

# METRIC

## SOCKETS, BOLTS, SCREWS, NUTS

### DIMENSIONS OF MOST COMMON HEADS (ALL MEASUREMENTS IN mm)

DIN	DIA		ILLUSTRATION	M1.6	M2	M2.5	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24	M30	M36	
912	DIA	$d_2$		3	3.8	4.5	5.5	7	8.5	10	13	16	18	24	30	36	45	54	
	HEIGHT	K		1.6	2	2.5	3	4	5	6	8	10	12	16	20	24	30	36	
	HEX KEY SIZE DIN 911	S		1.5	1.5	2	2.5	3	4	5	6	8	10	14	17	19	22	27	
6912	DIA	$d_2$		<b>DIN 6912 IS LOW HEAD DIN 6911 IS A HEX KEY WITH GUIDE</b>				7	8.5	10	13	16	18	24	30	36	45	54	
	HEIGHT	K						2.8	3.5	4	5	6.5	7.5	10	12	14	17.5	21.5	
	HEX KEY SIZE DIN 6911	S						3	4	5	6	8	10	14	17	19	22	27	
7984	DIA	$d_2$		<b>SIMILAR TO DIN 6912 BUT HEX SOCKET IS WITHOUT GUIDE</b>				5.5	7	8.5	10	13	16	18	24	30	36		
	HEIGHT	K						2	2.8	3.5	4	5	6	7	9	11	13		
	HEX KEY SIZE DIN 911	S						2	2.5	3	4	5	7	8	12	14	17		
7991	DIA	$d_2$					6	8	10	12	16	20	24	30	36	39			
	HEIGHT	K					1.7	2.3	2.8	3.3	4.4	5.5	6.5	7.5	8.5	14			
	HEX KEY SIZE DIN 911	S					2	2.5	3	4	5	6	8	10	12	14			
931 933 960 961	ACROSS FLATS (WRENCH SIZE)	S					5.5	7	8	10	13	17	19	24	30	36	46	55	
	HEIGHT	K					2	2.8	3.5	4	5.5	7	8	10	13	15	19	23	
84	DIA	$d_2$		3	3.8	4.5	5.5	7	8.5	10	13	16							
	HEIGHT	K		1	1.3	1.6	2	2.6	3.3	3.9	5	6							
7985	DIA	$d_2$					6	8	10	12	16	20							
	HEIGHT	K					2.4	3.1	3.8	4.6	6	7.5							
934	ACROSS	S		3.2	4	5	5.5	7	8	10	13	17	19	24	30	36	46	55	

FLATS (WRENCH SIZE)																			
	HEIGHT	m	1.3	1.6	2	2.4	3.2	4	5	6.5	8	10	13	16	19	24	29		

### MECHANICAL PROPERTIES OF FASTENERS

CLASS	New Designation	4.6	4.8	5.6	5.8	6.6	6.8	6.9	8.8	10.9	12.9	14.9
	Formerly	4D	4S	5D	5S	6D	6S	6G	8G	10K	12K	--
U.S. GRADE		1	2	2	2	3	3	3	5	8	--	--
Brinell	min.	110		140		170			225	280	330	390
	Max.	170		215		245			300	365	425	--
Rockwell	HRB	min.	63	78		88			--	--	--	--
		Max.	88	97		102			--	--	--	--
	HRC	min.	--	--		--			18	27	34	40
		Max.	--	--		--			31	38	44	49
Yield Point psi		45,000		56,000		76,000	76,000		91,000	128,000	153,000	180,000
Tensile Strength psi	min.	56,000		70,000		85,000	85,338		113,784	142,230	170,000	200,000
	Max.	78,000		100,000		113,000	99,561		128,000	170,676	200,000	230,000

### MECHANICAL PROPERTIES OF NUTS

NOMINAL DIAMETER mm	PITCH mm	NOMINAL STRESS AREA mm <sup>2</sup>	PROPERTY CLASSES OF NUTS						
			4	5	6	8	10	12	14
			PROOF LOAD kfg						
M6	1	20.1	800	1,000	1,200	1,600	2,000	2,400	2,800
M7	1	28.9	1,150	1,450	1,730	2,300	2,900	3,470	4,000
M8	1.25	36.6	1,450	1,830	2,200	2,900	3,650	4,300	5,100
M10	1.5	58	2,300	2,900	3,500	4,600	5,800	6,950	8,100
M12	1.75	84.3	3,350	4,210	5,050	6,700	8,400	10,000	11,800
M14	2	115	4,600	5,750	6,900	9,200	11,500	13,800	16,100
M16	2	157	6,300	7,850	9,400	12,600	15,700	18,800	22,000
M20	2.5	245	9,800	12,200	14,700	19,600	24,500	29,400	34,300
M24	3	353	14,100	17,600	21,200	28,200	35,300	42,300	49,400
M27	3	459	18,400	23,000	27,600	36,700	45,900	55,000	64,300
M30	3.5	561	22,400	28,000	33,600	44,800	56,100	67,300	78,500
M33	3.5	694	27,800	34,700	41,600	55,500	69,400	83,300	97,000
M36	4	817	32,700	40,800	49,000	65,300	81,700	98,000	114,400
M8	1	39.2	1,570	1,960	2,350	3,100	3,900	4,700	5,500
M10	1.25	61.2	2,400	3,060	3,700	4,900	6,100	7,350	8,550
M12	1.25	92.1	3,700	4,600	5,500	7,400	9,200	11,000	12,900

M16	1.5	167	6,700	8,350	10,000	13,400	16,700	20,000	23,400
M20	1.5	272	10,900	13,600	16,300	21,800	27,200	32,600	38,000
M24	2	384	15,400	19,200	23,000	30,700	38,400	46,000	53,800

## TIGHTENING TORQUES IN KILOGRAM METERS

GRADE		NOMINAL DIAMETER - REGULAR PITCH														
		M4	M5	M6	M7	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30
8.8	kpm	0.29	0.57	1	1.6	2.5	5	8	13	20	26	36	51	65	98	134
	Pound-Feet	2	4	7	11	18	32	58	94	144	190	260	368	470	707	967
10.9	kpm	0.4	0.8	1.4	2.3	3.5	6	12	18	27	37	51	72	92	138	188
	Pound-Feet	2.9	6	10	16	25	47	83	133	196	269	366	520	664	996	1357
12.9	kpm	0.5	1	1.6	2.7	4	8	14	22	33	45	61	87	110	167	226
	Pound-Feet	3.6	7	11	20	29	58	100	159	235	323	440	628	794	1205	1630