ARAMFIX
YOUR GLOBAL FASTENER SUPPLIER

ISO 10642 DATA SHEET

All dimensions in mm

DIN 7991
UNI 5933

Legend:
b - length of the thread (at least)
l - length of bolt
d - the nominal diameter of the thread
k - head height
e - the diameter of the circumscribed circle (not less than)
ds - diameter of the screw shank
t - groove depth
dk - head diameter
s - size of the internal hexagon

Makings:
Steel: 8.8, 10.9, 12.9
Stainless: A2, A4
Plastic: -
Non Ferrous: -
Thread: 6g-

Notes:

Disclaimer
ARAMFIX gives no guarantee for the topicality, accuracy and completeness of the information provided. This sheet is used at the users own risk. And is not liable for damage directly or indirectly resulting from the use of the data and the information it contains. Dimensional data and technical information was obtained from publicly available sources and through standards agencies. It has been completed and compiled for reference purposes only, where discrepancies are found they are subject to change without notice. ARAMFIX makes no warranties or representations regarding the accuracy and validity of the compiled information and data. Contact the relevant standards authorities for accurate and detailed information.

ARAMFIX
YOUR GLOBAL FASTENER SUPPLIER

ISO 10642 DATA SHEET

All dimensions in mm

DIN 7991
UNI 5933

TABLE 1: ACCORDING TO DIN 7991

Thread d		M3	M4	M5	M6	M8	M10	M12	(M14)	M16	(M18)	M20	(M22)	M24
P		0,5	0,7	0,8	1	1,25	1,5	1,75	2	2	2,5	2,5	2,5	3
a	2° 0	90°											60°	
b	l?125mm	12	14	16	18	22	26	30	34	38	42	46	50	54
		-	-	-	24	28	32	36	40	44	48	52	56	60
	l>200mm	-	-	-	-	-	45	49	53	57	61	65	69	73
c	approx.	0,2	0,3	0,3	0,3	0,4	0,5	0,5	0,5	0,5	0,5	0,5	1	1
dk	nominal=-max.	6	8	10	12	16	20	24	27	30	33	36	36	39
min.	5,7	7,64	9,64	11,57	15,57	19,48	23,48	26,48	29,48	32,38	35,38	35,38	38,38	
da	max.	3,6	4,7	5,7	6,8	9,2	11,2	13,7	15,7	17,7	20,2	22,4	24,4	26,4
ds	nominal=-max.	3	4	5	6	8	10	12	14	16	18	20	22	24
	min.	2,86	3,82	4,82	5,82	7,78	9,78	11,73	13,73	15,73	17,73	19,67	21,67	23,67
e	min.	2,3	2,87	3,44	4,58	5,72	6,86	9,15	11,43	11,43	13,72	13,72	16	16
k	max.	1,7	2,3	2,8	3,3	4,4	5,5	6,5	7	7,5	8	8,5	13,1	14
r	min.	0,1	0,2	0,2	0,3	0,5	0,5	1	1	1	1	1	1	1,6
s	nominal	2	2,5	3	4	5	6	8	10	10	12	12	14	14
	min.	2,02	2,52	3,02	4,02	5,02	6,02	8,025	10,025	10,025	12,032	12,032	14,032	14,032
	max.	2,1	2,6	3,1	4,12	5,14	6,14	8,175	10,175	10,175	12,212	12,212	14,212	14,212
t	nominal=-max.	1,2	1,8	2,3	2,5	3,5	4,4	4,6	4,8	5,3	5,5	5,9	8,8	10,3
	min.	0,95	1,5	2,05	2,25	3,2	4,1	4,3	4,5	5	5,2	5,6	8,44	9,87

