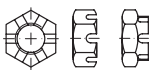
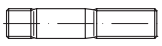
Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 933 (ISO 4017*/***)		5.6 8.8 10.9 12.9 Grade 5/8 1.7709 1.7218	A 2-A 5 A 2-70 A 4-70 A 2-80 A 4-80	Br bronze Al plastic
~ DIN 933		5.6 8.8 10.9	A 2-A 5	Br bronze Al plastic
	 Article 88913 Hexagon head screws with flange and lock ribs	90/100		
	 Article 88933 Hexagon head locking screws with flange	90/100		
DIN 934 (ISO 4032/4033*** ISO 8673/8674***)	 Hexagon nuts, product grade A - with metric thread M - with inch thread UNC/UNF (article 83934/ASME B18.2.2) - for container construction as per AD regulations	5 5-2 6 8 10 12 Grade 5/8 C 35 1.7258	A 1-A 5 A 2-70 A 4-70 A 2-80 A 4-80	Br bronze Al plastic
	 Article 88914 Hexagon nuts with flange and lock ribs	10		
	 Article 88934 Hexagon locking nuts	8 10		
	 Article 88034 HEICO-LOCK wedge lock nuts	10		
DIN 934	 Article 82934, 82935 Hexagon nuts assortments	6 8		
DIN 935	 Hexagon slotted and castle nuts	6 AU 8 10	A 1-A 5	Br
DIN 936 (ISO 4035/8675***)	 Hexagon thin nuts - with metric thread M - with metric fine thread M - with inch thread UNC/UNF (article 83936/ASME B18.2.2)	04 05 17 H 22 H Grade 5	A 1-A 5	Br Al
DIN 937 (DIN 979)	 Hexagon thin slotted and castle nuts	14 H 17 H 22 H	A 1-A 5	Br
DIN 938	 Studs, metal end ≈ 1 d - also for container construction as per AD regulations	5.6 5.8 8.8 10.9	A 1-A 5 A 2-70 A 4-70	Br

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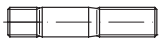
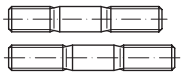
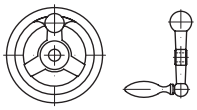
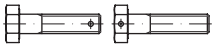
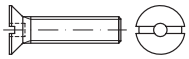
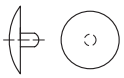
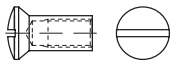
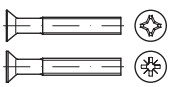
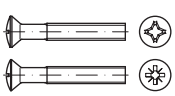
(see Technical Information from page 74)

① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 939	 Studs, metal end ≈ 1,25 d – also for container construction as per AD regulations	5.6 5.8 8.8 10.9	A 1–A 5 A 2–70 A 4–70	Br
ANSI	 Threaded bolts (→ DIN 976)	5.6 8.8 ASTM AISI BS	A 1–A 5 ASTM AISI BS	
DIN 940	 Studs, metal end ≈ 2,5 d	5.8 8.8 10.9	A 1–A 5	
DIN 949-1 DIN 949-2	 Studs with metric thread for interference MFS, metal end: -1 = 2 d, -2 = 2,5 d	5.8 8.8 10.9	A 1–A 5	Br
DIN 950 DIN 951 DIN 959	 Hand wheels and ball cranks according to standard and special form	MCI		Al
DIN 960 (ISO 8765***)	 Hexagon head bolts with shank, fine pitch thread	5.6 8.8 10.9 12.9	A 1–A 5	Br
DIN 961 (ISO 8676***)	 Hexagon head screws with thread up to head, fine pitch thread	5.6 8.8 10.9 12.9	A 2 A 4	
DIN 962 (ISO 7378/8991)	 Additional types and finishes for screws/bolts (→ Technical Information)			
DIN 963 (ISO 2009**)	 Slotted countersunk head screws	4.8 5.8 8.8	A 1–A 5	Br bronze Al plastic
	 Slotted countersunk screws with inner hole	4.8	A 2 A 4	Br
	 Article 88000–88003 Caps for countersunk screws with inner hole			plastic
DIN 964 (ISO 2010**)	 Slotted raised countersunk head screws	4.8 5.8 8.8	A 1–A 5	Br Al plastic
	 Article 88964 Sleeve nuts with internal thread, with slot/without slot	St	A 2 A 4	Br Al
DIN 965 (ISO 7046**)	 Countersunk head screws with cross recess H or Z	4.8 5.8 8.8	A 2 A 4	Br Al
"ISR" (ISO 14581)	 Countersunk head screws with hexalobular socket	4.8 8.8	A 2 A 4	
DIN 966 (ISO 7047**)	 Raised countersunk head screws with cross recess H or Z	4.8 5.8 8.8	A 2 A 4	Br plastic

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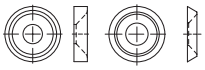
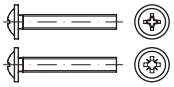
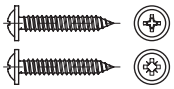
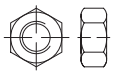
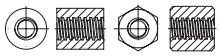
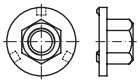
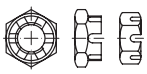
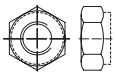
① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
		Article 88499, 88965 Collar washers	St	A 2 A 4	Br plastic
DIN 967		Pan head screws with collar, with cross recess H or Z	4.8 5.8 8.8	A 2 A 4	Br
DIN 968		Pan head taper screws with collar, with cross recess H or Z	4.8 5.8 8.8	A 2 A 4	Br
DIN 970 (ISO 4032*) DIN 971 (ISO 8673/8674*) DIN 972 (ISO 4034*)		Hexagon nuts, ISO type 1, ISO type 2, – with coarse pitch thread – with fine pitch thread	4 5 6 8 10 12	A 1–A 5	Br bronze Al Ti plastic
~ DIN 975 (DIN 976*)		Threaded rods – with metric thread M – with inch thread WW, UNC/UNF – lengths: 1000, 2000 and 3000 mm	4.6 4.8 5.6 5.8 8.8 10.9 12.9 ASTM	A 1–A 5 ASTM	Br plastic
DIN 975		Threaded rods with trapezoidal thread	5.8 8.8	A 2 A 4	
		Article 88089, 88090 Nuts with trapezoidal thread, round/hexagon			
DIN 976-1 DIN 976-2		Stud bolts/threaded rod – with metric thread M, – with metric thread for interference MFS	4.6 4.8 5.6 5.8 8.8 10.9 12.9 ASTM	A 1–A 5 ASTM	Br plastic
ANSI		Stud bolts with hexagon nuts	5.6 8.8 ASTM AISI BS	A 1–A 5 ASTM AISI BS	
DIN 977 (ISO 21670)		Hexagon weld nuts with flange	St		
DIN 979 (ISO 7038**)		Hexagon thin slotted and castle nuts	04 05	A 1–A 5	Br
DIN 980 (DIN 6925***) (ISO 7042/7719/ 10513)		Prevailing torque type hexagon nuts, all metal, type M = two parts (SPRING-STOP/VARGAL/DAX), type V = single component (STOVER/CLEVELOC/UNI-STOP)	5 8 10 12	A 1 A 2 A 4	Br Al

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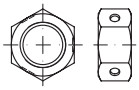
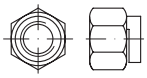
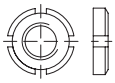
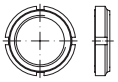
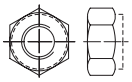
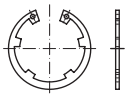
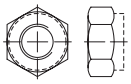
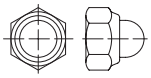
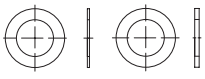
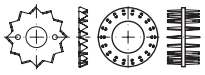
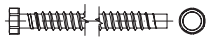
(see Technical Information from page 74)

① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
		Article 84032 Biloc nuts/prevailing torque type hexagon nuts	8 10	A 2 A 4	
		Article 88105 THERMAG nuts, all metal, prevailing torque type hexagon nuts	8 10		
DIN 981 KM		Locknuts	St	A 1-A 5	
		Locknuts with non metallic-insert GUA/GUK/GUP, FINE-U-Nut	St		
DIN 982 (DIN 6924***) (ISO 7040/10512***)		Prevailing torque type hexagon nuts with non-metallic insert (plastic), high type	5 6 8 10 12	A 1-A 5	
DIN 983		Retaining rings with lugs for shafts	SSt		
DIN 984		Retaining rings with lugs for bores	SSt		
DIN 985 (DIN 6924***) (ISO 10511/ 10512***)		Prevailing torque type hexagon nuts with non-metallic insert (plastic), low type, e.g. type NYLOX/POLY-STOP/ELASTIC-STOP	5 6 8 10	A 1-A 5	Br Al
DIN 985		Article 82985 Assortment of prevailing torque type hexagon nuts	8		
DIN 986		Prevailing torque type hexagon domed cap nuts with non-metallic insert (plastic)	5 6 8 10	A 1-A 5	
DIN 988		Shim rings/supporting rings	St SSt	A 1-A 5	
DIN 1052		Timber connectors, spikes one sided or two sided, metal sheet/malleable cast iron	MCI St		
DIN 1052		Washers for timber connectors	St	A 2 A 4	
DIN 1052		Article 88052 SPAX threaded rods with wood screw thread for lateral pass and lateral pressure, reinforcement for large timber components	St		

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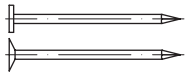
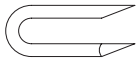
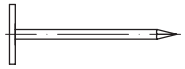
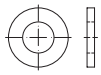
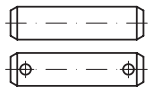
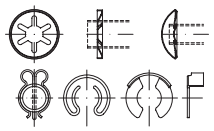
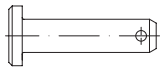
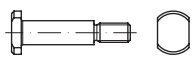
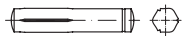
① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 1142 (EN 13411***)	 Clamps for wire ropes for end joints	MCI stirrup 6.8	A 2 A 4	
DIN 1144	 Nails for light weight building slabs, type A = head ∅ 20, type B = head ∅ 20	St		
DIN 1151	 Round plain head nails, type A = flat head plainly, type B = countersunk head corrugated	St		
DIN 1152	 Round nails with cold headed head	St		
DIN 1159	 Loop nails with unilateral cut point	St		
DIN 1160	 Wire nails with extra large head, type A = head ∅ ~ 3 x d_1, type B = head ∅ ~ 4 x d_1	St		
ISO 1207 (DIN 84**)	 Slotted cheese head screws	4.8 5.8	A 1-A 5	Br bronze Al plastic
ISO 1234 (DIN 94*)	 Split pins	St	A 2	Br Cu Al
DIN 1433-DIN 1436	 Bolts with or without head (→ DIN 1443/1444)	St	A 1-A 5	Br Al
DIN 1440 (ISO 8738**)	 Washers for clevis pins	St	A 1-A 5	Br
DIN 1441	 Washers for clevis pins	St	A 1-A 5	Br
DIN 1443 (ISO 2340**)	 Clevis pins without head, type A = without pin holes, type B = with pin holes	St	A 1-A 5	Br Al
	 Quick assembly elements for axles, shafts, bolts and pins; axle clamping rings, Duo-Clips, spring pins, KL-/SL-safety, U-Clips, Bajonett-Clips, PALNUT-Clips	SSt	1.4310	
DIN 1444 (ISO 2341**)	 Clevis pins with head, type A = without pin hole, type B = with pin hole	St	A 1-A 5	Br Al
DIN 1445	 Clevis pins with head and cone end	St	A 1-A 5	Br Al
DIN 1469	 Grooved pins with neck	St	A 1 A 2 1.4104	Br Al plastic

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Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 1470	Straight grooved pins with pilot end	St	A 1 A 2 1.4104	Br Al plastic
DIN 1471 (ISO 8744**)	Grooved pins, full length taper grooved	St	A 1 A 2 1.4104	Br Al plastic
DIN 1472 (ISO 8745**)	Grooved pins, half length taper grooved	St	A 1 A 2 1.4104	Br Al plastic
DIN 1473 (ISO 8740**)	Grooved pins, full length parallel grooved	St	A 1 A 2 1.4104	Br Al plastic
DIN 1474 (ISO 8741**)	Grooved pins, half length reverse grooved	St	A 1 A 2 1.4104	Br Al plastic
DIN 1475 (ISO 8742/8743)	Grooved pins, third length centre grooved	St	A 1 A 2 1.4104	Br Al plastic
DIN 1476 (ISO 8746*)	Grooved pins with round head	St	A 1 A 2 1.4104	Br Al plastic
DIN 1477 (ISO 8747*)	Grooved pins with countersunk head	St	A 1 A 2 1.4104	Br Al plastic
DIN 1478	Turnbuckles made from tubes SP = turnbuckles without accessories SP-AE = with 2 welding studs possible with conformity mark (ÜZ)	St 35 St 50-2	A 2 A 4	
	Shroud turnbuckles	St	A 4	
DIN 1479	Hexagon turnbuckles, possible with conformity mark (ÜZ)	St 6 AU	A 1-A 5	Br
	Coupling sleeves - hexagonal (article 88087) - round (article 88088)	St	A 1-A 5	Br
ISO 1479 (DIN 7976*)	Hexagon head tapping screws	St case-hard.	A 2 A 4	
DIN 1480	Turnbuckles, forged SP[1] = turnbuckles without accessories SP-AE[1] = with 2 welding studs SP-RR = with 2 eye bolts SP-RH = with eye bolt and hook bolt SP-HH = with 2 hook bolts SP-BS = with 2 flat leaf screws SP-BS-S[2] = with 2 flat leaf screws heavy version [1] optionally with ÜZ [2] with CE according to EN 1090-2	St	A 2 A 4	

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Driving features:
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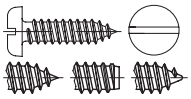
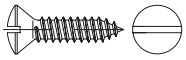
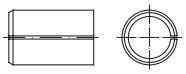
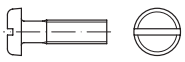
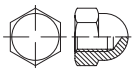
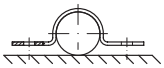
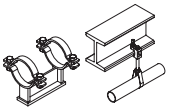
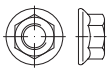
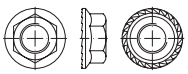
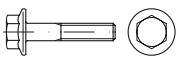
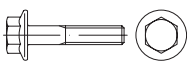
		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 1481 (ISO 8752**)	 Spring type straight pins, heavy duty	SSt	1.4310	
	 Spring type straight pins, tooth slotted ("CONNEX")	SSt	1.4310	
DIN 1481	 Article 82481 Spring type straight pins assortment	SSt		
ISO 1481 (DIN 7971**)	 Slotted cheese head taper screws, type C = cone end, type F = full dog point, type R = round cone end	St case-hard.	A 2 A 4	
ISO 1482 (DIN 7972***)	 Slotted countersunk taper screws	St case-hard.	A 2 A 4	
ISO 1483 (DIN 7973***)	 Slotted raised countersunk taper screws	St		
DIN 1498	 Tension bush for internal application, type EG = without inner chamfer and with straight slot	SSt		
ISO 1580 (DIN 85**)	 Slotted pan head screws	4.8 5.8	A 1-A 5	Br bronze Al plastic
DIN 1587	 Hexagon domed cap nuts, high type	6 AU 8	A 1-A 5	Br Al plastic
DIN 1592 DIN 1593 DIN 1596 DIN 1597	 Pipe clips	St	A 2-A 5	
	 Pipe clamps, pipe rack → LINDAPTER	St	A 2-A 5	
EN 1661 (DIN 6923***)	 Hexagon nuts with flange	8 10 12	A 2 A 4	
	 Article 88914, 88934 Locking-/RIPP nuts with flange (TENSILOCK/DURLOCK)	8 10		
	 Article 88034 HEICO-LOCK wedge lock nuts	10		
EN 1662 EN 1665 (DIN 6921***) (DIN 6922***)	 Hexagon screws with flange, light type, heavy type	8.8 10.9	A 2 A 4	
	 Article 10105 Hexagon head bolts with flange according to MBN 10105	10.9		

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Driving features:
H = cross recess Phillips
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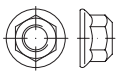
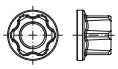
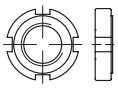
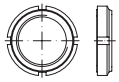
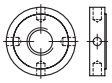
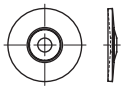
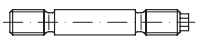
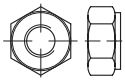
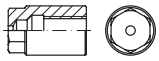
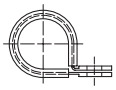
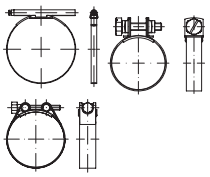
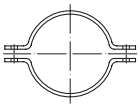
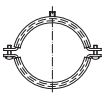
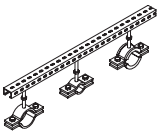
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
EN 1663 EN 1666 (DIN 6926**)		Prevailing torque type hexagon nuts with flange and non-metallic insert, coarse thread, fine pitch thread	8 10 12	A 2 A 4	
EN 1664 EN 1667 (DIN 6927**)		Prevailing torque type hexagon nuts with flange, all metal, coarse thread, fine pitch thread	8 10 12	A 2 A 4	
		Article 13023 Prevailing torque type hexagon nuts with flange according to MBN 13023	10		
		Article 13024 Lightweight construction nuts	10		
DIN 1804		Slotted round nuts for hook spanner	St	A 2-A 5	
		Locknuts with non-metallic insert GUA/GUK/GUP, FINE-U-Nut	St		
DIN 1816		Round nuts with set pin holes inside	St	A 1-A 5	Br
ISO 2009 (DIN 963**)		Slotted countersunk flat head screws	4.8 5.8	A 1-A 5	Br bronze Al plastic
ISO 2010 (DIN 964**)		Slotted raised countersunk head screws	4.8 5.8	A 1-A 5	Br bronze Al plastic
DIN 2093 (EN 16983*)		Disc springs	SSt	1.4122 1.4310 1.4568	bronze
		TECKENTRUP conical spring washers	SSt	1.4568	
ISO 2338 (DIN 7**)		Parallel pins	St	A 1-A 5	Br
ISO 2339 (DIN 1**)		Taper pins	St	A 1-A 5	Br
ISO 2341 (DIN 1444*)		Clevis pins with head	St	A 1-A 5	Br Al
ISO 2342 (DIN 427*)		Slotted headless screws with shank	14 H	A 1-A 5	Br
DIN 2509		Double end studs	5.6		
DIN 2510		Bolts with waisted shank, with certificate EN 10204/3.2/3.1	material → DIN 267-13	material→ DIN 267-13	

* DIN: ISO/EN identical = interchangeable
** DIN: ISO/EN mostly interchangeable
*** DIN: ISO/EN changes of dimension/form (see Technical Information from page 74)

① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 2510		Hexagon nuts for bolts with waisted shank, with certificate EN 10204/3.1	material → DIN 267-13	material→ DIN 267-13	
DIN 2510		Cap nuts for bolts, with certificate EN 10204/3.1	material → DIN 267-13	material→ DIN 267-13	
DIN 2510		Clamping sleeves for bolts, with certificate EN 10204/3.1	material → DIN 267-13	material→ DIN 267-13	
ANSI		Threaded bolts with hexagon nuts	5.6 8.8 ASTM AISI BS	A 2 A 4 ASTM AISI BS	
ISO 2936		Hexagon socket screw keys (socket wrench) for hexagon socket (also with ball head)	St-QT		
DIN 3015 DIN 3016		Fastening clamps with rubber profile	St MCI	1.4016 A 2 A 4	Al plastic
DIN 3017		Hose clamps, type A = with worm gear drive type B = with fastening lugs type C = with hinge bolts	St	1.4301 1.4436	
DIN 3090 (DIN 6899*)		Thimbles	St	A 4	
DIN 3220 DIN 3319		Hand wheels, flat and cranked	St	1.4016 1.4301 1.4401 1.4436 1.4571	
DIN 3404		Lubricating nipples, button head	St	A 2 A 4	Br
DIN 3405		Lubricating nipples, cupped type	St	A 2 A 4	Br
DIN 3567		Pipe clamps	St	A 2 A 4	
		Tubular clamps with noise protection inlays (DIN 4109)	St	A 2 A 4	
		Pipe support, pipe hangers	St	A 2 A 4	

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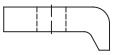
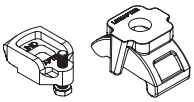
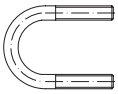
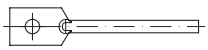
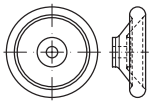
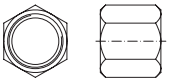
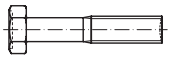
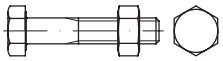
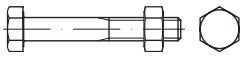
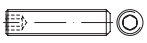
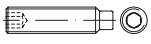
*** DIN: ISO/EN changes of dimension/form (see Technical Information from page 74)

① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 3568	 Clamping plates for pipe fixings	St 37		
	 LINDAPTER-clamping elements → Fixing Systems	MCI		
DIN 3570	 Stirrup bolts	St	A 2 A 4	Br
DIN 3575	 Anchors with welding ends for pipe suspension	St 37	A 2 A 4	
DIN 3670	 Disc hand wheels			Al
DIN 3870 DIN 3872	 Cap nuts	St	A 1-A 5	Br
ISO 4014 (DIN 931*/***)	 Hexagon head bolts with shank - with metric thread M - with inch thread UNC/UNF (article 83931/ASME B18.2.1) - for container construction as per AD regulations - for steel construction according to EN 15048 (SB)	5.6 8.8 10.9 12.9 Grade 5/8 1.7709 1.7218	A 2-A 5 A 2-70 A 4-70 A 2-80 A 4-80 D 6-100	Br bronze Al Ti plastic
ISO 4015	 Hexagon bolts with shank-∅ ~ pitch-∅	5.8 8.8	A 2 A 4	
ISO 4016 (DIN 601)	 Hexagon head bolts with shank, product grade C	3.6 4.6 4.8		
	 Article 89601 Bolts with hexagon nut, CE according to EN 14592	4.8		
ISO 4017 (DIN 933*/***)	 Hexagon head screws with thread up to head - with metric thread M - with inch thread UNC/UNF (article 83933/ASME B18.2.1) - for container construction as per AD regulations - for steel construction according to EN 15048 (SB)	5.6 8.8 10.9 12.9 Grade 5/8 1.7709 1.7218	A 2-A 5 A 2-70 A 4-70 A 2-80 A 4-80 D 6-100	Br bronze Al Ti plastic
ISO 4018 (DIN 558)	 Hexagon head screws with thread up to head, product grade C	3.6 4.6 4.8		
ISO 4026 (DIN 913*)	 Hexagon socket set screws with flat point	45 H	A 1-A 5	
ISO 4027 (DIN 914*)	 Hexagon socket set screws with cone point	45 H	A 1-A 5	
ISO 4028 (DIN 915*)	 Hexagon socket set screws with full dog point	45 H	A 1-A 5	
ISO 4029 (DIN 916*)	 Hexagon socket set screws with cup point	45 H	A 1-A 5	

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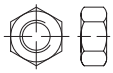
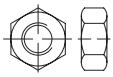
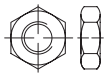
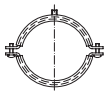
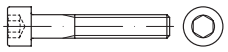
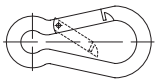
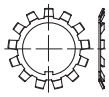
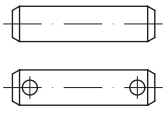
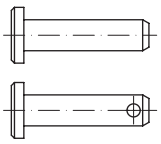
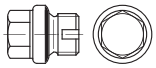
① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
ISO 4032 (DIN 934***)		Hexagon nuts, ISO type 1, product grade A, B – with metric thread M – with inch thread UNC/UNF (article 83934/ASME B18.2.2) – for container construction as per AD regulations	5 5-2 6 8 10	A 1-A 5 A 2 -70 A 4-70 A 2-80 A 4-80 D 6-100	Br bronze Al Ti plastic
ISO 4033 (DIN 934***)		Hexagon nuts, ISO type 2	12		
ISO 4034 (DIN 555)		Hexagon nuts, ISO type 1, product grade C	4 5		
ISO 4035/ ISO 4036 (DIN 439/936***)		Hexagon thin nuts (with/without chamfers)	04 05	A 1-A 5	Br
~ DIN 4109		Screwed tubular clamps with noise protection inlay	St	A 2 A 4	
ISO 4762 (DIN 912*)		Hexagon socket head cap screws – with metric thread M – with metric fine pitch thread M – with inch thread UNC/UNF (article 83912/ASME B18.3)	8.8 10.9 12.9 A 574	A 2-A 5 A 2-70 A 4-70 A 2-80 A 4-80 D 6-100	bronze
ISO 4766 (DIN 551*)		Slotted grub screws with flat point	14 H	A 1-A 5	Br plastic
DIN 5299		Snap hooks type C	St		
DIN 5406 MB/MBL		Lock washers/safety plates for locknuts according to DIN 981	St		
DIN 5417		Retaining rings, type A = for shafts, type B = for bores	SSt		
DIN 5525		Bolts without head for railway vehicles	St	A 1-A 5	Br Al
DIN 5526		Bolts with head for railway vehicles	St	A 1-A 5	Br Al
DIN 5586		Hexagon head screw plugs with collar and ventilation, with melted sealing (type B)	St	A 1-A 5	

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(see Technical Information from page 74)

