

Hexagon socket head shoulder screws

1 Scope and field of application

This International Standard lays down the specification for hexagon socket head shoulder screws with metric dimensions and nominal shoulder diameters from 6,5 to 25 mm inclusive.

NOTE — Particular attention is drawn to the note in clause 5 concerning the limitation on tensile testing.

If other specifications are required, it is recommended that they should be selected from existing International Standards, for example ISO 261, ISO 888, ISO 898, ISO 965, ISO 1302, ISO 4759/1.

2 References

ISO 261, *ISO general purpose metric screw threads — General plan.*

ISO 888, *Bolts, screws and studs — Nominal lengths, and thread lengths for general purpose bolts.*

ISO 898, *Mechanical properties of fasteners.*

ISO 965, *ISO general purpose metric screw threads — Tolerances.*

ISO 1302, *Technical drawings — Method of indicating surface texture on drawings.*

ISO 3269, *Fasteners — Acceptance inspection.*¹⁾

ISO 4042, *Threaded components — Electroplated coatings components.*¹⁾

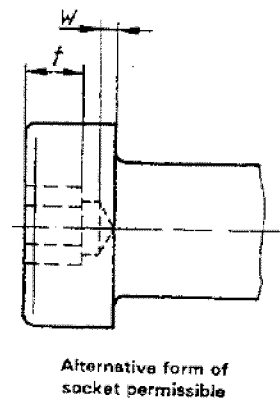
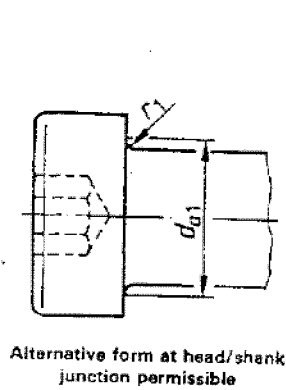
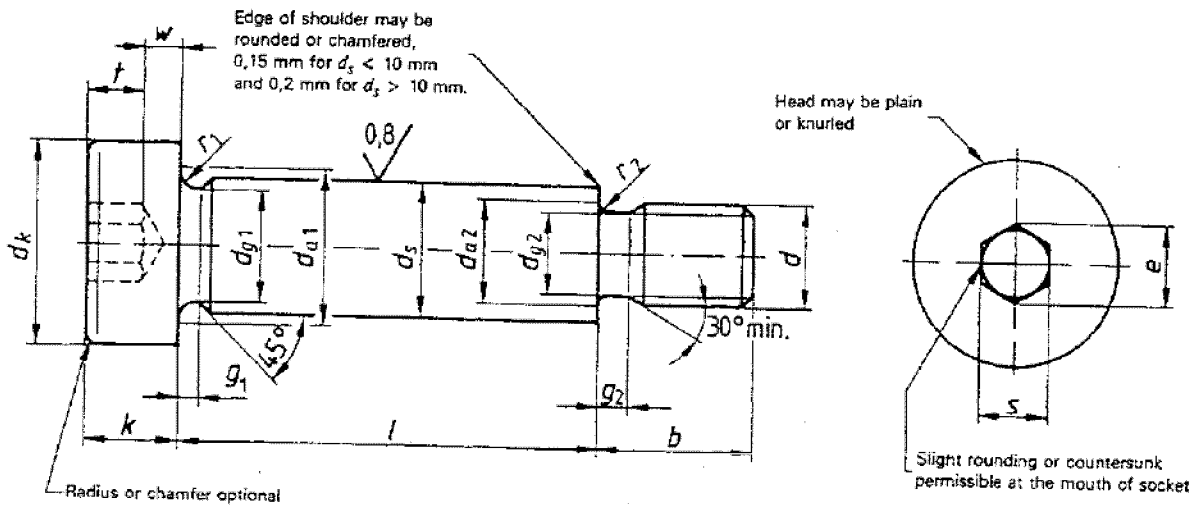
ISO 4755, *Fasteners — Thread undercuts for external metric ISO threads.*

ISO 4759/1, *Tolerances for fasteners — Part 1: Bolts, screws and nuts with thread diameters > 1,6 and < 150 mm and product grades A, B and C.*

¹⁾ At present at the stage of draft.

