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Zero defect

It would be a dream if all parts could be produced with zero defect, but unfortunately this is not the case.

Today we are able to get close to zero defect with help from well controlled production. The DIN and ISO standards for fasteners allow a number of defect parts per production batch which in some cases can not be accepted on high volume automatic assembling lines.

Therefore we can offer a solution to reduce the costs of production disturbances through 100% machine sorting. The cost for the sorting compared to a disturbance in the production is practically nonexistent.

Talk to our salesmen or our quality department and we will tell you what we can offer.



Machine sorting of fasteners are done in this fully automatic machine.

TECHNICAL INFORMATION

TENSILE STRENGTH FOR FASTENERS WITH METRIC THREAD

(ref: ISO 898/1)

Metric ISO coarse thread

Nominal thread diameter mm	Pitch mm	Nominal stress mm ²	Property class								
			3.6	4.6	4.8	5.6	5.8	6.8	8.8	10.9	12.9
			Minimum tensile strength N								
3	0,5	5,03	1 660	2 010	2 110	2 510	2 620	3 020	4 020	5 230	6 140
3,5	0,6	6,78	2 240	2 710	2 850	3 390	3 530	4 070	5 420	7 050	8 270
4	0,7	8,78	2 900	3 510	3 690	4 390	4 570	5 270	7 020	9 130	10 700
5	0,8	14,2	4 690	5 680	5 960	7 100	7 380	8 520	11 350	14 800	17 300
6	1	20,1	6 630	8 040	8 440	10 000	10 400	12 100	16 100	20 900	24 500
7	1	28,9	9 540	11 600	12 100	14 400	15 000	17 300	23 100	30 100	35 300
8	1,25	36,6	12 000	14 600	15 400	18 300	19 000	22 000	29 200	38 100	44 600
10	1,5	58,0	19 100	23 200	24 400	29 000	30 200	34 800	46 400	60 300	70 800
12	1,75	84,3	27 800	33 700	35 400	42 200	43 800	50 600	67 400	87 700	103 000
14	2	115	38 000	46 000	48 300	57 500	59 800	69 000	92 000	120 000	140 000
16	2	157	51 800	62 800	65 900	78 500	81 600	94 000	125 000	163 000	192 000
18	2,5	192	63 400	76 800	80 600	96 000	99 800	115 000	159 000	200 000	234 000
20	2,5	245	80 800	98 000	103 000	122 000	127 000	147 000	203 000	255 000	299 000
22	2,5	303	100 000	121 000	127 000	152 000	158 000	182 000	252 000	315 000	370 000
24	3	353	116 000	141 000	148 000	176 000	184 000	212 000	293 000	367 000	431 000
27	3	459	152 000	184 000	193 000	230 000	239 000	275 000	381 000	477 000	560 000
30	3,5	561	185 000	224 000	236 000	280 000	292 000	337 000	466 000	583 000	684 000
33	3,5	694	229 000	278 000	292 000	347 000	361 000	416 000	576 000	722 000	847 000
36	4	817	270 000	327 000	343 000	408 000	425 000	490 000	678 000	850 000	997 000
39	4	976	322 000	390 000	410 000	488 000	508 000	586 000	810 000	1 020 000	1 200 000

Metric ISO fine pitch

Nominal thread diameter mm	Pitch mm	Nominal stress mm ²	Property class								
			3.6	4.6	4.8	5.6	5.8	6.8	8.8	10.9	12.9
			Minimum tensile strength N								
8	1	39,2	12 900	15 700	16 500	19 600	20 400	23 500	31 360	40 800	47 800
10	1,25	61,2	20 200	24 500	25 700	30 600	31 800	36 700	49 000	63 600	74 700
12	1,25	92,1	30 400	36 800	38 700	46 000	47 900	55 300	73 700	95 800	112 000
14	1,5	125	41 200	50 000	52 500	62 500	65 000	75 000	100 000	130 000	152 000
16	1,5	167	55 100	66 800	70 100	83 500	86 800	100 000	134 000	174 000	204 000
18	1,5	216	71 300	86 400	90 700	108 000	112 000	130 000	179 000	225 000	264 000
20	1,5	272	89 800	109 000	114 000	136 000	141 000	163 000	226 000	283 000	332 000
22	1,5	333	110 000	133 000	140 000	166 000	173 000	200 000	276 000	346 000	406 000
24	2	384	127 000	154 000	161 000	192 000	200 000	230 000	319 000	399 000	469 000
27	2	496	164 000	194 000	208 000	248 000	258 000	298 000	412 000	516 000	605 000
30	2	621	205 000	248 000	261 000	310 000	323 000	373 000	515 000	646 000	758 000
33	2	761	251 000	304 000	320 000	380 000	396 000	457 000	632 000	791 000	928 000
36	3	865	285 000	346 000	363 000	432 000	450 000	519 000	718 000	900 000	1 050 000
39	3	1030	340 000	412 000	433 000	515 000	536 000	618 000	855 000	1 070 000	1 260 000

