

Overview of standards for fasteners

Standardisation / Standard conversion

Standards are universally recognised technological regulations. They serve quality assurance, safety, environmental protection and general understanding. Standards are reviewed after a certain period of time to ensure that they are up to date (state of the art) and revised if necessary. This task is performed by a defined committee. The drafting of a new standard can be requested by anyone.

Standards can be used in legislation or in legal transactions to describe technical issues. For example, the various standards can support the federal government or the European Union in areas such as occupational safety, health protection and the removal of technical trade barriers.

Standardisation takes place on three different levels and can be divided into the areas of general, electrical engineering and telecommunications.

	National level (e.g. Germany)	Regional level (e.g. Europe)	International level
General	DIN Deutsches Institut für Normung e.V. (German Institute for Standardisation)	CEN Comité Européen de Normalisation (European Committee for Standardisation)	ISO International Organisation for Standardisation
Electro technology	DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik	CENELEC Comité Européen de Normalisation Électrotechnique (European Committee for Electrotechnical Standardisation)	IEC International Electrotechnical Commission
Telecommunication	DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik	ETSI European Telecommunications Standards Institute	ITU International Telecommunication Union

Only the general field is considered below.

The changeover from a DIN standard to an EN or ISO standard is carried out with the general aim of simplifying the international exchange of goods. It is therefore important for export-orientated companies to know the current standards and which standards have been withdrawn. In practice, products based on a withdrawn standard are still frequently used (e.g. in the spare parts sector). This results in increased planning and warehousing costs. In addition, designations in the merchandise management system, drawings and parts lists need to be amended. The ISO standards were often based on the DIN standards. The DIN standards were converted (with minor changes) into ISO standards.

One of the most important changes in the standardisation was the change in the width across flats for hexagonal products (see: Change in width across flats). This affects the spanner sizes M10, M12, M14 and M22. Another adjustment to the ISO standards was the change in nut height (see: Change in nut height). The nut height was increased.

Particular caution is required for products with a discontinued standard, as the function is no longer guaranteed. It is essential to observe the current technical developments here.

Types of standard

The standard types are categorised on three levels:

- National level within Germany
- European level within the European internal market
- International level

DIN

At the national level, the Deutsches Institut für Normung e.V. (German Institute for Standardisation, DIN for short) is responsible for standardisation work. It is not a state organisation, but rather a registered association. National standards are largely being replaced by European and international standards. DIN standards remain in force if there are no corresponding EN or ISO standards.

ISO (DIN ISO)

Work on international standards is carried out by the International Organisation for Standardisation (ISO). The aim of ISO is to standardise technical regulations worldwide and to bring together the various national standards in order to facilitate the international exchange of goods and reduce barriers to trade.

DIN ISO is a national edition of an ISO standard that is adopted unchanged.

EN (DIN EN / EN ISO / DIN EN ISO)

European standards (EN) serve to harmonise technical regulations in the European internal market. They are organised by the European Committee for Standardisation CEN (Comité Européen de Normalisation). In principle, existing international standards at European level are to be adopted unchanged (EN ISO). If this is not possible at European level, independent EN standards are developed. These then deviate from the international standard.

The difference to the international standards is that, according to the resolution of the European Council, the EN standard must be introduced and adopted immediately and unchanged in all member states. At the same time, the national standard must be withdrawn. The DIN EN is the national edition of an EN standard that has been adopted unchanged.

DIN EN ISO is the German edition of an EN ISO standard that has been adopted unchanged.

Development of a standard

The process of drafting a standard is similar at national, European and international level. A proposal is made which may result in a draft standard. This is followed by an optional final draft or the publication of the respective standard.

National standard

All interested parties (e.g. manufacturers, trade, universities) can participate in the work of the standards committees. They delegate an expert to the DIN working committees, which are organised according to specialist areas.

Application

The development of a national standard begins with a standardisation request. Anyone can request the drafting of a new standard.

Proposal

After receiving the application, the responsible DIN committee discusses the need for the topic, the willingness to finance the project and the level (national, European or international) at which the project should be carried out. The public is informed in the „DIN-Anzeiger für technische Regeln“ (DIN journal for technical rules) and can comment on it.

Standard draft

If the decision in the standards committee is in favour of developing a national standard and it subsequently receives the approval of the steering committee, a draft standard is prepared. This is published by Beuth-Verlag. In addition, the draft will be made available to the public for comment in the „Standards Draft Portal“

Publication

The experts on the committee deliberate on the statement and discuss the content of the planned standard. Finally, the DIN standard is published.

European standard

The development of a European standard is carried out under the umbrella of the three major European standardisation organisations CEN, CENELEC and ETSI. CEN applies the national delegation principle, i.e. so-called mirror committees draw up the national statement (in Germany at DIN). This allows all interested parties to voice their opinions at national level without language barriers. The mirror committees delegate experts to the European working group. They represent national interests there. It is particularly important to incorporate national interests at an early stage and in a qualified manner during the development process.

Proposal

The standardisation proposal can be submitted by the national standardisation organisations, the European Commission and European or international organisations.

The proposal must be adopted by a simple majority and 71% of the weighted majority of the voting national standardisation organisations. In addition, a sufficient number of national standardisation organisations must undertake to cooperate. They examine the necessity of the topic and the financing of the project. The standardisation application will only be accepted under these conditions.

If a corresponding international standard already exists, this can be adopted. Otherwise, a draft standard will be prepared by the working committee.

Standard draft

The draft standard is distributed to all national standardisation organisations as part of a public survey. The national statement must be submitted within three months.