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3 Dimensions



For broached sockets which are at the maximum limit of size, the overcut resulting from drilling shall not exceed 20 % of the length of any flat of the socket.

NOTE — For form and position tolerances, see clause 4.

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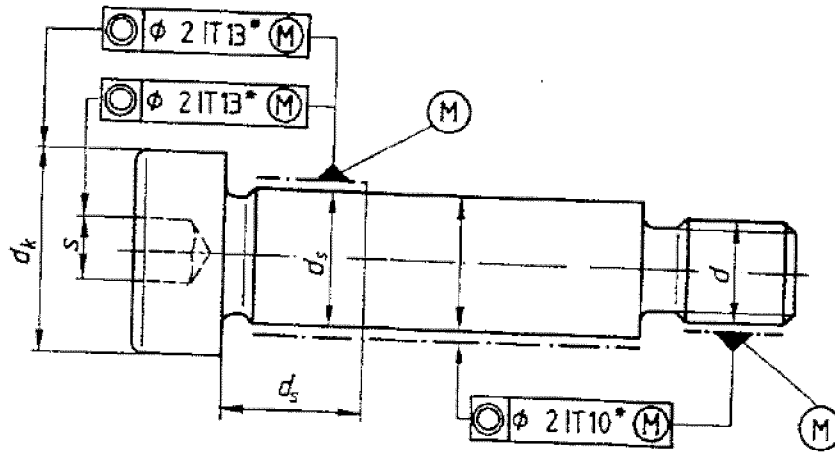
Dimensions in millimetres

	nom.	6,5	8	10	13	16	20	25
		d_s	max.	6,487	7,987	9,967	12,984	15,984
	min.	6,451	7,951	9,951	12,941	15,941	19,928	24,928
d		M5	M6	M8	M10	M12	M16	M20
P ¹⁾		0,8	1	1,25	1,5	1,75	2	2,5
b	max.	9,75	11,25	13,25	16,40	18,40	22,40	27,40
	min.	9,25	10,75	12,75	15,60	17,60	21,60	26,60
d_k	max. ²⁾	10	13	16	18	24	30	36
	max. ³⁾	10,22	13,27	16,27	18,27	24,33	30,33	36,39
	min.	9,78	12,73	15,73	17,73	23,67	29,67	35,61
d_{g1}	min.	5,92	7,42	9,42	12,42	15,42	19,42	24,42
d_{g2}	max.	3,86	4,58	6,25	7,91	9,57	13,32	16,57
	min.	3,68	4,40	6,03	7,69	9,35	12,96	16,30
d_{e1}	max.	7,5	9,2	11,2	15,2	18,2	22,4	27,4
d_{e2}	max.	5	6	8	10	12	16	20
e	min.	3,44	4,58	5,72	6,86	9,15	11,43	13,72
	max.	4,5	5,5	7	9	11	14	16
k	min.	4,32	5,32	6,78	8,78	10,73	13,73	15,73
	max.	2,5	2,5	2,5	2,5	2,5	2,5	3
f_1	max.	2	2,5	3,1	3,7	4,4	5	6,3
r_1	min.	0,25	0,4	0,6	0,6	0,6	0,8	0,8
	min.	0,5	0,53	0,64	0,77	0,87	1,14	1,38
s	nom.	3	4	5	6	8	10	12
	max.	3,08	4,095	5,095	6,095	8,115	10,115	12,142
	min.	3,02	4,02	5,02	6,02	8,025	10,025	12,032
t	min.	2,4	3,3	4,2	4,9	6,6	8,8	10
w	min.	1	1,15	1,6	1,8	2	3,2	3,25
		f ⁴⁾						
	nom.	min.	max.					
	10	10	10,25					
	12	12	12,25					
	16	16	16,25					
	20	20	20,25					
	25	25	25,25					
	30	30	30,25					
	40	40	40,25					
	50	50	50,25					
	60	60	60,25					
	70	70	70,25					
	80	80	80,25					
	90	90	90,25					
	100	100	100,25					
	120	120	120,25					