TECHNICAL INFORMATION

RECOMMENDED TIGHTENING TORQUE

The tightening torque (Mv) in Nm for plain, oiled steel screw applications when a torque wrench or torque controlled tightening equipment is used (torque tolerance max +/- 5%). Please see next page for conversion factor C for other material/lubrications.

Metric coarse thread					Property class acc. to 898/1				
Thread M	d mm	P mm	A _S mm ²	4.6	5.8	8.8	10.9	12.9	
1,6	1,6	0,35	1,27	0,065	0,10	0,17	0,24	0,29	
1,8	1,8	0,35	1,70	0,096	0,16	0,25	0,36	0,43	
2	2	0,4	2,07	0,13	0,22	0,35	0,49	0,58	
2,2	2,2	0,45	2,48	0,17	0,29	0,46	0,64	0,77	
2,5	2,5	0,45	3,39	0,26	0,44	0,70	0,98	1,2	
3	3	0,5	5,03	0,46	0,77	1,2	1,7	2,1	
3,5	3,5	0,6	6,78	0,73	1,2	1,9	2,7	3,3	
4	4	0,7	8,78	1,1	1,8	2,9	4,0	4,9	
4,5	4,5	0,75	11,3	1,6	2,6	4,1	5,8	7,0	
5	5	0,8	14,2	2,2	3,6	5,7	8,1	9,7	
6	6	1	20,1	3,7	6,1	9,8	14	17	
8	8	1,25	36,6	8,9	15	24	33	40	
10	10	1,5	58	17	29	47	65	79	
12	12	1,75	84,3	30	51	81	114	136	
14	14	2	115	48	80	128	181	217	
16	16	2	157	74	123	197	277	333	
18	18	2,5	192	103	172	275	386	463	
20	20	2,5	245	144	240	385	541	649	
22	22	2,5	303	194	324	518	728	874	
24	24	3	353	249	416	665	935	1120	
27	27	3	459	360	600	961	1350	1620	
30	30	3,5	561	492	819	1310	1840	2210	
33	33	3,5	694	663	1100	1770	2480	2980	
36	36	4	817	855	1420	2280	3210	3850	

Metric fine thread					Property class acc. to 898/1				
Thread M	d mm	P mm	A _S mm ²	4.6	5.8	8.8	10.9	12.9	
2x0,25	2	0,25	2,45	0,14	0,24	0,38	0,54	0,65	
2,2x0,25	2,2	0,25	3,03	0,19	0,32	0,52	0,73	0,87	
2,5x0,25	2,5	0,25	3,70	0,28	0,46	0,74	1,0	1,2	
3x0,35	3	0,35	5,60	0,49	0,82	1,3	1,8	2,2	
3,5x0,35	3,5	0,35	7,90	0,80	1,3	2,1	3,0	3,6	
4x0,5	4	0,5	9,79	1,2	1,9	3,1	4,3	5,2	
4,5x0,5	4,5	0,5	12,8	1,7	2,8	4,5	6,3	7,5	
5x0,5	5	0,5	16,1	2,3	3,9	6,2	8,7	10	
6x0,75	6	0,75	22,0	3,9	6,5	10	15	17	
8x1	8	1	39,2	9,2	15	25	35	42	
10x1,25	10	1,25	61,2	18	30	48	68	81	
10x1	10	1	64,5	19	31	49	70	84	
12x1,5	12	1,5	88,1	31	52	83	117	140	
12x1,25	12	1,25	92,1	32	53	85	120	144	
14x1,5	14	1,5	125	51	84	135	190	228	
16x1,5	16	1,5	167	76	127	204	287	344	
18x1,5	18	1,5	216	110	184	294	413	496	
20x1,5	20	1,5	272	153	255	408	574	688	
22x1,5	22	1,5	333	205	341	546	768	921	
24x2	24	2	384	261	435	696	979	1170	
27x2	27	2	496	376	627	1000	1410	1690	
30x2	30	2	621	520	866	1390	1950	2340	
33x2	33	2	761	697	1160	1860	2610	3130	
36x3	36	3	865	883	1470	2350	3310	3970	