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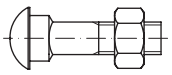
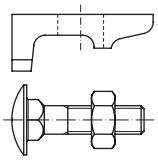
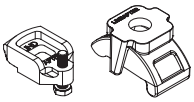
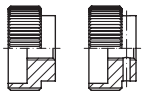
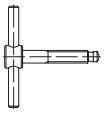
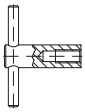
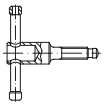
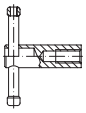
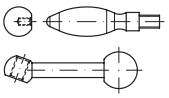
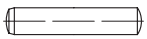
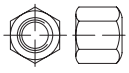
Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 5903		Fish bolts – with round head and oval neck – with square head	4.6		
DIN 5906		Bolts for clamping plates, clamping plates for rails	St		
		LINDAPTER clamping parts for rails → Fixing Systems	MCI		
DIN 5914		Baseplate screws with square head	St		
DIN 6303		Knurled nuts	5	A 1 A 2 A 4	Br Al
DIN 6304		Tommy screws with fixed clamping bolt	5.8		
DIN 6305		Tommy nuts with fixed clamping bolt	5		
DIN 6306		Tommy screws with movable clamping bolt	5.8		
DIN 6307		Tommy nuts with movable clamping bolt	5		
DIN 6311		Thrust pads for grub screws with thrust point according to DIN 6332	St hard.		
DIN 6319		Spherical washers type C, conical seats type D and G	St hard.		
DIN 6324		Operating elements for clamping devices: star/palm grips, ball knobs, tommy screws/nuts, crank handles	St		plastic
DIN 6325 (ISO 8734*)		Parallel pins	St hard.		
DIN 6330		Hexagon nuts with a height of 1,5 d, type B = one spherical bearing face	6 AU 8 10	A 1–A 5	Br

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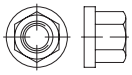
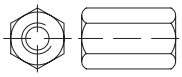
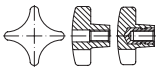
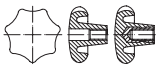
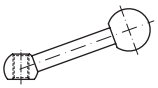
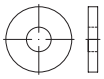
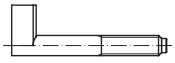
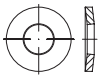
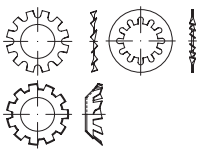
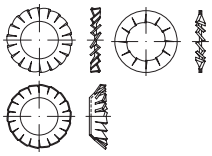
(see Technical Information from page 74)

① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 6331		Hexagon nuts with collar, with a height of 1,5 d	6 AU 8 10	A 1-A 5	
DIN 6332		Grub screws with thrust point	5.8 8.8		
~ DIN 6334		Hexagon nuts with a height of 3 d	6 AU	A 1-A 5	Br
DIN 6335		Palm grips	St		plastic
DIN 6336		Star grips	St		plastic
DIN 6337		Ball handles	St		plastic
DIN 6340		Washers for clamping devices	St-QT		
DIN 6378		Hook bolts	8.8		
DIN 6379		Studs for use with t-nuts	8.8		
DIN 6791		Semi-tubular pan head rivets	St		Br Cu Al
DIN 6792		Semi-tubular countersunk head rivets	St		Br Cu Al
DIN 6796		Conical spring washers	SSt	1.4310	
		TECKENTRUP conical spring washers	SSt	1.4568	
DIN 6797 ①		Toothed lock washers, type A = external teeth type I = internal teeth type V = countersunk	SSt	1.4310	bronze
DIN 6798 ①		Serrated lock washers, type A = external teeth type I = internal teeth type V = countersunk	SSt	1.4310 A 4	bronze

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Driving features:
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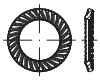
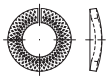
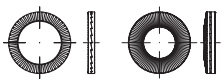
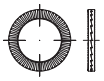
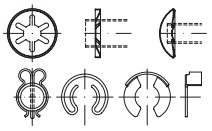
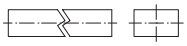
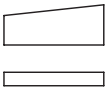
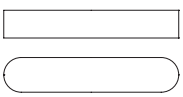
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
		Article 88123-88126 TECKENTRUP lock washers for hexagon head screws and hexagon socket cap screws	SSt	1.4568	
		Article 88129 TECKENTRUP lock washers with contact serrations	SSt	A 4	
		Article 88120, 88121 SCHNORR safety washers with serration on both sides, S, VS	St hard.	A 2 A 4	
		Article 88130, 88131 Lock rings	SSt	1.4310	
		Article 88132 NORD-LOCK washers, standard = normal outer diameter SP = enlarged outer diameter SC = for HV-connections X-series = wedge lock washer	St	A 4	
		Article 88032 HEICO-LOCK wedge lock washers	St	A 4	
		Article 88033 HEICO-LOCK ring lock washers	St		
		Article 88035 HEICO-LOCK combi washers	St	A 4	
DIN 6799		Retaining rings for shafts	SSt	1.4034 1.4122	bronze
		Quick assembly elements for axles, shafts, bolts and pins; axle clamping rings, Duo-clips, spring cotter pins, KL-/SL-backups, U-clips, Bajonett-clips, PALNUT-clips	SSt	1.4310	
DIN 6880		Key steel	St	A 2 A 4	
DIN 6881 DIN 6883 (ISO 2492)		Saddle keys, parallel keys	St	A 2 A 4	
DIN 6884 (ISO 2492)		Parallel keys with gib head	St	A 2 A 4	
DIN 6885 (ISO 773/2491**)		Parallel keys	St	A 2 A 4	

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Driving features:
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		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 6887 (ISO 774**)	Taper keys with gib head	St	A 2 A 4	
DIN 6888 (ISO 3912**)	Woodruff keys	St	A 2 A 4	
DIN 6899 (EN 13411***)	Thimbles for fibre ropes	St	A 2 A 4	
DIN 6900 DIN 6901 (ISO 10644/10510)	Screw and washer assemblies - with metric thread - with taper screw thread = ready to install fasteners with captive washers	4.8 5.8 8.8 10.9 St case-hard.	A 2 A 4	Br
	Nuts with captive washers	6 8 10	A 2 A 4	
DIN 6902- DIN 6908 (ISO 10669/10673)	Washers for screw and washer assemblies	St SSt	A 2 A 4 1.4310	Br bronze plastic
DIN 6911	Hexagon socket screw keys (pin wrenches) with pilot for hexagon socket cap screws according to DIN 6912	St-QT		
DIN 6912	Hexagon socket head cap screws with low head and centre	8.8 10.9	A 2 A 4	bronze
DIN 6914 (EN 14399-4)	Hexagon bolts with large head for high-strength structural bolting, system HV	10.9		
HVP (EN 14399-8)	Hexagon fit bolts with large head for high strength structural bolting, system HV	10.9		
HRC (HVA) (EN 14399-10)	Bolts with calibrated preload for high strength structural bolting (HVA bolts)	10.9		
DIN 6915 (EN 14399-4)	Hexagon nuts with large wrench size for high-strength structural bolting, system HV	10		
DIN 6916 (EN 14399-6)	Plain chamfered washers for high-strength structural bolting, system HV	C 45 -QT		
DIN 6917	Square taper washers for friction grip bolts on double-T sections in steel constructions (taper 14%)	C 45 -QT		
DIN 6918	Square taper washers for friction grip bolts on U-sections (taper 8%)	C 45 -QT		

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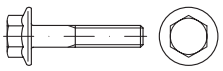
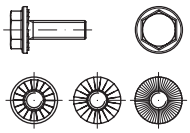
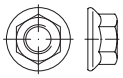
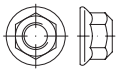
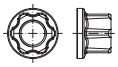
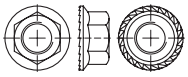
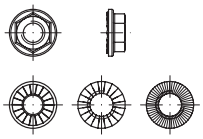
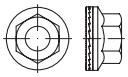
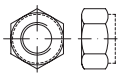
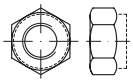
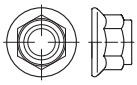
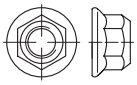
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 6921 DIN 6922 (ISO 4162/8100-04) (EN 1665***)		Hexagon flange bolts	8.8 10.9 12.9	
		Article 10105 Hexagon flange bolts according to MBN 10105	10.9	
		Article 88913, 88933 Locking screws, RIPP screws (TENSILOCK/DURLOK)	90/100 10.9 12.9	
DIN 6923 (EN 1661***)		Hexagon flange nuts	8 10 12	A 2 A 4
		Article 13023 Hexagon flange nuts according to MBN 13023	10	
		Article 13024 Lightweight construction nuts	10	
~ DIN 6923		Hexagon locking nuts with flange	8 10 12	A 2 A 4
		Article 88914, 88934 Locking nuts, RIPP nuts (TENSILOCK/DURLOK)	10 12	A 2 A 4
		Article 88034 HEICO-LOCK wedge lock nuts	10	
DIN 6924 (ISO 7040**/10512)		Prevailing torque type hexagon nuts with non-metallic insert (plastic)	5 8 10	
DIN 6925 (ISO 7042**/10513)		Prevailing torque type hexagon nuts, all metal	5 8 10 12	
DIN 6926 (ISO 7043/12125) (EN 1663***)		Prevailing torque type hexagon nuts with flange, with non-metallic insert (plastic)	8 10 12	
DIN 6927 (ISO 7044/12126) (EN 1664***)		Prevailing torque type hexagon nuts with flange, all metal	8 10 12	
		Nuts with cavity washers	6 8 10	A 2 A 4

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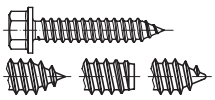
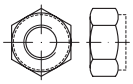
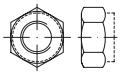
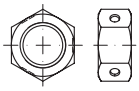
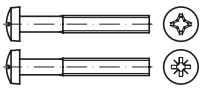
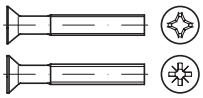
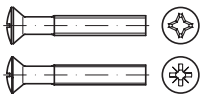
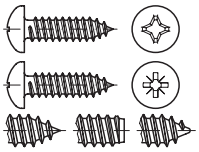
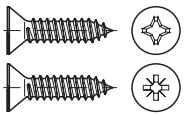
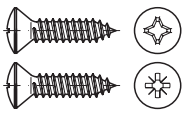
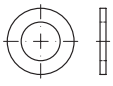
			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 6928 (ISO 7053/10509)		Hexagon taper screws with collar, type C = cone end, type F = full dog point, type R = round cone end	St case-hard.	A 2 A 4	
ISO 7040 (DIN 6924**/ 982***)		Prevailing torque type hexagon nuts with non-metallic insert (plastic)	5 8 10	A 2 A 4	
ISO 7042 (DIN 6925**/ 980***)		Prevailing torque type hexagon nuts, all metal	5 8 10 12		
		Article 84032 Biloc nuts/prevailing torque type hexagon nuts	8 10	A 2 A 4	
ISO 7045 (DIN 7985*)		Pan head screws with cross recess H or Z	4.8	A 2 A 4	Br plastic
ISO 7046-1 ISO 7046-2 (DIN 965***)		Countersunk head screws with cross recess H or Z	4.8 8.8	A 2 A 4	Br plastic
ISO 7047 (DIN 966***)		Raised countersunk head screws with cross recess H or Z	4.8 8.8	A 2 A 4	Br plastic
ISO 7049 (DIN 7981**)		Pan head tapping screws with cross recess H or Z	St case-hard.	A 2 A 4	
ISO 7050 (DIN 7982***)		Countersunk head tapping screws, countersunk ⧼ = 90°, with cross recess H or Z	St case-hard.	A 2 A 4	
ISO 7051 (DIN 7983***)		Raised countersunk head tapping screws, countersunk ⧼ = 90°, with cross recess H or Z	St case-hard.	A 2 A 4	
ISO 7089 (DIN 125**)		Plain washers, normal series, without chamfer, product grade A	200 HV 300 HV	A 1-A 5	Br Cu Al plastic
ISO 7090 (DIN 125**)		Plain washers, normal series, with chamfer, product grade A	200 HV 300 HV	A 1-A 5	Br Cu Al plastic
ISO 7091 (DIN 126*)		Plain washers, normal series, product grade C	100 HV	A 2 A 4	
ISO 7092 (DIN 433**)		Plain washers, small series, product grade A	200 HV 300 HV	A 1-A 5	Br

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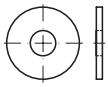
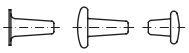
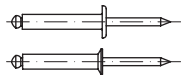
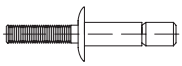
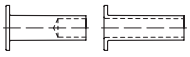
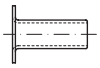
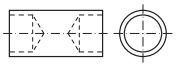
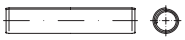
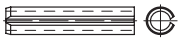
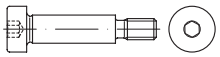
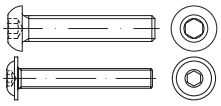
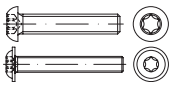
① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
ISO 7093-1/-2 (DIN 9021**)		Plain washers, large series, product grade A/C	200 HV 300 HV	A 1-A 5	Br Al
ISO 7094 (DIN 440**)		Plain washers, extra large series, product grade C	100 HV	A 2 A 4	
DIN 7331		Compression rivets, two-part	St		Br
DIN 7337 (ISO 15973-16585)		Blind rivets → Article 88401-88488 → Fixing systems	St	A 2 A 4	Br bronze Cu Al plastic
		Special blind rivets, blind rivet nuts, setting tools and assortment boxes	St	A 2 A 4	Cu Al
DIN 7338		Rivets for brake linings and clutch linings, type B = with bored shank, type C = tubular rivet	St		Cu Al
DIN 7339 DIN 7340		Hollow rivets, tubular rivets	St		Br Cu Al
DIN 7341 (ISO 1051)		Rivet pins	St	A 1-A 5	Br
DIN 7343 (ISO 8750*/8751)		Spring-type straight pins, coiled, standard duty	SSt	1.4310	
DIN 7344 (ISO 8748**)		Spring-type straight pins, coiled, heavy duty	SSt	1.4310	
DIN 7346 (ISO 13337**)		Spring-type straight pins, slotted, light duty	SSt	1.4310	
		Spring-type straight pins with tooth slot, ("CONNEX coiled spring pins")	SSt	1.4310	
DIN 7349		Washers for screws with heavy spring-type straight pins	St	A 2	
ISO 7379 (DIN 9841)		Hexagon socket head shoulder screws	10.9 12.9		
ISO 7380-1 ISO 7380-2		Hexalobular socket button head screws, Hexalobular socket button head screws and flange	4.6 8.8 10.9 12.9	A 2 A 4	
~ ISO 7380-1 ~ ISO 7380-2 ISR (DIN 34805-1/-2)		Hexalobular socket button head screws, Hexalobular socket button head screws and flange	8.8 10.9 12.9	A 2 A 4	

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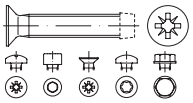
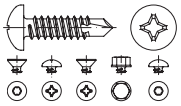
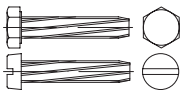
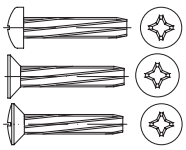
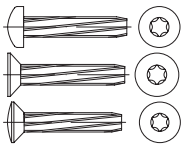
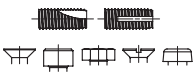
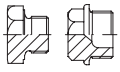
① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
ISO 7434 (DIN 553*)		Slotted grub screws with cone point	14 H	A 1-A 5	Br
ISO 7435 (DIN 417*)		Slotted grub screws with full dog point	14 H	A 1-A 5	Br
ISO 7436 (DIN 438*)		Slotted grub screws with cup point	14 H	A 1-A 5	Br
DIN 7500		Thread rolling screws for ISO metric thread, type A/AE = head according to DIN 84/ISO 1207 type B/BE = head according to DIN 85/ISO 1580 type C/CE = head according to DIN 7985/ISO 7045 type D/DE = head according to DIN 933/ISO 4017 type ~ D = hexagon head with collar type E/EE = head according to DIN 912/ISO 4762 type K/KE = head according to DIN 963/ISO 2009 type L/LE = head according to DIN 964/ISO 2009 type M/ME = head according to DIN 965/ISO 7046-2 type N/NE = head according to DIN 966/ISO 7047 type OE = head according to ISO 14579 type PE = head according to ISO 14583 type QE = head according to ISO 14584	St case-hard.		
DIN 7504 (ISO 15480*-81*/ 15482***-83***)		Drilling screws with tapping screw thread, type K = head according to DIN 6928 type L = head according to DIN 6928 (slot according DIN 962) type M = head according to ISO 7049/type N according DIN 7981 type O = head according to ISO 7050/type P according DIN 7982 type Q = head according to DIN 7983/type R according ISO 7051	St case-hard.	Bi-metal A 2 A 4	
DIN 7513		Thread cutting screws, type A = head according to DIN 933/ISO 4017 type B/BE = head according to DIN 84/ISO 1207 type F/FE = head according to DIN 963/ISO 2009 type G/GE = head according to DIN 964/ISO 2010	St case-hard.		
DIN 7516		Thread cutting screws with cross recess H or Z, type A/AE = head according to DIN 7985/ISO 7045 type D/DE = head according to DIN 965/ISO 7046-1 type E/EE = head according to DIN 966/ISO 7047	St case-hard.		
~ DIN 7516		Thread cutting screws with hexalobular socket, type AE = head according to ISO 14583 type DE = head according to ISO 7046-1 type EE = head according to ISO 7047	St case-hard.		
		Cut/scraper groove threaded bolts, self tapping screws (→ DIN 7500)	St case-hard.		
DIN 7603		Sealing rings			Cu Al fibre
DIN 7604		Hexagon head screw plugs with collar	St	A 1-A 5	Br Al plastic

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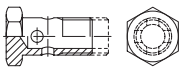
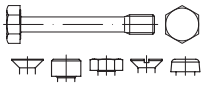
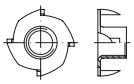
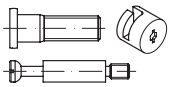
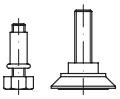
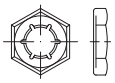
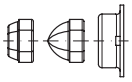
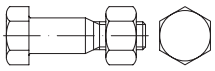
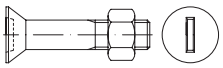
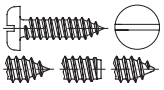
*** DIN: ISO/EN changes of dimension/form (see Technical Information from page 74)

① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 7642 DIN 7643	 Hollow screws for ring type banjos	St	A 1-A 5	
ISO 7719	 Prevailing torque type hexagon nuts, ISO type 1, all metal	5 8 10		
~ DIN 7964	 Screws with waisted shank, type A = head according to DIN 84 type B = head according to DIN 85 type C = head according to DIN 7985 type D1/D2 = head according to ISO 4014/DIN 931 type E = head according to DIN 912 (ISO 4762)	5.6 5.8 8.8	A 1-A 5	Br
DIN 7965	 Screwed inserts "RAMPA"	St	A 2 A 4	Br Al plastic
	 Article 88108 Tee nuts with pronge	St		
	 Furniture assembly elements	St		
	 Adjusting elements for furniture	St		plastic
DIN 7967 ①	 Self locking counter nuts	SSt	1.4310	
	 PAL-hatclips-nuts	SSt		
DIN 7968	 Hexagon fit bolts for steel structures, CE according to EN 15048	5.6 8.8		
DIN 7969	 Slotted countersunk head bolts for steel structures, CE according to EN 15048	4.6 5.6		
DIN 7971 (ISO 1481**)	 Slotted pan head tapping screws, type C = cone end, type F = flat end, type R = rounded end	St case-hard.	A 2 A 4	
DIN 7972 (ISO 1482***)	 Slotted countersunk head tapping screws	St case-hard.	A 2 A 4	
DIN 7973 (ISO 1483***)	 Slotted raised countersunk head tapping screws	St case-hard.	A 2 A 4	

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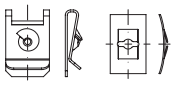
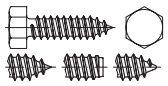
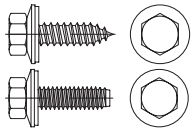
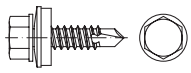
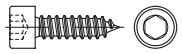
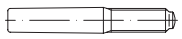
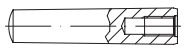
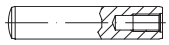
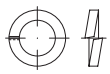
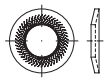
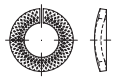
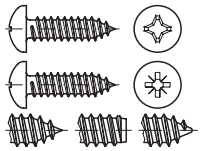
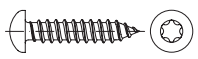
(see Technical Information from page 74)

① DIN standard withdrawn without replacement (see note on page 5)

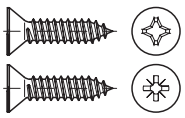
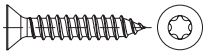
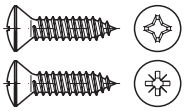
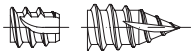
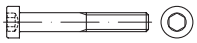
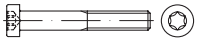
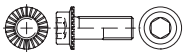
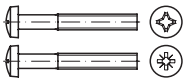
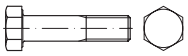
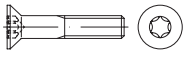
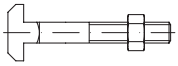
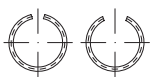
Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
		Clip/spring nuts for tapper screw threads (→ DIN 34818)	St case-hard.		
DIN 7971 DIN 7973		Article 82971, 82973 Tapping screws assortment	St case-hard.		
DIN 7976 (ISO 1479**)		Hexagon head tapping screws, type C = cone end, type F = flat end, type R = round cone end	St case-hard.	A 2 A 4	
		Article 88176, 88276 Tapping screws for facing with assembled sealing washer, type A = with cone end, type BZ = with full dog point	St case-hard.	A 2	
		Article 89812 Hexagon self drilling screws with EPDM seal, with and without painted head Selection of colours: olive green, anthracite gray, light gray, graphite black, white aluminum, copper brown	St		
		Article 88312 Cylindrical head tapping screws with hexagon socket	St case-hard.	A 2 A 4	
DIN 7977 (ISO 8737*)		Taper pins with external thread, constant threaded part	St	A 1-A 5	
DIN 7978 (ISO 8736*)		Taper pins with internal thread	St	A 1-A 5	
DIN 7979 (ISO 8733***/ 8735***)		Parallel pins with internal thread	St	A 1-A 5	
DIN 7980 ①		Spring lock washer for cheese head screws	SSt	1.4310 A 4	
		Article 88126 TECKENTRUP lock washers "Z" for hexagon head screws and hexagon socket head cap screws	SSt	1.4568	
		Article 88131 Lock rings "VSK-Z"	SSt		
DIN 7981 (ISO 7049**)		Pan head tapping screws with cross recess H or Z, type C = cone end, type F = flat end	St case-hard.	A 2 A 4	
~ DIN 7981 ISR (ISO 14585)		Pan head tapping screws with hexalobular socket	St case-hard.	A 2 A 4	

* DIN: ISO/EN identical = interchangeable
** DIN: ISO/EN mostly interchangeable
*** DIN: ISO/EN changes of dimension/form (see Technical Information from page 74)

① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 7982 (ISO 7050***)	 Countersunk head tapping screws with cross recess H or Z	St case-hard.	A 2 A 4	
~ DIN 7982 ISR (ISO 14586)	 Countersunk head tapping screws with hexalobular socket	St case-hard.	A 2 A 4	
DIN 7983 (ISO 7051***)	 Raised countersunk head tapping screws with cross recess H or Z	St case-hard.	A 2 A 4	
	 Tapping screws with scrape point	St case-hard.	A 2 A 4	
	 Article 88981/88003 Cap-head tapping screws	St case-hard.	A 2 A 4	
DIN 7984	 Hexagon socket head cap screws with low head	8.8 10.9	A 2 A 4	
~ DIN 7984 ISR (ISO 14580)	 Hexalobular socket head cap screws with low head	4.8 5.8 8.8 10.9	A 2 A 4	
	 Article 88912 Hexagon socket head cap screws with flange and lock ribs	100 12.9		
DIN 7985 (ISO 7045**)	 Pan head screws with cross recess H or Z	4.8 5.8 8.8	A 2 A 4	Br
~ DIN 7985 ISR (ISO 14583**)	 Pan head screws with hexalobular socket	4.8 8.8	A 2 A 4	
DIN 7989-1/-2	 Washers for steel structures, product grade C/product grade A	St 100 HV	A 2 A 4	
DIN 7990	 Hexagon head bolts for steel structures, CE according to EN 15048	4.6 5.6		
DIN 7991 (ISO 10642**)	 Hexagon socket countersunk head screws	8.8 10.9 12.9	A 2 A 4	Br
~ DIN 7991 ISR (ISO 14581/ 10642 ISR)	 Hexalobular socket countersunk head screws	8.8 10.9 12.9	A 2 A 4	
DIN 7992	 Tee head bolts with large head	3.6 4.6		
DIN 7993 (DIN 9925/9926***)	 Snap rings, type A = for shafts, type B = for bores	SSt		