In Germany, the EN standard is published as a DIN-EN draft. Anyone can comment on this within two months. The mirror committee consults with the objectors and draws up a national statement.

Optional final draft or publication

Taking into account the result of the vote and the comments, the working committee may decide to publish the EN standard or publish a final draft. The national standardisation organisations decide on the adoption of the final draft in a final vote within two months. No comments are made on the content of the final draft. A simple majority and 71% of the weighted majority of the voting national standardisation organisations are required to adopt the final draft. After a positive vote, the new EN standard is published.

Adoption as a national standard

After a positive vote, a European standard (EN) is formally confirmed. It must now be adopted unchanged by the national standardisation organisations as a national standard (DIN EN). Deviating national standards must be withdrawn.

International standard

The development of an international standard is carried out under the umbrella of the two major standardisation organisations ISO and IEC. The principle of national delegation also applies here, as with the European standard. Compared to the European standard, the mirror committees have an additional task. They decide whether an international standard is adopted into the national standardisation system (DIN ISO).

Proposal

The standardisation proposal can be submitted by five groups. These are ISO members (e.g. DIN), ISO working groups, international specialist organisations with liaison status, the ISO Technical Boards and the ISO Secretary General.

The proposal requires the approval of a simple majority of the national standardisation organisations active in the relevant field. In addition, a sufficient number of national standardisation organisations must agree to cooperate. The standardisation application will only be accepted under these conditions.

Committee draft

The active members then prepare a draft of the committee and submit it to the Technical Committee (all active and observing members). These must submit a statement within two months. The active members draw up a new committee draft as required, taking into account the comments received. This procedure is repeated until a final draft is submitted.

Standard draft

The approved draft is made available to all ISO members. They must submit a national statement on the draft standard within three months.

In Germany, the ISO standard is published as a DIN-ISO draft. Anyone can comment on this within two months. The mirror committee consults with the objectors and draws up a national statement.

Optional final draft or publication

Taking into account the result of the vote and the comments, the working committee may decide to publish the ISO standard or publish a final draft. The national standardisation organisations decide on the adoption of the final draft in a final vote within two months. No comments are made on the content of the final draft. A two-thirds majority is required to adopt the final draft. In addition, no more than 25% of the votes may be against. After a positive vote, the new ISO standard is published.

The national standardisation organisations are not obliged to adopt the new standard into the national body of standards. Internationally developed standards can, however, be introduced in parallel as European standards (EN ISO) in the development and coordination process, whereby they automatically become binding for all national standardisation organisations (DIN EN ISO).

Changing the spanner sizes

General hexagon nuts and hexagon bolts

Nominal Ø (sizes to be avoided)	Hexagon nuts, thin form		Hexagon nuts, type 1		Hex head screws with shank		Hex head screws with thread up to head	
	DIN 439	ISO 4035	DIN 934	ISO 4032	DIN 931	ISO 4014	DIN 933	ISO 4017
1	-	-	2,5	-	-	-	-	-
1,2	-	-	3	-	-	-	-	-
1,4	-	-	3	-	-	-	-	-
1,6	3,2	3,2	3,2	3,2	3,2	3,2	3,2	3,2
1,8	3,2	-	-	-	-	-	-	-
2	4	4	4	4	4	4	4	4
2,5	5	5	5	5	5	5	5	5
3	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5
(3,5)	6	6	6	6	6	6	6	6
4	7	7	7	7	7	7	7	7
5	8	8	8	8	8	8	8	8
6	10	10	10	10	10	10	10	10
(7)	-	-	11	-	11	-	11	-
8	13	13	13	13	13	13	13	13
10	17	16	17	16	17	16	17	16
12	19	18	19	18	19	18	19	18
(14)	22	21	22	21	22	21	22	21
16	24	24	24	24	24	24	24	24
(18)	27	27	27	27	27	27	27	27
20	30	30	30	30	30	30	30	30
(22)	32	34	32	34	32	34	32	34
24	36	36	36	36	36	36	36	36
(27)	41	41	41	41	41	41	41	41
30	46	46	46	46	46	46	46	46
(33)	50	50	50	50	50	50	50	50
36	55	55	55	55	55	55	55	55
(39)	60	60	60	60	60	60	60	60
42	65	65	65	65	-	65	65	65
(45)	70	70	70	70	-	70	70	70
48	75	75	75	75	-	75	75	75
(52)	80	80	80	80	-	80	80	80
56	-	85	85	85	-	85	-	85
(60)	-	90	90	90	-	90	-	90
64	-	95	95	95	-	95	-	95

Hexagon nuts with locking element

Nominal Ø	High hexagon nuts with locking element (complete metal nuts)		Hexagon nuts with locking element (with non-metallic insert), type 1		Thin hexagon nuts with locking element (with non-metallic insert)	
	(sizes to be avoided)	DIN 980	ISO 7042 DIN 6925	DIN 982	ISO 7040 DIN 6924	DIN 985
3	5,5	5,5 (DIN) - (ISO)	-	5,5	5,5	5,5
4	7	7 (DIN) - (ISO)	-	7	7	7
5	8	8	8	8	8	8
6	10	10	10	10	10	10
(7)	11	11 (DIN) - (ISO)	11	11 (DIN) - (ISO)	11	-
8	13	13	13	13	13	13
10	17	16	17	16	17	16
12	19	18	19	18	19	18
(14)	22	21	22	21	22	21
16	24	24	24	24	24	24
(18)	27	27 (DIN) - (ISO)	27	27 (DIN) - (ISO)	27	-
20	30	30	30	30	30	30
(22)	32	34 (DIN) - (ISO)	32	34 (DIN) - (ISO)	32	-
24	36	36	36	36	36	36
(27)	41	41 (DIN) - (ISO)	-	41 (DIN) - (ISO)	41	-
30	46	46	-	46	46	46
(33)	50	50 (DIN) - (ISO)	-	50 (DIN) - (ISO)	50	-
36	55	55	-	55	55	55
(39)	60	60 (DIN) - (ISO)	-	60 (DIN) - (ISO)	60	-
42	-	-	-	65 (DIN) - (ISO)	65	-
(45)	-	-	-	70 (DIN) - (ISO)	70	-
48	-	-	-	75 (DIN) - (ISO)	75	-