TECHNICAL INFORMATION

CONVERSION FACTOR (C) FOR TIGHTENING TORQUE FOR SOME COMMON PLATINGS

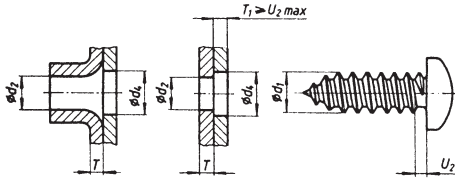
Material, plating ¹⁾		Lubrication	Conversion factor C ²⁾
Screw	Nut or mating thread		
Steel, plain	Steel, plain	dry oil MoS ₂ wax	0,96 1,00 0,86 0,63
Steel phos	Steel, phos or plain	dry oil MoS ₂ wax	0,90 0,86 0,77 0,63
Steel zpl or yzp	Steel, zpl, yzp or plain	dry oil/emulsion wax	0,96 0,86 0,63
	Light metal	oil/emulsion	0,94
Steel, hdg	Steel, hdg or plain	oil	1,07
		dry oil/emulsion wax	1,17 1,07 0,63
Dacromet 500	Dacromet 500	incl. teflon	0,96
Dacromet 320	Dacromet 320	without teflon	≥1,17
ZIB + WAX	ZIB or plain	gleitmo 603/602	0,96
Stainless and acid proof steel	Stainless and acid proof steel or light metal	wax	1,00
		oil/emulsion	0,84

1) Plain = plain, as processed, phos = phosphated, zincpl = zinc plated + bright chromated, fzy = zinc plated + yellow chromated, hdg = hot dip galvanized.

2) The conversion factor C has been set to 1,0 for plain oiled steel screw and nut and for waxed stainless steel screw and nut. The torque values given in the tables refers to these combinations. It's easy to recalculate them to other combinations by multiplying with factor C.

TECHNICAL INFORMATION

RECOMMENDED VALUES FOR HOLE DIAMETERS FOR SELFTAPPING SCREWS WITH ST-THREAD



Thread	ST 2,2	ST 2,9	ST 3,5	ST 4,2	ST 4,8	ST 5,5	ST 6,3	ST 8
d ₄	2,8	3,6	4,2	5	5,8	6,6	7,4	9,5

Thread P=pitch	Thickness of sheet T	Bore diameter, d ₂ , H12 or H13 ¹⁾						
		Steel, brass and copper Drifted hole Hole group 1A		Aluminium Drifted hole Hole group 2A		Cast alloys of magnesium, zinc, aluminium and brass Hole group 3 ³⁾	Plastic Duro plastic (thermoset) Hole group 4 ³⁾	Thermo/plast Hole group 5 ³⁾
ST 2,2 P=0,79	-0,56 (0,56)-0,75 (0,75)-0,88		1,6 1,7 1,8			2x3	2x5	2x5
	(0,88)-1,13 (1,13)-1,38 (1,38)-1,5		1,8 1,9 1,9		1,6 1,7 1,8			
ST 2,9 P=1,06	-0,56 (0,56)-0,63 (0,63)-0,75	2,2 2,5 2,5	2,2 2,3 2,3	2,2 2,2		2,7x5	2,5x6,5	2,4x6,5
	(0,75)-0,88 (0,88)-1,25 (1,25)-1,38	2,5	2,4 2,4 2,4	2,2 2,2	2,2 2,2 2,2			
	(1,38)-1,75 (1,75)-2,5		2,5 2,6		2,3 2,4			
ST 3,5 P=1,27	-0,56 (0,56)-0,75 (0,75)-0,88	2,8 2,8 2,8	2,6 2,7 2,7	2,8 2,8		3,3x6,5	3,2x6,5	3x6,5
	(0,88)-1,25 (1,25)-1,38 (1,38)-1,75		2,8 2,8 2,9	2,8	2,6 2,7 2,8			
	(1,75)-2,5 (2,5)-3 (3)-6		3 3,2		2,8 3 3			
ST 4,2 P=1,41	-0,5 (0,5)-0,63 (0,63)-0,88	3,5 3,5 3,5	3,2 3,2	3,5 3,5	2,9	3,9x6,5	3,8x8	3,7x8
	(0,88)-1,13 (1,13)-1,38 (1,38)-2,5	3,5 3,5	3,2 3,3 3,5	3,5 3,5	3 3,2 3,5			
	(2,5)-3 (3)-3,5 (3,5)-10		3,8 3,9		3,7 3,8 3,9			
ST 4,8 P=1,59	-0,5 (0,5)-0,75 (0,75)-1,13	4 4 4	3,7 3,7	4 4		4,5x6,4	4,5x8	4,3x8
	(1,13)-1,38 (1,38)-1,75 (1,75)-2,5	4	3,9 3,9	4	3,7 3,7			
	(2,5)-3 (3)-3,5		4 4,3		3,7 3,8 3,9			

