UDC 621.882.219.4.092.6 December 1980

Hexagon socket set screws with cup point
ISO 4029 modified

DIN 916

Gewindestifte mit Innensechskant und Ringschneide, ISO 4029 modifiziert

As it is current practice in standards published by the International Organization for Standardization (ISO), the comma has been used throughout as a decimal marker.

This standard includes all specifications of International Standard ISO 4029 – 1977, but is amended for national purposes. The parts amended are marked by shaded areas.

At this point in time it has not been possible to adopt ISO 4029 as a DIN ISO Standard without modifications because some ISO basic standards which are not yet available have to be replaced by national standards. Furthermore ISO 4029 does not cover sizes M 1,4, M 1,8, M 14, M 18 and M 22 as well as some intermediate lengths which are required for national purposes.

Dimensions in mm

1 Field of application

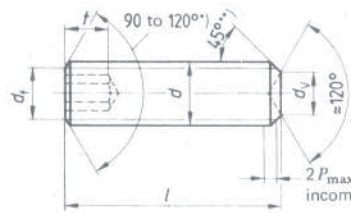
ISO 4029 specifies product grade A hexagon socket set screws with cup points with metric dimension and thread diameters from 1,6 up to and including 24 mm.

If, in special cases, specifications other than those listed are required, these shall be selected from existing International Standards, for example ISO 261, ISO 888, ISO 898, ISO 965, ISO 3506.

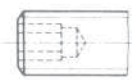
In Germany the following standards apply additionally:

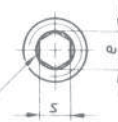
DIN 267 Part 1	Bolts, screws, nuts and similar threaded and formed parts, technical delivery conditions, general information
DIN 267 Part 2	Bolts, screws, nuts and similar threaded and formed parts, technical delivery conditions, types and dimensional accuracy
DIN 267 Part 5	Bolts, screws, nuts and similar threaded and formed parts, technical delivery conditions, testing and acceptance
DIN 267 Part 6	Fasteners, technical delivery conditions, type and dimensional accuracy for product grade F
DIN 267 Part 9	Fasteners, technical delivery conditions, electroplated coatings
DIN 267 Part 11	Fasteners, technical delivery conditions, stainless steel parts
DIN 267 Part 18	Fasteners, technical delivery conditions, parts made of non-ferrous metals

2 Dimensions and designation



Another permissible shape of the bottom of the hexagon





Rounding or countersink at the mouth of the socket is permissible

Designation of a hexagon socket set screw with thread size d = M 6, nominal size l = 12 mm and strength category 45H:

Set screw DIN 916 – M 6 × 12 – 45H

Set screws up to M 2,5 may also be ordered in product grade F according to DIN 267 Part 6. In this case the letter F shall be added to the designation, e.g. **Set screw DIN 916 – M 2 × 4 – 45H – F.**

If set screws in other strength categories (hardness categories) according to DIN ISO 898 Part 5 are required, the corresponding symbol must be indicated in the designation, e.g. **Set screw DIN 916 – M 6 × 12 – 22H.**