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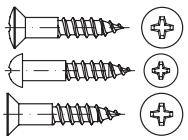
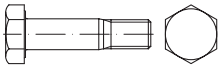
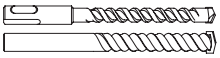
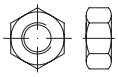
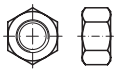
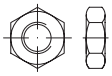
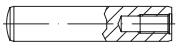
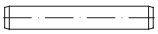
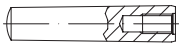
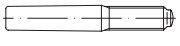
① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 7995 DIN 7996 DIN 7997		Wood screws with cross recess H – raised countersunk head – round head – countersunk head	St	A 2 A 4	Br Cu Al
DIN 7999 (EN 14399-8)		Hexagon fit bolts with large head for high-strength structural bolting, system HV	10.9 (12.9)		
DIN 8035 DIN 8039		Hammer drills (article 88997), masonry drills (article 88990)	St hard.		
DIN 8140		Article 88330-88346 Wire thread inserts, coarse thread, fine pitch thread, with locking		A 2 Nimonic Inconel	bronze
		Article 88340, 88342 Assortment thread inserts		A 2	
ISO 8673 (DIN 934***)		Hexagon nuts, ISO type 1, metric fine pitch thread	6 8 10	A 1-A 5	Br bronze
ISO 8674		Hexagon nuts, ISO type 2, metric fine pitch thread	8 10 12	A 1-A 5	Br bronze
ISO 8675 (DIN 439***)		Hexagon thin nuts with chamfers, metric fine pitch thread	04 05	A 1-A 5	Br bronze
ISO 8676 (DIN 961*/***)		Hexagon head screws with thread up to head, metric fine pitch thread	5.6 8.8 10.9	A 1-A 5	
ISO 8733 (DIN 7979***)		Parallel pins with internal thread	St untemp.	A 1-A 5	
ISO 8734 (DIN 6325*)		Parallel pins	St hard.	C1	
ISO 8735 (DIN 7979***)		Parallel pins with internal thread	St hard.	C1	
ISO 8736 (DIN 7978*)		Taper pins with internal thread	St		
ISO 8737 (DIN 7977*)		Taper pins with external thread, constant threaded part	St		
ISO 8738 (DIN 1440*)		Washers for clevis pins	St	A 1-A 5	Br
ISO 8739 (DIN 1470)		Parallel grooved pins with pilot	St	A 1 A 2 1.4104	Br Al plastic
ISO 8740 (DIN 1473**)		Grooved pins, full length parallel grooved	St	A 1 A 2 1.4104	Br Al plastic

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(see Technical Information from page 74)

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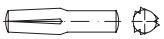
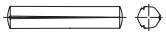
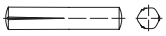
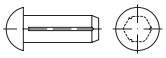
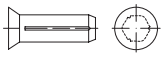
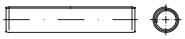
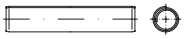
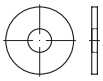
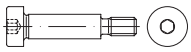
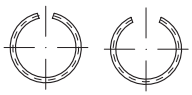
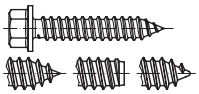
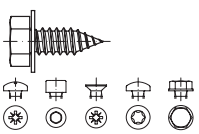
(see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
ISO 8741 (DIN 1474**)		Grooved pins, half length reverse grooved	St	A 1 A 2 1.4104	Br Al plastic
ISO 8742 ISO 8743 (DIN 1475**)		Grooved pins, third length centre grooved	St	A 1 A 2 1.4104	Br Al plastic
ISO 8744 (DIN 1471**)		Grooved pins, full length taper grooved	St	A 1 A 2 1.4104	Br Al plastic
ISO 8745 (DIN 1472**)		Grooved pins, half length taper grooved	St	A 1 A 2 1.4104	Br Al plastic
ISO 8746 (DIN 1476*)		Grooved pins with round head	St	A 1 A 2 1.4104	Br Al plastic
ISO 8747 (DIN 1477*)		Grooved pins with countersunk head	St	A 1 A 2 1.4104	Br Al plastic
ISO 8748 (DIN 7344**)		Spring type straight pins, coiled, heavy duty	SSt	1.4310	
ISO 8750 ISO 8751 (DIN 7343**)		Spring type straight pins, coiled, standard duty	SSt	1.4310	
ISO 8752 (DIN 1481**)		Spring type straight pins, heavy duty	SSt	1.4310	
ISO 8765 (DIN 960*/***)		Hexagon head bolts with shank, metric fine pitch thread	10.9 12.9	A 1–A 5	
DIN 9021 (ISO 7093**)		Plain washers, outside diameter ≈ 3 d	100 HV	A 2 A 4	Br Al
DIN 9045		Retaining rings	SSt		
DIN 9841		Cheese head screws with hexagon socket and beginning shank (shoulder screws)	10.9 12.9		
DIN 9925 DIN 9926 (DIN 7993***)		Snap rings, for shafts (DIN 9925) and bores (DIN 9926)	SSt		
ISO 10509 (DIN 6928**)		Hexagon flange head tapping screws	St hard.	A 2 A 4	
ISO 10510 (DIN 6901**)		Tapping screw and washer assemblies with plain washers	St case-hard.	A 2 A 4	

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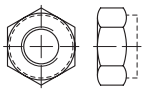
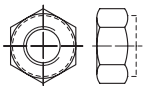
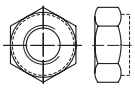
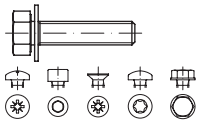
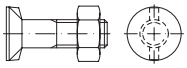
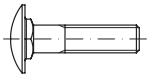
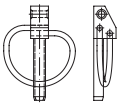
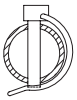
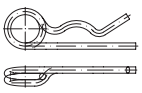
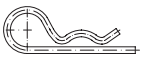
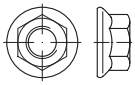
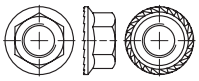
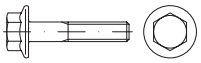
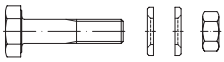
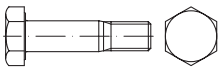
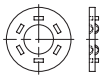
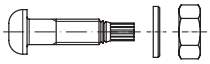
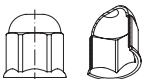
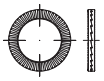
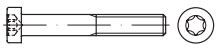
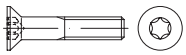
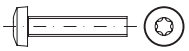
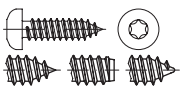
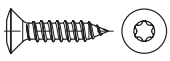
Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
ISO 10511 (DIN 985***)	 Prevailing torque type hexagon nuts with non-metallic insert, low type	04 05	A 2 A 4	
ISO 10512 (DIN 982***)	 Prevailing torque type hexagon nuts with non-metallic insert, high type, with metric fine pitch thread	6 8 10	A 2 A 4	
ISO 10513 (DIN 980***)	 Prevailing torque type hexagon nuts with metric fine pitch thread, all metal	8 10 12	A 2 A 4	
ISO 10642 (DIN 7991**)	 Hexagon socket countersunk head screws	8.8 10.9 12.9	A 2 A 4	Br
"ISR" (ISO 14581)	 Countersunk head screws with hexalobular socket	8.8 10.9 12.9	A 2 A 4	
ISO 10644 (DIN 6900*)	 Screw and washer assemblies with plain washers	4.8 10.9 12.9	A 2 A 4	Br
ISO 10669 ISO 10673 (DIN 6903/6902**)	 Plain washers for tapping screw and washer assemblies, plain washers for screw and washer assemblies	St	A 2 A 4	Br
DIN 11014	 Flat countersunk head bolts with two nibs	3.6 4.6		
DIN 11015	 Cup head square neck bolts for agricultural machines	8.8 10.9		
DIN 11023	 Linch pins, with and without third hole	St		
	 Article 88023 Linch pins for tubes	St		
DIN 11024	 Spring cotters for a bolt	St	A 2 A 4	
~ DIN 11024	 Spring cotters for a bolt, single type	St	A 2 A 4	
ISO 12474 (DIN 912*)	 Hexagon socket head cap screws with metric fine pitch thread	8.8 10.9 12.9	A 2-A 5	Br
ISO 13337 (DIN 7346**)	 Spring type straight pins, slotted, light duty	SSt	1.4310	

* DIN: ISO/EN identical = interchangeable
** DIN: ISO/EN mostly interchangeable
*** DIN: ISO/EN changes of dimension/form (see Technical Information from page 74)

① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
EN 14218 (ISO 10663) (DIN 6923)		Hexagon flange nuts, metric fine pitch thread	8 10 12	A 2 A 4	
		Hexagon locking nuts with flange	8 10 12	A 2 A 4	
EN 14219 (ISO 15072) (DIN 6921)		Hexagon nuts with flange, metric fine pitch thread	8.8 10.9 12.9	A 2 A 4	
EN 14399 -3/-4/-5/-6 (DIN 6914-6916)		Assemblies of hexagon bolts, nuts and washers for high-strength structural bolting (CE)	8.8 10.9 8/10		
EN 14399-8 (DIN 7999)		Hexagon fit bolts with large head for HV-connections for high-strength structural bolting (CE)	10.9		
EN 14399-9		Direct tension indicators for bolt and nut assemblies for high-strength structural bolting assemblies (CE)	St hard.		
EN 14399-10		Bolt and nut assemblies with calibrated preload, system HRC (CE)	10.9		
		Article 88916 Safety sockets for high-strength structural bolting assemblies	St		
		Article 88132 NORD-LOCK washers SC for HV-connections	St case-hard.	A 4	
ISO 14579 (DIN 912 ISR*)		Hexalobular socket head cap screws	8.8 10.9 12.9	A 2 A 4	
ISO 14580 (DIN 7984 ISR*)		Hexalobular socket head cap screws with low head	4.8 5.8	A 2 A 4	
ISO 14581		Hexalobular socket countersunk head screws	4.8 8.8	A 2 A 4	
ISO 14583 (DIN 7985 ISR)		Cheese head screws with hexalobular socket	4.8 5.8	A 2 A 4	
ISO 14585 (DIN 7981 ISR)		Pan head tapping screws with hexalobular socket	St case-hard.	A 2 A 4	
ISO 14586 (DIN 7982 ISR)		Hexalobular socket countersunk head tapping screws (countersunk ⊀ = 90°)	St case-hard.	A 2 A 4	
ISO 14587		Hexalobular socket raised countersunk head tapping screws (countersunk ⊀ = 90°)	St case-hard.	A 2 A 4	

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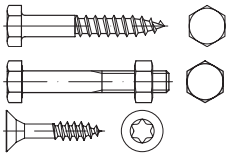
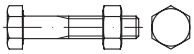
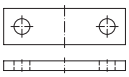
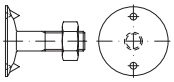
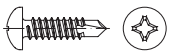
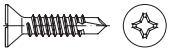
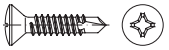
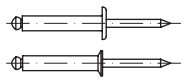
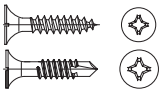
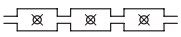
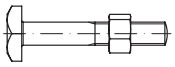
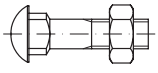
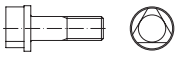
** DIN: ISO/EN mostly interchangeable
*** DIN: ISO/EN changes of dimension/form
(see Technical Information from page 74)

① DIN standard withdrawn without replacement
(see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
EN 14592		Screws for the load-bearing timber (CE) - Hexagon wood screws (article 89571) - Bolts with nut (article 89601) - Chipboard screws (article 89096-89098)	St hard. 4.6	A 2	
EN 15048		Non-preloaded structural bolting assemblies (CE)	8.8	A 2 A 4	
DIN 15058		Axle holders (for lifting appliances)	St		
DIN 15237		Seating screws with cupped washer, for attachment of components to belts	3.6	A 2 A 4	
ISO 15480 (DIN 7504*)		Hexagon washers head drilling screws with tapping screw thread	St case-hard.		
ISO 15481 (DIN 7504*)		Pan head drilling screws with tapping screw thread	St case-hard.		
ISO 15482 (DIN 7504***)		Countersunk head drilling screws (countersunk ⊀ = 90°) with tapping screw thread	St case-hard.		
ISO 15483 (DIN 7504***)		Raised countersunk head drilling screws with tapping screw thread	St case-hard.		
ISO 15975- ISO 16858 (DIN 7337)		Blind rivets → Article 88401-88488 → Fixing Systems	St	A 2 A 4	Br bronze Cu Al plastic
DIN 16903		Insert nuts for plastic mouldings	St		Br Al
EN 16983 (DIN 2093*)		Disc springs	SSt	1.4122 1.4310 1.4568	
DIN 18182		Dry wall screws for gypsum plasterboards with cross recess H	St case-hard.		
		Dry wall screws, magazined			
ISO 21269 (DIN 912)		Hexagon socket head cap screws with metric fine pitch thread	8.8 10.9 12.9	A 2	
DIN 21346		Square head bolts for wooden shaft guides	3.6		
DIN 21530 DIN 21547		Round head bolts with oval shoulders	4.6		
DIN 22424 DIN 22425		Triangle head bolts	5.8	A 1 A 2	Br

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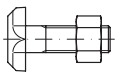
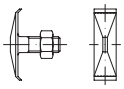
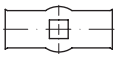
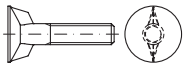
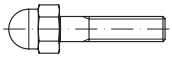
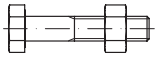
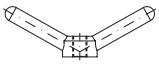
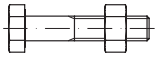
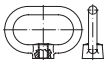
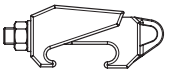
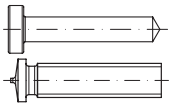
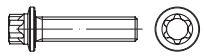
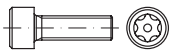
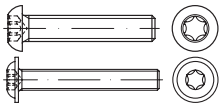
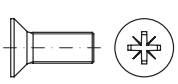
*** DIN: ISO/EN changes of dimension/form
(see Technical Information from page 74)

① DIN standard withdrawn without replacement (see note on page 5)

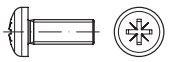
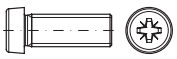
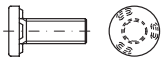
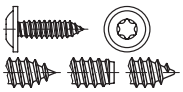
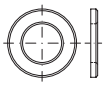
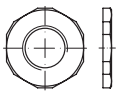
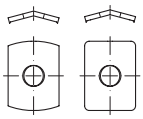
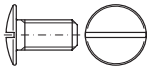
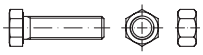
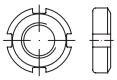
Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 25192	 T-head bolts for railway vehicles	3.6 4.6		
DIN 25193	 Mushroom head anchor screws	3.6 4.6		
	 Article 88102 Joint shims for bolts DIN 603	St		
DIN 25195	 Countersunk bolts with double nib	4.6		
DIN 25197	 Cap bolts for railway vehicles	4.6 5.8		
DIN 25200 DIN 25201 DIN 25203	 Bolts, nuts and savety elements for railway vehicles	4.6 8.8 10.9 St/SSt	A 1-A 5	
DIN 26020	 Tommy nuts for domes at tank wagons	5		
DIN 28030	 Bolts and nuts for flange joints for vessels and process apparatures, for the use according to AD regulations	material according to DIN 267-13,29		
DIN 28129	 Clamp nuts (lifting nuts)	St		
DIN 28152	 Clamps for vessels	St	A 4 1.7709	
DIN 32500 DIN 32501	 Studs for drawn arc stud welding threaded bolts, concrete anchors, shear connectors	St 4.8	A 2	CuZn Al AlMg AlSi
DIN 34800 DIN 34801	 Hexalobular head screws/bolts with small or large flange	8.8 10.9	A 2 A 4	
DIN 34802	 Hexalobular socket head cap screws with large driving feature	8.8 10.9		
DIN 34805-1/-2	 Hexalobular socket button screws, Hexalobular socket button screws with flange	8.8 10.9 12.9	A 2 A 4	
DIN 34810	 Hexagon head plastic screws			plastic
DIN 34811	 Countersunk plastic screws with cross recess Z			plastic

* DIN: ISO/EN identical = interchangeable
** DIN: ISO/EN mostly interchangeable
*** DIN: ISO/EN changes of dimension/form (see Technical Information from page 74)

① DIN standard withdrawn without replacement (see note on page 5)

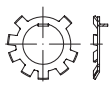
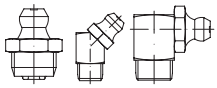
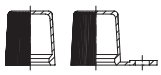
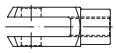
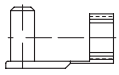
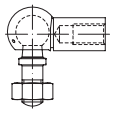
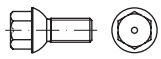
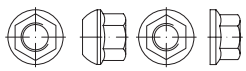
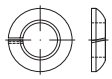
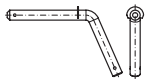
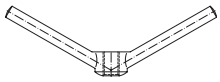
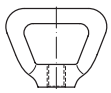
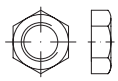
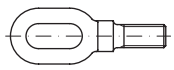
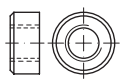
Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 34812	 Pan head plastic screws with cross recess Z			plastic
DIN 34813	 Cheese head plastic screws with cross recess Z			plastic
DIN 34814	 Hexagon plastic nuts			plastic
DIN 34815	 Plastic washers, normal series			plastic
DIN 34816	 Plastic washers, large series			plastic
DIN 34817	 Welding screws with metric thread	8.8		
DIN 34818	 Spring nuts with tapping screw thread	SSt		
DIN 34819	 Hexalobular socket raised head tapping screws with collar	St case-hard.	A 2 A 4	
DIN 34820	 Plain washers for steel structures according to DIN 18800	300 HV		
DIN 34821 DIN 34822 DIN 34824	 Screws with 12 point socket – with cheese head – with flange head – with raised countersunk head	8.8 10.9	A 2 A 4	
DIN 46258 DIN 46320	 Hexagon counter nuts, standard and heavy type	St		Br
DIN 46288	 Connection washers for electrical contact	SSt		
DIN 58450	 Slotted pan head screws, scale screws	St	A 1	Br
DIN 70613– DIN 70618	 Hexagon screws, hexagon nuts, with small wrench sizes	8.8 10.9 8		
DIN 70851 DIN 70852	 Locknuts for hook spanners	St		
DIN 70951	 Retaining rings (for hooks) for lock nuts according to DIN 70851	SSt-wire		

* DIN: ISO/EN identical = interchangeable
** DIN: ISO/EN mostly interchangeable
*** DIN: ISO/EN changes of dimension/form (see Technical Information from page 74)

① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 70952	 Lockwashers/safety plates for lock nuts according to DIN 70852	St		
DIN 71412	 Lubricating nipples	5.8	A 2 A 4	
	 Lubricating nipple caps			plastic
DIN 71752	 Fork joints	St		
	 Article 88752 Spring flap bolts ("ES bolts") for fork joints	St		
DIN 71802 DIN 71803 DIN 71805	 Angle joints (ball joints)	St		
DIN 74361	 Bolts with spherical collar (type G)	8.8 10.9		
DIN 74361	 Nuts with spherical collar (type A), flat collar nuts (type B)	8 10		
DIN 74361	 Spherical spring washers (type C)			
DIN 80403	 Socket pins	St	A 2 A 4	Br
DIN 80701	 Butterfly nuts	St	A 2 A 4	Br
DIN 80704	 Bow nuts		A 2 A 4	Br Al
DIN 80705	 Thin hexagonal nuts with small wrench size	14 H		Br
DIN 81698	 Eye bolts with small eye			Br Al
DIN 82006 DIN 82008 DIN 82010	 Oval eyes, double lug head fittings, stud eye head fittings for swivels and turnbuckles	St C 15 C 22		
DIN 82013	 Round nuts	6 AU 8	1.3952	

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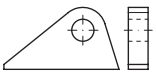
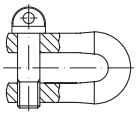
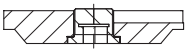
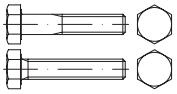
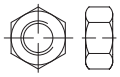
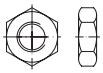
*** DIN: ISO/EN changes of dimension/form
(see Technical Information from page 74)

① DIN standard withdrawn without replacement (see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

		Steel	Stainless Steel	Brass Cu / Al / Ti plastic
DIN 82024 DIN 82025 (ISO 8146)	 Round eye plate, oval eye plate	St		
DIN 82101 DIN 82102 DIN 82103	 D-shackles, forged	St	A 2 A 4	
DIN 87721	 Drain screws (docking plugs), welding plates	St 52-3	1.4436 1.4571	
	Fasteners according to ASME/ANSI standards			
ASME B18.2.1	 Article 83931, 83933 Hex cap screws with shank/full thread, with UNC/UNF thread	Grade 5/8		
ASME B18.2.2	 Article 83934 Hex nuts with UNC/UNF thread	Grade 5/8	A 4	
ASME B18.2.2	 Artikel 83936 Hex jam nuts with UNC/UNF thread	Grade 5		
ANSI B18.22.1	 Article 83125 Plain washers, N = narrow W = wide	St		
ASME B18.3	 Article 83912 Hexagon socket head cap screws with UNC/UNF thread	A 574		

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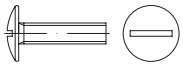
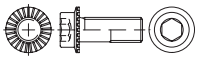
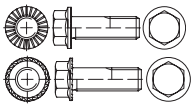
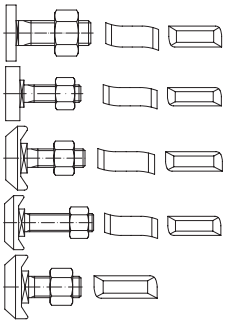
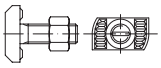
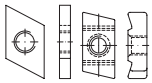
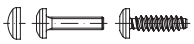
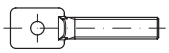
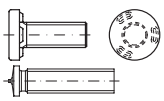
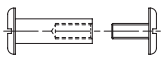
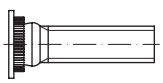
*** DIN: ISO/EN changes of dimension/form
(see Technical Information from page 74)

① DIN standard withdrawn without replacement
(see note on page 5)

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

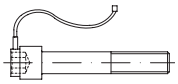
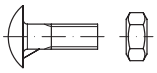
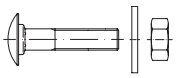
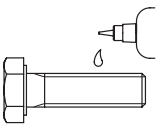
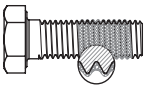
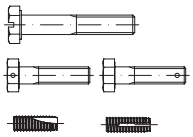
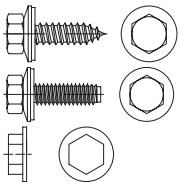
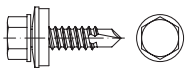
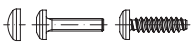
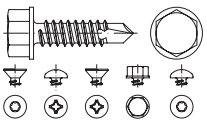
Non Standardized Screws with Machine Thread

Article			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
88086		Spacers with thread and with hexagon	St	A 1-A 5	Br Al plastic
88107		Slotted mushroom head screws	4.6 5.6	A 1 A 2	Br
10105		Hexagon head bolts with flange according to MBN 10105 (ACTROS screws)	10.9		
88912		Hexagon socket head cap screws with flange and lock ribs	100		
88913 88933		Hexagon head screws with flange and lock ribs, hexagon head screws with flange and serration	90/100 10.9 12.9		
88928 88938 88940 88950 88972		T-head bolts/Halfen bolts HS	4.6 8.8	A 2 A 4	
88941 88943 88944		T-head bolts/Halfen bolts HZS	8.8	A 4	
88951- 88955		T-head thread plates/slide nuts for (Halfen-) profiles	St		
88981		Cap-head tapping screws - with metric thread - with tapping screw thread	St	A 2	
		Eye screws, thumb screws	St		
		Welding screws, NELSON head bolts (→ DIN 32500, 32501, 34817)	St		
		Binder posts (book screws)	5.8		Br
		Rivet screws	St		

* with approval

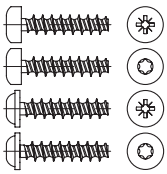
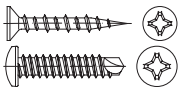
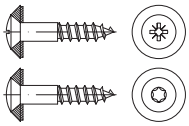
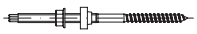
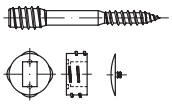
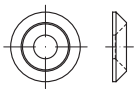
ETA
CE

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

Article		Non Standardized Screws and Bolts	Steel	Stainless Steel	Brass Cu / Al / Ti plastic
		Force measurement bolts, sensor screws for monitoring of preloads and operation loads (AMG Intellifast, ConSenses PiezoBolts)			
		Screws with hexagon nuts for crash barriers	4.6		
89804		Frame screws with hexagon nut and washer	St		
		Screws with old fashioned head	4.6	A 2	
85000		Chemical adhesives threadlockers			
		Adhesive/clamping coatings for screws			
		Additional types/versions → DIN 962/(ISO 7378, 8991)			
		Non Standardized Tapping Screws			
88176 88276		Tapping screws for facing with assembled sealing washer, type A = with cone end, type B = with pin, caps for building screws (article 88008)		A 2	
89812		Hexagon self drilling screws with EPDM seal, with and without painted head Selection colors: olive green, anthracite gray, light gray, graphite black, white aluminum, copper brown	St		
88312		Cylindrical head tapping screws with hexagon socket	St	A 2 A 4	
88981		Cap-head tapping screws - with metric thread - with tapping screw thread	St	A 2	
		Self drilling tapping screws with cone end (e.g. TEKS-, SUPER-TEKS-, Wing-TEKS-, DRIL-KWIK-screws) (→ DIN 7504/ISO 15480-15483)	St case- hard.		