TECHNICAL INFORMATION

Thread <i>P</i> =pitch	Thickness of sheet <i>T</i>	Bore diameter, d_2 , H12 or H13 ¹⁾						
		Steel, brass and copper Drifted hole		Aluminium Drifted hole		Cast alloys of magnesium, zinc, aluminium and brass Hole group 3 ³⁾	Plastic Duro plastic (thermoset)	
		Hole group 1A	Drilled or punched hole Hole group 1B	Hole group 2A	Drilled or punched hole Hole group 2B		Hole group 4 ³⁾	Thermo/plast Hole group 5 ³⁾
ST 4,8 <i>P</i> =1,59	(3,5)-4 (4)-4,75 (4,75)-10		4,4 4,4		3,9 4 4,2			
ST 5,5 <i>P</i> =1,81	-1,13 (1,13)-1,38 (1,38)-1,5 (1,5)-1,75 (1,75)-2,25 (2,25)-3 (3)-3,5 (3,5)-4 (4)-4,75 (4,75)-10	4,7 4,7	4,2 4,3 4,3 4,5 4,6 4,7 5 5 5,1		4,1 4,1 4,2 4,4 4,6 4,6 4,8 4,8 4,9	5x7	5x9,5	4,8x9,5
ST 6,3 <i>P</i> =1,81	-1,38 (1,38)-1,75 (1,75)-2 (2)-3 (3)-4 (4)-4,75 (4,75)-5 (5)-10	5,3	4,9 5 5,2 5,3 5,8 5,9		5 5 5,2 5,3 5,4 5,6 5,8	5,9x8	5,9x9,5	5,6x9,5
ST 8 <i>P</i> =2,12	-1,38 (1,38)-1,75 (1,75)-2 (2)-3 (3)-4 (4)-4,75 (4,75)-5 (5)-10		6,4 6,5 6,7 6,8 7,2 7,4		6,5 6,5 6,7 6,8 6,9 7 7,2			

1) If H13 is chosen then given values for d_2 shall be reduced by 0,1 mm.

2) HB 120 max. If the material is harder then the values in the table shall be increased by 0,1 to 0,2 mm.

3) $d_2 \times \text{min thread engagement}$.

Torsional strength for screw with ST thread

Thread	Torsional strength Nm min
ST 2,2	0,45
ST 2,6	0,9
ST 2,9	1,5
ST 3,3	2
ST 3,5	2,7
ST 3,9	3,4
ST 4,2	4,4
ST 4,8	6,3
ST 5,5	10
ST 6,3	13,6
ST 8	30,5

