Chavesbao

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Technical data sheet

Title	Mechanical properties of fasteners made from carbon steels and alloy steels. Part 2 Nuts with specified test load values. Coarse pitch thread.
Standard	UNE-EN ISO 898-2

1.- Purpose and field of application.

This international standard establishes the mechanical properties of nuts with specified test load values, tested at ambient temperature (see ISO 1 standard). The properties will vary at higher and lower temperatures.

It applies to nuts:

- With nominal thread diameters of up to 39 mm inclusive;
- With ISO triangular thread and with diameters and pitch threads in compliance with the ISO 68-1 and ISO 262 (coarse pitch thread) standards;
- With diameter/pitch thread combinations in accordance with the ISO 261 standard (coarse pitch thread);
- With 6H thread tolerances in accordance with the ISO 965-1 and ISO 965-2 standards;
- With specific mechanical requirements;
- With distance between faces in accordance with the ISO 272 standard or equivalent;
- With nominal heights of 0.45 D[(1)] or above;
- Made from carbon steel or low alloy steel.

It is not applicable to nuts that require special properties, such as:

- Locking capacities (see the ISO 2320 standard);
- Weldability;
- Resistance to corrosion;
- Capacity to withstand temperatures above +300ºC or below -50ºC.

1) D is the basic exterior diameter for interior threads (nominal diameter) in accordance with the ISO 724 standard.

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2- Chemical composition.

The nuts are made from steel in compliance with the chemical composition limits specified in table 3.

Thread	Type		Materials and treatment of the nut	Chemical composition limits (control analysis) % (m/m)			
				C Max.	Mn Min.	P Max.	S Max.
Coarse pitch thread	04[c]		Carbon steel[d]	0.58	0.25	0.60	0.150
	05[c]		Carbon steel, QT[e]	0.58	0.30	0.048	0.058
	5[b]		Carbon steel[d]	0.58	--	0.060	0.150
	6[b]		Carbon steel[d]	0.58	--	0.060	0.150
	8	Nut (type 2)	Carbon steel[d]	0.58	0.25	0.060	0.150
	8	Nut (type 1) D<=M16	Carbon steel[d]	0.58	0.25	0.060	0.150
	8[c]	Nut (type 1) D>M16	Carbon steel, QT[e]	0.58	0.30	0.048	0.058
	9		Carbon steel[d]	0.58	0.25	0.060	0.150
	10[c]		Carbon steel, QT[e]	0.58	0.30	0.048	0.058
	12[c]		Carbon steel, QT[e]	0.58	0.45	0.048	0.058
Fine pitch thread	04[b]		Carbon steel[d]	0.58	0.25	0.060	0.150
	05[c]		Carbon steel, QT[e]	0.58	0.30	0.048	0.058
	5[b]		Carbon steel[d]	0.58	--	0.060	0.150
	6[b]	D<=M16	Carbon steel[d]	0.58	--	0.060	0.150
	6[b]	D>M16	Carbon steel, QT[e]	0.58	0.30	0.048	0.058
	8	Nut (type 2)	Carbon steel[d]	0.58	0.25	0.060	0.150
	8[c]	Nut (type 1)	Carbon steel, QT[e]	0.58	0.30	0.048	0.058
	10[c]		Carbon steel, QT[e]	0.58	0.30	0.048	0.058
	12[c]		Carbon steel, QT[e]	0.58	0.45	0.048	0.058

NOTES:

[b)] The nuts in these quality classes may be made from free-cutting steels, unless another method is agreed upon by the buyer and the manufacturer. In such cases, the following maximum sulphur, phosphorus and lead contents are permissible:

sulphur 0.34%; phosphorus 0.11%; lead 0.35%.

[c)] If necessary, alloying elements may be added to improve the mechanical properties of the nuts.

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3- Mechanical and physical properties of the thread.

When the nuts are tested using the methods described in chapter 8, they must possess the mechanical properties established in tables 4 and 5.

Thread D	Quality class															
	04		05		5		6		8		9		10		12	
	Vickers Hardness, HV															
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
M5<=D<=M16	188	302	272	353	130	302	150	302	200	302	188	302	272	353	295	353
M16<D<=M39					146		170		233	353					272	
	Brinell Hardness, HB															
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
M5<=D<=M16	179	287	259	336	124	287	143	287	190	287	179	287	259	336	280	336
M16<D<=M39					139		162		221	336					259	
	Rockwell Hardness, HRC															
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
M5<=D<=M16	--	30	26	36	--	30	--	30	--	30	--	30	26	36	29	36
M16<D<=M39									--	36					26	

Thread D x P	Quality class													
	04		05		5		6		8		10		12	
	Vickers Hardness, HV													
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
M8x1<=D<=M16x1.5	188	302	272	353	175	302	188	302	250	353	295	353	295	353
M16x1.5<D<=M39x3					190		233		295	353	260		--	--
	Brinell Hardness, HB													
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
M8x1<=D<=M16x1.5	179	287	259	336	166	287	179	287	238	336	280	336	280	336
M16x1.5<D<=M39x3					181		221		280	336	247		--	--
	Rockwell Hardness, HRC													
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
M8x1<=D<=M16x1.5	--	30	26	36	--	30	--	30	22.2	36	29	36	29	36
M16x1.5<D<=M39x3					--		--		29.2	36	24		--	--

Note:
The minimum hardness is only mandatory for heat-treated nuts and nuts that are too big to be subjected to the test load test. For other nuts, the minimum hardness is given for information purposes only. For nuts that have not been tempered or hardened, and that satisfy the test load test, the minimum hardness should not be a cause for rejection.