Hexagon nuts and hexagon head screws with flange

Nominal Ø	Hexagon nuts with flange, type 2		Hexagon head screws with flange, heavy-duty series	
	DIN 6923	EN 1661 ISO 4161	DIN 6921	EN 1665
(sizes to be avoided)				
5	8	8	8	8
6	10	10	10	10
8	13	13	13	13
10	15	16	15	16
12	18	18	16	18
(14)	21	21	18	21
16	24	24	21	24
20	30	30	27	30

Changes in the nut height

Hexagon nuts with locking element

Nominal Ø (sizes to be avoided)	High hexagon nuts with locking element (complete metal nuts)		Hexagon nuts with locking element (with non-metallic insert), type 1			Thin hexagon nuts with locking element (with non-metallic insert)	
	DIN 980 DIN 6925	ISO 7042	DIN 982	DIN 6924	ISO 7040	DIN 985	ISO 10511
3	3,40 - 3,70	-	-	4,20 - 4,50	4,02 - 4,50	3,70 - 4,00	3,42 - 3,90
4	3,90 - 4,20	-	-	5,70 - 6,00	5,52 - 6,00	4,70 - 5,00	4,52 - 5,00
5	4,80 - 5,10	4,80 - 5,10	6,00 - 6,30	6,44 - 6,80	6,22 - 6,80	4,70 - 5,00	4,52 - 5,00
6	5,70 - 6,00	5,40 - 6,00	7,70 - 8,00	7,64 - 8,00	7,42 - 8,00	5,70 - 6,00	5,52 - 6,00
(7)	6,50 - 7,00	-	8,20 - 8,50	8,64 - 9,00	-	7,14 - 7,50	-
8	7,50 - 8,00	7,14 - 8,00	9,14 - 9,50	9,14 - 9,50	8,92 - 9,50	7,64 - 8,00	6,18 - 6,76
10	9,00 - 10,00	8,94 - 10,00	11,14 - 11,50	11,14 - 11,90	11,20 - 11,90	9,64 - 10,00	7,98 - 8,56
12	11,00 - 12,00	11,57 - 13,30	13,64 - 14,00	14,47 - 14,90	14,20 - 14,90	11,57 - 12,00	9,53 - 10,23
(14)	12,00 - 14,00	13,40 - 14,10	15,30 - 16,00	16,30 - 17,00	15,90 - 17,00	13,30 - 14,00	10,22 - 11,32
16	14,00 - 16,00	15,70 - 16,40	17,30 - 18,00	18,26 - 19,10	17,80 - 19,10	15,30 - 16,00	11,32 - 12,42
(18)	16,00 - 18,00	-	19,16 - 20,00	19,76 - 20,60	-	17,66 - 18,50	-
20	18,00 - 20,00	19,00 - 20,30	20,70 - 22,00	21,50 - 22,80	20,70 - 22,80	18,70 - 20,00	13,10 - 14,90
(22)	20,00 - 22,00	-	23,70 - 25,00	23,20 - 24,50	-	20,70 - 22,00	-
24	22,00 - 24,00	22,60 - 23,90	26,70 - 28,00	25,80 - 27,10	25,00 - 27,10	22,70 - 24,00	16,00 - 17,80
(27)	25,00 - 27,00	-	-	29,40 - 31,00	-	25,70 - 27,00	-
30	28,00 - 30,00	27,30 - 30,00	-	31,00 - 32,60	30,10 - 32,60	28,70 - 30,00	20,10 - 22,20
(33)	31,00 - 33,00	-	-	33,90 - 35,50	-	31,40 - 33,00	-
36	34,00 - 36,00	33,10 - 36,00	-	37,30 - 38,90	36,40 - 38,90	34,40 - 36,00	23,40 - 25,50
(39)	37,00 - 39,00	-	-	40,40 - 42,00	-	37,40 - 39,00	-
42	-	-	-	43,40 - 45,00	-	40,40 - 42,00	-
(45)	-	-	-	46,40 - 48,00	-	43,40 - 45,00	-
48	-	-	-	48,40 - 50,00	-	46,40 - 48,00	-