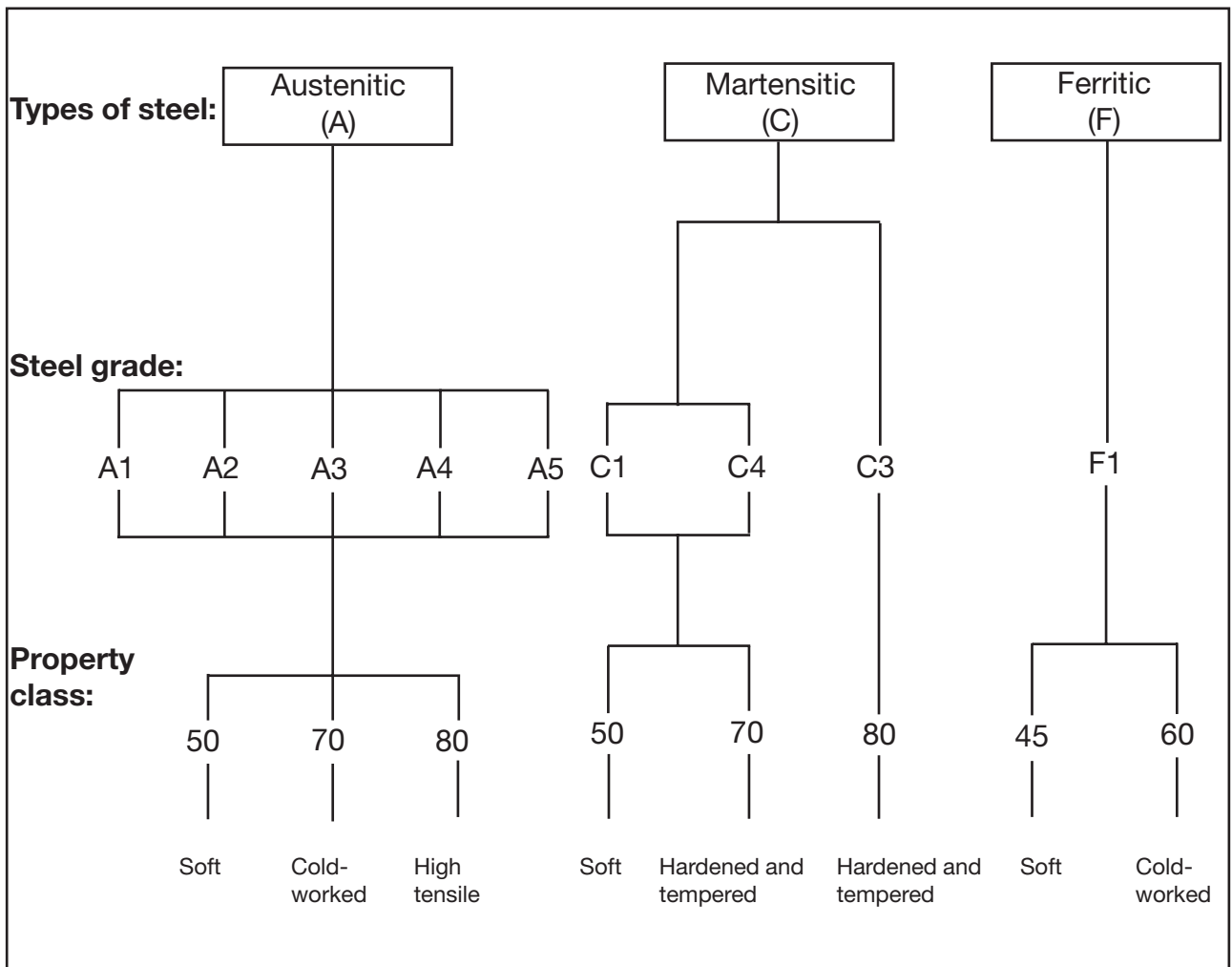
Recommended hole diameters in sheet metal for GF-threaded screws

Thread	Thickness of the material or thread engagement						
	0,5-1,5	1,5-2,5	2,5-4	4-6,5	6,5-10	10-15	15-
	Hole diameter D in mm						
M3	2,70	2,75	2,80	2,80	2,80		
M4	3,60	3,65	3,65	3,70	3,75		
M5		4,55	4,60	4,65	4,70		
M6		5,45	5,50	5,55	5,60	5,65	
M8			7,30	7,40	7,45	7,55	7,60
M10			9,20	9,25	9,30	9,40	9,45
M12				11,05	11,15	11,25	11,35

STAINLESS STEEL

Stainless steel for fasteners is divided into three main types of steel (A, C, F) and these types are divided into a number of different grades depending on chemical composition (1, 2, 3 etc.). Finally is the property class expressed in ultimate breaking point.