* with approval

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

Article			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
		Non Standardized Screws for Thermoplastic			
88200 88202 88203 88204		Pan head screws with screw thread for plastic – pan head or pan head with pressed washer – cross recess Z or hexalobular socket	St case-hard.		
		Non Standardized Wood and Chipboard screws			
88010– 88018		Drilling window screws with spiral tip, window frame anchorage	St		
88025		Chipboard screws with washer head	St hard. lubricated	A 2	
88095		Chipboard screws with raised countersunk head and cross recess Z			Br
88295 88296		Spengler screws, raised countersunk head wood screws with cross reccess or hexalobular socket, with rosettes and sealing washer		A 2	
88149		Hanger bolts	St	A 2 A 4	
		Hanger bolts, ready for use for solar engineering		A 2	
		Tapping screws for roofs with washers	St		
		Spacer screws for framework/bars, sleeves, caps	St		
89091		Wood building screws with countersunk head and milling ribs, with hexalobular socket and threaded tip with scraper groove, CE according to ETA-12/0276 – with partial thread and grater part – with thread up to head	St hard.		
89184		Countersunk washers for wood building screws (article 89091), CE according to ETA-12/0276	St		
89092		Wood building screws with flange head and hexalobular socket, with grater part and threaded tip with scraper groove, CE according to ETA-12/0276	St hard.		

* with approval

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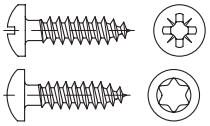
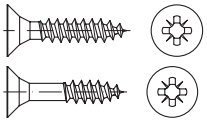
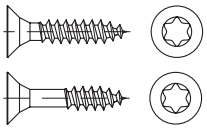
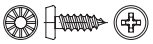
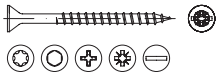
Article			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
89093		Wood building screws with cylindrical head, with hexalobular socket and threaded up to head, CE according to ETA-12/0276	St hard.		
89096		Chipboard screws with pan head, CE according to EN 14592 - with cross recess Z - with hexalobular socket	St hard.	A 2	
89097		Chipboard screws with countersunk head and cross recess Z, CE according to EN 14592 - with thread up to head - with partial thread	St hard.	A 2	
89098		Chipboard screws with countersunk head and hexalobular socket, CE according to EN 14592 - with thread up to head - with partial thread	St hard.	A 2	
89571		Hexagon wood screws, CE according to EN 14592	St		
89150		Drywall screws with flat bugle head and coarse thread, CE according to EN 14566	St		
89151		Drywall screws with flat bugle head and fine pitch thread, CE according to EN 14566	St		
89152		Drywall screws with flat bugle head and drilling point, CE according to EN 14566	St		
89153		Gypsum fibreboard with countersunk head, CE according to EN 14566	St		
89155		Drywall screws with countersunk head and fine pitch thread, CE according to EN 14566	St		
89192		Terrace screws with partially thread and cutting ribs		C 1	
89800		Adjusting screws with countersunk head and hexalobular socket	St		
89803		Framing screws with pan head and cross recess H	St		
		Wood screw S-WOOD with SIXFIX multi-screw head, screw head for 6 different bits - Hexalobular socket T15 and T20 - Hexagon socket SW3 - cross recess PH2 - cross recess PZ2 - Slot	St		

* with approval

Driving features:
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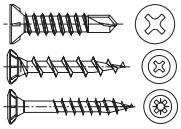
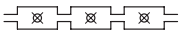
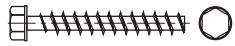
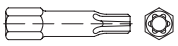
ISR = hexalobular socket

Article			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
	SPAX®	**SPAX Screws**			
88099		SPAX chipboard screws with countersunk head, with cross recess Z and center hole	St hard. lubricated		
88091*		SPAX chipboard screws with countersunk head and hexalobular socket	St hard. lubricated	A 2	
88092*		SPAX chipboard screws with raised countersunk head, cross recess Z or hexalobular socket	St hard. lubricated	A 2	
88093*		SPAX chipboard screws with pan head, cross recess Z or hexalobular socket	St hard. lubricated	A 2	
88094*		SPAX chipboard screws with countersunk head and cross recess Z	St hard. lubricated	A 2	
88094		SPAX chipboard screws with small countersunk head and cross recess Z	St hard. lubricated		
88187 88188 88189		SPAX window lair screws FEX, type A = for fastening metal reinforcements for simple-wall profiles type KS = fitting screws for plastic profiles type H = screws for wooden window frames	St hard. lubricated		
88190		SPAX glass strip screws with cross recess Z	St hard. lubricated	A 2	
88191		SPAX post screws with CUT cone end and star socket		A 2	
88192		SPAX screws with fixing thread for terraces planks		A 2 A 4	
88193*		SPAX screws with flange head	St hard. lubricated	A 2	
88195		SPAX screws with milling head for solid timber floors	St hard. lubricated		

* with approval

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

Article			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
88196*		SPAX screws fully threaded and MULTI countersunk head	St hard. lubricated		
88197*		SPAX screws with flange head for back boards	St hard. lubricated		
88198*		SPAX screws for MDF-boards	St hard. lubricated		
89015		SPAX flooring screws with fixing thread	St hard. lubricated		
89010 89011		SPAX frame anchors RA with star socket, with countersunk head, with cheese head	St hard. lubricated		
89014*		SPAX screws for wood, glass and frames	St hard. lubricated		
89018*		SPAX facade screws with raised countersunk head		A 2	
89019		SPAX facade screws with raised countersunk head and fixing thread		A 2	
		SPAX screws belted			
88052		SPAX-threaded rods with wood screw thread for lateral pass and lateral pressure reinforcement for large timber	St		
88001		Caps with pin			plastic
89012		Caps for SPAX frame anchors RA			plastic
89013		SPAX caps with pin			plastic
89021		SPAX screws assortment	St hard. lubricated		
88654 88663		SPAX BITcheck assortment, SPAX CUT-CASE	St hard.		
89017		SPAX assembly tools for SPAX threaded rods without head			

* with approval

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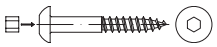
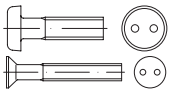
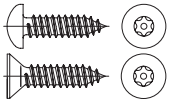
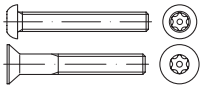
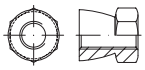
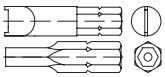
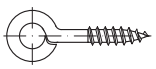
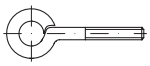
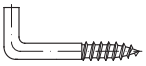
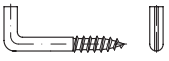
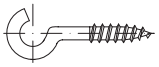
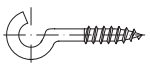
Article			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
		Fasteners with Theft Resistant Drives			
88110		Wood screws thread with hexagon socket and rivet pin	St		
88111 88112		Pan head/countersunk head screws with snake eyes drive, metric thread		A 2	
88113		Button head screws with hexagon socket and pin, metric thread		A 2	
88114 88115		Pan head/countersunk head screws with hexalobular socket and pin, tapping screw thread		A 2	
88116 88117		Button head/countersunk head screws with hexalobular socket and pin, metric thread		A 2	
88118		Theft resistant nuts/pull-off nuts for one-way assembly		A 1	
		Articles 88665-88667 Special bits	St hard.		
		Non Standardized Hooks and Eyes			
88133		Screw eyes with wood screw thread	St	A 2 A 4	Br
88135		S-hooks	St	A 2 A 4	Br
88136		Screw eyes with metric thread	St	A 2 A 4	Br
88137		Square bend screw hooks with wood screw thread	St	A 2 A 4	Br
88138		Straight screw hooks with metric thread	St	A 2 A 4	Br
88139		Square bend slotted screw hooks with wood screw thread	St	A 2 A 4	Br
88140		Cup hooks with wood screw thread	St	A 2 A 4	Br
88141		Cup hooks with wood screw thread, white painted	St	A 2 A 4	Br

* with approval

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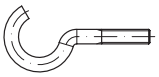
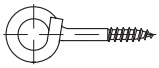
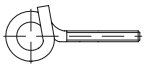
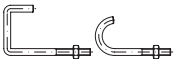
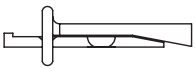
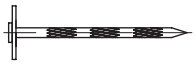
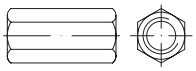
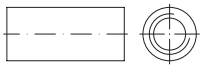
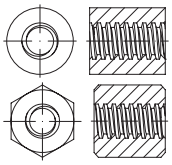
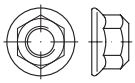
ISR = hexalobular socket

Article			Steel	Stainless Steel	Brass Cu / Al / Ti plastic
88142		Cup hooks with metric thread	St	A 2 A 4	Br
88143		Right angle screw hooks with wood screw thread, with hexalobular socket	St	A 2 A 4	Br
88144		Heavy duty screw eyes, spiral type, with wood screw thread	St	A 2 A 4	Br
88145		Heavy duty screw eyes, spiral type, with metric thread	St	A 2 A 4	Br
		L hooks, stirrup bolts	St	A 2 A 4	
		Non Standardized Nails			
89802		Ceiling nails, CE according to ETA-14/0390	St		
89805		Masonary nails	St		
89806		Concrete nails with washer head	St		
89807		Spikes for nail-plates	St		
89808		Nails for slate	St		
		Non Standardized Nuts and Inserts			
88087		Hexagon couplings	St	A 1-A 5	Br
88088		Round couplings	St	A 1-A 5	Br
88089 88090		Round and hexagon nuts with trapezoidal thread	St	A 1-A 5	Br bronze
13023		Prevailing torque type hexagon nuts with flange, according to MBN 13023 (ACTROS nuts)	10		

* with approval

Driving features:
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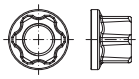
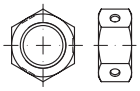
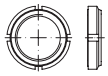
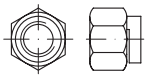
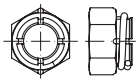
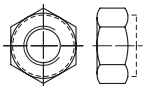
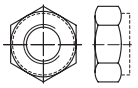
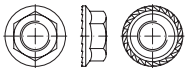
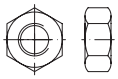
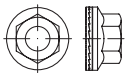
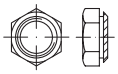
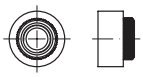
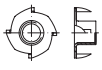
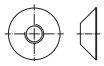
Z = cross recess pozidriv
ISR = hexalobular socket

Article		Non Standardized Nuts and Inserts	Steel	Stainless Steel	Brass Cu / Al / Ti plastic
13024		Lightweight construction nuts	10		
84032		Biloc nuts/prevailing torque type hexagon nuts	8 10	A 2 A 4	
88081		Locknuts with non-metallic insert GUK	St		
		Locknuts with non-metallic insert GUA/GUP (Elastic-Stop-locknuts/FINE-U-NUT)	St		
88105		THERMAG nuts, prevailing torque type hexagon nuts, all metal	St		
		Prevailing torque type hexagon nuts, all metal, two parts (e.g. SPRING-STOP/VARGAL/DAX)	5 6 8 10 12	A 1-A 4	Br Al
		Non-metallic insert (plastic) (→ DIN 982, 985, 986, 6924/ISO 7040, 10511, 10512) (e.g. NYLOC/POLY-STOP-ELASTIC-STOP)			
		Single component (→ DIN 980, 6925/ISO 7042, 10513) (e.g. STOVER/CLEVELOC/UNI-STOP)			
88914		Hexagon locking nuts with lock ribs	10		
88934		Hexagon locking nuts, surface hardened	8 10 12		
		Hexagon nuts AMELOCK® with self-locking threaded insert	8	A 2 A 4	
88034		HEICO-LOCK wedge lock nuts	10		
88106		Rivet nuts	St		
		Anchor rivet nuts	St hard.	A 1-A 4	
88108		Tee nuts with pronge	St		
88888		Counter nut CONU-S, -L	St		

* with approval

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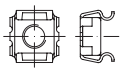
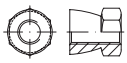
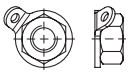
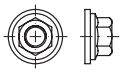
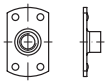
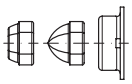
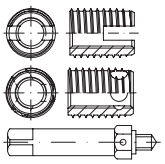
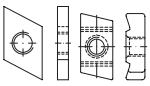
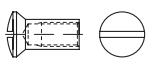
Article		Non Standardized Nuts and Inserts	Steel	Stainless Steel	Brass Cu / Al / Ti plastic
88109		Square caged nuts	St		
88118		Theft resistant nuts/pull-off nuts for one-way assembly		A 1 A 2	
88153		RUV-REYHER captivity nuts for usage according to EC machinery directive		A 2	
88215		Wing nuts, small “American” type	St	A 2	Br
		Nuts with captive washers	6 8 10	A 2 A 4	
		Spot-weld nuts	St		
		Speed nuts, spring nuts for tapping screw threads (→ DIN 34818)	SSt		
		Insert nuts (→ DIN 16903) – to force fit/engage – to push in/break in	St		Br Al
		PAL cap nuts for metric thread	SSt		
88301 88302 88305 88307 88308		ENSAT threaded inserts, short, long, setting tools for ENSAT threaded inserts	St hard.	A 1	
88330 88331- 88346		AMECOIL wire thread inserts, coarse thread, fine pitch thread, self locking, setting tools		A 2 Nimonic	bronze
88342 88344		AMECOIL assortment box with threaded inserts		A 2	
		RAMPA inserts/sleeves (→ DIN 7965)	St		
88951- 88955		T-head thread plates/slide nuts for (Halfen-) profiles	St		
88964		Sleeve nuts with internal thread		A 1	Br

* with approval

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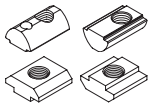
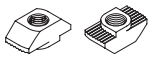
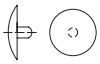
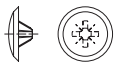
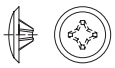
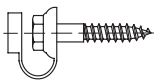
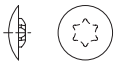
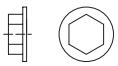
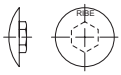
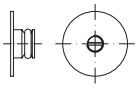
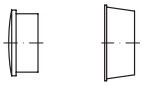
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

Article		Non Standardized Accessories	Steel	Stainless Steel	Brass Cu / Al / Ti plastic
87010- 87013		T-Slot nuts, for profiles 5, 6, 8 and 10 mm	St		
87014- 87015		Hammer head nuts, for profiles 8 and 10 mm	St		
		Non Standardized Accessories			
85000		LOCTITE threadlockers			glue
88001		Caps with pin for chipboard screws, for SPAX screws with inner hole			plastic
88002		Caps with pin for chipboard screws with cross recess Z			plastic
88003		Decorative caps for cap screws, for article 88981, ∅ 3.9			plastic
88004		Caps with pin for chipboard screws with cross recess H			plastic
88005		Plastic sealings and caps for hexagon wood screws, 7 mm ∅ for corrugated roof panels			plastic
88006		Caps for countersunk head screws with hexalobular/star socket			plastic
88008		Caps for tapping screws with hexagon for facing			plastic
88251		Caps for hexagon socket head screws			plastic
		Cover for countersinks for cylinder screws			Al
88497		KORREX protection caps			plastic
		Protection and sealing plugs, caps and sleeves for tube ends and workpieces			plastic

* with approval

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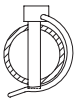
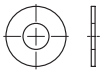
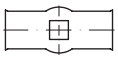
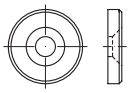
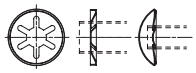
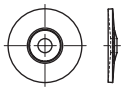
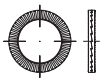
Article		Non Standardized Accessories	Steel	Stainless Steel	Brass Cu / Al / Ti plastic
88023		Linch pins for tubes	St		
88100		Washers	St		
88101		"Cupal" washers			CuAl
88102		Joint washers to use with cup head square neck bolts according to DIN 603	St		
88104		Washers with large outside diameter	St	A 2	
88184		Machine washers with sink hole for fixing control units	St		
88122		Quick fastening elements for axles, bolts and shafts; axle clamping rings, Duo-Clips, spring cotter pins, KL-/SL-locking, devices, U-Clips, shaft locking clips	SSt	1.4310	
88119		LOCKTIX washers	St hard.		
88120 88121		SCHNORR locking washers, serrated both side, S, VS	SSt	A 2 A 4	
88123 88124 88125 88126		TECKENTRUP lock washers for hexagon head screws and hexagon socket head cap screws	SSt	1.4568	
88129		TECKENTRUP lock washers with contact serrations	SSt	1.4568	
		TECKENTRUP disc springs	SSt	1.4568	
88130 88131		Lock rings	SSt	1.4310 A 4	
88132		NORD-LOCK washers pairs, standard = normal outer diameter SP = enlarged outer diameter SC = for HV fastenings X-series = wedge lock washers	St	A 4	
88032		HEICO-LOCK wedge lock washers	St	A 4	

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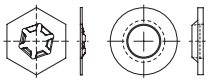
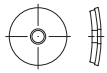
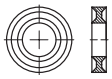
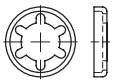
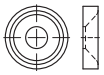
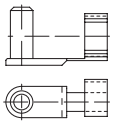
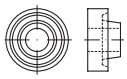
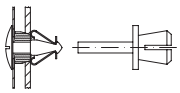
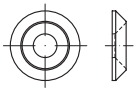
Article		Non Standardized Accessories	Steel	Stainless Steel	Brass Cu / Al / Ti plastic
88033		HEICO-LOCK ring lock washers	St		
88035		HEICO-LOCK combi washers	St	A 4	
88151 88152		RUV-REYHER captivity washers	St	A 2	plastic
88277		Sealing washers (convex metal washers with vulcanised sealing)	St	A 2 Neoprene	Al Neoprene
88494 88495		DUBO profile washers	St		plastic
88496		DUBO lock washers	St		plastic
88498		KORREX insulating tubes			plastic
88499		KORREX rosettes	St	A 2 A 4	Br Al
88965 88966		Rosettes/finishing washers	St	A 2 A 4	Br Al
88752		Spring flap bolts ("ES bolts") for yokes according to DIN 71752	St		
88917		Sealings type EPDM for solar engineering			plastic
		Quick opening device, quick fastening elements	St	A 2 A 4	Br plastic
89184		Countersunk washers for wood building screws (article 89091), CE according to ETA-12/0276	St		

* with approval

Driving features:
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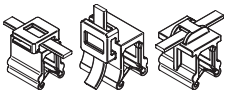
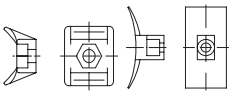
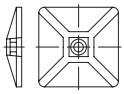
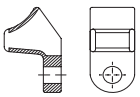
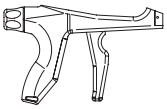
ISR = hexalobular socket

Cable Ties

Article		Fixing Technology	Material	Coating
82500 82505 82510 82515		Cable ties, inside serrations, T series = standard	plastic	
82520		Cable ties, internal serrations, LK series = higher tensile strength	plastic	
88516		Cable ties, outside serrated, Robusto series = with flat head	plastic	
82517		Cable ties, inside serrated, Q-tie = with open head and pre-locking functionality	plastic	
82518		2-piece fixing ties, Coupler = for parallel separation	plastic	
82521 82522 82523		Fixing ties for edges - EdgeClip-Family	plastic	
82543 82546		Cable tie mounts, screwable	plastic	
82540 82550 82553 82554		Cable tie mounts, self adhesive	plastic	
82560		Cable tie mounts	plastic	
82535		Manual application tools for cable ties		
82580		Cable conduits	plastic	
82565		Assortment boxes with cable tie mounts	plastic	

* with approval

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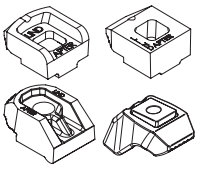
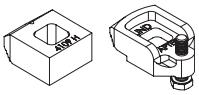
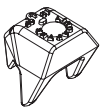
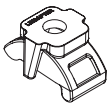
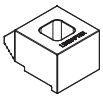
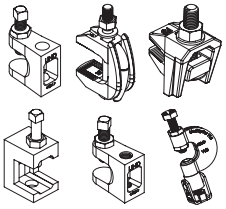
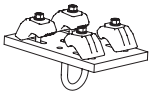
Article		Fixing Technology	Material	Coating
		LINDAPTER clamps		
82001* 82002* 82040 82049		Type A, B Type AF-K Type AAF	malleable iron	ZP HDG
82003 82007		Type BS, D2, (D3)	malleable iron	ZP HDG
82045		Type CF	malleable iron	ZP HDG
82010		Type LR	malleable iron	ZP HDG
82046		Type LS	1.4408	
82048		Type BR	malleable iron	ZP HDG
82008 82009 82022 82025 82058 82068		Type FL-D, FL-M, FL-S, F9, LC, F3	malleable iron	ZP HDG
82051		LINDAPTER-lifting eyes ALP		
		LINDAPTER Accessories		
82011 82012- 82016 82042- 82044		Type CW, P, Type AF-CW, AF-P	steel malleable iron	ZP HDG
82047		Type LS-P2	stainless steel A 4	

* with approval

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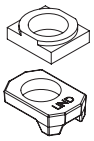
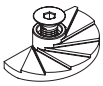
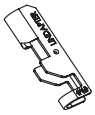
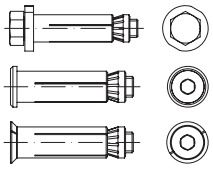
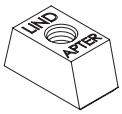
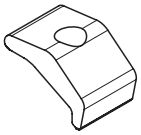
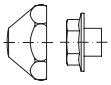
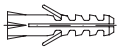
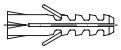
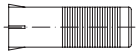
Article		Fixing Technology	Material	Coating
82021 82041		Type W Type AFW	steel malleable iron	ZP HDG
82019		LINDAPTER-FLOOR-FAST-FF for floor plate fixings	malleable iron (Screw DIN 7991/ ISO 10642)	ZP
82024		LINDAPTER toggle clamps TC with internal thread for decking fixing	steel	ZP
82031*		LINDAPTER HOLLO-BOLT for fixing onto hollow steel sections, Type HB = with hexagon head Type HBCSK = with countersunk head Type HBFF = FlushFit	steel stainless steel A 4	ZP
		LINDAPTER V-nuts	malleable iron	ZP
		MTH clamping plates		
82400*		MTH clamping plates Nova Grip	C45+N	ZP
		Plugs and Anchors		
		General Fixings		
		FISCHER caps AKM, FISCHER collar nuts BUM	plastic plastic	Cr
88500		FISCHER plugs S	plastic	
88506		FISCHER plugs MS	plastic	
88507*		FISCHER twist lock anchors GB	plastic	
88510		FISCHER plugs M	plastic/ cone: brass	

* with approval

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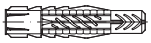
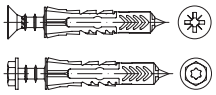
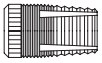
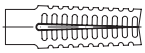
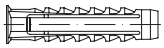
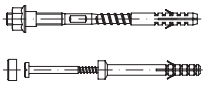
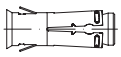
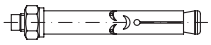
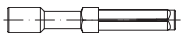
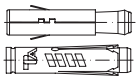
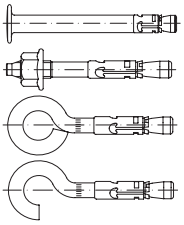
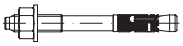
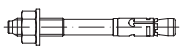
Article		Fixing Technology	Material	Coating
88520		FISCHER universal plugs UX, UX-R	plastic	
88690		FISCHER universal plugs DUOPOWER	plastic	
88690		FISCHER universal plugs DUOPOWER – countersunk screw with cross recess Z – hexagon screw with hexalobular socket	plastic/ screw: steel	ZP
88521		FISCHER anchors PA 4	brass	
88545		FISCHER steel expansion plugs FMD	steel	ZP
88554		FISCHER expansion plugs SX	plastic	
		FISCHER sanitary fixing set WD, WDP, WST, UST, BO, WCN, S8 RD, KM	plastic/ screw: steel brass	ZP CrP
		FISCHER special fixings for stairs TB, TBB	plastic/ screw: brass	
		FISCHER door stopper TS8	plastic/ screw: steel	ZP
		High Performance Steel Anchors		
88513*		FISCHER hollow ceiling anchors FHY	steel stainless steel A 4	ZP
		FISCHER bolt anchors FSA	steel	ZP
88688*		FISCHER aircrete anchors FPX-I	steel	ZP
88530 88683*		FISCHER heavy duty anchors SL, TA-M	steel stainless steel A 4	ZP
88531		FISCHER wall screws MR	steel	ZP
88546* 88548* 88547* 88549*		FISCHER nail anchors FNA, FNAM, FNA OE, FNA-H	steel	ZP
88561*		FISCHER anchor bolts FAZ II	steel stainless steel A 4 stainless steel 1.4529	ZP
88694*		FISCHER anchor bolts FBZ	steel stainless steel A 4	ZP

* with approval

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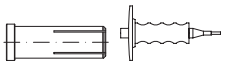
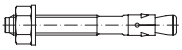
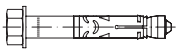
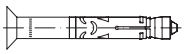
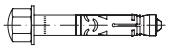
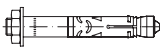
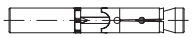
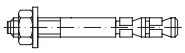
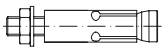
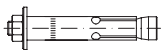
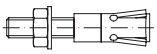
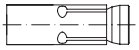
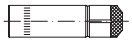
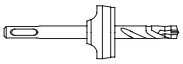
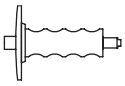
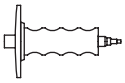
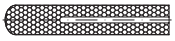
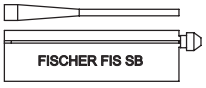
Article		Fixing Technology	Material	Coating
88567* 88568		FISCHER hammerset anchors EA and setting tools EAWH	steel stainless steel A 4	ZP
88582*		FISCHER bolt anchors FB-N	steel stainless steel A 4	ZP
88593*		FISCHER high performance anchors FH II-S	steel stainless steel A 4	ZP
88594*		FISCHER high performance anchors FH II-SK	steel stainless steel A 4	ZP
88590*		FISCHER high performance anchors FH II-H	steel	ZP
88592*		FISCHER high performance anchors FH II-B	steel	ZP
88689*		FISCHER high performance anchors FH II-I with internal thread	steel stainless steel A 4	ZP
88715*		FISCHER bolt anchors EXA	steel	ZP
88583*		FISCHER ZYKON bolt anchors FZA	steel stainless steel A 4	ZP
88584*		FISCHER ZYKON through anchors FZA-D	steel stainless steel A 4	ZP
88589		FISCHER ZYKON anchors for fixing step irons FZA ST	stainless steel A 4	
88585*		FISCHER ZYKON internally threaded anchors FZA-I	steel stainless steel A 4	ZP
88597*		FISCHER ZYKON hammerset anchors FZEA II	steel stainless steel A 4	ZP
88587		FISCHER drill bits FZUB	steel	
88588		FISCHER setting tools FZE plus	steel	
88595		FISCHER setting tools FZED plus	steel	
		**Chemical Fixings**		
88579* 88687*		FISCHER resin capsules FHB II, RSB	glass capsule	
88578* 88522* 88686* 88527*		FISCHER injection mortar FIS HB, FIS V, FIS EM, FIS SB	mortar	