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4.- Test load test.

The test load test is used whenever the capacity of the available testing unit permits, and is the assessment method for threads ≥ M5.

The nuts are mounted on a hardened and threaded test chuck, as shown in figures 1 and 2. The axial traction test is decisive for assessment purposes.

The test load is applied against the nut in the axial direction and maintained for 15 s. The nut must withstand the load without a failure due to alteration of the thread or breakage, and must be able to be unscrewed with the fingers after the load is released. If the thread of the chuck is damaged during the test, the test must be stopped and rejected. (It may be necessary to use a manual spanner wrench to begin to unscrew the nut. This is permissible as long as it is only used for a half rotation before continuing to unscrew the nut with the fingers).

The hardness of the test chuck must be at least 45 HRC.

Thread D	Thread Pitch P	Quality Class							
		04	05	5	6	8	9	10	12
		Test load (A_5 x S_p)							
M5	0.8	5 400	7 100	8 250	9 500	12 140	13 000	14 800	16 300
M6	1	7 640	10 000	11 700	13 500	17 200	18 400	20 900	23 100
M7	1	11 000	14 500	16 800	19 400	24 700	26 400	30 100	33 200
M8	1.25	13 900	18 300	21 600	24 900	31 800	34 400	38 100	42 500
M10	1.5	22 000	29 000	34 200	39 400	50 500	54 500	60 300	67 300
M12	1.75	32 000	42 200	51 400	59 000	74 200	80 100	88 500	100 300
M14	2	43 700	57 500	70 200	80 500	101 200	109 300	120 800	136 900
M16	2	59 700	78 500	95 800	109 900	138 200	149 200	164 900	186 800
M18	2.5	73 000	96 000	121 000	138 200	176 600	176 600	203 500	230 400
M20	2.5	93 100	122 500	154 400	176 400	225 400	225 400	259 700	294 000
M22	2.5	115 100	151 500	190 900	218 200	278 800	278 800	321 200	363 600
M24	3	134 100	176 500	222 400	254 200	324 800	324 800	374 200	423 600
M27	3	174 400	229 500	289 200	330 500	422 300	422 300	486 500	550 800
M30	3.5	213 200	280 500	353 400	403 900	516 100	516 100	594 700	673 200
M33	3.5	263 700	347 000	437 200	499 700	638 500	638 500	735 600	832 800
M36	4	310 500	408 500	514 700	588 200	751 600	751 600	866 000	980 400
M39	4	370 900	488 000	614 900	702 700	897 900	897 900	1 035 000	1 171 000

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Fine thread D	Quality Class						
	04	05	5	6	8	10	12
	Test load (A_5 x S_p)						
M8x1	14 900	19 600	27 000	30 200	37 400	43 100	47 000
M10x1.25	23 300	30 600	44 200	47 100	58 400	67 300	73 400
M10x1	24 500	32 200	44 500	49 700	61 600	71 000	77 400
M12x1.5	33 500	44 000	60 800	68 700	84 100	97 800	105 700
M12x1.25	35 000	46 000	63 500	71 800	88 000	102 200	110 500
M14x1.5	47 500	62 500	86 300	97 500	119 400	138 800	150 000
M16x1.5	63 500	83 500	115 200	130 300	159 500	185 400	200 400
M18x2	77 500	102 000	146 900	177 500	210 100	220 300	--
M18x1.5	81 700	107 500	154 800	187 000	221 500	232 200	--
M20x2	98 000	129 000	185 800	224 500	265 700	278 600	--
M20x1.5	103 400	136 000	195 800	236 600	280 200	293 800	--
M22x2	120 800	159 000	229 000	276 700	327 500	343 400	--
M22x1.5	126 500	166 500	239 800	289 700	343 000	359 600	--
M24x2	145 900	192 000	276 500	334 100	395 500	414 700	--
M27x2	188 500	248 000	351 100	431 500	510 900	535 700	--
M30x2	236 000	310 500	447 100	540 300	639 600	670 700	--
M33x2	289 200	380 500	547 900	662 100	783 800	821 900	--
M36x3	328 700	432 500	622 800	804 400	942 800	934 200	--
M39x3	391 400	515 000	741 600	957 900	1 123 000	1 112 000	--