IBATECH

TECNOLOGIA LINEAR

A solução adequada ao seu projeto.

FUSOS DE ESFERAS

Qualidade
Comprometimento
Pontualidade
Competitividade

IPIRANGA

IBATECH
TECNOLOGIA LINEAR

A Husillos Ipiranga atua no mercado mundial a mais de 30 anos onde se especializou no desenvolvimento e fabricação de fusos de esferas recirculantes.

Sua filosofia de trabalho está baseada na busca continua de produtos com alto nível tecnológico, baseado em pesquisas contínuas e numa estreita relação com seus clientes.

Com altos investimentos em processos de manufatura e a certificação de qualidade para projetos e aplicação de fusos em máquinas ferramentas, atende o mercado com produtos adaptados às necessidades e demandas de cada cliente.

Uma competitiva performance de entregas promove um atendimento com prazos bastante reduzidos para produtos específicos ou especiais sob desenho.

O programa de fabricação atende a norma DIN 69051 e ISO 3408 e abrange diâmetros de 16 até 125mm; com passo de 05 até 64 mm.

Os fusos retificados são fornecidos com classe de precisão IT1, IT3 e IT5 conforme projeto e necessidades de aplicação.

Os fusos laminados são produzidos nas classes de precisão IT5 e IT7 e IT10.

A Ibatech promove a venda, distribuição e assistência técnica dos produtos Ipiranga, em todo o mercado brasileiro.

Índice

IPIRANGA
www.ipirangahusillos.com

Precisão do passo

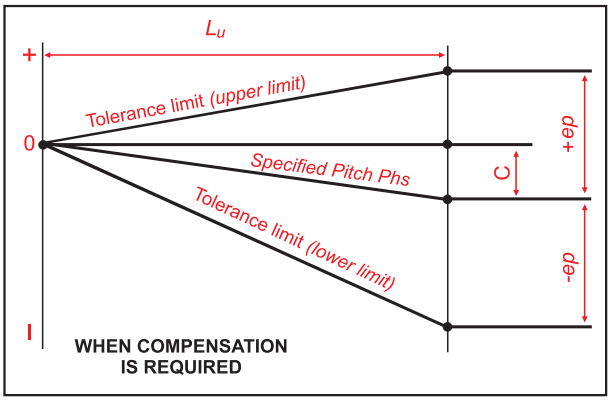
Pitch acuracy

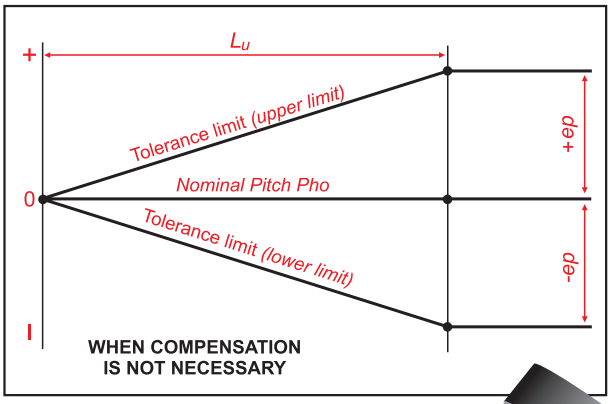
Pitch accurancy is the most important characteristic to define a ballscrew. All control values during manufacturing process of the assembly are in relation with the pitch accuracy. IPIRANGA ground ballscrews are anufactured in three diferent qualities.

QUALITY CLASS	IT1	IT3	IT5
VARIATION V300p (µm)	6	12	23

Tolerância do passo

Pitch tolerances



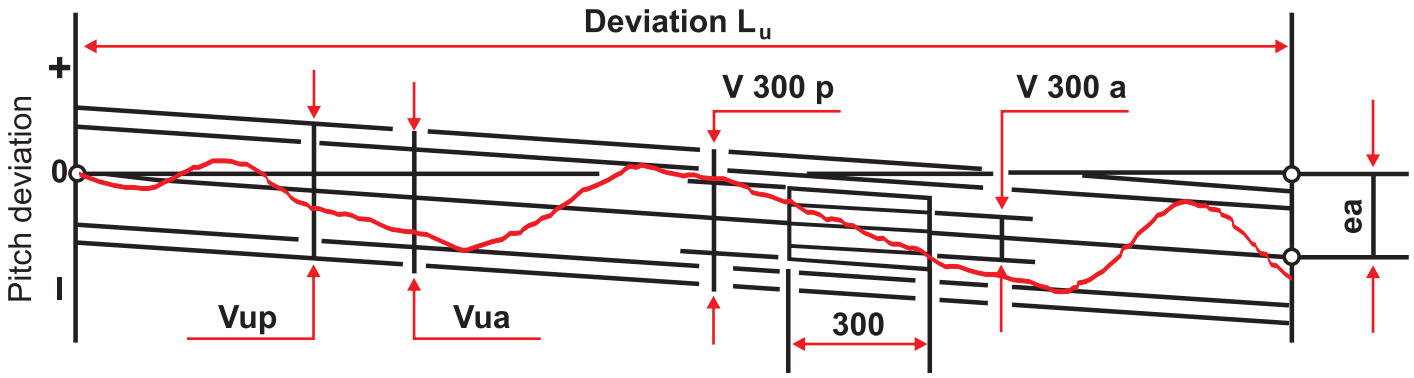


ITEMS & TOLERAQNCES

P_{ho} = Nominal pitch
P_{hs} = Specifi pitch
L_u = stroke. When it is not mentioned is taken L_s and the value is for thread length.
L_s = Specified stroke.
C = Stroke COMPENSATION in L_u.
The customer should define this value to compensate the screw stretch, preload, etc.
If it is not mentioned it will be taken as base point 0.
e = Stroke DEVIATION in L_u.
V_u = Stroke VARIATION in L_u.
V300 = Stroke VARIATION in 300 mm.
Variations correspond to bandwidth, between two parallel lines ea.
The accuracy limits and obtained values are designed as suffix p & a.
p = Allowed tolerance.
a = Mean real value.

Tolerância do passo

Pitch tolerance



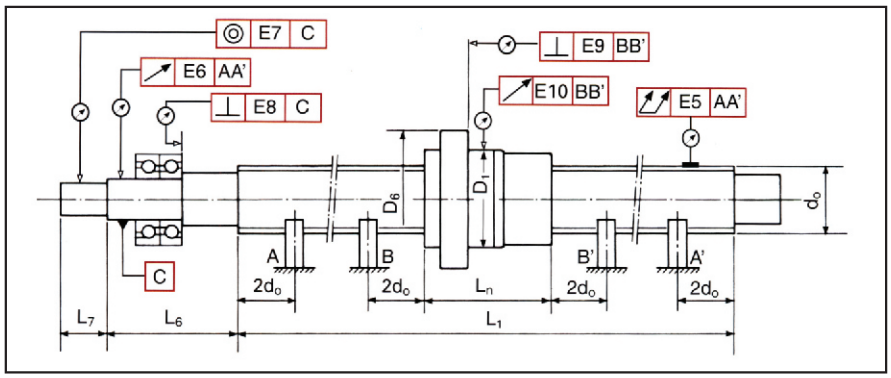
Quality class	Deviation Variation	Lu	>		315	400	500	630	800	1000
			≤	315	400	500	630	800	1000	1250
IT1	ep±	µm		6	7	8	9	10	11	13
	Vup			6	6	7	7	8	9	10
IT3	ep±			12	13	15	16	18	21	24
	Vup			12	12	13	14	16	17	19
IT5	ep±			23	25	27	30	35	40	46
	Vup			23	25	26	29	31	35	39