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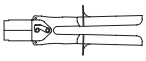
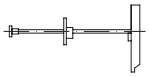
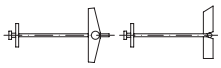
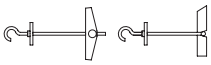
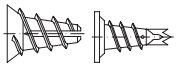
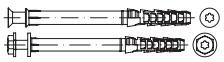
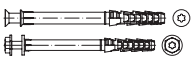
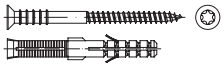
ISR = hexalobular socket

Article		Fixing Technology	Material	Coating
88525 88579 88685 88524 88684		FISCHER accessories for chemical fixings, static mixer, blow-out pumps, brushes, dispenser, extension tubes		
88579* 88534* 88523* 88529*		FISCHER anchors FHB II-A, FHB-A dyn, RGM, FIS-A, FIS-E	steel stainless steel A 4	ZP
88562* 88526*		FISCHER anchor sleeves FIS H K, FIS H N, FIS H L	steel plastic	
		Cavity Fixings		
88512		FISCHER cavity metal fixings HM	steel	ZP
88511		FISCHER professional tools HM-Z 1 for cavity fixing plugs HM-S	steel	
88509		FISCHER toggle fixings K	plastic	
88518		FISCHER toggles KD	steel	ZP
88519		FISCHER toggles KDH	steel	ZP
88598		FISCHER plasterboard fixings GK/GK-M	steel plastic	ZP
		Long Shaft Anchors, Frame Fixings, Adjustment Fixings		
88503		FISCHER nail plugs N	plastic/ screw: steel stainl. steel A 2	ZP
		FISCHER nail sleeves FNH	spring steel	ZP
88542*		FISCHER frame fixings SRX-T, SRX-FUS	plastic screw: steel stainl. steel A 4	ZP
88551*		FISCHER frame fixings SXRL-FUS, SXRL-T	plastic screw: steel stainl. steel A 4	ZP
88515		FISCHER adjustment screws JUSS, FISCHER adjustable fixing S10J	plastic/ screw: steel	ZP
88516		FISCHER frame fixings F-S	plastic/ screw: steel	ZP

* with approval

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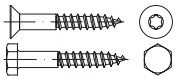
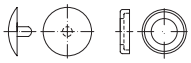
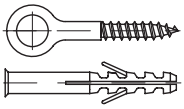
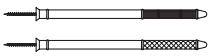
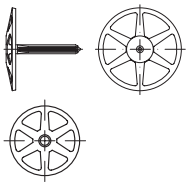
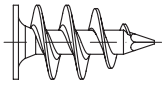
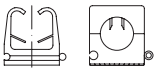
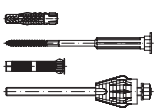
Article		Fixing Technology	Material	Coating
88540		FISCHER frame fixings S-H-R	plastic	
88563* 88564*		FISCHER frame fixings FUR-T/-TS/-SS	plastic/ screw: steel stainl. steel A 4	ZP
88680		FISCHER metal frame fixings F-M	steel/ screw: steel	ZP
88565		FISCHER rapid installation foam PU 500	polyurethane	
88596 88599		FISCHER safety screws SHT, countersunk head with hexalobular socket or hexagon head	steel stainl. steel A 4	ZP
88528 88556 88681 88682		FISCHER caps ADT, ADF, ADM, ASM for FISCHER frame fixings	plastic	
		Scaffold Fixings		
88536		FISCHER scaffold fixings S 14 ROE, GS 12	steel plastic	ZP
		FISCHER wall-ties VBS 8, assembly tools	stainless steel A 4	
		Insulation Supports		
88514 88580		FISCHER insulation supports DHK, DT	plastic steel	Al-Zn- coating
88696		FISCHER insulation fixing	plastic	
		Electrical Fixings		
88558 88559		FISCHER pipe clips FC and saddles SCH	plastic	
88695		FISCHER stand-off installation Thermax	plastic/ screw: steel	ZP

* with approval

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Driving features:
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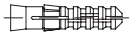
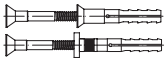
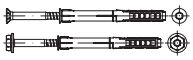
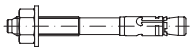
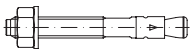
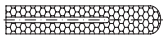
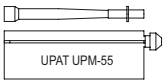
ISR = hexalobular socket

Article		Fixing Technology	Material	Coating
		General Fixings		
		UPAT plugs Ultra U	plastic	
		UPAT universal plugs UVD	plastic	
		UPAT nail plugs UN	plastic/ screw: steel	ZP
88781*		UPAT frame fixings URD	plastic/ screw: steel	ZP
		Anchors – Heavy Duty Fixings		
88741*		UPAT express anchors MAX	steel stainless steel A 4	ZP
88764*		UPAT express anchors IMC	steel stainless steel A 4	ZP
88716*		UPAT impact anchors USA	steel	ZP
88717		UPAT setting tools for USA hammerset anchors	steel	
		Chemical Fixings		
88722*		UPAT threaded rods UKA 3-ASTA	steel stainless steel A 4	ZP HDG
88714		UPAT internal thread bushes UKA 3-IST	steel stainless steel A 4	ZP
88734		UPAT threaded rods UPM-A	steel stainless steel A 4	ZP
88770		UPAT internal thread anchors UPM-I	steel	ZP
88735		UPAT mesh bushes UPM-SH-K	plastic	
88720*		UPAT resin capsules UKA 3 PLUS	glass capsule	
88733* 88772* 88774* 88775*		UPAT injection mortar UPM 55, UPM 44, UPM 33, UPM 11	mortar	

* with approval

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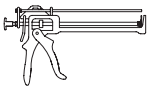
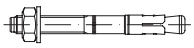
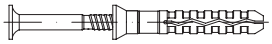
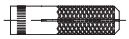
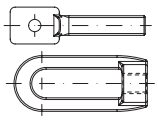
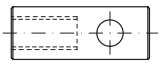
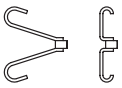
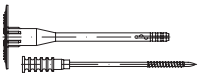
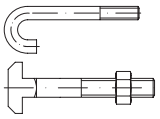
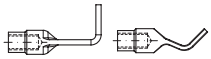
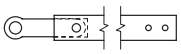
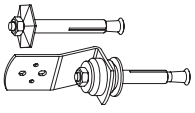
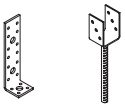
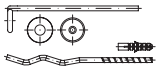
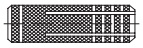
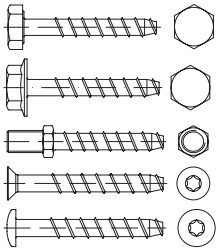
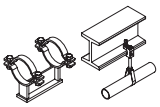
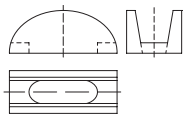
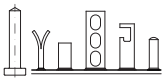
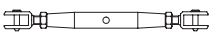
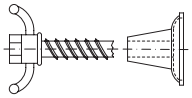
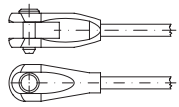
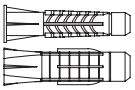
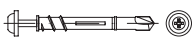
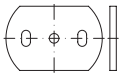
Article		Fixing Technology	Material	Coating
88718 88738 88760 88765 88766 88769 88771 88776		UPAT accessories for chemical fixings, static mixers, cleaning brushes, blow-out pumps, application guns, setting tools		
		LIEBIG® metal plugs		
*		– Bolt anchors		
*		– Frame fixings		
*		– Nail plugs		
		– Brass plugs		
		Other Fixing Elements		
		Eye screws, thumb screws, eye nuts, hanger nuts	steel C 22.8 forged	ZP flZn
		Anchor sleeves	steel stainless steel A 4	ZP HDG
		Concrete anchors	steel stainless steel A 4	ZP HDG flZn
89810		Insulation fixing with metal pin	plastic/ screw: steel	
		Drive-in plugs/mushroom plugs with expanding pins	plastic	
		Anchor bolts, tie anchors, tractive anchors	steel stainless steel A 4	ZP HDG
		Concrete anchor sleeves	steel stainless steel A 4	ZP
		KORO scaffolding systems, caps (concrete anchor sleeves with ring pads)	steel stainless steel A 4 plastic	ZP
		KUNKEL ceiling fixings, KUNKEL pipe fixings, KUNKEL special drills and setting tools	steel	ZP
		Strap joints, angle joints, strap anchors for timber connectors	steel stainless steel A 4	ZP HDG flZn

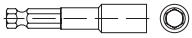
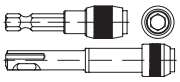
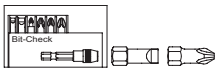
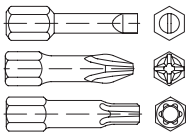
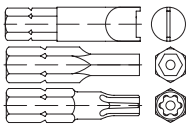
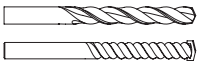
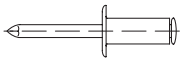
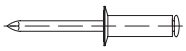
* with approval

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

Article		Fixing Technology	Material	Coating
		Facing anchors	stainless steel A 4	
88910		Brass expanding plugs	brass	
		Perforated strap hangers	steel	ZP
88902* 88903* 88905* 88908*		MULTI-MONTI HMS/MMSplus screw anchors, wall screws	Steel hard.	ZP
89801		Nail plugs – Countersunk screw with cross recess H	plastic/ screw: steel	ZP
		Pipe fixings (fixed/insulated)	steel MCI stainless steel A 2, A 4	ZP HDG flZn
88060 88061		Adjusting washers for cam segments and cam segments for tension anchors for diagonal pull tensioning	malleable iron	
		Welded head bolts, wall anchors, panel anchors (NELSON head bolts)	steel stainless steel A 2, A 4	ZP
		Turnbuckles	steel stainless steel A 4	ZP
		Tension rods for steel construction, wing nuts for tension rods, steel cones and water locking nuts for tension rods	steel	ZP flZn
		Anchor systems for steel construction: clevis, right hand/left hand thread, bolts, tension rods	cast iron steel	ZP HDG
88381- 88383		TOX hook plugs 4 As K, Tri, Trika	plastic	
		Lifting ball head anchors for concrete construction	steel 52-3	
89809		Drywall system fixing, round head screws with flange and cross recess H	plastic/ screw: steel	ZP
		Anchor sheets, heavy duty washers	steel stainless steel A 2, A 4	ZP HDG flZn

* with approval

Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

Article		Fixing Technology	Material	Coating
		Assembly Tools **– Drills, Bits, Wrench Keys**		
88265		Socket wrenches	steel hardened	
88279 88280		Universal bit holders, screw couplings with strong permanent magnet	steel hardened	
88281– 88286 89811		Bit assortment – for slotted head – for cross recess H or Z – for hexalobular socket	steel hardened	
88654– 88663		Bits with hexagon drive for screws with slotted head, cross recess (Phillips, Pozidriv) and hexalabour socket	steel hardened	
88665 88666 88667		Bits for theft resistant screws (Articles 88111–88117)	steel hardened	
88988 88990 88997		HSS-spiral drills DIN 338 for steel, stone drills, standard and extra large shaft connection, hammer drills with shaft connection SDS plus	steel hardened	
		Blind Rivet Tools		
88401– 88408		Open-end blind rivets with break pull mandrel DIN 7337, type A = protruding head	steel/steel Al-alloy/steel Al-alloy/stainless steel A 2 stainless steel A 2/ stainless steel A 2 stainless steel A 2/steel copper/steel copper/bronze plastic/plastic	ZP ZP ZP ZP
88410			Al-alloy/Al-alloy	
88415			stainless steel A 4/ stainless steel A 4	
88493			Monel/stainless steel A 4	
88417		Open-end blind rivets with break pull mandrel DIN 7337, type B = countersunk head	Al-alloy/steel	ZP
88411			steel/steel	ZP
88412			Al-alloy/steel	ZP

* with approval

ETA
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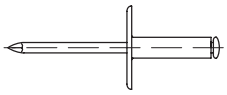
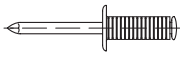
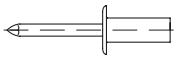
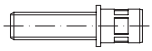
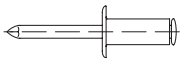
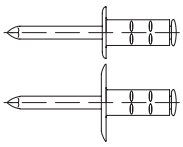
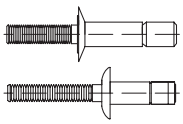
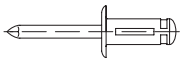
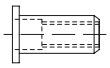
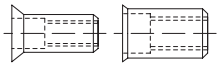
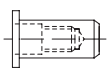
Driving features:
H = cross recess Phillips
Z = cross recess pozidriv
ISR = hexalobular socket

Article		Fixing Technology	Material	Coating
88409 88413 88414 88416		Open-end blind rivets with break pull mandrel DIN 7337, type C = large protruding head	Al-alloy/steel steel/steel Al-alloy/Al-alloy Al-alloy/stainless steel A 2	ZP ZP
88419		Open-end blind rivets with grooved rivet body for blind hole rivetting	Al-alloy/steel	ZP
88420		Closed-end blind rivets for air- and water-tight rivetting	Al-alloy/steel Al-alloy/stainless steel A 2 copper/steel copper/stainless steel A 2	phos-phated
88421		Open-end blind rivets with break pull mandrel, type M = with connection thread	steel/steel	ZP
88422		Open-end blind rivet with break pull mandrel, type SS-A = protruding head, with peel rivet body, for soft building material	Al-alloy/steel	ZP
88474 88475		Open-end blind rivets with multigrip rivet body "PolyGrip", type A = protruding head, type C = large protruding head	Al-alloy/steel Al-alloy/stainless steel A 2 Al-alloy/Al-alloy	ZP
88476 88477		Open-end blind rivets with break pull mandrel, "MEGA G-LOCK" = for high strength rivet assembly, type F = protruding head type S = countersunk head	steel/steel	ZP
88488		Open-end blind rivets with break pull mandrel, "TRIFOLD" = recessed crown for soft material, type F = protruding head	Al-alloy	
		Blind Rivet Nuts		
88423		Blind rivet nuts, round, open-end, type F = protruding head	steel Al-alloy stainless steel A 2	ZP
88424 88418		Blind rivet nuts, round, open-end, type S = countersunk head, type Sk = small countersunk head	steel Al-alloy stainless steel A 2	ZP
88480		Blind rivet nuts, round, closed, for air- and water-tight rivetting, type F = protruding head	steel Al-alloy	ZP

* with approval

ETA
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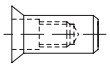
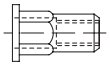
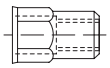
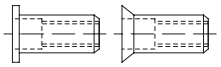
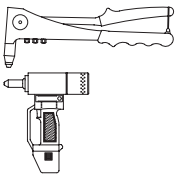
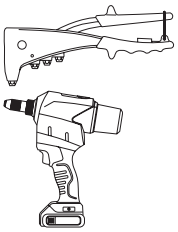
ISR = hexalobular socket

Article		Fixing Technology	Material	Coating
88481		Blind rivet nuts, closed-end for air- and water-tight rivetting, type S = countersunk head	steel Al-alloy	ZP
88483		Blind rivet nuts, hexagon, open-end, type F = protruding head	steel stainless steel A 2	ZP
88484		Blind rivet nuts, hexagon, open-end, type Sk = small countersunk head	steel stainless steel A 2	ZP
88490 88491		Blind rivet nuts, round, open-end, with multigrip rivet body, type F = protruding head, type S = countersunk head	steel Al-alloy stainless steel A 2	ZP
		GESIPA Accessories		
		- Hand tools, rivetting power tools for blind rivets and blind rivet nuts - Tool assortment, power accus, chargers - Spare parts		
		HONSEL Accessories		
88440 88441 88443		- Hand tools, rivetting power tools - Tool assortment, power accus, chargers - Spare parts		

* with approval

Driving features:
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Z = cross recess pozidriv
ISR = hexalobular socket

TECHNICAL INFORMATION (TI)

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Table of Contents, TI Extracts

Standards conversion DIN ➔ ISO/EN

The conversion of some national DIN standards to ISO or EN standards is (was) done with the aim of deconstructing trade barriers in international goods exchange and harmonising the technical rules in the common single European market.
Table 1 shows the ISO/EN standards for product standards and the most important thread and basic standards according to the corresponding DIN in ascending order (as of: 10/2019).

Table 2 (next page) shows the EN and DIN standards according to the corresponding ISO in ascending order.
The tables also include draft standards and withdrawn standards.

Table 1

Product standards	
DIN	ISO DIN ISO DIN EN ISO
1	2339
7	2338
39	–
84	1207
85	1580
93*	–
94	1234
95, 96, 97	–
98, 99	–
123,124	1051
125-1,2	7089, 7090
126	7091
127*, 128*	–
134*, 137*	–
186, 188	–
258	ISO 8737
261	–
302	1051
314-318	–
319	–
338, 340	–
388, 390	–
404	–
417	7435
427	2342
431	–
432*	–
433-1,2	7092
434-436	–
438	7436
439-1	4036
439-2 CT/FT	4035, 8675
440	7094
442, 443	–
444	–
462, 463*	–
464, 465*	–
466, 467	–
468, 469	–
470	–
471, 472	–
478-480	–
508	–
525, 529	–
546-548	–
551	4766
553	7434
555	4034
557	–
558	4018
561	–
562	–
564	–
571	–
580, 582	–
601	4016
603	–
604-608	–
609, 610*	–
653	–
660-662	1051
674, 675	1051
703*, 705	–
741	–
787	299
792	–
797, 798*	–
830*	–
835	–
906-910	–

Product standards	
DIN	ISO DIN ISO DIN EN ISO
911	2936
912 (CT)	4762
912 (FT)	12474
913	4026
914	4027
915	4028
916	4029
917	–
920-927	–
928, 929	–
931-1	4014
931-2	–
933	4017
934 CT	4032, 4033
934 FT	8673, 8674
935-1	–
935-3	–
936 CT/FT	(4035/8675)
937	–
938-940	–
949-1,2	–
950-959	–
960	8765
961	8676
963	2009
964	2010
965	7046-1, 2
966	7047
967, 968	–
(970)	4032
(971-1,2)	8673,8674
(972)	4034
975	DIN 976
976-1,2	–
977	–
979	–
980 CT	7042 (7719)
980 FT	10513
981	–
982 CT	7040
982 FT	10512
983	–
985	10511
986	–
987*	–
988	–
1052	–
1433-1436	–
1440	8738
1441	–
1443	2340
1444	2341
1445	–
1469	–
1470	8739
1471	8744
1472	8745
1473	8740
1474	8741
1475	8742/8743
1476	8746
1477	8747
1478-1480	–
1481	8752
1587	–
1592-1597	–
1804	–
1816	–
2093	EN 16983
2507	(EN 1515)

Product standards	
DIN	ISO DIN ISO DIN EN ISO
2509*	–
2510-1...8	–
3015-3016	–
3017	–
3220	–
3319	–
3404, 3405	–
3567	–
3568*	–
3570	–
3575	–
3670	–
3870, 3872	–
4109	–
5299	–
5406	–
5417	–
5525, 5526	–
5586	–
5903, 5906	–
5914	–
6303	–
6304-6307	–
6311	–
6319	–
6324	–
6325	8734
6330, 6331	–
6332	–
6334*	–
6335-6337	–
6340	–
6378	–
6379	–
6791, 6792	1051
6796	–
6797*	–
6798*	–
6799	–
6880	–
6881	–
6883, 6884	2492
6885-1, 2	–
6885-3	–
6886, 6887	–
6888	3912
6899	–
6900	10644
6901	10510
6902-6908	10669, 10673
6911	–
6912	–
6913*	–
6914-6915	EN 14399-4
6916	EN 14399-6
6917-6918	–
6921	EN 1665
6922	EN 1665
6923	EN 1661
6924 (CT)	7040
6924 (FT)	10512
6925 (CT)	7042
6925 (FT)	10513
6926 (CT)	EN 1663
6926 (FT)	EN 1666
6927 (CT)	EN 1664
6927 (FT)	EN 1667
6928 (CT)	7053
6928 (FT)	10509
7331	–

Product standards	
DIN	ISO DIN ISO DIN EN ISO
7337	15973-16585
7338-7340	–
7341	1051
7343	8750
7344	8748
7346	13337
7349	–
7500-1	–
7504	15480-15483
7513	–
7516	–
7603	–
7604	–
7642, 7643	–
7964	–
7965	–
7967*	–
7968	–
7969	–
7971	1481
7972	1482
7973	1483
7976	1479
7977	8737
7978	8736
7979	8733, 8735
7980*	–
7981	7049
7982	7050
7983	7051
7984	–
7985	7045
7987*, 7988*	–
7989-1,2	–
7990	–
7991	10642
7992	–
7993	DIN 9925/9926
7995-7997	–
7999	EN 14399-8
8140	–
9021	7093-1,-2
9045*	–
9841	7379
11014	–
11023, 11024	–
15058	–
15237	–
16903	–
18182	–
21346	–
21547	–
22424, 22425	–
25192	–
25193	–
25195	–
25197*	–
25200-25203	–
26020	–
28030	–
28129	–
28152	–
32500, 32501	13918
34800-34802	–
34803, 34804	–
34805	–
34810-34816	–
34817-34819	–
34820	–
46258, 46320	–

Product standards	
DIN	ISO DIN ISO DIN EN ISO
46288	–
58450	–
70613-70618	–
70851*	–
70852	–
70951*	–
70952	–
71412	–
71752	–
71802-71805	–
74361	–
80403	–
80701	–
80704	–
80705	–
81698	–
82006-82010	–
82013	–
82101	–

Thread standards	
13-1...11	724
13-12	261
13-13	262, 965-2
13-14, 15	965-1, -2
13-16...18	1502
13-19	68-1
13-20...26	–
13-27	965-3
13-28	–
13-50...52	–
14	–
103-1	2901
103-2	2902
103-3	2903
103-4	2904
103-5...9	–
202	–
2244	5408
2510-2	–
7952	–
7970	1478
7998	–
8140, 8141	–

Basic/Functional standards	
DIN	ISO DIN ISO DIN EN ISO
78	4753
101	1051
267-1	8992
267-2	4759-1
267-3	898-1
267-4	898-2
267-5	3269 (16426)
267-6	4759-1
267-7	898-1
267-8	898-2
267-9	4042
267-10	10684
267-11	3506-1-4
267-12	2702
267-13	–
267-15	2320
267-18	8839
267-19	6157-1, 3
267-20	6157-2
267-21	10484
267-23	898-6
267-24	–
267-25	898-7
267-26-30	–
475**	272 (EN 1660)
522	4759-3
918	1891
946	16047
962 (34803)	7378, 8991
969	–
974	–
2510-2, 8	–
7150-7152	286
7154-7157	–
7160, 7161	286
7168	2768, 8015
7172, 7182	286
7184	1101
7337	14588-589
7500-2/7504	-/10666
7962	4757
7970	1478
7998	–
8140-1-3	–
9830	–
18800	–
34803, 34804	–
40080	2859-1-3
50049	EN 10204/ ISO 16228

– ISO/EN standard not yet known (as of 10/2019)

( ) Transitional standards (dimensions identical with ISO)

* withdrawn DIN standard without replacement, because, for example, technically reworked
(On issue of DIN EN-/DIN EN ISO standards the corresponding DIN/DIN ISO are/were withdrawn)

Legend for table 2:

HV	high strength steel	Hex.	hexagon
Csk.	countersunk	CR	cross recess
Rcsk.	raised countersunk	MP	Mechanical Properties
CT/FT	coarse pitch thread/fine pitch thread	S/H/L	standard/heavy/light version
CH/TC/CD/CP	with flat point/with cone point/ with dog point/with cup point	Ww	Withworth
		TDC	technical delivery conditions