A schematic arrangement looks like following:



TECHNICAL INFORMATION

Most common among the standard fasteners is A2-70 and A4-70 which are usually called stainless and acid proof steel. If other steel or class of resistance is wanted then this should be stated in the order.

A1 is designed for machining which is different from for example A2/A4 which is aimed for cold forming.

The A and the F types of the stainless steel are not heat treatable and the mechanical properties can only be increased by cold working.

The C type of the stainless steel is heat treatable.

The A type of stainless steel is not magnetic but can become light magnetic during cold forming.

The C and the F types of stainless steel are magnetic.

Table for comparison for stainless and acid proof steel (according to the german Stahlschüssel)

Type	SS 14*	B.S.*	Werkstoff Nr*	AFNOR*	AISI*
A1	2346	303 S 21	1.4305	Z 10 CNF 18-09	303
A2	2332	304 S 15	1.4301		304
"	2333	304 S 15	1.4301	Z 6 CN 18-09	304
"	2352	304 S 11	1.4306		304L
A4	2343	316 C 16	1.4436		316
"	2347	316 S 16	1.4401	Z 6 CND 17-11	316
"	2353	316 S 11	1.4435		316L
C1	2302	410 S 21	1.4006	Z 12 C 13	410
"	2303	420 S 37	1.4021	Z 20 C 13	420
"	2304	420 S 45	1.4028		
C3	2321	431 S 29	1.4057	Z 15 CN 16-02	431
C4	2380	416 S 21	1.4005		416
F1	2320	430 S 15	1.4016	Z 8 C 17	430
"	2325	434 S 17	1.4113	Z 8 CD 17.01	434
"	2326				

* Example of steel in each type.

TECHNICAL INFORMATION

TABLE OF TRANSLATION FOR DIN/ISO

The development of new ISO norms is proceeding and due to this, is the branch of trade learning new numbers of the product standards. The table below shows information about the closest equivalence between DIN norms and ISO norms. The table on the next page states the equivalence in the ISO numerical order. To estimate the interchangeability please take a look at the table on the next page. The norm is only mentioned below if it's about one and the same type of product.

Please call us if you would like to know the difference between each norm. We generally recommend you to specify your product according to ISO norm when you place an order.

DIN	ISO	DIN	ISO	DIN	ISO
1	2339	960	8765	6916	7415, 7416
7	2338	961	8676	6921	8102, 4162
84	1207	963	2009	6922	4162
85	1580	964	2010	6923	4161
94	1234	965	7046-1,2	6924	7040, 7041,
				"	10512
125	7089, 7090	966	7047	6925	7042, 7719,
126	7091	970	4032	"	10513
258	8737	971-1	8673	6926	7043, 12125
417	7435	971-2	8674	6927	7044, 12126
427	2342	972	4034	6928	7053, 10509
				7343	8750, 8751
433	7092	980	7042, 7719,		
438	7436	"	10513	7344	8748
439-1	4036	982	7040, 10512	7346	13337
439-2	4035, 8675	985	-	7504-K	15480
440	7094	1440	8738	7504-N (M)	15481
		1443	2340	7504-P (O)	14582
551	4766	1444	2341	7504-Q (R)	14583
553	7434	1446	2338		
555	4034	1470	8739	7971	1481
558	4018	1471	8744	7972	1482
601	4016			7973	1483
		1472	8745		
603	8677, 8678	1473	8740	7976	1479
911	2936	1474	8741	7977	8737
912	4762, 21269	1475	8742	7978	8736
913	4026	1481	8752	7979	8733, 8735
914	4027			7981	7049
		6325	8734		
915	4028	6883, 6884	2492	7982	7050
916	4029	6885-1,2	773	7983	7051
931	4014	6885-3	2491	7985	7045
933	4017	6886, 6887	774	7991	10642
934	4032, 4033			9021	7093
		6888	3912	32501	13918
934	8673	6901	10510	34802	14579
935-1	7035, 7036	6902-6908	10669, 10673		
935-3	7037	6914	7411, 7412		
936	4035, 8675	6915	4775, 7413,		
937	7038		7414		