General hexagon nuts

Nominal Ø (sizes to be avoided)	Hexagon nuts, type 1	
	DIN 934	ISO 4032
1	0,55 - 0,80	-
1,2	0,75 - 1,00	-
1,4	0,95 - 1,20	-
1,6	1,05 - 1,30	1,05 - 1,30
2	1,35 - 1,60	1,35 - 1,60
2,5	1,75 - 2,00	1,75 - 2,00
3	2,15 - 2,40	2,15 - 2,40
(3,5)	2,55 - 2,80	2,55 - 2,80
4	2,90 - 3,20	2,90 - 3,20
5	3,70 - 4,00	4,40 - 4,70
6	4,70 - 5,00	4,90 - 5,20
(7)	5,20 - 5,50	-
8	6,14 - 6,50	6,44 - 6,80
10	7,64 - 8,00	8,04 - 8,40
12	9,64 - 10,00	10,37 - 10,80
(14)	10,30 - 11,00	12,10 - 12,80
16	12,30 - 13,00	14,10 - 14,80
(18)	14,30 - 15,00	15,10 - 15,80
20	14,90 - 16,00	16,90 - 18,00
(22)	16,90 - 18,00	18,10 - 19,40
24	17,70 - 19,00	20,20 - 21,50
(27)	20,70 - 22,00	22,50 - 23,80
30	22,70 - 24,00	24,30 - 25,60
(33)	24,70 - 26,00	27,40 - 28,70
36	27,40 - 29,00	29,40 - 31,00
(39)	29,40 - 31,00	31,80 - 33,40
42	32,40 - 34,00	32,40 - 34,00
(45)	34,40 - 36,00	34,40 - 36,00
48	36,40 - 38,00	36,40 - 38,00
(52)	40,40 - 42,00	40,40 - 42,00
56	43,40 - 45,00	43,40 - 45,00
(60)	46,40 - 48,00	46,40 - 48,00
64	49,10 - 51,00	49,10 - 51,00

Changes in the washer thickness

Nominal size (sizes to be avoided)	Flat washers, normal series	
	DIN 125-1 DIN 125-2	ISO 7089 ISO 7090
1,6	0,25 - 0,35	0,25 - 0,35
1,7	0,25 - 0,35	-
2	0,25 - 0,35	0,25 - 0,35
2,3	0,45 - 0,55	-
2,5	0,45 - 0,55	0,45 - 0,55
2,6	0,45 - 0,55	-
3	0,45 - 0,55	0,45 - 0,55
(3,5)	0,45 - 0,55	0,45 - 0,55
4	0,70 - 0,90	0,70 - 0,90
5	0,90 - 1,10	0,90 - 1,10
6	1,40 - 1,80	1,40 - 1,80
(7)	1,40 - 1,80	-
8	1,40 - 1,80	1,40 - 1,80
10	1,80 - 2,20	1,80 - 2,20
12	2,30 - 2,70	2,30 - 2,70
(14)	2,30 - 2,70	2,30 - 2,70
16	2,70 - 3,30	2,70 - 3,30
(18)	2,70 - 3,30	2,70 - 3,30
20	2,70 - 3,30	2,70 - 3,30
(22)	2,70 - 3,30	2,70 - 3,30
24	3,70 - 4,30	3,70 - 4,30
26	3,70 - 4,30	-
(27)	3,70 - 4,30	3,70 - 4,30
28	3,70 - 4,30	-
30	3,70 - 4,30	3,70 - 4,30
32	4,40 - 5,60	-
(33)	4,40 - 5,60	4,40 - 5,60
35	4,40 - 5,60	-
36	4,40 - 5,60	4,40 - 5,60
38	5,40 - 6,60	-
(39)	5,40 - 6,60	5,40 - 6,60
40	5,40 - 6,60	-
42	6,00 - 8,00	7,00 - 9,00
(45)	6,00 - 8,00	7,00 - 9,00
48	7,00 - 9,00	7,00 - 9,00
50	7,00 - 9,00	-
(52)	7,00 - 9,00	7,00 - 9,00
55	8,00 - 10,00	-
56	8,00 - 10,00	9,00 - 11,00
58	8,00 - 10,00	-
(60)	8,00 - 10,00	9,00 - 11,00
64	8,00 - 10,00	9,00 - 11,00

Nominal size	Flat washers, normal series	
(sizes to be avoided)	DIN 125-1 DIN 125-2	ISO 7089 ISO 7090
68	9,00 - 11,00	-
72	9,00 - 11,00	-
76	9,00 - 11,00	-
80	10,80 - 13,20	-
85	10,80 - 13,20	-
90	10,80 - 13,20	-
95	10,80 - 13,20	-
100	12,80 - 15,20	-
105	12,80 - 15,20	-
110	12,80 - 15,20	-
115	12,80 - 15,20	-
120	14,80 - 17,20	-
125	14,80 - 17,20	-
130	14,80 - 17,20	-
135	14,80 - 17,20	-
140	16,80 - 19,20	-
145	16,80 - 19,20	-
150	16,80 - 19,20	-
160	16,80 - 19,20	-

Nominal size	Flat washers, large series	
(sizes to be avoided)	DIN 9021	ISO 7093-1 ISO 7093-2
2,5	0,70 - 0,90	-
3	0,70 - 0,90	0,70 - 0,90
(3,5)	0,70 - 0,90	0,70 - 0,90
4	0,90 - 1,10	0,90 - 1,10
5	1,00 - 1,40	0,90 - 1,10
6	1,40 - 1,80	1,40 - 1,80
(7)	1,80 - 2,20	-
8	1,80 - 2,20	1,80 - 2,20
10	2,30 - 2,70	2,30 - 2,70
12	2,70 - 3,30	2,70 - 3,30
(14)	2,70 - 3,30	2,70 - 3,30
16	2,70 - 3,30	2,70 - 3,30
(18)	3,70 - 4,30	3,70 - 4,30
20	3,70 - 4,30	3,70 - 4,30
(22)	4,40 - 5,60	4,40 - 5,60
24	4,40 - 5,60	4,40 - 5,60
(27)	-	5,40 - 6,60
30	5,40 - 6,60	5,40 - 6,60
(33)	-	5,40 - 6,60
36	7,00 - 9,00	7,00 - 9,00