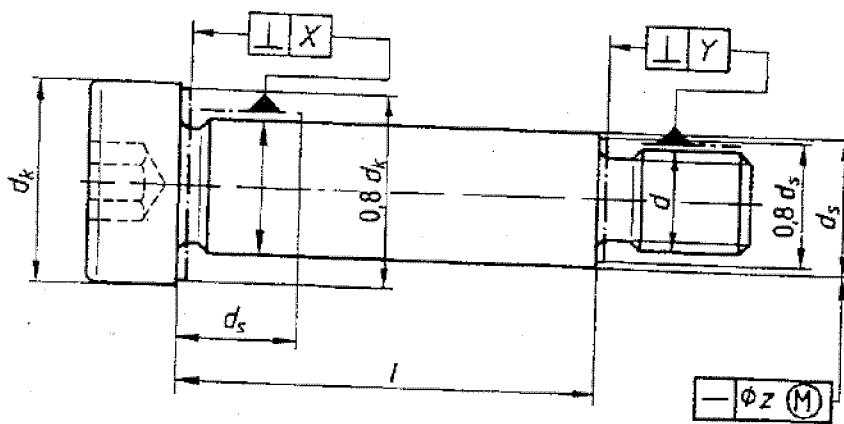
- 1) P = pitch of the thread.
- 2) For plain heads.
- 3) For knurled heads.
- 4) Intermediate lengths according to ISO 888 are permissible.

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4 Geometrical tolerances



Concentricity tolerance of head to shoulder is based on dimension d_k .
 Concentricity tolerance of socket to shoulder is based on dimension d_s .
 Concentricity tolerance of shoulder to thread is based on dimension d .



Concentricity and perpendicularity tolerances

Based on d_k	2 IT13*	Based on d_s	2 IT13*	Based on d	2 IT10*	Based on d_s	X	Based on d	Y
10	0,44	6,5	0,44	5	0,12	6,5	0,15	5	0,15
13	0,54	8		6		8	0,18		
16		10		10		0,24			
18	0,66	13	12	13		0,31	12	0,20	
24		16	16	16	0,34				
30	0,78	20	20	20	0,42	16	0,30		
36		25	20	25	0,50				

* The table gives the tolerance corresponding to quality 2 IT13 or 2 IT10 as a function of the respective diameter.

Straightness tolerance

Based on	Tolerance z
For $d_s < 8$	0,002 / + 0,05 mm
For $d_s > 8$	0,0025 / + 0,05 mm

5 Specifications and reference International Standards

Material		Steel
Thread	Tolerance	5g - 6g
	International Standards	ISO 261, ISO 965
Mechanical properties	Class	12.9 ¹⁾
	International Standard	ISO 898/1
Tolerances	Product grade	A
	International Standard	ISO 4759/1
Finish	Shoulder	To surface roughness of R_a value = 0,8 μm in accordance with ISO 1302. Tolerances only apply before electroplating.
	Other features	Black oxide (thermal or chemical). Requirements for electroplating are covered in ISO 4042. If different electroplating requirements are needed for other finishes, they should be negotiated between customer and supplier.
Acceptability		The acceptance procedure is covered in ISO 3269.

1) Because of their configuration these screws cannot be subjected to tensile testing. They are nevertheless required to meet all the other material and property requirements for property class 12.9 in ISO 898/1.

6 Designation

Example of the designation of a hexagon socket head shoulder screw with a shoulder diameter $d_s = 10$ mm (thread diameter $d = \text{M8}$) and nominal length $l = 40$ mm :

Hexagon socket head shoulder screw ISO 7379 - 10 x 40