Quality class	Deviation Variation	Lu	>	1250	1600	2000	2500	3150	4000	5000
			≤	1600	2000	2500	3150	4000	5000	6300
IT1	ep±	µm		15	18	22	26	32	-	-
	Vup			11	13	15	17	21	-	-
IT3	ep±			29	35	41	50	62	76	-
	Vup			22	25	29	34	41	49	-
IT5	ep±			54	65	77	93	115	140	170
	Vup			44	51	59	69	82	99	119

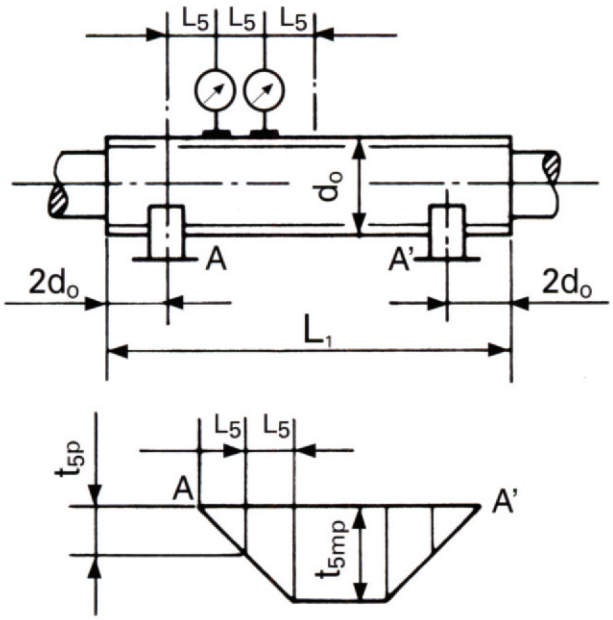
Tolerância de posição

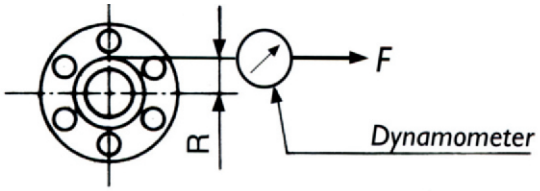
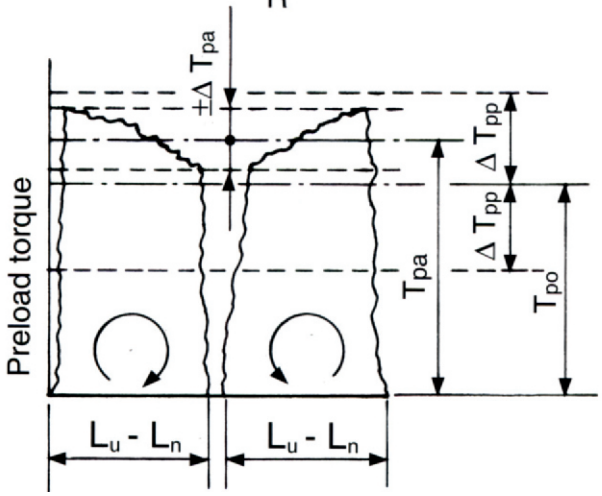
Position tolerances

In a ground ballscrew the geometric accuracy of the elements must ensure a perfect rotation of the assembly.
For that IPIRANGA ground ballscrews are controlled with the latest technology during the whole process according to the actual requeriments of quality.



Tolorances of screw and nut have different parameters relating to diameters and lengths. The dimensions without indication are in mm and tolerances in µm.

TEST	DESCRIPTION	DATA			QUALITY CLASS		
E5	Radial run-out control t_5 of screw 	d_0 >	d_0 ≤	L_5	IT1	IT3	IT5
					t_{5p} for L_5		
		16	25	160	20	25	32
		25	50	315			
		50	100	630			
		100	125	1250			
		L_1/d_0 >	L_1/d_0 ≤		t_{5mp} for $L_1 \geq 4\ L_5$		
			40		40	50	64
		40	60		60	75	96
		60	80		100	125	160
		80	100		160	200	256
E6	Radial run-out control t_6 of diameter C for bearing Normal conditions: $L_6 <= L$ when $L_6 > L$, is valid with: $t_{6a} <= t_{7p} \cdot L_6 / L$	d_0 >	d_0 ≤	L	t_{6p} for L		
		16	20	80	10	12	20
		20	50	125	12	16	25
		50	125	200	16	20	32

TEST	DESCRIPTION	DATA			QUALITY CLASS		
E7	Radial run-out control t_7 of terminal diameter, relating to diameter C for bearing. Normal condition: $L_7 <= L$ When $L_7 > L$ is valid with: $L_{7a} <= t_{7p} \cdot L_7 / L$	d_0		L	t_{7p} for L		
		>	≤				
		16	20	80	5	6	8
		20	50	125	6	8	10
		50	125	200	8	10	12
E8	Axial run-out control t_8 on the face support for bearing relating to C.	d_0			IT1	IT3	IT5
		>	≤		t_{8p}		
		16	3		3	4	5
		63	125		4	5	6
E9	Axial run-out control t_9 of lateral face of the flange for preload nuts.	D_6			t_{9p}		
		>	≤				
		28	63		12	16	20
		63	125		16	20	25
		125	250		20	25	32
E10	Axial run-out control t_{10} of positioning diameter D_1, for preloaded nuts.	D_1			t_{10p}		
		>	≤				
		28	63		12	16	20
		63	125		16	20	25
		25	200		20	25	32
E12	Control of dynaminc preload torque of the nuts T_p  Force $F = \frac{T_p}{R}$  Speed n = 100 mim^{-1} Lubrication = ISO - VG - 100 method = Without wipers T_{po} = Nominal torque ΔT_{pp} = Allowed deviation Index a = Real values	T_{po} (Nm)		for $L_u/d_0 \leq 40$ with $L_u \leq$ 4000 ΔT_{pp} (% de T_{po})		
		>	≤				
		0,2	0,4		35	40	50
		0,4	0,6		30	35	40
		0,6	1		25	30	35
		1	2,5		20	25	30
		2,5	6,3		15	20	25
		6,3	10		-	15	20
		T_{po} (Nm)			for $L_u/d_0 \leq 60$ with Lu ≤ 4000 ΔT_{pp} (% de T_{po})		
		>	≤				
		0,2	0,4		40	50	60
		0,4	0,6		35	40	45
		0,6	1		30	35	40
		1	2,5		25	30	35
		2,5	6,3		20	25	30
		6,3	10		-	20	25
		T_{p0} (Nm)			for $L_u > 4000 \Delta T_{pp}$ (% deT_{po})		
		>	≤				
		-	0,6		No specification		
		0,6	1		-	40	45
		1	2,5		-	35	40
		2,5	6,3		-	30	35
		6,3	10		-	25	30

Lubrificação a óleo

Oil lubrication

The use of CL oils or CLP mixed oils with additives EP keep low the friction coefficient and protect against oxidisation.

The adequate viscosity grade is relating to the peripheral speed and operation temperature.