Short overview

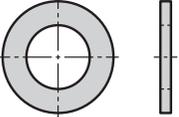
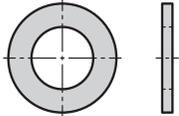
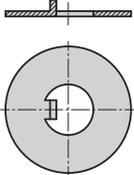
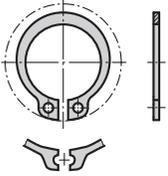
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125-2	7089
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551	4766
580	3266
582	-
609	-
787	299
912	4762
913	4026
914	4027
915	4028
917	-
923	-
931-1	4014
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934	4032
976-1	-
980	7042
981	-
982	7040
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6925	7042
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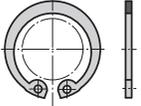
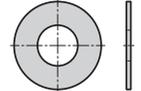
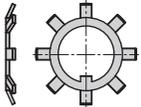
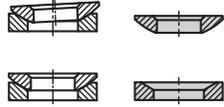
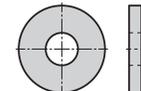
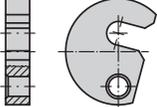
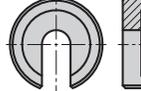
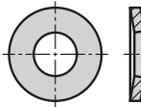
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	787
773	6885-1
1234	94
EN 1661	6923
EN 1665	6921
2338	7
3266	580
3912	6888
4014	931-1
4017	933
4026	913
4027	914
4028	915
4032	934
4035	439-2
4161	6923
4762	912
4766	551
7040	982
	6924
7042	980
	6924
7089	125-1
	125-2
7090	125-1
	125-2
7092	433-1
	433-2
7093-1	9021
7093-2	9021
7379	9841
7380-1	-
7380-2	-
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8735	7979
8752	1481
10511	985
10642	7991

Standardisation overview

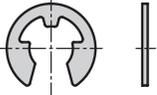
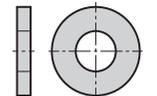
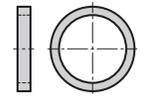
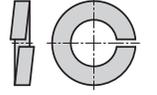
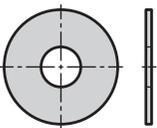
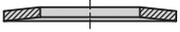
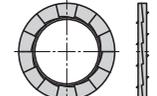
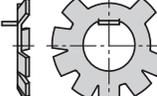
Washers, rings

Image	Family	DIN	ISO	Description	Standard validity	Changing the DIN standards to ISO
	K0868	125-1 125-2	7089 7090	Flat washers, normal series	DIN invalid	<ul style="list-style-type: none"> - Classified into ISO 7089 (Form A without chamfer) and ISO 7090 (Form B with chamfer) - Nominal size determined on the basis of the thread diameter instead of the hole diameter - Nominal sizes 68 - 160 deleted - Nominal sizes 1.7; 2.3; 2.6; 7; 26; 28; 32; 35; 38; 40; 50; 55 and 58 deleted - Washer thickness partially increased (42; 45; 56; 60 and 64) - Hardness grade 140 HV not applicable - Reference to zinc flake coatings included
	-	137	complies with no ISO standard	Spring washers, waved Form B	DIN withdrawn without substitution	The function is not guaranteed with high-strength screws
	K2099	433-1 433-2	7092	Flat washers, small series	DIN invalid	<ul style="list-style-type: none"> - Nominal size determined on the basis of the thread diameter instead of the hole diameter - Nominal sizes 1; 1.2; 1.4 and 1.8 deleted - Nominal sizes 22; 27 and 33 added - Hardness grade 140 HV not applicable - Reference to zinc flake coatings included
	K2062	462	complies with no ISO standard	Lock washers with inner tab for DIN 1804 slotted round nuts	DIN valid	
	K1938	471	complies with no ISO standard	Circlips (retaining rings) for shafts - standard version and heavy-duty version	DIN valid	

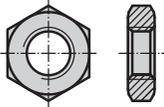
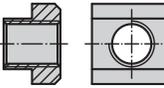
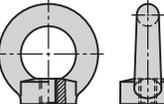
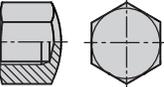
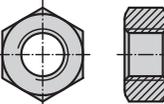
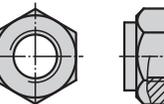
Washers, rings

Image	Family	DIN	ISO	Description	Standard validity	Changing the DIN standards to ISO
	K1939	472	complies with no ISO standard	Circlips (retaining rings) for bores - standard version and heavy-duty version	DIN valid	
	K1151	988	complies with no ISO standard	Shim washers and support washers	DIN valid	
	K2063	5406	complies with no ISO standard	Rolling bearing nut locks; locking plates, circlips	DIN valid	
	K0729	6319	complies with no ISO standard	Spherical washers, conical seats	DIN valid	
	K0867	6340	complies with no ISO standard	Washers for clamping devices	DIN valid	
	K0703	6371	complies with no ISO standard	Captive C-washers for fixtures	DIN valid	
	K0730	6372	complies with no ISO standard	C-washers for fixtures	DIN valid	
	-	6796	complies with no ISO standard	Conical spring washers for screw connections	DIN valid	

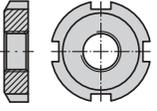
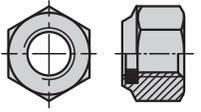
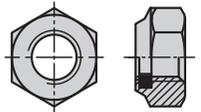
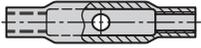
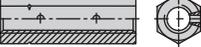
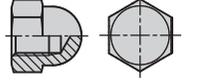
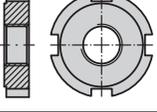
Washers, rings