TECHNICAL INFORMATION

TABLE OF TRANSLATION FOR ISO/DIN

The code number indicates the interchangeability according to the following:

- 1= full interchangeability (identical)
- 2= practically interchangeable (almost identical)
- 3= the interchangeability shall be considered from case to case
- 1/3= mostly interchangeable (some dimensions should be considered from case to case)

ISO norm	DIN norm	Inter-changeable	ISO norm	DIN norm	Inter - changeable
1207	84	1	7089/7090	125/1	1/2
1234	94	1	7091	126	1/2
1479	7976	1/2	7092	433	1/2
1481	7971	1/2	7093	9021	1/2
1482	7972	3	7094	440	1/2
1483	7973	3	7434	553	1
1580	85	1	7435	417	1
2009	963	1/3	7436	438	1
2010	964	1/3	7719	6925	2
2338	7	2	"	980	3
2338	1446	1	7720	-	-
2339	1	2	8102	6921, 6922	3
2340	1443	2	8673	971-1	1
2341	1444	2	8674	971-2	1
2936	911	2	8675	439	1/3
2982-2	981	1	8675	936	1/3
4014	931	1/3	8676	961	1/3
4016	601	1/3	8677	603	2
4017	933	1/3	8678	603	3
4018	558	1/3	8733	7979-C	2
4026	913	1	8734	6325	1
4027	914	1	8735-A	7979-D	2
4028	915	1	8736	7978	1
4029	916	1	8737	7977	2
4032	934	3	8738	1440	1/2
4032	970	1	8739	1470	2
4033	934	3	8740	1473	2
4034	555	3	8741	1474	2
4034	972	1	8742	1475	2
4035	936	1/3	8744	1471	2
4035	439-2	1/3	8745	1472	2
4036	439-1	1/3	8746-A	1476	1
4161	6923	1	8748	7344	1
4162	6921, 6922	3	8750	7343	1
4762	912	2	8751	7343	3
4766	551	1	8752	1481	1/2
7035	935-1	1	8765	960	1/3
7036	935-1	1	10509	6928	3
7037	935-3	1	10511	-	-
7038	979	3	10512	6924	2
7040	6924	2	"	982	3
"	982	3	10513	6925	2
7041	6924	3	"	980	3
7042	6925	1/3	10642	7991	3
"	980	3	12125	6926	1
7043	6926	1	12126	6927	1
7044	6927	1	13337	7346	1/2
7045	7985	2	13918	32501	2
7046	965	1/3	14579	34802	3
7047	966	1/3	15480	7504-K	1
7049	7981	2	15481	7504-N (M)	2(1)
7050	7982	3	15482	7504-P (O)	3(1)
7051	7983	3	15483	7504-Q (R)	3(1)
7053	6928	1	21269	912	2

TECHNICAL INFORMATION

PITCH OF THREAD, metric

Metric thread	3.0	2,6	3,5	4	5	6	7	8	10	12	14	16	18	20	22
Coarse pitch	0,5	0,45	0,6	0,7	0,8	1,0	1,0	1,25	1,5	1,75	2,0	2,0	2,5	2,5	2,5
Fine pitch	0,35	0,35	0,35	0,5	0,5	0,75	0,75	1,0	1,25	1,25	1,5	1,5	1,5	1,5	1,5
Metric thread	24	27	30	33	36	39	42	45	48	52	56	64			
Coarse pitch	3	3	3,5	3,5	4,0	4,0	4,5	4,5	5,0	5,0	5,5	6,0			
Fine pitch	2,0	2,0	2,0	2,0	3,0	3,0	3,0	3,0	3,0	3,0	4,0	4,0			

PITCH OF THREAD, unified

Thread	No 0	No 2	No 4	No 5	No 6	No 8	No 10	1/4	5/16	3/8	7/16	1/2	9/16
Diam. (mm)	1,52	2,18	2,85	3,18	3,51	4,17	4,83	6,35	7,94	9,52	11,11	12,70	14,29
UNC		56	40	40	32	32	24	20	18	16	14	13	12
UNF	80	64	48	44	40	36	32	28	24	24	20	20	18
Thread	5/8	3/4	7/8	1"	1 1/8	1 1/4	1 3/8	1 1/2	1 3/4	2"	2 1/2	3"	
Diam. (mm)	15,87	19,05	22,22	25,40	28,57	31,75	34,92	38,10	44,45	50,80	63,50	76,20	
UNC	11	10	9	8	7	7	6	6	5	4 1/2	4	4	
UNF	18	16	14	12	12	12	12	12					