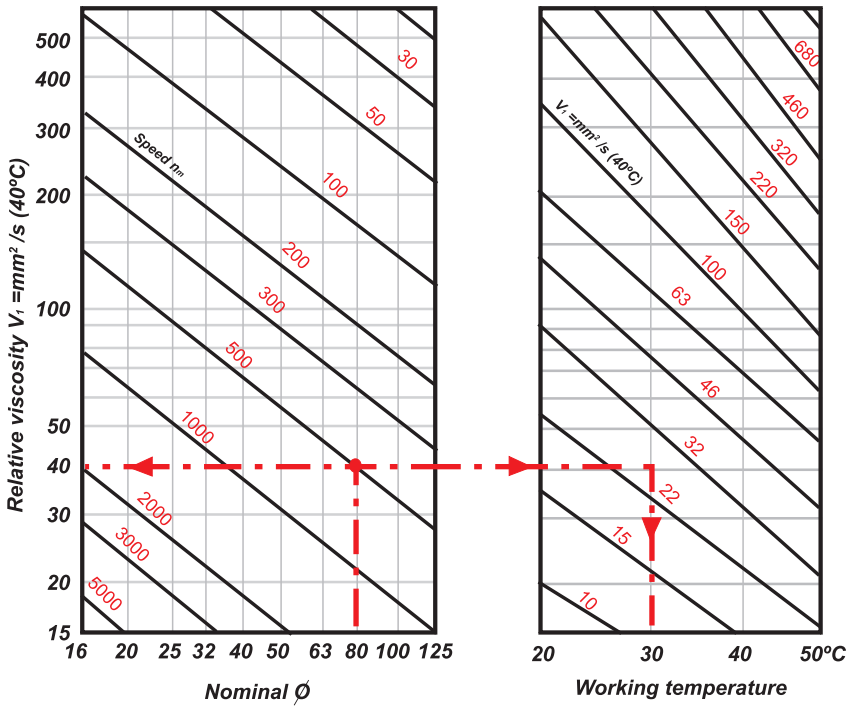
The amount of oil required for ball circuits depends on the turning speed estimated between 2 & 5 cm^3/hour. In case of bath lubrication for horizontal application, it is sufficient that the level reach the centre of the lower ball.

With the following graphic can be determined the viscosity grade:

Example: d_o = 80 mm

Mean speed n_m = 500 min^{-1}

Working temperature = 30ºC



For a nominal diameter of 80 mm. and a mean speed n_m of 500 min^{-1} on the left side of diagram correspond a relative viscosity V_1 of 40 mm^2/s.

Projecting this value on the right side of diagram, the viscosity required for a working temperature of 30ºC is between ISO VG 22 & ISO VG 32.

The minimum viscosity recommended is 21 mm^2/s.

Lubrificação a graxa

Grease lubrication

Ballscrews can be also lubricated with grease.

Due to the permanent movement of the nut there is a loss of grease. A re-grease is necessary to replace the quantity lost and also for its renovation to avoid ageing and contamination.

The re-grease periods will be stabilised on each case, depending on rotating speed, working load, environment conditions and assembly position.

Under normal working conditions it is recommended to make the re-grease approximately every 1.000-hours of work or after a 2 years period maximum.

The different classes of grease are classified with the references NLG1 according to DIN 51.878. On the following table are shown some applications.

DIN 51878 NLG1 CLASS	DIN 51804 COMPLETE PENETRATION	GREASE WITH LITHIUM SOAP		SPECIAL SINTETIC CREASE
		Fa = ≤ 0,15 Cam Without EP additives	Fa = > 0,15 Cam With EP additives	
0	Fluid frease Half=liquid 355-385	-	High load up to 800 min^{-1}	-
1	Very light 310-340	Low load up to 800 min^{-1}	-	High speed up to 4000 min^{-1}
2	Ligth (smooth) 265-295	Normal load up to 600 min^{-1}	Very high load up to 600 min^{-1}	
3	Medium firmness 220-250	Hifh load up to 400 min^{-1}	-	-

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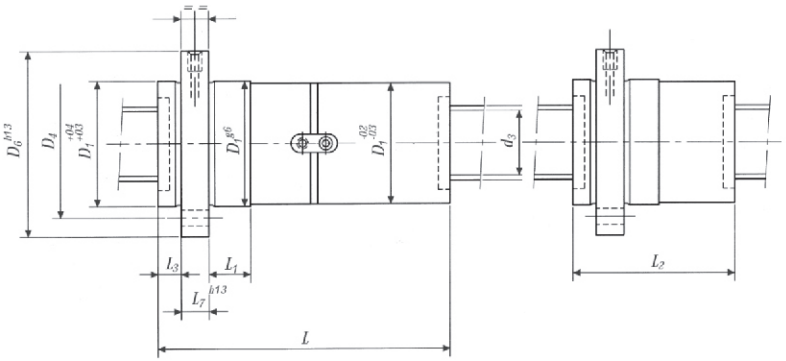
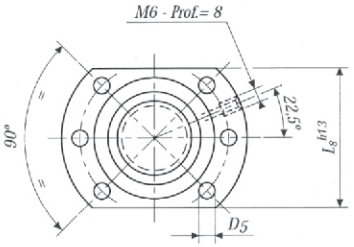
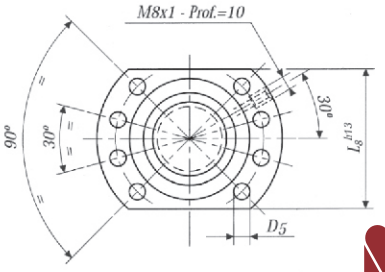