Image	Family	DIN	ISO	Description	Standard validity	Changing the DIN standards to ISO
	K1940	6799	complies with no ISO standard	Lock washers (retaining washers) for shafts	DIN valid	
	K1968	7349	complies with no ISO standard	Washers for bolts with heavy-duty clamping sleeves	DIN valid	
	K2078	7603	complies with no ISO standard	Sealing washers	DIN valid	
	-	7980	complies with no ISO standard	Spring washers for cap screws	DIN withdrawn without substitution	The function is not guaranteed with high-strength screws
	K1150	9021	7093-1 7093-2	Flat washers, large series	DIN invalid	<ul style="list-style-type: none"> - Nominal sizes determined on the basis of the thread diameter instead of the hole diameter - Nominal sizes 2.5 and 7 deleted - Nominal sizes 27 and 33 added - Washer thickness partially reduced (5) - Hardness grade 140 HV not applicable - Hardness grades 200 HV and 300 HV included - Reference to zinc flake coatings included
	-	16983	complies with no ISO standard	Spring washer	DIN valid	
	-	25201	complies with no ISO standard	Wedge lock washers	DIN valid	
	K2061	70952	complies with no ISO standard	Lock washers for DIN 70852 slotted round nuts	DIN valid	

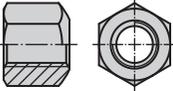
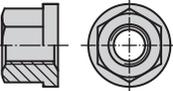
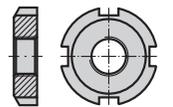
Nuts

Image	Family	DIN	ISO	Description	Standard validity	Changing the DIN standards to ISO
	K0700	439-2	4035	Hexagon nuts, thin form (with chamfer)	DIN invalid	<ul style="list-style-type: none"> - Width across flats changed by M10; M12; M14 and M22 - Nominal size M1.8 deleted - Nominal sizes M56; M60 and M64 added - Strength class for stainless steels changed from 50 to 025 and from 70 to 035 - The ISO standard is only for standard threads
	K0377	508	299	T-slot nuts	DIN valid	<ul style="list-style-type: none"> - T-slot width changed by M20; M24; M30 and M36 - T-slot height changed by M4; M30; M36; M42 and M48 - The ISO standard only contains connection dimensions for T-slot nuts
	K0768/ K1334	582	complies with no ISO standard	Ring nuts	DIN valid	
	K1801	917	complies with no ISO standard	Hexagon cap nuts, low Form	DIN valid	
	K1145	934	4032	Hexagon nuts, type 1	DIN invalid	<ul style="list-style-type: none"> - Width across flats changed by M10; M12; M14 and M22 - Nominal sizes M1; M1.2; M1.4 and M7 deleted - Nut heights partially increased (M5 to M39) - Material stainless steel A4-50 and A4-70 incorporated - Reference to zinc flake coatings included - The ISO standard is only for standard threads
	K1146	980/ 6925	7042	High hexagon nuts with locking element (complete metal nuts)	DIN invalid	<ul style="list-style-type: none"> - Width across flats changed by M10; M12; and M14 (DIN 6925 already includes the new width across flats) - Nominal sizes M3; M4; M7; M18; M22; M27; M33 and M39 deleted - Nut height changed - Valid for strength grades 5; 8; 10 and 12 - Reference to zinc flake coatings included - The ISO standard is only for standard threads

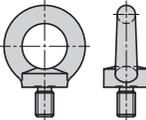
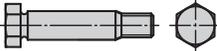
Nuts

Image	Family	DIN	ISO	Description	Standard validity	Changing the DIN standards to ISO
	K2060	981	complies with no ISO standard	Roller bearing-slotted round nuts	DIN valid	
	K1147	982/ 6924	7040	Hexagon nuts with locking element (with non-metallic insert), type 1	DIN invalid	<ul style="list-style-type: none"> - Width across flats changed by M10; M12 and M14 (DIN 6924 already includes the new width across flats) - Nominal diameter M7; M18 and M22 deleted (for both DIN standards) - Nominal diameters M27; M33; M39; M42; M45 and M48 deleted (to DIN 6924) - Nominal diameters M3; M4; M30 and M36 added (to DIN 982) - Nut height changed - Strength grade 12 deleted - Valid for strength grades 5; 8 and 10 - The ISO standard is only for standard threads
	K1148	985	10511	Thin hexagon nuts with locking element (with non-metallic insert)	DIN invalid	<ul style="list-style-type: none"> - Width across flats changed by M10; M12 and M14 - Nominal diameters M7; M18; M22; M27; M33; M39; M42; M45 and M48 deleted - Nut height reduced - Valid for strength grades 4 and 5 - Reference to zinc flake coatings included - The ISO standard is only for standard threads
	-	1478	complies with no ISO standard	Turnbuckle nuts made from steel tube or round steel	DIN valid	
	-	1479	complies with no ISO standard	Hexagonal turnbuckle nuts	DIN valid	
	K1800	1587	complies with no ISO standard	Hexagon cap nuts, high form	DIN valid	
	K1917	1804	complies with no ISO standard	Slotted round nuts with fine thread	DIN valid	

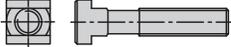
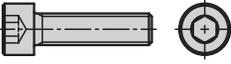
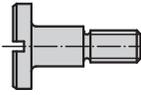
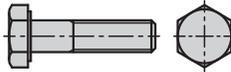
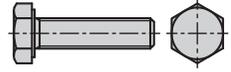
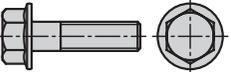
Nuts