TABLE OF TRANSFORMATION inch – mm

Inch	mm	Inch	mm	Inch	mm
1/64	0,397	1/4	6,350	1 7/8	47,673
1/32	0,794	5/16	7,938	2"	50,800
3/64	1,191	3/8	9,525	2 1/4	57,150
1/16	1,587	7/16	11,112	2 1/2	63,500
5/64	1,980	1/2	12,700	2 3/4	69,850
3/32	2,381	5/8	15,875	3"	76,200
7/64	2,778	3/4	19,050	3 1/4	82,550
1/8	3,175	7/8	22,225	3 1/2	88,900
9/64	3,572	1"	25,400	3 3/4	95,250
5/32	3,969	1 1/8	28,575	4"	101,600
11/64	4,366	1 1/4	31,750	4 1/4	107,950
3/16	4,762	1 3/8	34,925	4 1/2	114,300
3/64	5,159	1 1/2	38,100		
7/32	5,556	1 5/8	41,375		
15/64	5,953	1 3/4	44,450		

CROSS RECESSES, phillips and pozidrive

Standard cross recess sizes for machine and self tapping screws.
 Sizes on TX recesses are stated on each product page

THREAD	ST2,2	ST2,9	ST3,5	ST4,2	ST4,8	ST5,5	ST6,3
THREAD	B2*	B4	B6	B8	B10	B12	B14
DRIVE SIZE	1	1	2	2	2	3	3
THREAD	M1,6	M2*-M3	M3,5-M5	M6	M8-M10		
DRIVE SIZE	0	1	2	3	4		

* Screws acc. to ISO have recess no 0.

HYDROGEN EMBRITTLEMENT

In cases where a fastener

- 1) have high hardness (eg case hardened thread forming screws and screws in propertyclass 10.9 or higher)
- 2) have been exposed for hydrogen introducing (eg electrolytic plating)
- 3) is under high stress

there are always a risk of hydrogen embrittlement fractures

In cases where our customer require a shipment of fasteners under above conditions we let them pass a hydrogen embrittlement relief. It's a heat treatment that aims to reduce the risk of hydrogen embrittlement fractures. But there are no full guarantee that a fracture still can't appear. Bufab are not in position to take responsibility for costs caused by such fractures as long as we have had the relief done. We recommend you as customer to take this into consideration in your choice of fastener and if possible redesign your construction or plating specification.

ISO 4042 and ISO 15330 are two examples of standards that deals with this problem and how to reduce the risk respectively how to test the result of the relief.

WASSERSTOFFVERSPRÖDUNG

Falls Festigungselementen

- 1) eine hohe Härte haben (z.B. einatzgehärtete gewindeformende Schrauben oder Schrauben i Festigkeitsklass 10.9 oder höher)
- 2) mit Wasserstoff induziert werden (z.B. elektrolytische Oberflächenbehandlung)
- 3) mit hohen Spannung eingesetzt werden

is immer ein Gefahr für bruch durch Wasserstoffversprödung.

Im Fall die Kunde eine Lieferung mit oben genannten Vorassetzungen verlangen lassen wir die Festigungselementen getempert werden. Das ist eine Wärmebehandlung die die Risiko für was-serstoffversprödung reduziert. Da ist doch nie eine volle Garantie das kein Bruch vorkommen kön-nen. Bufab übernimmt die Volgekosten, die in diesem Fall aufstehen können, nicht. Wir rekomen-dieren Ihnen als Kunde das in Ihren Wahl von Festigungselement zu beobachten und das Sie, falls möglich, Ihre Konstruktion oder Oberflächenbehandlung zu ändern.

ISO 4042 und ISO 15330 sind zwei Beispiele von Standards die oben genannte Probleme be-schreiben und wie man die Risiko reducirien können beziehungsweise wie man das Resultat kon-trollieren können.