d_0 - 32



d_0 • 40

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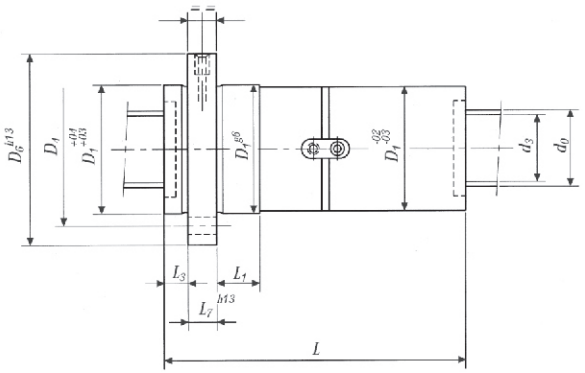
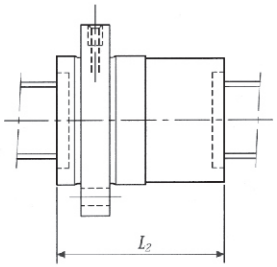
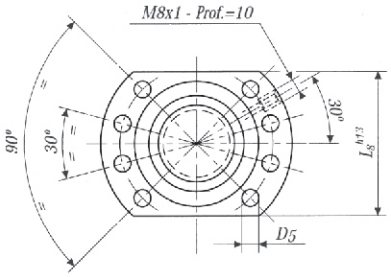
Referencia Reference Reference Riferimento Referenz		ø Nominal ø Nominal ø Nominal ø Nominale ø Nenn	Paso Pitch Pas Passo Steigung	ø Bolas ø Ball ø Billes ø Sfere ø Kugel	Circuitos Circuits Circuits Circuiti Umläufe	Diámetros Diameters Diamètres Diametri Durchmesser					Longitudes Lengths Longueurs Longhezze Längen						Cargas Loads Charges Carichi Tragzahl		Rigidez Rigidity Rigidite Rigidita Steifigkeit	
Tuerca única Single nut Ecrou simple Chiocciola singola Einzel - Mutter	Tuerca doble Double nut Ecrou double Doppia Chiocciola Doppel - Mutter	d_o	P_{ho}	Dw	i	d_3	D_1	D_4	D_5	D_6	L	L_1	L_2	L_3	L_7	L_8	Dinámica Dynamic Dynamique Dinamica Dynamische C_{am} (KN)	Estática Static Statique Statica Statische C_{oam} (KN)	Husillo por metro Screw per meter Vis par mètre Vite per metro Spindel per Meter R_{sm} (N/µm)	Tuerca doble Double nut Ecrou double Doppia Chiocciola Doppel - Mutter R_{nu} (N/µm)
1.016.05.4.3	2.016.05.4.3	16	5	3,969	3	13,4	28	38	5,5	48	84	10	49	5,5	10	40	14,7	21.1	35	340
1.020.05.4.3	2.020.05.4.3	20	5	3,969	3	17,4	36	47	6,6	58	84	10	49	5,5	10	44	16,9	27.4	57	450
1.025.05.4.3	2.025.05.4.3	25	5	3,969	3	22,4	40	51	6,6	62	85	10	50	6	10	48	19,4	35.8	92	500
1.025.10.5.3	2.025.10.5.3		10	4,762	3	21,75	40	51	6,6	62	132	10	74	6	10	48	23,3	39.4	89	550
1.025.15.5.3	2.025.15.5.3		15	4,762	3	21,75	40	51	6,6	62	169	10	94	6	10	48	21,9	36.2	89	550
1.032.05.4.4	2.032.05.4.4	32	5	3,969	4	29,4	50	65	9	80	98	10	57	6	12	62	27,9	61.7	154	850
1.032.10.6.3	2.032.10.6.3		10	6,35	3	27,66	50	65	9	80	138	20	76	6	12	62	37,5	65	145	700
1.032.15.6.3	2.032.15.6.3		15	6,35	3	27,66	56	71	9	86	176	20	103	6	14	65	35,3	59.7	145	700
1.032.20.5.3	2.032.20.5.3		20	4,762	3	28,75	56	71	9	86	208	20	122	6	14	65	28,9	59.3	151	700
1.032.25.5.2	2.032.25.5.2		25	4,762	2	28,75	56	71	9	86	177	20	106	6	14	65	19,5	37.3	151	500
1.040.05.4.4	2.040.05.4.4	40	5	3,969	4	37,4	63	78	9	93	102	10	61	7	14	70	31,6	81.3	246	950
1.040.05.4.5	2.040.05.4.5				5						112		66				38,3	101.6		1200
1.040.10.6.3	2.040.10.6.3	40	10	6,35	3	35,66	63	78	9	93	141	20	81	7	14	70	45,1	91.4	233	800
1.040.10.6.4	2.040.10.6.4				4						163		92				57,8	122		1000
1.040.10.6.5	2.040.10.6.5				5						185		103				70	152.4		1250
1.040.12.6.3	2.040.12.6.3	40	12	6,35	3	35,66	63	78	9	93	167	20	91	7	14	70	43,4	86.2	233	800
1.040.12.6.4	2.040.12.6.4				4						193		104				55,5	115		100
1.040.12.6.5	2.040.12.6.5				5						218		117				67,3	143.7		1250
1.040.15.6.3	2.040.15.6.3	40	15	6,35	3	35,66	63	78	9	93	192	20	109	7	14	70	41,6	81	233	800
1.040.15.6.4	2.040.15.6.4				4						225		128				53,2	108		1000
1.040.20.6.3	2.040.20.6.3	40	20	6,35	3	35,66	63	78	9	93	221	20	126	7	14	70	39,5	75.6	233	800
1.040.20.6.4	2.040.20.6.4				4						264		148				50,6	100.7		1000
1.040.25.6.2	2.040.25.6.2	40	25	6,35	2	35,66	70	85	9	100	175	20	91	7	14	75	32,4	63.4	233	625
1.040.25.6.3	2.040.25.6.3				3						225		116				45,9	95.1		800
1.040.30.6.2	2.040.30.6.2	40	30	6,35	2	35,66	70	85	9	100	193	20	100	7	14	75	32,1	63	233	625
1.040.30.6.3	2.040.30.6.3				3						253		130				45,4	94.4		800
1.040.40.6.2	2.040.40.6.2	40	40	6,35	2	35,66	70	85	9	100	230	20	120	7	14	75	31,3	61.8	233	625

Tabela de medidas







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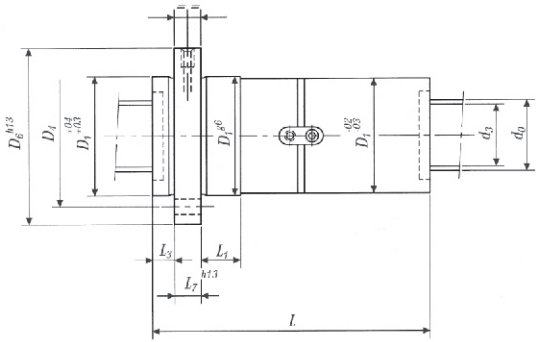
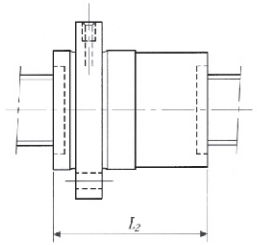
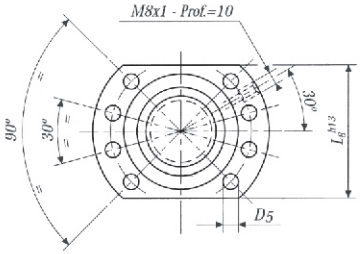
Referencia / Reference / Reference / Riferimento / Referenz		ø Nominal / ø Nominal / ø Nominale / ø Nenn	Paso / Pitch / Pas / Passo / Steigung	ø Bolas / ø Ball / ø Billes / ø Sfere / ø Kugel	Circuitos / Circuits / Circuits / Circuiti / Umläufe	Diámetros / Diameters / Diamètres / Diametri / Durchmesser					Longitudes / Lengths / Longueurs / Longhezze / Längen						Cargas / Loads / Charges / Carichi / Tragzahl		Rigidez / Rigidity / Rigidite / Rigidita / Steifigkeit	
Tuerca única / Single nut / Ecrou simple / Chiocciola singola / Einzel - Mutter	Tuerca doble / Double nut / Ecrou double / Doppia Chiocciola / Doppel - Mutter	d_0	P_{ho}	Dw	i	d_3	D_1	D_4	D_5	D_6	L	L_1	L_2	L_3	L_7	L_8	Dinámica / Dynamic / Dynamique / Dinamica / Dynamische C_{am} (KN)	Estática / Static / Statique / Statica / Statische C_{oam} (KN)	Husillo por metro / Screw per meter / Vis par mètre / Vite per metro / Spindel per Meter R_{sm} (N/µm)	Tuerca doble / Double nut / Ecrou double / Doppia Chiocciola / Doppel - Mutter R_{nu} (N/µm)
1.050.05.4.4	2.050.05.4.4	50	5	3,969	4	47,4	75	93	11	110	104	10	63	7	16	85	35	103,7	389	1100
1.050.05.4.5	2.050.05.4.5				5						114		68				42,4	129,6		1400
1.050.05.4.6	2.050.05.4.6				6						124		73				49,6	155,5		1650
1.050.10.7.3	2.050.10.7.3	50	10	7,144	3	45,14	75	93	11	110	143	20	83	7	16	85	56,8	123	370	1000
1.050.10.7.4	2.050.10.7.4				4						165		94				72,7	164		1300
1.050.10.7.5	2.050.10.7.5				5						187		105				88	205		1600
1.050.10.7.6	2.050.10.7.6				6						208		116				103	246		1800
1.050.12.8.3	2.050.12.8.3	50	12	7,938	3	44,58	75	93	11	110	176	20	103	7	16	85	65	135	364	1000
1.050.12.8.4	2.050.12.8.4				4						201		116				83,2	180		1300
1.050.12.8.5	2.050.12.8.5				5						226		128				100,8	225		1600
1.050.15.8.3	2.050.15.8.3	50	15	7,938	3	44,58	75	93	11	110	198	20	115	7	16	85	62,2	126,8	364	1000
1.050.15.8.4	2.050.15.8.4				4						230		131				79,7	169,1		1300
1.050.15.8.5	2.050.15.8.5				5						261		147				96,6	211,4		1600
1.050.16.8.3	2.050.16.8.3	50	16	7,938	3	44,58	75	93	11	110	203	20	115	7	16	85	62,2	126,8	364	1000
1.050.16.8.4	2.050.16.8.4				4						237		132				79,7	169,1		1300
1.050.16.8.5	2.050.16.8.5				5						270		149				96,6	211,4		1600
1.050.20.8.3	2.050.20.8.3	50	20	7,938	3	44,58	75	93	11	110	228	20	133	7	16	85	62	126,4	364	1000
1.050.20.8.4	2.050.20.8.4				4						271		155				79,4	168,6		1300
1.050.20.8.5	2.050.20.8.5				5						313		176				96,2	210,7		1600
1.050.25.8.3	2.050.25.8.3	50	25	7,938	3	44,58	82	100	11	118	232	25	119	7	16	92	69,1	150	364	1050
1.050.25.8.4	2.050.25.8.4				4						282		144				88,6	200		1375
1.050.30.8.2	2.050.30.8.2	50	30	7,938	2	44,58	82	100	11	118	200	25	103	7	16	92	48,5	99,2	364	750
1.050.30.8.3	2.050.30.8.3				3						260		133				68,7	148,8		1050
1.050.40.8.2	2.050.40.8.2	50	40	7,938	2	44,58	82	100	11	118	228	25	119	7	16	92	47,7	98	364	750
1.050.40.8.3	2.050.40.8.3				3						308		159				67,6	147		1050
1.050.50.8.2	2.050.50.8.2	50	50	7,938	2	44,58	82	100	11	118	283	25	143	7	16	92	46,8	96,5	364	750