Thread d			M3		M4		M5		M6		M8		M10		M12	
l			lengths ls and lg													
nominal	min.	max.	ls min.	lg max.	ls min.	lg max.	ls min.	lg max.	ls min.	lg max.	ls min.	lg max.	ls min.	lg max.	ls min.	lg max.
8	7,71	8,29	-	3,2	-	4,4	-	5,2	-	6,3						
10	9,71	10,29	-	3,2	-	4,4	-	5,2	-	6,3	-	8,2				
12	11,65	12,35	-	3,2	-	4,4	-	5,2	-	6,3	-	8,2	-	10		
16	15,65	16,35	-	3,2	-	4,4	-	5,2	-	6,3	-	8,2	-	10		
20	19,58	20,42	-	3,2	-	4,4	-	5,2	-	6,3	-	8,2	-	10	-	11,8
25	24,58	25,42	10,5	13	-	4,4	-	5,2	-	6,3	-	8,2	-	10	-	11,8
30	29,58	30,42	15,5	18	12,5	16	-	5,2	-	6,3	-	8,2	-	10	-	11,8
35	34,5	35,5			17,5	21	15	19	-	6,3	-	8,2	-	10	-	11,8
40	39,5	40,5			22,5	26	20	24	17	22	-	8,2	-	10	-	11,8
50	49,5	50,5					30	34	27	32	21,7	28	16,5	24	-	11,8
60	59,4	60,6									31,7	38	26,5	34	21,25	30
70	69,4	70,6											36,5	44	31,25	40
s	nominal	2	2,5	3	4	5	6	8	10	10	12	12	14	14		
	min.	2,02	2,52	3,02	4,02	5,02	6,02	8,025	10,025	10,025	12,032	12,032	14,032	14,032		
	max.	2,1	2,6	3,1	4,12	5,14	6,14	8,175	10,175	10,175	12,212	12,212	14,212	14,212		
t	nominal=-max.	1,2	1,8	2,3	2,5	3,5	4,4	4,6	4,8	5,3	5,5	5,9	8,8	10,3		
	min.	0,95	1,5	2,05	2,25	3,2	4,1	4,3	4,5	5	5,2	5,6	8,44	9,87		

Thread d			(M14)		M16		(M18)		M20		(M22)		M24	
l			lengths ls and lg											
nominal	min.	max.	ls min.	lg max.	ls min.	lg max.	ls min.	lg max.	ls min.	lg max.	ls min.	lg max.	ls min.	lg max.
20	19,58	20,42												
25	24,58	25,42	-	13										
30	29,58	30,42	-	13	-	13,5								
35	34,5	35,5	-	13	-	13,5	-	15,5	-	16				
40	39,5	40,5	-	13	-	13,5	-	15,5	-	16	-	20,6		
50	49,5	50,5	-	13	-	13,5	-	15,5	-	16	-	20,6	-	23
60	59,4	60,6	16	26	-	13,5	-	15,5	-	16	-	20,6	-	23
70	69,4	70,6	26	36	22	32	15,5	28	-	16	-	20,6	-	23
80	79,4	80,6	36	46	32	42	25,5	38	21,5	34	-	20,6	-	23
90	89,3	90,7			42	52	35,5	48	31,5	44	27,5	40	-	23
100	99,3	100,7					45,5	58	41,5	54	37,5	50	31	46
70	69,4	70,6											36,5	44

ARAMFIX
YOUR GLOBAL FASTENER SUPPLIER

ISO 10642 DATA SHEET

All dimensions in mm

DIN 7991
UNI 5933

Chemical Composition and Tempering
According to NEN-EN-ISO 898-1:2013 this table specifies limits for the chemical composition of steels and minimum tempering temperatures for the different property classes of bolts, screws and studs. The chemical composition shall be assessed in accordance with the relevant International Standards. For fasteners that have to be hot dip galvanized, the additional material requirements given in ISO 10684 apply.

TABLE 2: CHEMICAL COMPOSITION AND TEMPERING

Property class	Material and heat treatment	Chemical composition limit (cast analysis, %)[a]					Tempering temperature °C
		C		P	S	B[b]	
		min.	max.	max.	max.	max.	min
4.6[c d]	Carbon steel or carbon steel with additives	-	0,55	0,050	0,060	Not specified	-
4.8[d]							
5.6[d]		0,13	0,55	0,050	0,060		
5.8[d]		-	0,55	0,050	0,060		
6.8[d]		0,15	0,55	0,050	0,060		
8.8[f]	Carbon steel with additives (e.g. Boron or Mn or Cr) quenched and tempered or	0,15[e]	0,40	11,2	2,4	0,003	425
	Carbon steel quenched and tempered or	0,25	0,55	0,025	0,025		
	Alloy steel quenched and tempered[g]	0,20	0,55	0,025	0,025		
9.8[f]	Carbon steel with additives (e.g. Boron or Mn or Cr) quenched and tempered or..	0,15[e]	0,40	0,025	0,025	0,003	425
	Carbon steel quenched and tempered or	0,25	0,55	0,025	0,025		
	Alloy steel quenched and tempered[g]	0,20	0,55	0,025	0,025		
10.9[f]	Carbon steel with additives (e.g. Boron or Mn or Cr) quenched and tempered or..	0,20[e]	0,55	0,025	0,025	0,003	425
	Carbon steel quenched and tempered or..	0,25	0,55	0,025	0,025		
	Alloy steel quenched and tempered[g]	0,20	0,55	0,025	0,025		
12.9[f h i]	Alloy steel quenched and tempered[g]	0,30	0,50	0,025	0,025	0,003	425
12.9[f h i]	Carbon steel with additives (e.g. Boron or Mn or Cr or Molybdenum) quenched and tempered	0,28	0,50	0,025	0,025	0,003	425