Table 2

Product standards			
ISO DIN ISO DIN EN ISO	EN DIN EN	DIN	Title keyword
-	1515	2507	Flange joints
-	1661	6923	Hexagon nuts with flange
-	(1662), 1665	6921, 6922	Hexagon bolts with flange
-	1663, 1664	6926, 6927	Hexagon nuts with flange
-	1666, 1667FT	6926, 6927FT	and prevailing torque type
-	14218,14219	-	Hex. bolts/nuts with flange FT
-	14399-4	6914-6915	Hexagon bolts/nuts (HV)
-	14399-6	6916	Plain chamfered washers (HV)
-	14399-8	7999	Hexagon fit bolts (HV)
-	16983	2093	Disc springs
299	-	508/787	Screws/nuts for T-slots
773	-	6885-1, 2	Parallel keys
774	-	6886, 6887	Taper keys with gip head
1051	-	660	Rivet, rivet pins
1207	-	84	Slotted cheese head screws
1234	-	94	Splint pins
1479	-	7976	Hexagon head tapping screws
1481	-	7971	Pan head tapping screws
1482	-	7972	Csk. head tapping screws
1483	-	7973	Rcsk. head tapping screws
1580	-	85	Pan head screws
2009	-	963	Countersunk head screws
2010	-	964	Rcsk. head screws
2338	-	7	Parallel pins
2339	22339	1	Taper pins
2340	22340	1443	Clevis pins without head
2341	22341	1444	Clevis pins with head
2342	-	427	Headless screws
2491	-	6885-3	Parallel keys
2492	-	6883, 6884	Gib head/parallel keys
2936	-	911	Hexagon socket screw keys
3912	-	6888	Woodruff keys
4014	-	931-1	Hexagon head bolts
4016	-	601	Hexagon head bolts
4017	-	933	Hexagon head bolts
4018	-	558	Hexagon head screws
4026	-	913	Hexagon socket set screws CH
4027	-	914	Hexagon socket set screws TE
4028	-	915	Hexagon socket set screws CD
4029	-	916	Hexagon socket set screws CP
4032	-	934	Hexagon nuts I CT
4033	-	934	Hexagon nuts II CT
4034	-	555	Hexagon nuts
4035	-	439-2, 936	Hexagon thin nuts
4036	-	439-1	Hexagon thin nuts
4161	1661	6923	Hexagon nuts with flange
4162	1662, 1665	6922	Hexagon bolts with flange
4762	-	912	Hexagon socket head cap screws
4766	24766	551	Set screws CR
4775	780, 783	6915	Hexagon nuts (HV)
7040, 7041	-	982, 6924	Prevailing torque type hex. nuts
7042	-	980, 6925	Prevailing torque type hex. nuts
7043	1663/1666	6926	Prevailing locking nuts with flange
7044	1664/1667	6927	Hexagon locking nuts with flange
7045	-	7985	Raised cheese head screws CR
7046-1, 2	-	965	Countersunk head screws CR
7047	-	966	Rcsk. head screws CR
7048	-	-	Slotted cheese head screws CR
7049	-	7981	Pan head tapping screws CR
7050	-	7982	Csk. head tapping screws CR
7051	-	7983	Raised countersunk head
7053	-	6928	Hex. washer head tapping screws
7089	-	125-1,2	Washers, grade A
7090	-	125-1, 2	Washers, grade B
7091	-	126	Washers, standard design
7092	-	433-1, 2	Washers, small series
7093-1, 2	-	9021	Washers, large series
7094	-	440	Washers, extra large series

Product standards			
ISO DIN ISO DIN EN ISO	EN DIN EN	DIN	Title keyword
7379	-	9841	Hex. socket head shoulder screws
7380	-	-	Hex. socket button head screws
7434	27434	553	Slotted set screws TC
7435	27435	417	Slotted set screws CD
7436	27436	438	Slotted set screws CP
7719, 7720	-	980, 6925	Prevailing torque type hex. nuts
8100, 8102	1665	6921	Hexagon bolts with flange
8104	1662	6922	Hexagon bolts with flange
8673	-	934, 971-1	Hexagon nuts FT
8674	-	934, 972-2	Hexagon nuts FT
8675	-	439-2, 936	Hexagon thin nuts (chamfered) FT
8676	-	961	Hexagon head screws FT
8733	-	7979	Parallel pins, internal thread
8734	-	6325	Parallel pins, hardened
8735	-	7979	Parallel pins, internal thread
8736	28736	7978	Taper pins, internal thread
8737	28737	7977, 258	Tape pins, CD thread
8738	28738	1440	Washers for clevis pins
8739	-	1470	Grooved pins
8740	-	1473	Grooved pins champfer
8741	-	1474	Grooved pins
8742	-	1475	Grooved pins
8743	28743	1475	Grooved pins
8744	-	1471	Grooved pins
8745	-	1472	Grooved pins
8746	-	1476	Round head grooved pins
8747	-	1477	Grooved pins with csk. head
8748	-	7344	Spring-type straight pins H
8750	-	7343	Spring-type straight pins S
8751	-	7343	Spring-type straight pins L
8752	-	1481	Spring pins H
8765	-	960	Hexagon head bolts FT
10509	-	6928	Hex. flange head tapping screws
10510	-	6901	Tapping screws
10511	-	985	Hexagon thin locking nuts
10512	-	982, 6924	Hexagon locking nuts
10513	-	980, 6925	Hexagon locking nuts
10642	-	7991	Hex. socket csk. head screws
10644	-	6900	Screws and washer assemblies
10663	1661	6923	Hexagon nuts with flange FT
10666	-	7504	Drilling screws with tapping screw thread
10669/10673	-	6903/6902	Washers for assemblies
12125	-	6926	Hexagon locking nuts with flange
12126	-	6927	Hexagon locking nuts with flange
12474	-	912 (FT)	Hex. socket head cap screws FT
13337	-	7346	Spring-type straight pins L
13918	-	32500	Welding studs for stud welding
14579...587	-	-	Hex. socket head cap screws
14588, 14589	-	7337	Blind rivets, terms
15071...073	-	-	Hex. bolts with flange, small S
15480...483	-	7504	Drilling screws
15973...986	-	7337	Blind rivets
16582-585	-	7337	Blind rivets
21269	-	-	Hex. socket head cap screws FT
21670	-	977	Hexagon weld nuts with flange
68	-	13 T 19	Metric screw threads - profile
228-1...3	-	259-1...3	Ww head cap pipe thread G
261	-	13-12	Selection of pitch threads CT/FT
262	-	13-13	Thread selection series
724	-	13	ISO thread: Basic dimensions
965-1...5	-	13-13...15,27	Metric threads, data/principles
1478	-	7970	Tapping screws thread
1502	-	13-16...18	Thread gauges
2901-2904	-	103-1...4	Trapezoidal thread
5408	-	2244	Thread: Terms
6410-1...3	-	27	Threads description in drawing

Basic/Functional standards			
ISO DIN ISO DIN EN ISO	EN DIN EN	DIN	Title keyword
225	20225	-	Fasteners: Dimensions
272	1660	475-1	Hexagon wrench sizes
273	20273	69	Clearance holes for bolts
286-1, 2	20286	7150-7182	ISO system of limits and fits
885	-	-	Radi unnder screw head
887	-	-	Plain washers - general plan
888	-	-	Nominal lengths screws/threads
898-1	-	267-3, 7	TDC fasteners: bolts
898-2	-	4, 8	TDC fasteners: nuts CT
898-5	-	267-3	TDC fasteners: set screws
898-6	-	267-23	TDC fasteners: nuts FT
898-7	-	267-25	Torsional test M 1-M 10
1051	-	101	Rivets: technical specifications
1101	-	7184	Tolerances of form/position
1891	-	918	Fasteners: terminology
2320	-	267-15	TDC fasteners: locking nuts
2702	-	267-12	TDC fasteners: tapping screws
2768-1...2	-	7168-1, 2	General tolerances
2859	-	40080	Sampling plans
3269	-	267-5	TDC fasteners: acceptance inspection
3506-1...4	-	267-11	TDC fasteners: stainless steel
3508	-	76-1	Thread runouts/undercuts
4042	-	267-9	TDC fasteners: electroplated coatings
4753	-	78	Thread ends/protrusions
4755	-	76-1	Thread runouts/undercuts
4757	-	7962	Cross recess for screws
4759-1...3	-	267-2, 6, 522	Tolerances for fasteners
6157-1...3	-	267-19	Surface discontinuities, bolts
6157-2	(493)	267-20, 21	Surface discontinuities, nuts
7085/7500-1	-	-	Thread rolling screws
7378	-	962	Split pin holes/wire holes
7721	-	-	Csk. head screws: configuration
8749	-	-	Determ. of shear strength of pins
8839	28839	267-18	TDC fasteners: non-ferrous metal
8991	-	962	Designation system for fasteners
8992	-	267-1	TDC fasteners: general requirements
-	10204	50049	Certificates
10484	(493)	267-21	Widening test on nuts
10644	-	6900-1	Screw/washer ass. hardness d.
10664	-	-	Hexalobular socket
10666	-	7504	MP drilling screws
10683	-	-	Zinc flake coatings
10684	-	267-10	Hot dip galvanized coatings
12683	-	-	Mechanical zinc coatings
-	13811	-	Sheradizing
15065	-	66	Countersinking
15330	-	-	Hydrogen embrittlement..
16047	-	946	Torque/clamp force testing
16048	-	-	Passivation of stainless steel
16426	-	-	Fasteners QA system

Standard types, relations, publishers:

DIN National German standard (Deutsches Institut für Normung). DIN standards shall still be given for the products/services for which there are no ISO/EN standards and no standardisation necessity.

ISO International Standardization Organisation

DIN ISO National German issue of an unmodified, adopted ISO standard

EN **E**uropean **N**orm (CEN = Comité Européen de Normalisation). In general, existing ISO standards should be adopted as EN standards with the ISO standard number → EN ISO. If this does not happen at European standards levels, independent EN standards shall be generated with EN standard numbers which are different to those of the ISO.

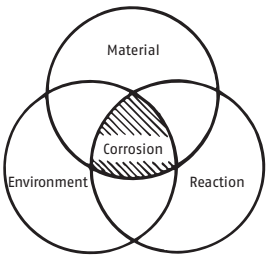
DIN EN National German issue of an unmodified, adopted EN standard.
According to the resolution of the European Council, EN standards are to be adopted unmodified and immediately by the EU member states and the corresponding national standards are to be withdrawn.

EN ISO European standard issue which was adopted unmodified by ISO (EN and ISO standard numbers are identical – the earlier practice of "ISO number + 20,000" has not been in use since Jan. 95. Standards still in use according to this mode are to be converted accordingly). **The description is carried out according to ISO.**

DIN EN ISO National German issue of an unchanged EN standard adopted by ISO. The article naming is done according to ISO.

Publisher and author of the standards for "Mechanical fasteners" is the German National Standards Organisation (DIN - Deutsches Institut für Normung e.V.), Berlin, www.fmv.din.de. Reference to the standards sheets from Beuth Verlag GmbH, Burggrafenstrasse 6, 10787 Berlin, www.beuth.de, Fax +030 2601-1260

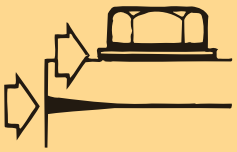
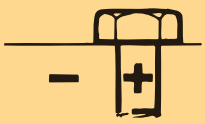
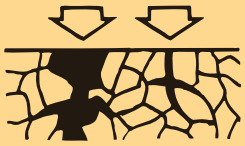
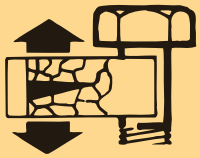
General information



Corrosion is the reaction of a metallic material with its environment which causes a measurable change in the material and can negatively influence the function of a metallic component or an entire system. In most cases, this reaction is of an electrochemical nature, but, in some cases, it can be of a chemical or a metal-physical nature. (Definition: Basic principle of "Corrosion" according to ISO 8044)

Table 1 shows the most important corrosion types from a selection of different corrosions which need to be considered with "mechanical fasteners".

Table 1: Corrosion types

		Electrolyte 		
Surface corrosion, e.g. rust, pitting corrosion	Crevice corrosion	Electrochemical corrosion (Contact corrosion) (see Table 2)	intergranular/ transgranular corrosion	Stress corrosion cracking

Corrosion is unavoidable, but damage due to corrosion is avoidable, provided the proper planning of suitable corrosion protection measures is in place. The corrosion protection of screw fastenings needs to be at least as corrosion-resistant as the components to be connected.

The task of constructive planning is to determine the necessary corrosion protection measures. Here the resilience of the corrosion protection in known operating conditions is to be taken into account until maintenance is due or until the limitation of damages has been reached. Surface or material specifications are to be listed in the article order text according to standards.

The next page provides a rough overview of the corrosion protection options for fasteners.

Inspection standards for corrosion protection procedures, compiled in DIN pocketbook 175, stipulate uniform conditions for the type and setup of equipment and methods for checking adherence to the specified coating type, layer thickness and optical appearance. The inspections according to these standards do not provide any information on the effect or fatigue strength of the corrosion protection under practical operating conditions.

An overview of the friction coefficients for various surface) combinations ➔ TI assembly. The friction ratios in the screw fastenings are vital when determining the correct tightening torque (➔ VDI 2230)

Electrochemical corrosion

The combination of electrochemical noble and ignoble metals in humid conditions (= electrolyte) generates corrosion currents which spread from ignoble (anodic) metal to more noble metal (cathode). This means that less noble metal will be more eroded or corroded. The corrosion current thicknesses are also vital. If the ignoble, anodic part is small in comparison with the surrounding cathodic area (screw head on sheet surface), a very high anodic current thickness will generate which will carry off a lot of material.

Example 1:
Zinc plated screws for fastening a copper sheet:
Zinc is considerably less noble compared to copper. In humid conditions, a very high corrosion current thickness occurs on the small, ignoble, anodic screw head (left column zinc – small) in the direction of the noble, cathodic copper sheet (upper row – copper). The galvanized surface of the screw erodes in a short space of time and red rust appears on the steel.

Remedy:
In relation to the metallic building component, the fasteners should be as similar as possible if not more noble.

Screw	Component
zinc plated	zinc plated
nickel plated	steel, copper, brass
stainless	steel, zinc plated, aluminium, copper, brass

Example 2:
Copper or stainless steel screws which work in a similar way for fastening a zinc plated metal sheet: This time, the ignoble, anodal, galvanized section is very large in relation to the small, noble, cathodic screw head. The corrosion current which stretches over the entire surface has very low tightness in the anode. The material degradation occurs across the entire surface and shows hardly any corrosion. This process actually additionally protects the nobler screw head against corrosion.

If unfavourable metal pairings cannot be avoided, they should be isolated from each other, e.g. using intermediate layers or coatings. Here, it must be made sure that the full strength of the connection remains intact.

Table 2: Electrochemical corrosion with metal pairings

In regard to contact corrosion of observed material ▼	Area ratio*	Magnesium alloy	Zinc	Hot-dip galvanized steel	Aluminium alloy	Cadmium coating	Construction steel	Low-alloy steel	Cast steel	Chrome steel	Lead	Tin	Copper	Stainless steel
Magnesium alloy	small		S	S	S	S	S	S	S	S	S	S	S	S
	large		M	M	M	M	S	S	S	S	S	S	S	S
Zinc	small	M		G	M	M	S	S	S	S	S	S	S	S
	large	G		G	G	G	G	G	G	G	G	G	G	G
Hot dip galvanized steel	small	M	G		M	M	S	S	S	S	S	S	S	S
	large	G	G		G	G	G	G	G	G	G	G	G	G
Aluminium alloy	small	M	G	G		G	M	G	S	M	S	S	S	S
	large	G	M	M		G	G		M		S		S	M
Cadmium coating	small	G	G	G	G		S	S	S	S	S	S	S	S
	large	M	G	M	G		G	G	G	G	G	G	G	G
Construction steel	small	G	G	G	G	G		M	S	S	S	S	S	S
	large	G	G	G	G	G		G	G	G	G	G	G	G
Low-alloy steel	small	G	G	G	G	G	G		G	S	S	S	S	S
	large	G	G	G	G	G	G		G	G	G	G	G	G
Cast steel	small	G	G	G	G	G	G	M		S	S	S	S	S
	large	G	G	G	G	G	G	G		G	G	G		
Chrome steel	small	G	G	G	G	G	G	G			M	M	S	S
	large	G	G	G	G	G	G	G			G	G		G
Lead	small	G	G	G	G	G	G	G	G	G		G	G	
	large	G	G	G	G	G	G	G	M	G		G		G
Tin	small	G	G	G	G	G	G	G		G	G			
	large	G	G	G	G	G	G	G	G	M	G			
Copper	small	G	G	G	G	G	G	G		M	M	S		
	large	G	G	G	G	G	G	G	G		G	M		G
Stainless steel	small	G	G	G	G	G		G	G		M	G		
	large	G	G	M	G	G	G	G	G	M	M	M	G	

S = strong corrosion of the observed material
M = moderate corrosion of the observed material (in very humid environments)
G = negligible or zero corrosion of the observed material

* ratio of the surface of the "observed" material to the surface of the "pairing material"
(Source: "FEUERVERZINKEN" (HOT DIP GALVANIZATION) information centre)

Corrosion protection measures

Constructive measures e.g. isolation, avoidance of crevices...
Electrochemical measures e.g. cathodic protection, ventilation

Table 3: Surface measures

Measures	Procedures	Coatings	Coat-thicknesses µm	Standards Brand names
• **Non-metallic coatings** (inorganic/ *organic coatings)	Lubrication	Oil	–	
	Browning, oxidising	Iron oxide coat	0.5 – 2	DIN 50938
	Phosphate-coating	Phosphate coat	–	EN 12476 (DIN 50942)
	Thin-layer coats of lacquer*	Lacquer/Plastic / Resin (Fluoropolymer/TEFLON)	3 – 20	IRCO-SEAL, KLEVER-COL, XYLAN, PTFE, STAND-COTE
	Dip coating*	Epoxide resin/Polyester/ Phenolic resin	10 – 20	KTL-KATAPHORESE, ECO 2000
	Powder coatings*	Polyester powder	60 – 90	PULVER-COLOR, WEMA-KOR-EX
• **Metallic coatings** (inorganic coatings)	**Electroplated coatings:** (electrolytic/chemical/acidic/ alkaline/cyanidic)	Zinc Cadmium Copper Copper-zinc Nickel Nickel-chrome Copper-nickel Copper-nickel-chrome Tin Copper-tin Silver Copper-silver Zinc-nickel Zinc-cobalt Zinc-iron	3 – 25	ISO 4042
	+ Conversion layers (e.g. passivation/ chromating – ISO 4520)			
	Hot dip galvanization tZn	Zinc	min. 40	ISO 10684 (DIN 267-10) for fasteners ISO 1461 for batch galvanizing
	Mechanical plating (plated coatings)	Zinc powder on sub-layer copper-plating (chromating possible)	6 – 107	ISO 12683
	Diffusion coatings	Zinc power burned in/on	15 – 45	EN 13811: SHERARD-galvanizing ISO 14713-3
• **Zinc flake coating**	**Basecoat** (dispersions coatings = inorganic)	Zn-/Al lamellas (silver)	5 – 20	ISO 10683, DACROMET/GEOMET, DELTA-TONE, ZINCTECH
	Topcoat (thin-layer lacquering = organic)	Thin layer argentine or coloured, lubrication integration possible	8 – 15	DELTA-SEAL, DELTA-PROTEKT KL + VH, GEOMET PLUS VL, DACROBLACK, GEOBLACK

Table 4: Material measures

Measures	Procedure	Coatings	Standards	Brand names
• **Non-ferrous metals (NE)**	Copper (Cu) Brass (CuZn) Bronze (CuNiSi, CuSn)	– Ni plated, Cr plated, browned –	ISO 8839 (DIN 267-18) (galv. coatings ISO 4042 [DIN 267-9])	KURBUS Special brass 59 KUPRODUR
	Aluminium (Al)	anodised	–	–
	Titanium/Titanium alloys	–	ISO 8839 (DIN 267-18)	–
• **Non-metallic materials (K)***	Plastics PA, POM, PP, PVDF, Nylon	–	VDI 2544 DIN 34810 - 34816	ULTRAMID, DELRIN, HOSTALEN...
• **Stainless steels**	**Ferritic steels (F)** 1.4016, 1.4568	clean and metallic, bright-polished	ISO 3506 (DIN 267-11) EN 10088 (DIN 17224)	–
	Martensite steels (C) 1.4016, 1.4057, 1.4122...		ISO 3506 (DIN 267-11) EN 10088 (DIN 17442)	–
	Austenitic steels (A) A 1 = 1.4305 A 2 = 1.4301, 1.4303 A 4 = 1.4401 A 3 = 1.4541 A 5 = 1.4571 FSt = 1.4310		ISO 3506 (DIN 267-11) EN 10088 (DIN 17440, 17244) EN 10088 (DIN 17224)	NIRO, NIROSTA, INOX, CRONIFER, REMANIT, UNOX, SINOX ... Austenitic/austenitic-ferritic steels with particular resistance against chlorine-induced stress corrosion, e.g. indoor swimming pools → TI-226
• **Special materials**	Nickel, nickel alloys	metallic, bright-polished	DIN 17740, 17742-44	INCONEL, HASTELLOY, MONEL...
	Special copper alloys Multi-component bronzes		DIN 17662-17665	Sn-/Al-Bronze, NEUSILBER, RESISTIN, CUNIFER...
	Special steels		EN 10269 (DIN 17240), SEW 390	URANUS, SICROMAL, MANOX...

Table 5:
Standard references for corrosion protection of surfaces

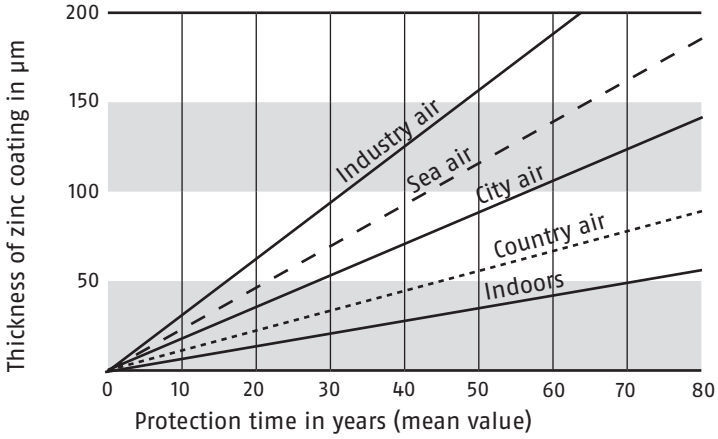
Standard no.	Title
ISO 4042	Fasteners – Electroplated coatings
ISO 10683	Fasteners – Non-electrolytically applied zinc flake coatings
ISO 10684	Fasteners – Hot dip galvanized coating
ISO 1891-2	Fasteners – Terminology. Vocabulary and definitions for coatings
ISO 19598	Metallic coatings – Electroplated coatings of zinc and zinc alloys on iron or steel with supplementary Cr(VI)-free treatment
ISO 2081	Metallic and other inorganic coatings – Electroplated coatings of zinc with supplementary treatments on iron or steel
ISO 1461	Hot dip galvanized coatings on fabricated iron and steel articles
EN 1403	Electrodeposited coatings – Method of specifying general requirements
ISO 12944 Part 1 to part 6	Corrosion protection of steel structures

Table 6:
Service conditions for zinc plated steel

	Service condition	Duration of salt spray test without base metal corrosion (NSS) in hours
0	Decorative use (without strain)	48
1	Indoor conditions in warm, dry atmosphere	72
2	Indoor condition in rooms, in which condensation may occur	120
3	Outdoor weathering under moderate conditions	192
4	Outdoor weathering under difficult corrosive conditions – e.g. salt/industry environment	360

- Extract from ISO 2081:2009-05, EN 1403
- The listed protective effects vary in practice and are mere reference values
- Suitable coatings are listed below

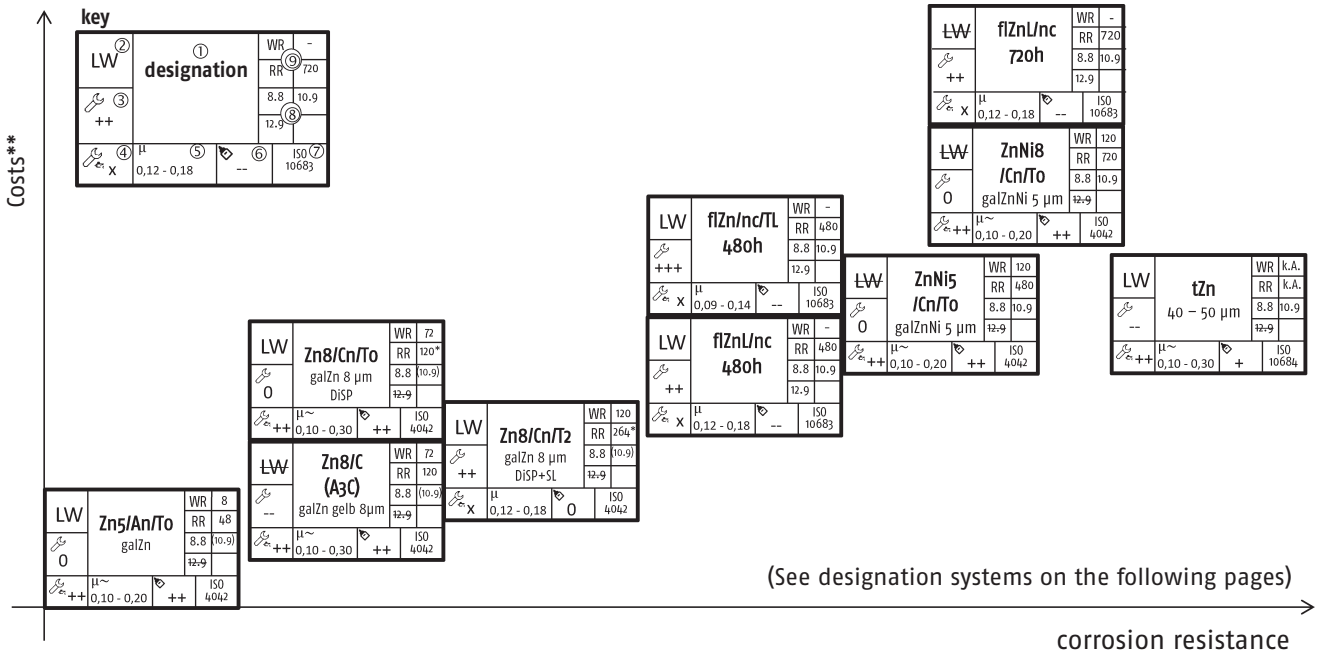
Table 7:
Yearly erosion values for zinc



Service condition	µm/year
Indoors	1.0 – 2.0
Country air*	1.3 – 2.5
City air*	1.9 – 5.6
Industry air*	6.4 – 19
Sea air*	2.2 – 7.2

* In practice, a mixed climate is to be reckoned with.