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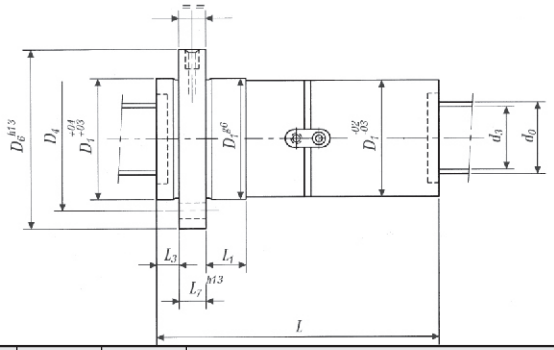
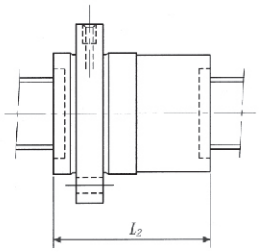
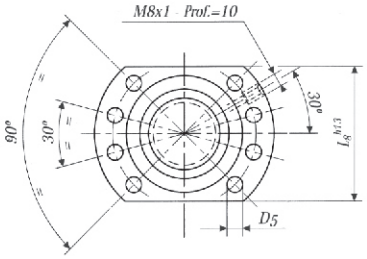
Referencia Reference Reference Riferimento Referenz		ø Nominal ø Nominal ø Nominal ø Nominale ø Nenn	Paso Pitch Pas Passo Steigung	ø Bolas ø Ball ø Billes ø Sfere ø Kugel	Circuitos Circuits Circuits Circuiti Umläufe	Diámetros Diameters Diamètres Diametri Durchmesser					Longitudes Lengths Longueurs Longhezze Längen						Cargas Loads Charges Carichi Tragzahl		Rigidez Rigidity Rigidite Rigidita Steifigkeit	
Tuerca única Single nut Ecrou simple Chiocciola singola Einzel - Mutter	Tuerca doble Double nut Ecrou double Doppia Chiocciola Doppel - Mutter	d_o	P_{ho}	Dw	i	d_3	D_1	D_4	D_5	D_6	L	L_1	L_2	L_3	L_7	L_8	Dinámica Dynamic Dynamique Dinamica Dynamische C_{am} (KN)	Estática Static Statique Statica Statische C_{oam} (KN)	Husillo por metro Screw per meter Vis par mètre Vite per metro Spindel per Meter R_{sm} (N/µm)	Tuerca doble Double nut Ecrou double Doppia Chiocciola Doppel - Mutter R_{nu} (N/µm)
1.063.05.4.4	2.063.05.4.4	63	5	3,969	4	60,4	90	108	11	125	106	10	65	7	18	95	38,4	131,7	626	1300
1.063.05.4.5	2.063.05.4.5				5						116		70				46,6	164,7		1600
1.063.05.4.6	2.063.05.4.6				6						126		75				54,5	197,6		1950
1.063.10.7.4	2.063.10.7.4	63	10	7,144	4	58,14	90	108	11	125	167	20	96	7	18	95	83,2	218,2	601	1500
1.063.10.7.5	2.063.10.7.5				5						189		107				100,8	272,7		1850
1.063.10.7.6	2.063.10.7.6				6						210		118				118	327,3		2200
1.063.12.8.4	2.063.12.8.4	63	12	7,938	4	57,58	95	115	13,5	135	205	25	117	7	20	100	94,5	236	594	1600
1.063.12.8.5	2.063.12.8.5				5						230		130				114,5	295		1950
1.063.12.8.6	2.063.12.8.6				6						255		143				134	353,8		2300
1.063.15.8.4	2.063.15.8.4	63	15	7,938	4	57,58	95	115	13,5	135	236	25	131	9	20	100	91,5	225	594	1600
1.063.15.8.5	2.063.15.8.5				5						267		147				111	281		1950
1.063.15.8.6	2.063.15.8.6				6						298		163				129,6	337,4		2300
1.063.16.8.4	2.063.16.8.4	63	16	7,938	4	57,58	95	115	13,5	135	243	25	138	9	20	100	91,5	225	594	1600
1.063.16.8.5	2.063.16.8.5				5						276		154				111	281		1950
1.063.16.8.6	2.063.16.8.6				6						309		170				129,6	337,4		2300
1.063.20.10.3	2.063.20.10.3	63	20	9,525	3	56,5	95	115	13,5	135	245	25	140	9	20	100	89,1	194,5	583	1300
1.063.20.10.4	2.063.20.10.4				4						287		161				114,1	259,3		1600
1.063.20.10.5	2.063.20.10.5				5						329		182				138,2	324		1950
1.063.25.10.3	2.063.25.10.3	63	25	9,525	3	56,5	105	125	13,5	145	232	25	119	9	20	110	99	228,2	583	1300
1.063.25.10.4	2.063.25.10.4				4						282		144				130,9	319,5		1700
1.063.30.10.3	2.063.30.10.3	63	30	9,525	3	56,5	105	125	13,5	145	260	25	135	9	20	110	98,6	227,5	583	1300
1.063.30.10.4	2.063.30.10.4				4						320		165				130,4	318,5		1700
1.063.40.10.2	2.063.40.10.2	63	40	9,525	2	56,5	105	125	13,5	145	238	25	124	9	20	110	68,6	150,5	583	1000
1.063.40.10.3	2.063.40.10.3				3						318		164				97,6	225,7		1300
1.063.50.10.2	2.063.50.10.2	63	50	9,525	2	56,5	105	125	13,5	145	287	25	146	9	20	110	68	149	583	1000
1.080.10.7.4	2.080.10.7.4	80	10	7,144	4	75,14	105	125	13,5	145	177	16	103	9	20	110	92,6	281,8	987	1650
1.080.10.7.5	2.080.10.7.5				5						198		114				112,2	352,2		2050
1.080.10.7.6	2.080.10.7.6				6						219		125				131,2	422,7		2400