Image	Family	DIN	ISO	Description	Standard validity	Changing the DIN standards to ISO
	K0702	6330	complies with no ISO standard	Hexagon nuts, high	DIN valid	
	K0701	6331	complies with no ISO standard	Hexagon nuts, high with collar	DIN valid	
	K1797	6923	EN 1661/ 4161	Hexagon nuts with flange, type 2	DIN invalid	- Width across flats changed by M10 - The ISO standard is only for standard threads
	K2059	70852	complies with no ISO standard	Slotted round nuts	DIN valid	

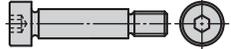
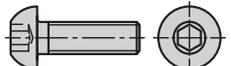
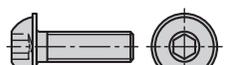
Screws

Image	Family	DIN	ISO	Description	Standard validity	Changing the DIN standards to ISO
	K0396/ K1418	444	complies with no ISO standard	Eye bolts	DIN valid	
	K0767/ K1333	580	3266	Ring bolts	DIN valid	- Nominal sizes M6; M14; M18; M22; M27; M33; M39; M45 and M60 deleted - Nominal size M90x6 added - Form and dimensions (except for the nominal diameter) changed - Stainless steel omitted - Minimum axial breaking force reduced - Mandatory declaration of conformity from the manufacturer included
	K0706	609	complies with no ISO standard	Hex head shoulder screw with long threaded portion	DIN valid	

Screws

Image	Family	DIN	ISO	Description	Standard validity	Changing the DIN standards to ISO
	K0698	787	299	T-slot bolts	DIN valid	<ul style="list-style-type: none"> - T-slot width changed by M5; M6; M8; M10; M12; M20; M24; M30 and M36 - T-slot height changed by M5; M6; M8; M10; M12; M30; M36; M42 and M48 - Nominal diameter M4 deleted from the DIN - The ISO standard only contains connection dimensions for T-slot bolts
	K1159/ K0869	912	4762	Cap screws with hexagon socket	DIN invalid	<ul style="list-style-type: none"> - Nominal diameter M1.4; M18; M22; M27 and M33 deleted - Thread to the head no longer possible - Reference to zinc flake coatings included - The ISO standard is only for standard threads
	K0704	923	complies with no ISO standard	Shoulder screws with slotted flat head	DIN valid	
	K0870	931-1	4014	Hex head screws with shank	DIN invalid	<ul style="list-style-type: none"> - Width across flats for M10 and M12 - Nominal size M7 deleted - Nominal sizes M42; M45; M48; M52; M56; M60 and M64 added
	K0871	933	4017	Hex head screws with thread up to head	DIN invalid	<ul style="list-style-type: none"> - Width across flats for M10 and M12 - Nominal size M7 deleted - Nominal sizes M56; M60 and M64 added
	K1160	6912	complies with no ISO standard	Countersunk screws with hexagon socket with reduced load capacity, low head	DIN valid	
	K1161	6921	EN 1665	Hex head screw with flange, heavy duty series	DIN invalid	<ul style="list-style-type: none"> - Width across flats changed by M10; M12; M14; M16 and M20 - Strength grade 12.9 deleted

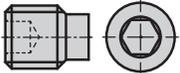
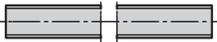
Screws

Image	Family	DIN	ISO	Description	Standard validity	Changing the DIN standards to ISO
	K0708	7991	10642	Countersunk screws with hexagon socket with reduced load capacity	DIN invalid	<ul style="list-style-type: none"> - Nominal sizes M18; M22 and M24 deleted - Nominal sizes M2 and M2.5 added - Head height and head diameter partially changed (M3; M4; M5; M6; M8; M10; M12; M14; M16 and M20) - Material stainless steel included - Strength grades 10.9 and 12.9 added
	K0705	9841	7379	Socket head shoulder screws	DIN valid	<ul style="list-style-type: none"> - Nominal diameter 6.5 added - Nominal diameter 32 deleted - Head height and shaft length partially changed - Form A deleted - Strength grade changed (from 8.8 to 12.9)
	K1796	complies with no DIN standard	7380-1	Button head screws with reduced loading, part 1	-	No DIN
	K1796	complies with no DIN standard	7380-2	Button head screws with reduced loading, part 2	-	No DIN

Pins

Image	Family	DIN	ISO	Description	Standard validity	Changing the DIN standards to ISO
	K2013	7	2338	Dowel pins made of unhardened steel and austenitic stainless steel	DIN invalid	<ul style="list-style-type: none"> - Change in length definition (ISO incl. crown) - Crown height changed - Hardness range defined for steel - Stainless steel incorporated

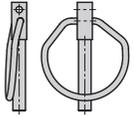
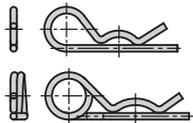
Pins