For *) and **) see page 2

Continued on pages 2 to 4
Explanations on page 4

Thread size d		M 1,4	M 1,6	(M 1,8)	M 2	M 2,5	M 3	M 4	M 5	M 6
P 1)		0,3	0,35	0,35	0,4	0,45	0,5	0,7	0,8	1
d_v	max.	0,7	0,8	0,9	1	1,2	1,4	2	2,5	3
	min.	0,45	0,55	0,65	0,75	0,95	1,15	1,75	2,25	2,75
d_f	≈	Lower limit of minor thread diameter								
e	min. 2)	0,803	0,803	0,803	1,003	1,427	1,73	2,30	2,87	3,44
s	Nominal size	0,7	0,7	0,7	0,9	1,3	1,5	2	2,5	3
	min.	0,711	0,711	0,711	0,889	1,27	1,52	2,02	2,52	3,02
	max.	0,724	0,724	0,724	0,902	1,295	1,545	2,045	2,56	3,08
t	min. 3)	0,6	0,7	0,8	0,8	1,2	1,2	1,5	2	2
	min. 4)	1,4	1,5	1,6	1,7	2	2	2,5	3	3,5
l		Weight (7,85 kg/dm³) kg per 1000 pieces ≈								
Nominal size	min. / max.									
2	1,80 / 2,20									
2,5	2,30 / 2,70	0,018	1,029	0,030						
3	2,80 / 3,20	0,022	0,028	0,036	0,044	0,075				
(3,5)	3,26 / 3,74									
4	3,76 / 4,24	0,029	0,037	0,048	0,059	0,100	0,140			
5	4,76 / 5,24	0,036	0,046	0,060	0,074	0,125	0,180	0,255	0,420	
6	5,76 / 6,24	0,043	0,056	0,072	0,089	0,150	0,220	0,380	0,540	0,740
8	7,71 / 8,29				0,119	0,199	0,310	0,530	0,780	1,09
10	9,71 / 10,29				0,148	0,249	0,400	0,680	1,02	1,44
12	11,65 / 12,35						0,490	0,830	1,26	1,79
(14)	13,65 / 14,35									
16	15,65 / 16,35						0,670	1,13	1,74	2,49
(18)	17,65 / 18,35									
20	19,58 / 20,42						0,850	1,43	1,22	3,19
(22)	21,58 / 22,42									
25	24,58 / 25,42								2,82	4,07
(28)	27,58 / 28,42									
30	29,58 / 30,42									4,95
35	34,5 / 35,5									5,83

For 1) to 4) see page 3

*) The 120° angle is mandatory for short-length set screws above the dashed stepped line.

**) The ≈ 45° angle applies only to the portion between the minor thread diameter and the cup point diameter d_v.

Thread size d		M 8	M 10	M 12	(M 14)	M 16	(M 18)	M 20	(M 22)	M 24
P 1)		1,25	1,5	1,75	2	2	2,5	2,5	2,5	3
d_v	max.	5	6	8	9	10	12	14	16	16
	min.	4,7	5,7	7,64	8,64	9,64	11,57	13,57	15,57	15,57
d_f	≈	Lower limit of minor thread diameter								
e	min. 2)	4,58	5,72	6,86	6,86	9,15	11,43	11,43	13,72	13,72
s	Nominal size	4	5	6	6	8	10	10	12	12
	min.	4,02	5,02	6,02	6,02	8,025	10,025	10,025	12,032	12,032
	max.	4,095	5,095	6,095	6,095	8,115	10,115	10,115	12,142	12,142
t	min. 3)	3	4	4,8	5,6	6,4	7,2	8	9	10
	min. 4)	5	6	8	9	10	11	12	13,5	15

l Nominal size	l min.	l max.	Weight (7,85 kg/dm³) kg per 1000 pieces ≈								
6	5,76	6,24									
8	7,71	8,29	1,88								
10	9,71	10,29	2,51								
12	11,65	12,35	3,14	4,73							
(14)	13,65	14,35									
16	15,65	16,35	4,40	6,73	9,50						
(18)	17,65	18,35									
20	19,58	20,42	5,66	8,71	12,3		20,9				
(22)	21,58	22,42									
25	24,58	25,42	7,25	11,2	15,9		27,4		41,4		
(28)	27,58	28,42									
30	29,58	30,42	8,84	13,7	19,5		34,0		51,7		70,3
35	34,5	35,5	10,4	16,2	23,1		40,5		62,0		85,3
40	39,5	40,5	12,0	18,7	26,7		47,1		72,3		100
45	44,5	45,5							82,6		115
50	49,5	50,5							92,9		130
55	54,4	55,6									145
60	59,4	60,6									160

1) P = Pitch of the thread (normal thread)

2) $e_{min} = 1{,}14\, s_{min}$; except for sizes M 1,4 to M 2,5

3) Minimum depth of key engagement for set screws with nominal sizes l above the dashed stepped line.