Tabela de medidas







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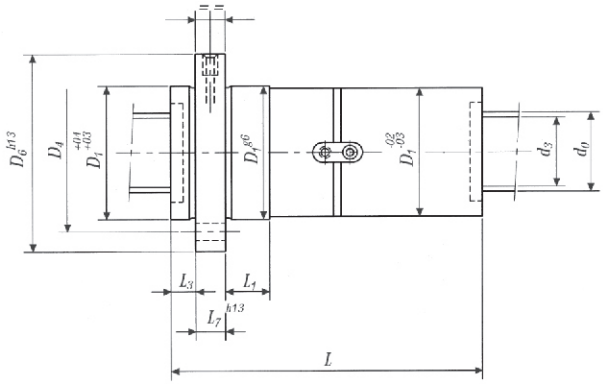
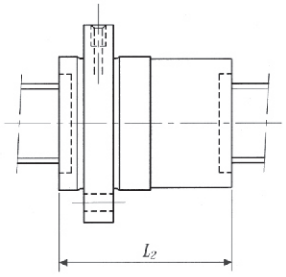
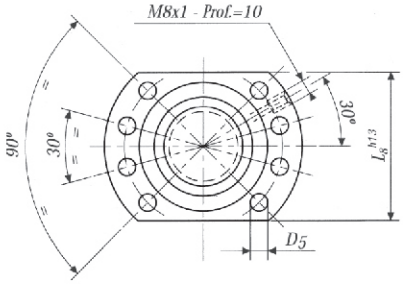
Tuerca única / Single nut / Ecrou simple / Chiocciola singola / Einzel - Mutter	Tuerca doble / Double nut / Ecrou double / Doppia Chiocciola / Doppel - Mutter	d_o	P_{ho}	Dw	i	d_3	D_1	D_4	D_5	D_6	L	L_1	L_2	L_3	L_7	L_8	Dinámica / Dynamic / Dynamique / Dinamica / Dynamische C_{am} (KN)	Estática / Static / Statique / Statica / Statische C_{oam} (KN)	Husillo por metro / Screw per meter / Vis par mètre / Vite per metro / Spindel per Meter R_{sm} (N/µm)	Tuerca doble / Double nut / Ecrou double / Doppia Chiocciola / Doppel - Mutter R_{nu} (N/µm)
1.080.12.8.4	2.080.12.8.4	80	12	7,938	4	74,58	105	125	13,5	145	213	25	125	10	25	110	107,6	314	978	1750
1.080.12.8.5	2.080.12.8.5				5						238		137				130,3	392,6		2200
1.080.12.8.6	2.080.12.8.6				6						263		150				152,5	471		2600
1.080.16.8.4	2.080.16.8.4	80	16	7,938	4	74,58	105	125	13,5	145	249	25	147	10	25	110	105	303	978	1750
1.080.16.8.5	2.080.16.8.5				5						282		163				127,2	378,7		2200
1.080.16.8.6	2.080.16.8.6				6						315		179				148,8	454,5		2600
1.080.20.10.4	2.080.20.10.4	80	20	9,525	4	73,5	125	145	13,5	165	302	25	167	10	25	130	129,3	340	964	2000
1.080.20.10.5	2.080.20.10.5				5						344		188				156,6	425		2500
1.080.20.10.6	2.080.20.10.6				6						385		209				183,2	510		2900
1.080.20.1.4	2.080.20.1.4	80	20	12,70	4	71,3	125	145	13,5	165	308	25	175	10	25	130	193,7	460,5	933	2000
1.080.20.1.5	2.080.20.1.5				5						350		196				234,7	575,7		2500
1.080.20.1.6	2.080.20.1.6				6						392		217				274,5	691		3000
1.080.25.10.4	2.080.25.10.4	80	25	9,525	4	73,5	125	145	13,5	165	340	25	195	10	25	130	129,3	340	964	2000
1.080.25.10.5	2.080.25.10.5				5						393		221				156,6	425		2500
1.080.25.1.4	2.080.25.1.4	80	25	12,70	4	71,3	135	155	13,5	175	346	25	198	10	25	140	193,7	460,5	933	2000
1.080.25.1.5	2.080.25.1.5				5						399		224				234,7	575,7		2600
1.080.30.10.3	2.080.30.10.3	80	30	9,525	3	73,5	125	145	13,5	165	260	25	135	10	25	130	109,4	288,7	964	1600
1.080.30.10.4	2.080.30.10.4				4						320		165				143,8	400,4		2000
1.080.30.1.3	2.080.30.1.3	80	30	12,70	3	71,3	135	155	13,5	175	268	25	139	10	25	140	162,1	384,7	933	1600
1.080.30.1.4	2.080.30.1.4				4						328		169				214,9	540		2000
1.080.40.10.3	2.080.40.10.3	80	40	9,525	3	73,5	125	145	13,5	165	317	25	165	10	25	130	108,7	287,3	964	1650
1.080.40.1.3	2.080.40.1.3	80	40	12,70	3	71,3	135	155	13,5	175	333	25	172	10	25	140	161,1	382,8	933	1750
1.080.50.10.2	2.080.50.10.2	80	50	9,525	2	73,5	125	145	13,5	165	287	25	146	10	25	130	76,1	190,3	964	1200
1.080.50.10.3	2.080.50.10.3				3						387		196				107,8	285,5		1650
1.080.50.1.2	2.080.50.1.2	80	50	12,70	2	71,3	135	155	13,5	175	291	25	148	10	25	140	112,8	253,6	933	1200
1.080.50.1.3	2.080.50.1.3				3						391		198				159,8	380,4		1750
1.080.64.10.2	2.080.64.10.2	80	64	9,525	2	73,5	125	145	13,5	165	327	25	168	10	25	130	75	188,2	964	1200
1.080.64.1.2	2.080.64.1.2	80	64	12,70	2	71,3	135	155	13,5	175	332	25	170	10	25	140	111,2	251	933	1200