Overiew of common coating systems



(See designation systems on the following pages)

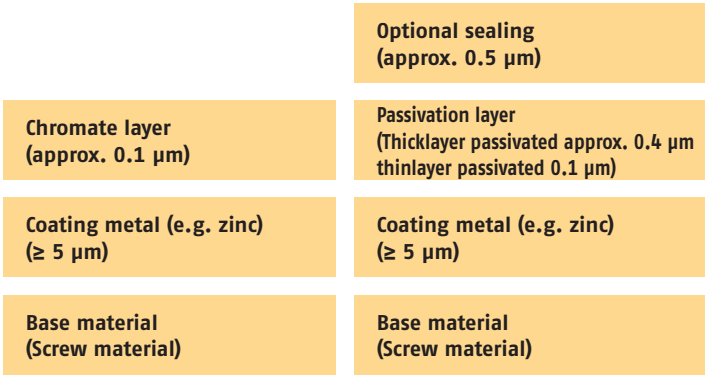
1) Designation of surface; 2) Products with this surface in stock; 3) assembly behaviour (friction coefficient spread) without additional lubrication (-- = bad to ++ = very good); 4) assembly behaviour (friction coefficient spread) with additional lubrication (-- = bad to ++ = very good / x = lubrication already contained in surface); 5) friction coefficient range in delivery condition (µ~ = typical values) 6) Bonding suitability of surface (-- = bad to ++ = good); 7) Standard for technical delivery conditions; 8) Suitability of surface for property classes; 9) corrosion resistance in salt spray test (WR = white rust; RR = red rust)

*Deviating from ISO 4042
**the categorization gives an approximate, nonbinding overview of costs

Corrosion protection: Electroplated coatings

The technical conditions of delivery ISO 4042 apply to electroplated coatings on standard and non-standard fasteners.
The coating metal is applied onto the parts to be coated in an electrolytic precipitation process in an electroplating bath.

Layer composition and description system of electroplated coatings



with Cr(VI) **without Cr(VI)**

Table 8: Coating metals (Extract from ISO 4042)

Symbol	Description	Type
Zn	Zinc	Metal
ZnNi	Zinc-nickel	Alloy
ZnFe	Zinc-iron	Alloy
Ni	Nickel	Metal
Ni+Cr	Nickel-Chrome	Multi-layer
Cu+Ni	Copper-Nickel	Multi-layer
Cu+Ni+Cr	Copper-Nickel-Chrome	Multi-layer
CuZn	Brass	Alloy
CuSn	Copper-Tin (Bronze)	Alloy
Cu	Copper	Metal
Sn	Tin	Metal

Table 9: Sealings/topcoats/lubricants

Code	Description	Requirement
–		Manufacturer's choice
T0	No sealing or topcoat	To achieve a certain function, no sealing or topcoat shall be applied
T2	Sealing	Sealing to increase corrosion resistance with or without integrated lubricant
T4	Subsequently applied lubricant	A lubricant shall be applied to the metal coating or the conversion layer or the sealing/topcoat
T7	Topcoat	e.g. increase chemical resistance or colouring scheme
nL	No lubricant	There shall be no integrated lubricant in T2 or T7

Table 10: Conversion layers for zinc and zinc alloy coatings

Code	Name	Typical look	Type of conversion layer
An	Transparent	Transparent, clear to bluish	Passivation without Cr(VI)
Cn	Iridescent (Thick layer passivation)	Transparent, clear to iridescent	Passivation without Cr(VI)
Fn	Black	Black, dark iridescent permitted	Passivation without Cr(VI)
A	Clear	Transparent, clear to bluish	Chromation with Cr(VI)
C	Iridescent	Yellow iridescent	Chromation with Cr(VI)
D	Matt	Olive	Chromation with Cr(VI)
F	Black	Black, dark iridescent permitted	Chromation with Cr(VI)
U	–	No conversion layer	–

Designation example of electroplating surface treatment as per ISO 4042
ISO 4014 – M 16x60 – 8.8 /Zn8/Cn/T2(µ0.12–0.18)

Zn8	Cn	T2	(µ0.12–0.18)
			Set friction coefficient range – to be implemented with integrated lubricant in the sealing or subsequently applied lubricant
		Sealing with or without integrated lubricant	
	Conversion layer Cn = Cr(VI)-free passivation iridescent (thick layer passivation)		
Coating metal Zn = zinc with a minimum layer thickness of 8 µm			

General/common descriptions

Table 11: Coating metals (extract from ISO 4042)

Description old	Description new	common descriptions
A2A; A2B; A2K	ISO 4042 Zn5/An/T0	galZn; VZB; elVZ; ZP; BZP; VZ
–	ISO 4042 Zn5/Cn/T0	galZnDiSP; VZD;...
A2C	ISO 4042 Zn5/C/T0	galZnC; VG; GVZ; YZP; VZG

Corrosion resistance of electroplated zinc and zinc alloy coatings with Cr(VI)-free conversion layers

Table 12: Corrosion resistance as per ISO 4042

Coating system	Code	Minimum time for neutral salt spray test in hours		
		White rust	Red rust layer thickness	
			5 µm	8 µm
Zn, transparent passivated	Zn/An/T0	8	48	72
Zn, iridescent passivated	Zn/Cn/T0	72	120	192
Zn, iridescent passivated, sealed	Zn/Cn/T2	120	168	240
Zn, black passivated, sealed	Zn/Fn/T2	24	72	144
ZnFe, iridescent passivated	ZnFe/Cn/T0	96	144	216
ZnFe, iridescent, passivated, sealed	ZnFe/Cn/T2	120	216	288
ZnFe, black passivated, sealed	ZnFe/Fn/T2	96	192	240
ZnNi, silver grey, passivated	ZnNi/Cn/T0	120	480	720
ZnNi, silver grey, passivated, sealed	ZnNi/Cn/T2	168	600	720
ZnNi, black, passivated	ZnNi/Fn/T0	48	360	600
ZnNi, black, passivated, sealed	ZnNi/Fn/T2	120	480	720
1) in drum-coating; inspection is performed directly after coating				

Note: These are only extracts from standards. For inspection purposes, please refer to the relevant standard.

Requirements for gaugeability and assemblability of fasteners as per ISO 4042

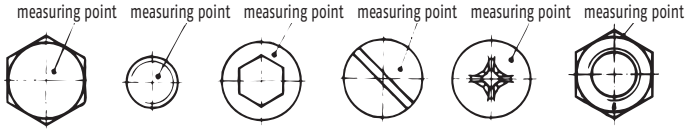
The tread tolerances apply before the coatings are plated – when coating, the zero line of a screw thread (tolerance range h) or nut thread (tolerance range H) shall not be exceeded and deceeded, respectively. Thus, the screw thread with coating may be in between the upper tolerance limit and the zero line. The threads shall be gaugable over the complete thread length. Deviating from this, the threads may be damaged in delivery condition due to transport and pouring processes. In this case the maximum torques of a thread gauge shall not exceed the value of $0.001d^3$ in Nm (Table 13). Alternatively, order and supplier may agree on an inspection for assemblability with a suitable nut or screw.

In the interest of threadability, the layer thickness for thread parts with a normal degree of tolerance of 6g/6H is of course limited. The empirically recommended limit values possible according to ISO 4042 can be found in Table 14. Thicker coatings require different tolerance zones with larger sizes according to DIN 13-14 (custom-made).

Layer thickness inspection of electroplated coatings on fasteners

In order to determine the layer thickness, different testing methods can be applied (X-ray spectrometric method as per ISO 3497, coulometric method as per ISO 2177, microscopical method as per ISO 1463, magnetic method as per ISO 1463, or eddy current method as per ISO 21968). In case of arbitration, the microscopical method shall be applied.

The test shall be performed at the reference areas marked in the figure.



Normal storage:	Layer thickness = Type (≥ M 5)
"galZn"	approx. 5 µm
"galZnC" yellow chromate	approx. 5 µm
"galZn 8 DiSP"	approx. 8 µm thick layer passivation

Table 13: Maximum torque for gauging of coated metric threads as per ISO 4042

Thread	Max. Torque [Nm]	Thread	Max. Torque [Nm]
M 3	0.03	M 18	5.8
M 4	0.06	M 20	8.0
M 5	0.13	M 22	11.0
M 6	0.22	M 24	14.0
M 8	0.51	M 27	20.0
M 10	1.0	M 30	27.0
M 12	1.7	M 33	36.0
M 14	2.7	M 36	47.0
M 16	4.1	M 39	59.0

Table 14: Maximum layer thicknesses for outer threads with thread tolerance group g

Thread Ø M	Pitch	Max. Layer thickness [µm] as per ISO 4042 ① Screw length			Practice values ② Screw length	
		< 5d	5d – 10d	10d – 15d	< 5d	5d – 15d
1 – 2	0.2 – 0.4	3	3	3	–	–
2.5 – 7	0.45 – 1	5	3	3	3	3
8	1.25	5	5	3	5	3
10 – 16	1.5 – 2	8	5	5	5	3
18 – 22	2.5	10	8	5	8	5
24 – 27	3	12	8	8	8	5
30 – 33	3.5	12	10	8	8	8
36 – 52	4 – 5	15	12	10	10	8
56 – 60	5.5	15	15	12	12	10
64	6	20	15	12	12	10

① Mathematical limiting value according to ISO 4042, Tab. 2
② Recommended limiting value from practice in due consideration of manufacturing and procedural faults according to ISO 6157-1, -3

Notes on manufacturing-related hydrogen embrittlement (ISO 4042)

The risk of manufacturing-related hydrogen embrittlement exists (IHE = internal hydrogen embrittlement), if the fastener has high hardness or tensile strength, is subjected to tensile stress and can absorb atomic hydrogen during the manufacturing process.

Table 15: Measures to reduce hydrogen embrittlement with regard to hardness as per ISO 4042

Measure	A	B	C①
Description measure	No supplementary process verification or product testing with regard to IHE AND No malleablizing required	Supplementary process verification and/or product testing with regard to IHE OR Malleablizing	Supplementary process verification and/or product testing with regard to IHE AND Malleablizing
Applicable for screws of property class as per ISO 898-1	≤ 8.8	10.9	12.9
Applicable for nuts of property class and hardness as per ISO 898-2	≤ property class 12 and < 360 HV	≤ property class 12 and ≥ 360 HV	-
Applicable for washers of property class as per ISO 898-3	≤ 200 HV	300 HV	380 HV

① As, despite measure C the risk of hydrogen embrittlement cannot be ruled out completely for the listed screws and washers, they are manufactured only upon explicit order.

Corrosion protection: Zinc flake coatings

The technical conditions of delivery ISO 10683 apply to non-electrolytically applied zinc flake coating on standard and non-standard fasteners. The coating is composed of zinc and aluminium flakes linked by an inorganic matrix. It is applied onto the part surface in a dipping or spraying process and then burned in at temperatures between 200 ° - 320 °C.

Layer composition and description system of zinc flake coatings

Variations in layer composition:

- Basecoat only
- Basecoat + lubricant
- Basecoat + topcoat
- Basecoat + topcoat + lubricant

Optional - lubricant

Optional topcoat optional with integrated lubricant (topcoat)

Basecoat optional with integrated lubricant (basecoat)

Base metal

Table 16: Comparison of resistance in the salt spray test to reference layer thickness according to ISO 10683

Duration NSS without red rust [h]	Reference layer thickness a) [µm]
240	4
480	5
600	6
720	8
960	10

a) The reference layer thickness includes basecoat layer(s) and topcoat layer(s), if present, with or without cr(VI). For approval, the corrosion resistance is decisive; the indication of the reference layer thickness is merely for orientation.

Table 17: Designation system according to ISO 10683

Basecoat	Chromium(VI)	Topcoat	Additional lubricant	Duration of salt spray test until red rust	Requirements for the friction coefficient range
1. Without integrated lubricant **= flZn**	1. Not specified (manufacturer's choice)	1. With integrated lubricant in the top layer **= TL**	**L**	e.g. **480 h**	**C**[a]
2.With integrated lubricant **= flZnL**	2.With Cr(VI) = **yc**	2.Without integrated lubricant in the top layer **= Tn**			
	3.Without Cr(VI) = **nc**				

a) Friction coefficient range µ must be named in the order

Description example for a screw with zinc flake coating as per ISO 10683
ISO 4014 – M 16 x 60 – 8.8 flZnL/nc/480h/C (µ = 0.12–0.18)

flZnL	nc	480h	C (µ=0.12-0.18)
			Requirement for a friction coefficient range µ between 0.12 and 0.18
		Corrosion resistance in salt spray test 480 h to red rust	
	Coating system Cr(VI) free		
Zinc flake coating with integrated lubricant in the basecoat			

Table 18: Typical products

Manufacturers	Product examples	
MAGNI EUROP	Basecoat: Topcoat:	MAGNI FLAKE MAGNI TOP
ATOTECH	Basecoat: Topcoat:	ZINKTEK TECHSEAL
DÖRKEN	Basecoat: Topcoat:	DELTA-PROTEKT ® DELTA-SEAL ® DELTACOLL ®
NOF	Basecoat: Topcoat:	GEOMET PLUS L ® PLUS VL ®

Requirements for gaugeability and assemblability of fasteners as per ISO 10683

The thread tolerances apply before the coatings are plated – when coating, the zero line of a screw thread (tolerance range h) or nut thread (tolerance range H) shall not be exceeded and deceeded, respectively. Thus, the screw thread with coating may be in between the upper tolerance limit and the zero line. Threads may be damaged in delivery condition due to transport and pouring processes. In this case, the maximum torques of a thread gauge shall not exceed the value of $0.001d^3$ in Nm (Table 19). Alternatively, order and supplier may agree on an inspection for assemblability with a suitable nut or screw.

Table 19: Maximum torque for gauging of coated metric threads per ISO 10683

Thread	Max. Torque [Nm]	Thread	Max. Torque [Nm]
M 3	0.03	M 18	5.8
M 4	0.06	M 20	8
M 5	0.13	M 22	11
M 6	0.22	M 24	14
M 8	0.51	M 27	20
M 10	1	M 30	27
M 12	1.7	M 33	36
M 14	2.7	M 36	47
M 16	4.1	M 39	59

Properties of zinc flake technology at a glance:

- No hydrogen embrittlement as a result of the application process
- Virtually all systems are now Cr(VI)-free in accordance with according to RoHS and EU-End-of-Life-Vehicles Directives
- Extremely thin coatings of typically 5 - 12 µm
- Caution, however, with cropped parts with internal drive and small diameters ≤ M 6
- High cathodic corrosion protection compared to electroplated standard surfaces

Note: These are only extracts from standards. For inspection purposes, please refer to the relevant standard.

Corrosion protection: Hot dip galvanized fasteners

For hot dip fasteners, the technical conditions of delivery apply according to ISO 10684.

Requirements for thread and geometry tolerances

The minimum layer thickness of at least 40 µm at the point of measurement stipulated by this standard requires that the thread dimensions be adjusted (see Table 10).

The undersize is usually to be found in the screw thread with the tolerance group 6az so that the hot dip galvanized screw thread does not exceed the (ISO-compatible) zero line (h tolerance). These screws are also identified with a "U".
Rethreading the screw is not permitted.

For high-strength structural bolting assemblies -system HV- according to EN 14399-4, a non-rethreaded screw (g tolerance) is coated which means that the screw thread with hot dip galvanization is above the zero line.
In this case the necessary oversize is in the nut thread (= 6 az).
The nut thread is later cut into the hot dip galvanized castings. The corrosion protection of the bare nut thread comes from the zinc coating of the screw thread with remote cathodic protection.

In case of external dimensions (head, shaft), there may be a minor oversize due to the zinc layer.

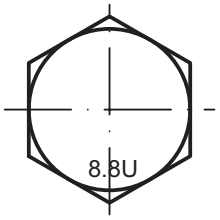


Table 20: Basic dimensions of the screw thread before hot dip galvanization – tolerance group 6az according to ISO 10684/ISO 965-4

Coarse thread	M 6*	M 8	M 10	M 12	M 14 M 16	M 18 M 22	M 24 M 27	M 30 M 33	M 36 M 39	M 42 M 45	M 48 M 52	M 56 M 60	M 64
Upper limit dimension es [µm]	-290	-295	-330	-335	-340	-350	-360	-370	-380	-390	-400	-410	-420

* not regulated by standards

Requirements for mechanical properties

After hot dip galvanization, the requirements of ISO 898-1 and ISO 898-2 apply to hot dip galvanized screws and nuts ≥ M 12.

For thread sizes M 8 and M 10, reduced load bearing capacities apply according to ISO 10684.

Table 21:
Minimum tensile strength [N] for screws of the 6az tolerance

Property class Marking	4.6 4.6 U	5.6 5.6 U	8.8 8.8 U	10.9 10.9 U
M 6*	7 075	8 844	14 150	17 687
M 8	13 300	16 600	26 600	34 500
M 10	21 400	26 800	42 900	55 700
M 12	33 700	42 200	67 400	87 700
M 16	62 800	78 500	125 000	163 000
M 20	98 000	122 000	203 000	255 000
M 24	141 000	176 000	293 000	367 000
M 30	224 000	280 000	466 000	583 000
M 36	327 000	408 000	678 000	850 000

*reference values not regulated by standards

Table 22:
Proof loads [N] for nuts of the 6az tolerance

Property class Marking	5 5 Z	6 6 Z	8 8 Z	10 10 Z
M 6*	7 969	9 962	15 934	19 923
M 8	17 300	20 000	25 500	30 600
M 10	28 600	33 000	42 200	50 400
M 12	51 400	59 000	74 200	88 500
M 16	95 800	109 900	138 200	164 900
M 20	154 400	176 400	225 400	259 700
M 24	222 400	254 200	324 800	374 200
M 30	353 400	403 900	516 100	594 700
M 36	514 700	588 200	751 600	866 000

*reference values not regulated by standards

Assembly

When assembling hot dip galvanized screws and nuts, especially with additional lubrication of the threading, different friction coefficients and tightening torques need to be reckoned with. EN 1993 – 1 – 8 NA needs to be considered for hot dip galvanized high strength structural bolting assemblies!
(➔ TI - Assembly)

Requirements for coating and surface

The grey appearance of the hot dip galvanized surface is dependent on the material and not a characteristic for the quality of corrosion protection. White rust and/or whitish to dark corrosion points (zinc oxide), which may occur after hot dip galvanization, e.g. through dampness, do not usually impair the corrosion protection and are no reason for rejection (➔ ISO 1461, section 6.1).

A certain surface rawness and small dents in the thread tips are dependent on the procedure. For this reason, an assembly tool may be required for initial screwing.

Suitability of hot dip galvanizing for fasteners

Due to the great layer thicknesses and the coating process, coating is standardized only for thread diameters starting from M 8. Fasteners with a diameter of M 6 are suitable for hot dip galvanizing to a limited extent.

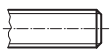
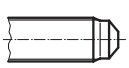
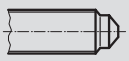
Articles with hollow sections (e.g. cap nuts, hexagon socket screws) are not suitable for hot dip galvanizing.

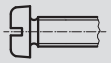
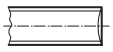
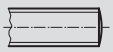
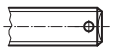
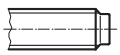
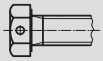
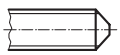
Product information: Head shapes, drive features and ends of externally threaded fasteners

Table 1: Drive features

Slot		Hexalobular socket		Triangle	
Phillips cross recess H		Triple square socket		Hexalobular	
Pozidriv cross recess Z		12 point socket		Triple square	
Supradriv cross recess		Torque set		Hexagon with slot	
Cross recess combi H+		Tri – Wing		Theft resistant drives	
Cross recess combi Z+		Hi torque			
Square socket		Hexagon			
Hexagon socket		Square			

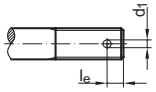
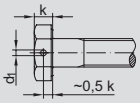
Table 2: Ends of externaly threaded fasteners

Description	New name	Old name	Picture (example)	Description example
Short dog point with rounded end (DIN 962)	Ak	Ak		ISO* – M 12 x 50 – Ak – 8.8
Chamfered end (ISO 4753)	CH	K		ISO* – M 12 x 50 – CH – 8.8
Cone point (ISO 4753)	CN	–		ISO* – M 12 x 50 – CN – 8.8
Cup point (ISO 4753)	CP	Rs		ISO* – M 12 x 50 – CP – 8.8
Flat point (ISO 4753)	FL	Ks		ISO* – M 12 x 50 – FL – 8.8
Long dog point (ISO 4753)	LD	Za		ISO* – M 12 x 50 – LD – 8.8
Pilot point with truncated cone (ISO 4753)	PC	PC		ISO* – M 12 x 50 – PC – 8.8
Short dog point with truncoated cone (DIN 962)	Asp	Asp		ISO* – M 12 x 50 – Asp – 8.8

Description	New name	Old name	Picture (example)	Description example
Pilot point, flat (ISO 4753)	PF	PF		ISO* – M 12 x 50 – PF – 8.8
Thread undercut (DIN 76-1)	Ri	Ri		ISO* – M 12 x 50 – Ri – 8.8
as-rolled end (ISO 4753)	RL	Ko		ISO* – M 12 x 50 – RL – 8.8
rounded end (ISO 4753)	RN	L		ISO* – M 12 x 50 – RN – 8.8
Split pin hole (DIN 962/34803)	S	S		ISO* – M 12 x 50 – S – 8.8
Scrape point (ISO 4753)	SC	Sb		ISO* – M 12 x 50 – SC – 8.8
Short dog point (ISO 4753)	SD	Ka		ISO* – M 12 x 50 – SD – 8.8
Wire hole (DIN 962/34803)	SK	SK		ISO* – M 12 x 50 – SK – 8.8
Truncated cone point (ISO 4753)	TC	Sp		ISO* – M 12 x 50 – TC – 8.8

*product standard

Table 3: Dimensions for split pin holes (S) and wire holes (SK)

Thread Ø M		3	4	5	6	7	8	10	12	14	16	18	20	22	24	27	30	33	36
Pin holes S* (DIN 962/34803)	d_1	0.8	1	1.2	1.6	1.6	2	2.5	3.2	3.2	4	4	4	5	5	5	6.3	6.3	6.3
	l_e	2	2.2	2.6	3.3	3.3	4	5	6	6.5	7	7.7	7.7	8.7	10	10	11.3	11.3	12.5
Wire holes SK* (DIN 962/34803)	d_1	–	1.2	1.2	1.6	1.6	2	2	2	2	3	3	3	3	3	3	3	4	4
	*Position tolerance t = 2 IT13 (PK A), 2 IT14 (PK B), 2 IT15 (PK C)																		
Dimensions for slots**	~	0.8	1	1.2	1.6	1.6	2	2.5	3	3	4	**position of the slot at the corners of the hexagon or square is optional							

Inspections, acceptance testings and certificates

For "Mechanical fasteners" (screws, nuts and accessory parts), all function-relevant external and internal characteristics are regulated in detail in DIN, ISO or EN standards, this includes:

- **Product standards** (e.g. DIN 931/ISO 4014)
  Specifications on the figure of the product, assigned version and product class (tolerance group), usual strength classes and/or materials and nominal sizes. Furthermore, each product standard contains "normative references" to relevantly applicable basic function standards.
- **Basic/Function standards** (e.g. DIN 13, 267/ISO 898, 4759, 3269...)
  Regulations for joint characteristics of the various products such as e.g. thread, tolerances, surface versions, corrosion protection, mechanical properties and corresponding factory test programme as well as acceptance testing conditions.

By naming an article with a product standard number, all referred basic standards are automatically included and applicable as "Technical Delivery Conditions". This also applies for non-standardised thread and form parts when no particular arrangements have been made between the orderer and the supplier.

Standards always can only regulate just one general standard for products "for general use", this also applies for "Mechanical fasteners" (➔ ISO 3269/8992). For higher requirements for specific cases exceeding these normative regulations, it is the job of the user to define these requirements and specify necessary additional inspection requirements.

1. Quality checks during manufacture:
For basic/functional standards, testing programmes and procedures are given within which the manufacturer has to ensure the compliance with the proper standards quality of its products by carrying out constant sample checks. Alongside the obligatory checks for dimensional accuracy and surface condition, the following checks are also listed, among others:

- for screws and similar thread parts (➔ e.g. ISO 898-1)
  - hardness testing, proof load testing
  - bolt head impact/diagonal pull testing
  - surface decarburisation testing
- for nuts (➔ e.g. ISO 898-2)
  - hardness test, proof load test
  - expansion test

The procedure to be used in arbitration is specified in the standards. All standardised mechanical properties are generally valid at room temperature (approx. +20 °C).

2. Additional tests – Certificates

For particular requirements and/or safety-related use cases, additional articles or use-specific tests can be carried out either in the factory or by a commissioned factory independent technical expert or testing institute. The results of these extra tests shall be documented in a test certificate.

The type and scope of these additional tests and who is to carry out and document them is to be determined by the user due to his knowledge on the use and particular requirements, and specified accordingly upon ordering. The costs for additional tests are usually not part of the product price.