a) In case of dispute, the product analysis applies. **b)** Boron content can reach 0,005 %, provided non-effective boron is controlled by the addition of titanium and/or aluminium. **c)** For cold forged fasteners of property classes 4.6 and 5.6, heat treatment of the wire used for cold forging or of the cold forged fastener itself may be necessary to achieve required ductility. **d)** Free cutting steel is allowed for these property classes with the following maximum sulfur, phosphorus and lead contents: S: 0,34 %; P: 0,11 %; Pb: 0,35 %. **e)** In case of plain carbon boron steel with a carbon content below 0,25 % (cast analysis), the minimum manganese content shall be 0,6 % for property class 8.8 and 0,7 % for property classes 9.8 and 10.9. **f)** For the materials of these property classes, there shall be a sufficient hardenability to ensure a structure consisting of approximately 90 % martensite in the core of the threaded sections for the fasteners in the "as-hardened" condition before tempering. **g)** This alloy steel shall contain at least one of the following elements in the minimum quantity given: chromium 0,30 %, nickel 0,30 %, molybdenum 0,20 %, vanadium 0,10 %. Where elements are specified in combinations of two, three or four and have alloy contents less than those given above, the limit value to be applied for steel class determination is 70 % of the sum of the individual limit values specified above for the two, three or four elements concerned. **h)** Fasteners manufactured from phosphated raw material shall be dephosphated before heat treatment; the absence of white phosphorus enriched layer shall be detected by a suitable test method. **i)** Caution is advised when the use of property class 12.9/12.9 is considered. The capability of the fastener manufacturer, the service conditions and the wrenching methods should be considered. Environments can cause stress corrosion cracking of fasteners as processed as well as those coated.

ARAMFIX
YOUR GLOBAL FASTENER SUPPLIER

ISO 10642 DATA SHEET

All dimensions in mm

DIN 7991
UNI 5933

Mechanical and physical properties of steel Metric Coarse fasteners
The Mechanical and physical properties according to NEN-EN-ISO 898-1:2013 The bolts, screws and studs of the specified property classes shall, at ambient temperature, meet all the applicable mechanical and physical properties in accordance with the tables regardless of which tests are performed during manufacturing or final inspection. For specific details consult NEN-EN-ISO 898-1:2013