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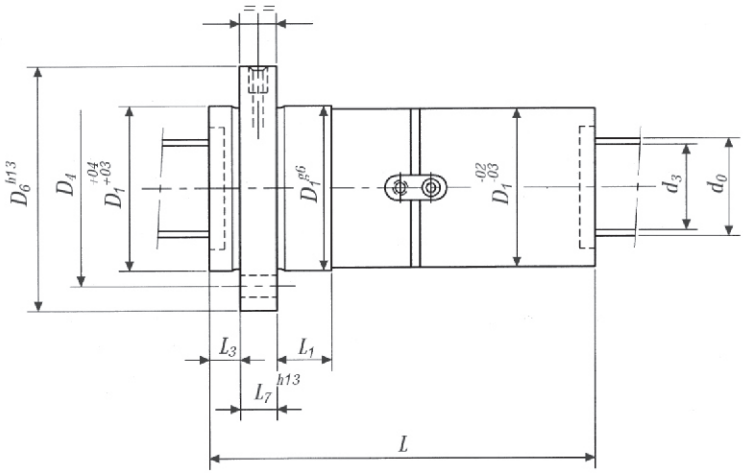
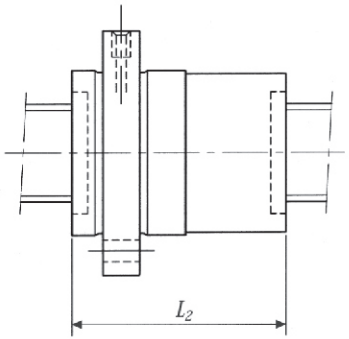
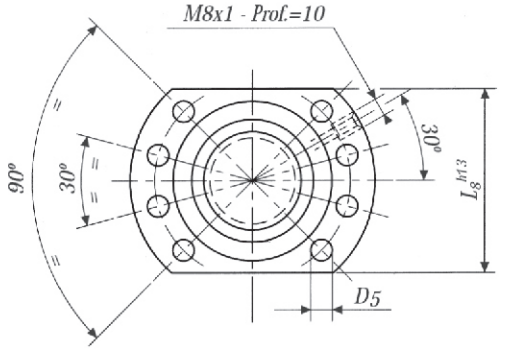
Tuerca única / Single nut / Ecrou simple / Chiocciola singola / Einzel - Mutter	Tuerca doble / Double nut / Ecrou double / Doppia Chiocciola / Doppel - Mutter	d_o	P_{ho}	Dw	i	d_3	D_1	D_4	D_5	D_6	L	L_1	L_2	L_3	L_7	L_8	Dinámica / Dynamic / Dynamique / Dinamica / Dynamische C_{am} (KN)	Estática / Static / Statique / Statica / Statische C_{oam} (KN)	Husillo por metro / Screw per meter / Vis par mètre / Vite per metro / Spindel per Meter R_{sm} (N/µm)	Tuerca doble / Double nut / Ecrou double / Doppia Chiocciola / Doppel - Mutter R_{nu} (N/µm)
1.100.10.7.5	2.100.10.7.5	100	10	7,144	5	95,14	125	145	13,5	165	203	16	119	12	22	130	125	454	1563	2250
1.100.10.7.6	2.100.10.7.6				6						224		130				146	545		2750
1.100.12.8.5	2.100.12.8.5	100	12	7,938	5	94,56	125	145	13,5	165	245	16	144	12	30	130	145	505	1552	2400
1.100.12.8.6	2.100.12.8.6				6						270		157				170	605,5		2850
1.100.16.8.4	2.100.16.8.4	100	16	7,938	4	94,56	125	145	13,5	165	256	16	154	12	30	130	117,4	392,6	1552	2100
1.100.16.8.5	2.100.16.8.5				5						289		170				142,3	491		2600
1.100.16.8.6	2.100.16.8.6				6						322		186				166,4	589		3050
1.100.20.10.4	2.100.20.10.4	100	20	9,525	4	93,5	150	176	17,5	202	311	25	176	12	30	155	147,7	452,5	1535	2300
1.100.20.10.5	2.100.20.10.5				5						353		197				179	565,6		2800
1.100.20.10.6	2.100.20.10.6				6						394		218				209,3	679		3350
1.100.20.1.4	2.100.20.1.4	100	20	12,70	4	91,3	150	176	17,5	202	318	25	180	15	30	155	220,4	603,4	1495	2500
1.100.20.1.5	2.100.20.1.5				5						360		201				267	754		3000
1.100.20.1.6	2.100.20.1.6				6						402		222				312,4	905		3650
1.100.25.10.4	2.100.25.10.4	100	25	9,525	4	93,5	150	176	17,5	202	349	25	200	12	30	155	157,5	498,8	1535	2500
1.100.25.10.5	2.100.25.10.5				5						402		226				190,8	623,4		3000
1.100.25.1.4	2.100.25.1.4	100	25	12,70	4	91,3	150	176	17,5	202	356	25	203	15	30	155	233,3	657,6	1495	2500
1.100.25.1.5	2.100.25.1.5				5						409		229				282,6	822		3000
1.100.30.10.3	2.100.30.10.3	100	30	9,525	3	93,5	150	176	17,5	202	260	25	135	15	30	155	122,7	373,6	1535	1900
1.100.30.10.4	2.100.30.10.4				4						320		165				157,2	498		2500
1.100.30.10.5	2.100.30.10.5				5						380		195				190,5	622,6		3000
1.100.30.1.3	2.100.30.1.3	100	30	12,70	3	91,3	150	176	17,5	202	268	25	139	15	30	155	181,8	492,5	1495	1300
1.100.30.1.4	2.100.30.1.4				4						328		169				233	656,7		2500
1.100.30.1.5	2.100.30.1.5				5						388		199				282,2	821		3000
1.100.40.10.3	2.100.40.10.3	100	40	9,525	3	93,5	150	176	17,5	202	317	25	165	15	30	155	122,2	372,3	1535	1900
1.100.40.10.4	2.100.40.10.4				4						397		205				156,5	496,5		2500
1.100.40.1.3	2.100.40.1.3	100	40	12,70	3	91,3	150	176	17,5	202	333	25	172	15	30	155	181	491	1495	1900
1.100.40.1.4	2.100.40.1.4				4						413		212				232	654,6		2500