4) Minimum depth of key engagement for set screws with nominal sizes l below the dashed stepped line.

The commercial sizes are marked with the weight.

Bracketed thread sizes d and bracketed nominal sizes l should be avoided wherever possible.

Note: In ISO 4029 the range of the commercial nominal sizes l is in some cases defined somewhat differently. In ISO 4029 weights are not indicated. The sizes listed in the above table marked with the weight are those customary in Germany and are generally in stock.

In the case of short-length set screws penetration of the bottom of the hexagon is not permissible.

3 Technical delivery conditions

Material		Steel	Stainless steel	Non-ferrous metal
General requirements		according to DIN 267 Part 1		
Thread	Tolerance	5g 6g for strength category 45H 6g for all the other strength categories and materials		
	Standard	DIN 13 Part 12 and Part 15		
Mechanical properties	Strength category	45H	up to M 20: A2-70 A4, C3 over M 20: A2-50 A4, C3	.... 2)
	Standard	DIN ISO 898 Part 5	DIN 267 Part 11 1)	DIN 267 Part 18
Permissible dimensional deviations and deviations of form	Product grade	A 3)		
	Standard	DIN ISO 4759 Part 1		
Surface		black oxide (thermal or chemical)	plain	plain
		For the peak-to-valley heights of the surfaces DIN 267 Part 2 (April 1968 edition), subclause 2.1 applies. Requirements for electroplated surface protection according to DIN 267 Part 9		
Acceptance test		For the acceptance test DIN 267 Part 5 applies.		

1) In ISO 4029 ISO Standard 3506 is referred to. This standard is included in DIN 267 Part 11.
2) Standard DIN 267 Part 18 comprises a selection of non-ferrous metals (light and heavy metals) for fasteners. The first edition was published in 1980. A choice of materials for set screws could still not be made.
3) See clause 2

4 Designation

Clause 4 specifying the designations of the set screws according to ISO 4029 has not been adopted because this standard is a national standard (not a DIN ISO Standard) in which the DIN number must be indicated in the designation of the different parts (see clause 2 and explanations).

Explanations

The contents of this standard agree with International Standard ISO 4029 – 1977

Hexagon socket set screws with cup point,

i.e. the ISO Standard has been incorporated completely. All the national specifications going beyond the specifications of ISO 4029 have been marked by shaded areas. The reasons for this kind of adopting an International Standard as a national standard have been stated in the preface.

Compared with the January 1973 edition of DIN 916 by adopting ISO 4029 no modifications adversely affecting the exchangeability have been made.

On principle, the set screws will be designated according to DIN 916 as usual (see clause 4). To facilitate international communication, however, a designation according to ISO 4029 may be used, if required. In this case, however, only the characteristics (not marked by shaded areas in this standard) corresponding to ISO apply.

Example:

Set screws ISO 4029 – M 6 × 12 – 45H

In ISO 4029 of the strength categories (hardness categories) according to ISO 898/V (see DIN ISO draft 898 Part 5) only category 45H is specified. For national purposes set screws in other strength categories, e.g. category 22H, are also required, so that this possibility has been mentioned in the national amendment. This applies also to product grade (type) F according to DIN 267 Part 6 which is required for set screws up to M 2,5 for precision engineering.

In ISO Standard 4029 the former strength category A2-2 for rust-resisting and acidproof (stainless) steel is still specified. Corresponding with ISO 3506 (see DIN 267 Part 11) this category has been renamed to A2-70 or A2-50, respectively.

For non-ferrous metals DIN 267 Part 18 has been referred to, because there is still no corresponding International Standard available.

The minimum hexagon depths t for very short set screws above the stepped line have been reduced. Furthermore a note has been included specifying that the bottom of the hexagon must not be penetrated in the case of short-length set screws. When screwing down these short-length set screws reduced screwing conditions have to be taken into account.

As far as possible the editorial representation of the standard has been adopted from the ISO Standard to facilitate a comparison between DIN and ISO Standards also in this respect.