TABLE 3: MECHANICAL AND PHYSICAL PROPERTIES OF STEEL FOR METRIC COARSE FASTENERS

No.	Mechanical or physical property		Property class									
			4.6	4.8	5.6	5.8	6.8	8.8 d≤ 16 mm[a]	8.8 d> 16 mm[b]	9.8 d≤ 16 mm	10.9	12.9/ 12.9
1	Tensile strength, Rm, MPa	nom.[c]	400		500		600	800		900	1 000	1 200
		min.	400	420	500	520	600	800	830	900	1 040	1 220
2	Lower yield strength, R_{eL}[d], MPa	nom.[c]	240	—	300	—	—	—	—	—	—	—
		min.	240	—	300	—	—	—	—	—	—	—
3	Stress at 0,2 % non-proportional elongation, $R_{p0,2}$, MPa	nom.[c]	—	—	—	—	—	640	640	720	900	1 080
		min.	—	—	—	—	—	640	660	720	940	1 100
4	Stress at 0,0048*d* non-proportional elongation for full-size fasteners, R_{pf}, MPa	nom.[c]	—	320	—	400	480	—	—	—	—	—
		min.	—	340[e]	—	420[e]	480[e]	—	—	—	—	—
5	Stress under proof load, S_p[f], MPa	nom.[c]	225	310	280	380	440	580	600	650	830	970
	Proof strength ratio: $S_{p,nom}/R_{eL,min}$ or $S_{p,nom}/R_{p0,2\,min}$ or $S_{p,nom}/R_{pf,\,min}$		0,94	0,91	0,93	0,9	0,92	0,91	0,91	0,9	0,88	0,88
6	Percentage elongation after fracture for machined test pieces, *A*, %	min.	22	—	20	—	—	12	12	10	9	8
7	Percentage reduction of area after fracture for machined test pieces, *Z*, %	min.	—					52		48	48	44
8	Elongation after fracture for full-size fasteners, Af min. (see also Annex C)	min.	—	0,24	—	0,22	0,2	—	—	—	—	—
9	Head soundness		No fracture									
10	Vickers hardness HV F ≥ 98 N	min.	120	130	155	160	190	250	255	290	320	385
		max.	220[g]				250	320	335	360	380	435
11	Brinell hardness, HBW F = 30 D^2	min.	114	124	147	152	181	245	250	286	316	380
		max.	209[g]				238	316	331	355	375	429

Table 3 (continued)

Disclaimer
ARAMFIX gives no guarantee for the topicality, accuracy and completeness of the information provided. This sheet is used at the users own risk. And is not liable for damage directly or indirectly resulting from the use of the data and the information it contains. Dimensional data and technical information was obtained from publicly available sources and through standards agencies. It has been completed and compiled for reference purposes only, where discrepancies are found they are subject to change without notice. ARAMFIX makes no warranties or representations regarding the accuracy and validity of the compiled information and data. Contact the relevant standards authorities for accurate and detailed information.

ARAMFIX
YOUR GLOBAL FASTENER SUPPLIER

ISO 10642 DATA SHEET

All dimensions in mm

DIN 7991
UNI 5933

No.	Mechanical or physical property		Property class									
			4.6	4.8	5.6	5.8	6.8	8.8 d≤ 16 mm[a]	8.8 d> 16 mm[b]	3.05 d≤ 16 mm	10.9	12.9/ 12.9
12	Rockwell hardness. HRB	min.	67	71	79	82	89	—				
		max.	95,0[g]				99,5	—				
	Rockwell hardness. HRC	min.	—					22	23	28	32	39
		max.	—					32	34	37	39	44
13	Surface hardness. HV 0.3	max.	—					—			390	435
14	Non-carburization. HV 0.3	max.	—					h			h	h
15	Height of non-decarburized thread zone. E. mm	min.	—					1/2 H_1			2/3 H_1	3/4 H_1
	Depth of complete decarburization in the thread. G. mm	max.	—					0.015				
16	Reduction of hardness after retempering. HV	min.	—					20				
17	Breaking torque. M_B. Nm	min.	—					in accordance with ISO 898-7				
18	Impact strength. KV i j. J	min.	—		27	—		27	27	27	27	—
19	Surface integrity in accordance with	min.	ISO 6157-1l									ISO 6157-3

a) Values do not apply to structural bolting. **b)** For structural bolting d ≥ M12 **c)** Nominal values are specified only for the purpose of the designation system for property classes. See Clause 5. **d)** In cases where the lower yield strength. ReL. cannot be determined. it is permissible to measure the stress at 0.2 % non- proportional elongation Rp0.2. **e)** For the property classes 4.8. 5.8 and 6.8. the values for Rpf.min are under investigation. The values at the time of publication of this part of ISO 898 are given for calculation of the proof stress ratio only. They are not test values. **f)** Proof loads are specified in original ISO 898-1:2013. **g)** Hardness determined at the end of a fastener shall be 250 HV. 238 HB or 99.5 HRB maximum. **h)** Surface hardness shall not be more than 30 Vickers points above the measured base metal hardness of the fastener when determination of both surface hardness and base metal hardness are carried out with HV 0.3 **i)** Values are determined at a test temperature of −20 °C. **j)** Applies to d ≥ 16 mm. **k)** Value for KV is under investigation. **l)** Instead of ISO 6157-1. ISO 6157-3 may apply by agreement between the manufacturer and the purchaser.