2.1. Inspection documents according to ISO 16228

For fasteners, ISO 16228 was released in May 2018 and replaces DIN 11204. This standard regulates the various types of inspection documents for fasteners, and it also contains 4 document types according to ISO 10204, starting with F (for fasteners), i. e. F2.1, F2.2, F3.1, F3.2. Furthermore, the scope of content of inspection documents for fasteners is specified and can be applied to finished fasteners such as bolts, screws, threaded bolts, nuts, washers, pins, rivets, and so forth, made of steel, stainless steel, non-ferrous metals or non-metallic material. In the inspection documents (F2.2, F3.1, F3.2) all inspection results are taken over from the certificates of the material suppliers and/or the reference inspections on the finished fasteners. In case of F3.1 this can be made by the actual manufacturer or the distributor. ISO 16228 is thus a useful summary of EN 10204 and DIN 11204 and facilitates the handling of inspection documents for fasteners.

2.2. Inspection contents according to ISO 16228 (former DIN 11204)
If there are no specifications on the scope of the test contents agreed in the order, ISO 16228 shall apply.

Table 1 – Test contents for fasteners (excerpt from ISO 16228)

Screws	Type of test	
	Material properties/ mechanical and physical properties	functional properties
Screws ISO 898-1	Chemical composition except for F2.2 (M) tensile strength [a] (M) hardness for quenched property class (M)	Thread reduction (A)
Screws ISO 3506-1	Chemical composition except for F2.2 (M) tensile strength and elongation after fracture (M) hardness for fasteners made of martensitic and ferritic stainless steel (M)	Thread reduction (A)

Nuts	Type of test	
	Material properties/ mechanical and physical properties	functional properties
Nuts ISO 898-2	Chemical composition except for F2.2 (M) test load a) (M) hardness for quenched property class (M)	Thread reduction (A)
Nuts ISO 3506-2	Chemical composition except for F2.2 (M) test load a) (M) hardness for fasteners made of martensitic and ferritic stainless steel (M)	Thread reduction (A)

(M) = Measurement, (A) with attribute test
a) If possible, the tensile strength of mechanical fasteners shall be tested on whole screws according to the FF test programme as per ISO 898-1. If none of the tensile inspections specified in ISO 898-1, the substitute inspection that has to be performed, shall be agreed at the time of order placement.

General information:

- The values determined by additional testing and documented in certificates are not "committed properties" or "guarantees of quality" according to Section 267 of the German Civil Code (BGB) and do not mean that the user does not have to perform the proper inspection of incoming goods (Section 377 of the German Commercial Code (HGB)).
- All tests named in 1 and 2 are carried out in general on samples. While their results are representative for the most part of the delivery batch of a load, a 100% guarantee for each part of the batch can be derived from this just as little as its suitability for a specific purpose can be.

Table 2: Overview of the usual inspection documents for screws, nuts and accessory parts according to ISO 16228
Excerpt from ISO 16228 – 05.2018

Type and name of test certificate for mechanical fasteners		When	Content	Confirmed by
F2.1 ①	Declaration of Conformity for fasteners	requested on ordering	Declaration of Conformity for delivered fasteners, no results	Authorized representative of manufacturer or distributor
F2.2 ②	Inspection certificate for fasteners	requested on ordering	Declaration of Conformity for delivered fasteners, with results on the basis of non-specific tests	Authorized representative of manufacturer
F3.1	Inspection certificate for fasteners	requested on ordering	Declaration of Conformity for delivered fasteners, with results of specific tests	Authorized representative of manufacturer or distributor
F3.2 ③	Inspection certificate for fasteners	requested on ordering	Declaration of Conformity for delivered fasteners, with results of specific tests	Authorized representative of manufacturer or distributor and either an authorized representative of the buyer or an external authorized representative

① not recommended since there is no specific statement on the delivered product.
② the sample quantities for destructive inspections are to be taken into account when deciding the order quantity
③ e.g. TÜV, GL, DB ...

3. Acceptance testing for "Mechanical fasteners" according to ISO 3269

This standard is always included as applicable when "Mechanical fasteners" are ordered according to standard or similar form parts, if not expressly agreed otherwise beforehand.

It does not apply to fasteners which

- are intended for automatic screw-in,
- are supposed to fulfil particularly high requirements,
- require particular processing procedures/testing measures,
- require specific traceability.

Here, special corresponding arrangements always need to be made on request, on ordering at the latest (e.g. according to ISO 16426). In general, standard commercial stock is not suitable for these specific requirements.

The final draft ISO 3269 – FprISO 3269:2019 now defines scopes of random samples, acceptance numbers and rejection numbers for certain test categories. The test categories are allocated to certain characteristics. Tables 3 and 4 show an extract from this draft with the most important details.

Table 3: Sample test scope, acceptance number N_A and number of rejections N_R
per FprISO 3269:2019

Batch size	Category 1	Category 2		Category 3
		Initial sample test	Additional sample test	
	N_A=0 N_R=1	N_A=0 N_R=2	N_A=0 N_R=1	
2 to 50	1	4	4	not applicable
51 to 90	1	5	5	5 N_A=1 N_R=2
91 to 150	1	6	6	6 N_A=1 N_R=2
151 to 280	1	7	7	7 N_A=1 N_R=2
281 to 500	2	9	9	9 N_A=1 N_R=2
501 to 1 200	2	11	11	11 N_A=1 N_R=2
1 201 to 3 200	2	13	13	13 N_A=1 N_R=2
3 201 to 35 000	3	15	15	15 N_A=2 N_R=3
35 001 to 500 000	5	20	20	20 N_A=2 N_R=3
more than 500 000	8	20	20	20 N_A=2 N_R=3

Table 4: Test categories according to FprISO 3269:2019

Test category	Description
Category 1	Characteristics, for which the acceptance number N_A is zero. Category 1 characteristics comprise all mechanical and functional properties that are usually tested with destructive testing. In case deviations are detected during random sampling, the batch or delivery will be rejected.
Category 2	Characteristics, for which the acceptance number N_A is zero; however, in case of deviation, a second sample may be taken. Category 2 characteristics are important dimensional characteristics, which may have negative effects on fit or function of the fastener. If, however, a single deviation is detected in the first sample, another sample with regard to this respective characteristic shall be tested, the scope of which shall correspond to the first sample. If no deviation is detected in this additional sample with regard to the respective characteristic, the batch will be accepted.
Category 3	Characteristics, for which the acceptance number N_A matches one or more deviations, as indicated respectively. Category 3 characteristics are minor dimensional characteristics and certain functional properties, for which deviations are tolerated to a certain extent. In case more deviations are detected during random sampling than those stated as acceptable, the batch or delivery will be rejected.

EC Directive 2000/53/EC on end-of-life vehicles (ELV Directive)

(End-of-Live-Vehicles)

The aim of this European directive is to avoid having materials which are dangerous to health in vehicles or to prevent this from happening as much as possible.

All cars and utility vehicles up to 3.5 t, which were put into operation from 1st July 2007 onwards are affected by this.
The following are banned from this date

1. Lead
2. Cadmium
3. Chromium (VI)
4. Mercury

Exceptional approval was granted until 1st July 2008 for hexavalent chromium in corrosion protection layers for screws and nuts to fasten parts of chassis frames.

This EC directive was adopted into German law through the end-to-life vehicles directive.

The automotive industry implemented the requirements of the EC directive in the form of

1. VDA data sheet 232-101 (list of materials which must be declared)
2. International material data system (IMDS)

The IDMS is a portal on which all environmentally relevant information in the supply chain are summarized and reported to the vehicle manufacturer.

➜ These products from the REYHER catalogue comply with this directive

All products made of steel, stainless steel and non-ferrous metals uncoated or zinc-plated with blue/transparent thick layer passivation, with zinc flake coatings without hexavalent chromates (flZnnc) and hot dip galvanization

EC Directive 2011/65/EU on electrical and electronic equipment (RoHS directive)

(Restriction of Hazardous Substances)

The Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment has been updated with the Directive 2015/863/EU (RoHS III).

It is implemented by the Electrical and Electronic Equipment Ordinance (ElektroStoffV) in Germany. According to this ordinance, waste electrical and electronic equipment, including cables and spare parts that contain more than 0.1 percent by weight of lead, mercury, hexavalent chromium, polybrominated biphenyls or polybrominated diphenyl ethers or more than 0.01 percent by weight of cadmium per homogeneous material may not be placed on the market. For certain substances and applications there are exceptions.

For lead as an alloying element there are exemptions applicable according to Annex III:

- 6(a) -I (steel up to 0.35%, galvanised steel containing up to 0.2% by weight)
- 6(b) -I (as an alloying element in aluminium containing up to 0.4% lead by weight)
- 6(c) -I (copper alloy containing up to 4% by weight)

➜ These products from the REYHER catalogue comply with this directive

To this current date, products that are marked with the RoHS symbol on the price pages do not contain amounts of any hazardous substances exceeding the above-mentioned limit values or are exemptions according to Annex III. If there are products that are not marked with this symbols, these might contain amounts of the mentioned substances exceeding the limit value. More detailed information is available on request.

ZEK 01.2-08 PAK

(Polycyclic aromatic hydrocarbons)

This directive replaces directive ZEK 01-08. Products (technical work equipment and consumer products) must comply with legal requirements to avoid any risk to health, such as § 30, 31 LFGB, the Chemicals Prohibition Ordinance and § 4 the Equipment and Product Safety Act (GPSG), which is why the revised PAH test specifications as well as the new PAH maximum values were specified in this document. Materials that may contain PAHs are, for example, elastomers (plastics and rubber materials), black or dark-coloured polymers, coatings and lacquers as well as materials treated with preservatives (naphtalene) such as natural bristles, leather products, bast and wood.

The main causes of PAH contamination in materials are the use of:

- PAH-contaminated softening oils in rubber and flexible plastics (soft plastics)
- PAH-contaminated soot as a black pigment used in rubber, plastics and varnish

This shows that products we delivered which were made of steel, stainless steel and non-ferrous metals including all coatings are not affected by this regulation.

➜ All products from the REYHER catalogue comply with this directive

California Proposition 65

(The Safe Drinking Water and Toxic Enforcement Act of 1986)

California Proposition 65 is a Californian law to protect drinking water sources from contamination with chemicals known to cause cancer and/or birth defects or other reproductive harm. This law does not prohibit any substances, but sets limit values for exposure to certain substances. It requires businesses to provide "clear and adequate" warnings to individuals prior to exposure to listed chemicals. These chemicals can be in the products that people purchase, in their homes or workplaces, or that are released into the environment.

The list of chemicals causing cancer and/or birth defects or other reproductive harm is maintained by the Office of Environmental Health Hazard Assessment (OEHHA),and updated every year. Currently, it contains more than 900 chemicals.

SJ/T 11364-2014 (China RoHS 2)

(Administrative Measures for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products)

The China RoHS 2 is very close to the EU RoHS and can be compared to the EC Directive 2011/65/EU (RoHS 2). According to the China RoHS 2, waste electrical and electronic equipment that contains more than 0.1 percent by weight of lead, mercury, hexavalent chromium, polybrominated biphenyls or polybrominated diphenyl ethers or more than 0.01 percent by weight of cadmium per homogeneous material. Other than the EU RoHS, the China RoHS 2 does not state exemptions. That is why products, that are in compliance with the EU RoHS, do not automatically fulfil the China RoHS conditions. China RoHS 2 requires that all electronic and electrical products that are sold in the People's Republic of China be marked with a label. The "e" label is applied to products that do not contain any hazardous substances exceeding concentration limits. Products that contain certain hazardous substances are marked with an orange label and can be used safely during its environmental protection use period (as indicated by the number in the center) which should enter into the recycling system after its environmental protection use period. In the case of the orange label, the amount of substances to be declared shall also be stated on the component or, in case of limited space, in the user manual. This indication must be made in Mandarin.

Conflict minerals

(Dodd Frank Act)

With the 15th title of the Dodd Frank Act the use of "conflict minerals" shall be avoided that are originating in or near the Democratic Republic of the Congo and are benefiting armed groups in the area. The relevant raw materials comprise tin, tantalum, tungsten, and gold from the African Great Lakes region including the Democratic Republic of the Congo, Angola, Burundi, Rwanda, Tanzania, Uganda and the Central African Republic of Zambia. According to section 1502 Dodd-Frank Act, companies that, according to US legislation, are required to issue annual reports on their stock trade to disclose whether so-called "conflict minerals" required for manufacturing products are originating in or near the Democratic Republic of the Congo. This way, all companies are affected that are allocated along the supply chain of companies listed on US stock exchanges, be it as a direct supplier or intermediate supplier. The material data communication in the supply chain is made via a CMRT template, that we will gladly send to you upon request.

EC Regulation EC 2006/122 (PFOS)

(Perfluoroctansulfonate)

The EU directive 2006/122/EC relates to the use of perflouroctane sulfonates (PFOS). PFOS are mainly used in the aerospace, semiconductor, and electronics industries, as well as in the photographic trade. If emissions into the environment and exposure in the workplace can be reduced to a minimum, there is no serious threat to the environment or to human health. According to the directive, special attention needs to be given to galvanic processes and surface treatment of metals and plastics. There are indications and experience shows that legislative measures are to be expected in this regard. By using the best technology available, it is expected that emissions shall be reduced accordingly. Another proposal is for restricting semi-finished products and products containing PFOS to which PFOS were intentionally added. The directive would apply only to new products and not to products that are already on the market. Since perfluoro-octanoic acid (PFOA) and its salts pose a similar risk, possible additions to this directive with regard to this group are to be expected. A fully galvanized product does not contain any measureable quantities of PFOS.

➜ All products from the REYHER catalogue comply with this directive

EC Regulations 1907/2006 – Chemicals regulation (REACh)

(Registration, Evaluation, Authorisation of Chemicals)

This EC regulation centralises and simplifies Europe-wide chemical laws through registration, evaluation and authorisation and came into effect on 1st June 2007. It is the dedicated objective to increase the level of knowledge of the dangers and risks which arise from chemicals. Here, companies are given more responsibility for the safe handling of their products. Although fasteners are in principle included as articles by the REACh regulation, most fall under exemptions and are thus exempt from the registration requirement.

According to Article 3 of REACh regulation fasteners are articles. Articles are objects, whose function is defined not by its chemical composition (e.g.by the metal components in the alloy), but by their external shape.

However, according to Article 7, Section 1 REACh regulation articles are only subject to registration if they also contain substances that are intended to be released. This is however not the case for fasteners.

Even fasteners with corrosion protection coatings, which thus have a sacrificial coating, i.e. a coating which is sacrificed to protect the component part, is not subject to having to be registered. This is because the protective layer is not released as such, but only certain reaction products. What is relevant is the exemption under Article 2 section 7 (b) REACh regulation in conjunction with Annex V section 3 of the REACh regulation. According to this, the substances which result from a chemical reaction occurring upon end use of other substances, mixtures or articles and which are not themselves manufactured, imported or placed on the market, are exempted from the obligation to register.

However, this does not affect provisions regarding substances of very high concern (SVHC) (Articles 57, 59, Annex 14 REACh regulation) in articles under Article 7 section 2 REACh regulation. These substances are not subject to registration, but must be reported, provided

a) the substance is present in those articles in quantities totalling over one tonne per year per producer or importer
b) the substance in these articles contain a concentration of more than 0.1% (by mass).

The statements above do not apply to chemical/technical products (e. g. aerosols, adhesives and sealants). These are preparations, not articles. For preparations it is not the preparations themselves, but the ingredients that are subject to registration. For products manufactured in the EU this obligation to register affects the manufacturer and the importer for imports from non-EU countries.

Next to the obligation to register and report, the REACh regulation also describes an obligation to inform according to article 33. Every supplier of every product, which contains at least one substance listed according to Article 59 (SVHC) in a concentration of more than 0.1% (by mass), must inform all participants within the supply chain. In doing so at least the name of the substance must be given. The list of substances according to Article 59 is revised and extended every half year. The Court of Justice of the European Union decided on the concept of articles, 10th September 2015 "Once and article – always an article". This means that each individual article and not the number of articles a product is composed of, serves as a reference for determining the obligation to inform. If a product contains more than 0.1% (by mass) of an SVHC candidate and thus be subject to information obligation this does not affect the production, distribution or processing of the product.

On 27th June 2018 lead (CAS-No. 7439-92-1, EG-No. 231-100-4) was added to the list of SVHC candidates, and some of our products are affected. Lead may be contained as an alloy in machine elements > 0.1 percent per pass in the following property classes/materials:

- Property classes: 4.6, 4.8, 5.8, 6.8, 04, 4, 5, 6, 11H, 14H, 17H, 22H, 33H, 45H
- free cutting steel
- copper alloys (e.g. brass, bronze)
- Aluminium alloys

Although lead has been classified as a substance causing reproductive harm, this does not mean that materials containing lead represent imminent danger. Apart from that, the potentially toxic properties of lead have been known for years and must be considered depending on the use.

➜ **The following products from the REYHER catalogue do not contain any SVHC**
All products marked with a "REACh SVHC free" symbol in the price pages do currently not contain any SVHC candidate in a concentration of more than 0.1% (by mass). If there are products that are not marked with this symbol, these might contain SVHC candidates in concentrations of more than 0.1% (by mass).

EC Construction Products Regulation 305/2011/EU

(Construction products directive)

On 1st July 2013 this regulation repealed Construction Products Directive 89/106/EEG.

This regulation defines the conditions for the marketing and provision of construction as well as their CE marking.

For more detailed information, please refer to the REYHER special publication "Fasteners Metal and Steel Construction"

➜ **These products from the REYHER catalogue comply with this directive***

- Fasteners for steel construction: EN 14399-4, EN 14399-6, EN 14399-8, DIN 7968, DIN 7969, DIN 7989, DIN 7990, Sets from ISO 4014/4017 according to EN 15048.
- Fasteners for steel construction:
  – Chipboard screws: REYHER Article numbers 89096 – 89098, SPAX articles
  – Wood building screws: REYHER Article numbers 89091, 89092
  – Hexagon wood building screws: REYHER Article numbers 89571
  – Bolts with hexagon nuts: REYHER Article number 89601

EC Directive 2006/42/EC
(Machinery Directive)

The **Directive** regulates a unified protection level for accident prevention when bringing machinery into circulation inside the European Economic Area (EEA).

This Machinery Directive is supposed to reduce non-tariff barriers in the Union. Like all directives decreed on the basis of the EC Treaty, the Machinery Directive does not have any direct effect. It needs to be adopted into national law. In Germany, this has been done by the Equipment and Product Safety Act (Geräte- und Produktsicherheitsgesetz (GPSG)) and the Machinery Directive based thereon (9th GPSGV).

From **29th December 2009** the new Machinery Directive is to be applied in a binding fashion.

Essentially, the following change were made:

- Clearer restriction of the scope of application for the low-voltage directive and for the lift directive
- Incomplete machinery are included in the scope of application. Which directive requirements were satisfied can be found in the related documents. Included in the scope of delivery are a declaration of installation and assembly instructions written in the language of the country.
- The basic health and safety requirements were modified to meet technical advances made
- Selection options for conformity assessment procedures for machinery with inherently dangerous machines (see Annex 4 of the directive)
- Safety components receive the CE marking
- Inclusion of household appliances also commercially used, provided they fulfil the machine definition

➜ **These products from the REYHER catalogue can be used to implement this directive**
DIN 7964 and REYHER article numbers 88151, 88152 and 88153

Product Safety Act (ProdSG)

The German Product Safety Act, formerly the Equipment and Product Safety Act (GPSG), applies whenever products are made available on the market, exhibited on the market or used for the first time in the context of a commercial activity as well as tot he erection and the operation of installations subject to mandatory inspection, which are used for commercial or economic purposes or which may put employees at risk, with the exception of installations subject to mandatory inspection.

The Product Safety Act (ProdSG) includes a number of regulations which have implemented a number of European directives into German law.

1. ProdSV – Regulation relating to making available on the market electrical equipment designed for use within certain voltage limits
2. ProdSV – Regulation relating to the safety of toys
6. ProdSV – Regulation relating to making available on the market simple pressure vessels
7. ProdSV – Appliances burning gaseous fuels regulation
8. ProdSV – Regulation relating to making available on the market personal protective equipment
9. ProdSV – Machinery regulation
10. ProdSV – Regulation relating to making available on the market recreation craft and transport using recreational craft
11. ProdSV – Explosion protection regulation
12. ProdSV – Lift regulation
13. ProdSV – Aerosol dispenser regulation
14. ProdSV – Pressure equipment regulation

EU Directive 97/23/EC
(Pressure equipment directive)

The EU Directive is implemented by the 6th and 14th ProdSV Regulation relating to making available on the market simple pressure vessels.

The Regulation is reflected in the Technical Regulations (standards), which include instructions on computation and construction, on approved materials (including materials and strength classes for bolts and nuts), on acceptance test provisions (factory inspection documents) and on selected and correspondingly recognised manufacturers.

In addition or if not otherwise specified, the Technical Regulations apply to bolts and nuts among others:

AD 2000 data sheet $_{W}$ 0 = General principles for materials
AD 2000 data sheet $_{W}$ 2 = For austenitic steel parts
AD 2000 data sheet $_{W}$ 7 = For ferritic steel parts
AD 2000 data sheet $_{W}$ 10 = For ferrous material parts for low temperatures

The recognised manufacturer of bolts and nuts made from permitted materials must prove to the responsible authority that the requirements have been satisfied according to AD 2000 data sheet W0. Manufacturers who fulfil these requirements are listed in the VdTÜV data sheet for materials 1253/1. These manufacturers are subject to constant inspection.

➜ **These products from the REYHER catalogue are in compliance with this regulation***
DIN 938 (5.6), DIN 939 (5.6), DIN 28129 (C 35)
ISO 4014/4017 (5.6, 8.8, A 2-70, A 4-70, A 4-80, BUMAX 88), ISO 4032 (5, 8, A 2-70, A 4-70, A 4-80, BUMAX 88),
ISO 4762 (8.8, A 2-70, A 4-70, A 4-80, BUMAX 88)

*See the information on the corresponding products on the price pages

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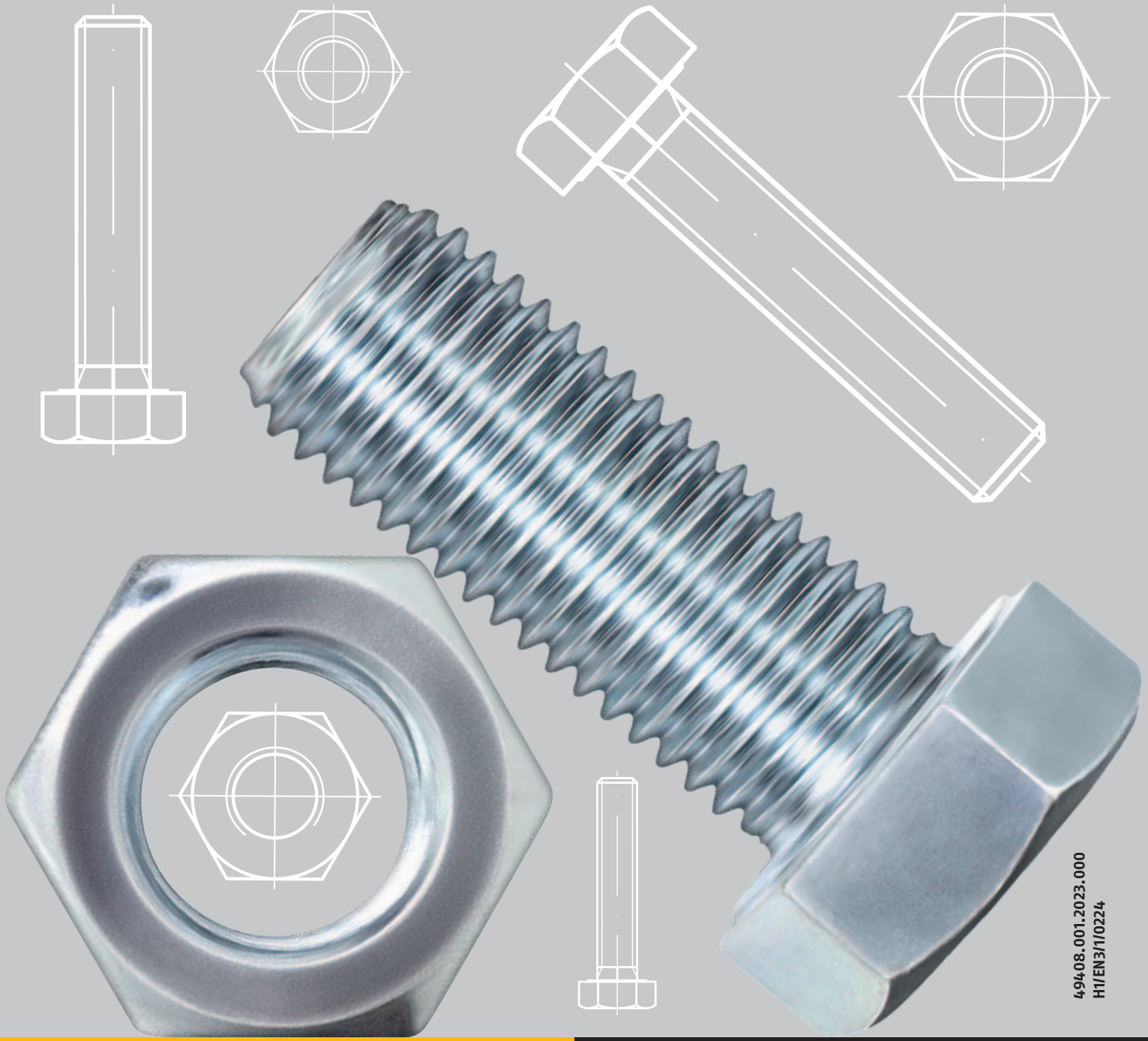

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