Image	Family	DIN	ISO	Description	Standard validity	Changing the DIN standards to ISO
	-	551	4766	Grub screws with slot and truncated cone	DIN invalid	<ul style="list-style-type: none"> - Nominal sizes M1 and M1.4 deleted - Flat point renamed truncated cone - Use „hardness grade“ instead of „strength grade“ - Reference to zinc flake coatings included
	K0707	913	4026	Grub screws with hexagon socket and truncated cone	DIN invalid	<ul style="list-style-type: none"> - Nominal sizes M1.4; M1.8; M14; M18 and M22 deleted - Nominal lengths 14; 18; 22 and 28 deleted - Use of „hardness grade“ instead of „strength grade“ for stainless steels - Hardness grades introduced for stainless steels
	K0797	914	4027	Hexagon socket grub screws with flattened tip	DIN invalid	<ul style="list-style-type: none"> - Nominal sizes M1.4; M1.8; M14; M18 and M22 deleted - Nominal lengths 14; 18; 22 and 28 deleted - Flattened tip for all nominal diameters - Use of „hardness grade“ instead of „strength grade“ for stainless steels - Hardness grades introduced for stainless steels - Reference to zinc flake coatings included
	K2052	915	4028	Grub screws with hexagon socket and pin	DIN invalid	<ul style="list-style-type: none"> - Nominal sizes M1.4; M1.8; M14; M18 and M22 deleted - Nominal lengths 14; 18; 22 and 28 deleted - Flattened tip for all nominal diameters - Use of „hardness grade“ instead of „strength grade“ for stainless steels - Hardness grades introduced for stainless steels - Reference to zinc flake coatings included
	K1960	976-1	complies with no ISO standard	Studs, part 1	DIN valid	
	-	1481	8752	Dowel pins (sleeves), slotted, heavy-duty version	DIN invalid	<ul style="list-style-type: none"> - Nominal diameters ≤8 with 2 chamfers - Vickers hardness test included - Single-cut shear forces eliminated

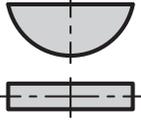
Pins

Image	Family	DIN	ISO	Description	Standard validity	Changing the DIN standards to ISO
	K1908	6325	8734	Dowel pins made of hardened steel and martensitic stainless steel	DIN invalid	- Stainless steel material included
	K0390	6332	complies with no ISO standard	Grub screws with thrust point	DIN valid	
	K0697	6379	complies with no ISO standard	Studs for T-slot nuts	DIN valid	
	K1909	7979	8735	Dowel pins with internal thread made of hardened steel and martensitic stainless steel	DIN invalid	- Stainless steel material included

Pin connections, cotter pins, pins

Image	Family	DIN	ISO	Description	Standard validity	Changing the DIN standards to ISO
	K1136	94	1234	Cotter pins	DIN invalid	- Stainless steel material included
	K2014	11023	complies with no ISO standard	linchpin	DIN valid	
	K1137	11024	complies with no ISO standard	R-clips	DIN valid	

Wedge keys

Image	Family	DIN	ISO	Description	Standard validity	Changing the DIN standards to ISO
	K0696	6885-1	ISO/R 773 withdrawn without substitution	Parallel keys, high Form A, part 1	DIN valid	
	-	6888	ISO 3912 withdrawn without substitution	Woodruff keys	DIN valid	

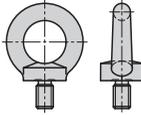
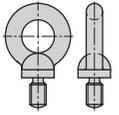
Standard differentiation between T-slot nuts and screws

There is no directly corresponding ISO standard for T-slot nuts and bolts. The exact dimensioning and definition is based on the two DIN standards 508 and 787. The ISO equivalent is ISO 299, which defines T-slots, but has a definition on the connection dimensions of T-slot nuts and bolts.

Nominal Ø	DIN 508		DIN 787		ISO 299	
	T-slot width	T-slot height	T-slot width	T-slot height	T-slot width	T-slot height
M4	9	2,5	-	-	9	3
M5	10	4	9	3	10	4
M6	13	6	10	4	13	6
M8	15	6	13	6	15	6
M10	18	7	15	6	18	7
M12	22	8	18 / 22	7 / 8	22	8
M16	28	10	28	10	28	10
M20	35	14	35	14	34	14
M24	44	18	44	18	43	18
M30	54	22	54	22	53	23
M36	65	26	65	26	64	28
M42	75	30	75	30	75	32
M48	85	34	85	34	85	36

Ring bolt standard changes

During the switch from DIN to ISO standards, the entire ring bolt standards were revised. The standards differ in terms of form, dimensions, measurements and the specification for the minimum axial breaking force.

DIN 580					ISO 3266			
								
Nominal Ø	Thread length	Edition D2	Ring internal diameter	Axial minimum breaking force	Thread length	Edition D2	Ring internal diameter	Axial minimum breaking force
6	13	20	20	4.400N	-	-	-	-
8	13	20	20	8.200N	12	17	9	2.000N
10	17	25	25	13.500N	15	20	11	3.200N
12	20,5	30	30	20.000N	18	21	13	4.000N
14	27	35	35	28.800N	-	-	-	-
16	27	35	35	41.200N	24	28	18	8.000N
18	30	40	40	50.000N	-	-	-	-
20	30	40	40	70.600N	30	38	25	16.000N
22	36	50	50	82.400N	-	-	-	-
24	36	50	50	106.000N	36	46	32	25.000N
27	45	65	60	124.000N	-	-	-	-
30	45	65	60	189.000N	45	57	40	40.000N
33	54	75	70	189.000N	-	-	-	-
36	54	75	70	271.000N	54	70	50	63.000N
39	63	85	80	271.000N	-	-	-	-
42	63	85	80	371.000N	63	79	57	80.000N
45	68	100	90	371.000N	-	-	-	-
48	68	100	90	507.000N	72	87	63	100.000N
52	78	110	100	507.000N	78	97	71	125.000N
56	78	110	100	677.000N	84	109	80	160.000N
60	90	120	110	677.000N	-	-	-	-
64	90	120	110	942.000N	96	121	89	200.000N
72x6	100	150	140	1.177.000N	108	135	100	250.000N
80x6	112	170	160	1.648.000N	120	152	113	320.000N
90x6	-	-	-	-	135	169	126	400.000N
100x6	130	190	180	2.354.000N	150	189	141	500.000N