Disclaimer
ARAMFIX gives no guarantee for the topicality, accuracy and completeness of the information provided. This sheet is used at the users own risk. And is not liable for damage directly or indirectly resulting from the use of the data and the information it contains. Dimensional data and technical information was obtained from publicly available sources and through standards agencies. It has been completed and compiled for reference purposes only, where discrepancies are found they are subject to change without notice. ARAMFIX makes no warranties or representations regarding the accuracy and validity of the compiled information and data. Contact the relevant standards authorities for accurate and detailed information.

ARAMFIX
YOUR GLOBAL FASTENER SUPPLIER

ISO 10642 DATA SHEET

All dimensions in mm

DIN 7991
UNI 5933

Minimum Ultimate Tensile loads
According to NEN-EN-ISO 898-1:2013 the minimum ultimate tensile loads are applicable for coarse pitch thread.

TABLE 4: MINIMUM ULTIMATE TENSILE LOADS FOR STEEL METRIC COARSE FASTENERS

Thread[a] [d]	Nominal stress area As,nom[b] mm²	Property class								
		4.6	4.8	5.6	5.8	6.8	8.8	9.8	10.9	12.9/12.9
		Minimum ultimate tensile load, Fm,min (As,nom × Rm,min), N								
M3	5,03	2 010	2 110	2 510	2 620	3 020	4 020	4 530	5 230	6 140
M3,5	6,78	2 710	2 850	3 390	3 530	4 070	5 420	6 100	7 050	8 270
M4	8,78	3 510	3 690	4 390	4 570	5 270	7 020	7 900	9 130	10 700
M5	14,2	5 680	5 960	7 100	7 380	8 520	11 350	12 800	14 800	17 300
M6	20,1	8 040	8 440	10 000	10 400	12 100	16 100	18 100	20 900	24 500
M7	28,9	11 600	12 100	14 400	15 000	17 300	23 100	26 000	30 100	35 300
M8	36,6	14 600[c]	15 400	18 300[c]	19 000	22 000	29 200[c]	32 900	38 100[c]	44 600
M10	58	23 200[c]	24 400	29 000[c]	30 200	34 800	46 400[c]	52 200	60 300[c]	70 800
M12	84,3	33 700	35 400	42 200	43 800	50 600	67 400[d]	75 900	87 700	103 000
M14	115	46 000	48 300	57 500	59 800	69 000	92 000[d]	104 000	120 000	140 000
M16	157	62 800	65 900	78 500	81 600	94 000	125 000[d]	141 000	163 000	192 000
M18	192	76 800	80 600	96 000	99 800	115 000	159 000	—	200 000	234 000
M20	245	98 000	103 000	122 000	127 000	147 000	203 000	—	255 000	299 000
M22	303	121 000	127 000	152 000	158 000	182 000	252 000	—	315 000	370 000
M24	353	141 000	148 000	176 000	184 000	212 000	293 000	—	367 000	431 000
M27	459	184 000	193 000	230 000	239 000	275 000	381 000	—	477 000	560 000
M30	561	224 000	236 000	280 000	292 000	337 000	466 000	—	583 000	684 000
M33	694	278 000	292 000	347 000	361 000	416 000	576 000	—	722 000	847 000
M36	817	327 000	343 000	408 000	425 000	490 000	678 000	—	850 000	997 000
M39	976	390 000	410 000	488 000	508 000	586 000	810 000	—	1 020 000	1 200 000

a) Where no thread pitch is indicated in a thread designation, coarse pitch is specified. **b)** To calculate As,nom, see 9.1.6.1. in ISO 898-1:2013 **c)** For fasteners with thread tolerance 6az in accordance with ISO 965-4 subject to hot dip galvanizing, reduced values in accordance with ISO 10684:2004, Annex A, apply. **d)** For structural bolting 70 000 N (for M12), 95 500 N (for M14) and 130 000 N (for M16).

Disclaimer
ARAMFIX gives no guarantee for the topicality, accuracy and completeness of the information provided. This sheet is used at the users own risk. And is not liable for damage directly or indirectly resulting from the use of the data and the information it contains. Dimensional data and technical information was obtained from publicly available sources and through standards agencies. It has been completed and compiled for reference purposes only, where discrepancies are found they are subject to change without notice. ARAMFIX makes no warranties or representations regarding the accuracy and validity of the compiled information and data. Contact the relevant standards authorities for accurate and detailed information.