Tabela de medidas







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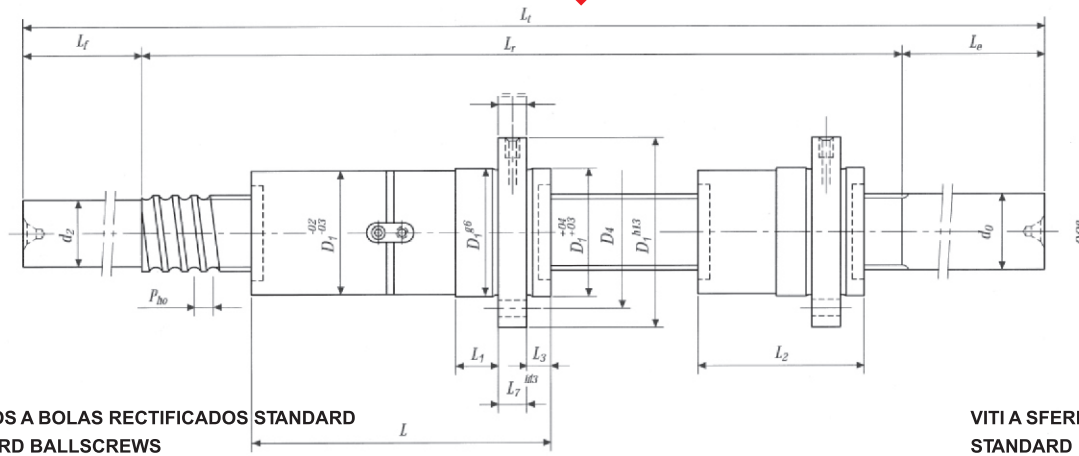
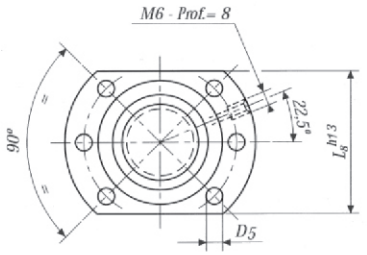
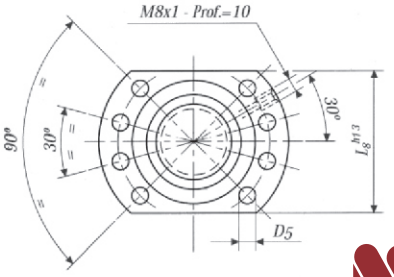
Referencia / Reference / Reference / Riferimento / Referenz		ø Nominal / ø Nominal / ø Nominal / ø Nominale / ø Nenn	Paso / Pitch / Pas / Passo / Steigung	ø Bolas / ø Ball / ø Billes / ø Sfere / ø Kugel	Circuitos / Circuits / Circuits / Circuiti / Umläufe	Diámetros / Diameters / Diamètres / Diametri / Durchmesser					Longitudes / Lengths / Longueurs / Longhezze / Längen						Cargas / Loads / Charges / Carichi / Tragzahl		Rigidez / Rigidity / Rigidite / Rigidita / Steifigkeit	
Tuerca única / Single nut / Ecrou simple / Chiocciola singola / Einzel - Mutter	Tuerca doble / Double nut / Ecrou double / Doppia Chiocciola / Doppel - Mutter	d_o	P_{ho}	Dw	i	d_3	D_1	D_4	D_5	D_6	L	L_1	L_2	L_3	L_7	L_8	Dinámica / Dynamic / Dynamique / Dinamica / Dynamische C_{am} (KN)	Estática / Static / Statique / Statica / Statische C_{oam} (KN)	Husillo por metro / Screw per meter / Vis par mètre / Vite per metro / Spindel per Meter R_{sm} (N/µm)	Tuerca doble / Double nut / Ecrou double / Doppia Chiocciola / Doppel - Mutter R_{nu} (N/µm)
1.100.50.10.2	2.100.50.10.2	100	50	9,525	2	93,5	150	176	17,5	202	287	25	146	15	30	155	82,2	231,7	1535	1400
1.100.50.10.3	2.100.50.10.3				3						387		196				119	359,2		2000
1.100.50.1.2	2.100.50.1.2	100	50	12,70	2	91,3	150	176	17,5	202	291	25	148	15	30	155	123,5	312,4	1495	1450
1.100.50.1.3	2.100.50.1.3				3						391		198				180	489		2100
1.100.64.10.2	2.100.64.10.2	100	64	9,525	2	93,5	150	176	17,5	202	327	25	168	15	30	155	81,4	230	1535	1400
1.100.64.1.2	2.100.64.1.2	100	64	12,70	2	91,3	150	176	17,5	202	332	25	170	15	30	155	122,4	310	1495	1450
1.125.20.1.4	2.125.20.1.4	125	20	12,70	4	116,3	170	196	17,5	222	318	30	180	15	30	175	246,2	775,4	2384	2950
1.125.20.1.5	2.125.20.1.5				5						360		201				298,3	970		3500
1.125.20.1.6	2.125.20.1.6				6						402		222				349	1163		4050
1.125.25.1.4	2.125.25.1.4	125	25	12,70	4	116,3	170	196	17,5	222	356	30	203	15	30	175	257,6	830,2	2384	2950
1.125.25.1.5	2.125.,25.1.5				5						409		229				312	1038		3500
1.125.30.1.3	2.125.30.1.3	125	30	12,70	3	116,3	170	196	17,5	222	268	30	139	15	30	175	201	622,2	2384	2350
1.125.30.1.4	2.125.30.1.4				4						328		169				257,3	830		2950
1.125.30.1.5	2.125.30.1.5				5						388		199				311,7	1037		3500
1.125.40.1.3	2.125.40.1.3	125	40	12,70	3	116,3	170	196	17,5	222	333	30	172	15	30	175	200,3	621	2384	2350
1.125.40.1.4	2.125.40.1.4				4						413		212				256,6	827,8		2950
1.125.50.1.2	2.125.50.1.2	125	50	12,70	2	116,3	170	196	17,5	222	291	30	148	15	30	175	137,7	400	2384	1700
1.125.50.1.3	2.125.50.1.3				3						391		198				200	620		2350
1.125.64.1.2	2.125.64.1.2	125	64	12,70	2	116,3	170	196	17,5	222	332	30	170	15	30	175	137	397	2384	1700

Tabela de fusos de esferas retificados standard







HUSILLOS A BOLAS RECTIFICADOS STANDARD
STANDARD BALLSCREWS
VIS À BILLES STANDARD

VITI A SFERE STANDARD d_0 - 32
STANDARD KUGELUMLAUFSPINDELN d_0 • 40

IPIRANGA

Referencia / Reference / Reference / Riferimento / Referenz		ø Nominal / ø Nominale / ø Nenn	Paso / Pitch / Pas / Passo / Steigung	ø Bolas / ø Ball / ø Billes / ø Sfere / ø Kugel	Circuitos / Circuits / Circuits / Circuiti / Umläufe	Diámetros / Diameters / Diamètres / Diametri / Durchmesser					Longitudes / Lengths / Longueurs / Longhezze / Längen				Longitudes / Lengths / Longueurs / Longhezze / Längen						Cargas / Loads / Charges / Carichi / Tragzahl		Rigidez / Rigidity / Rigidite / Rigidita / Steifigkeit	
Tuerca única / Single nut / Ecrou simple / Chiocciola singola / Einzel - Mutter	Tuerca doble / Double nut / Ecrou double / Doppia Chiocciola / Doppel - Mutter	d_o	P_{ho}	Dw	i	d_2	D_1	D_4	D_5	D_6	L_t	L_r	L_f	L_e	L	L_1	L_2	L_3	L_7	L_8	Dinámica / Dynamic / Dynamique / Dinamica / Dynamische Cam (KN)	Estática / Static / Statique / Statica / Statische Coam (KN)	Husillo por metro / Screw per meter / Vis par mètre / Vite per metro / Spindel per Meter Rsm (N/µm)	Tuerca doble / Double nut / Ecrou double / Doppia Chiocciola / Doppel - Mutter Rnu (N/µm)
20.205.62	30.205.62	20	5	3,969	3	17,1	36	47	6,6	58	620	300	60	260	84	10	49	5,5	10	44	16,9	27,4	57	450
20.205.82	30.205.82										820	500												
20.255.72	30.255.72	25	5	3,969	3	22,1	40	51	6,6	62	720	400	60	260	84	10	50	6	10	48	19,4	35,8	92	500
20.255.92	30.255.92										920	600												
20.325.10	30.325.10	32	5	3,969	4	29,1	50	65	9	80	1060	600	100	360	98	10	57	6	12	62	27,9	61,7	154	850
20.325.14	30.325.14										1460	1000												
20.321.10	30.321.10	32	10	6,35	3	27,7	50	65	9	80	1060	600	100	360	138	20	76	6	12	62	37,5	65	145	700
20.321.14	30.321.14										1460	1000												
20.405.16	30.405.16	40	5	3,969	5	37,1	63	78	9	93	1650	1000	150	500	112	10	66	7	14	70	38,3	101,6	246	1200
20.405.21	30.405.21										2150	1500												
20.401.16	30.401.16	40	10	6,35	3	35,4	63	78	9	93	1650	1000	150	500	141	20	81	7	14	70	45,1	91,4	233	800
20.401.21	30.401.21										2150	1500												
20.501.23	30.501.23	50	10	7,144	5	44,8	75	93	11	110	2300	1500	200	600	187	20	105	7	16	85	88	205	370	1600
20.501.28	30.501.28										2800	2000												
20.501.33	30.501.33										3300	2500												
20.501.38	30.501.38										3800	3000												
20.631.23	30.631.23	63	10	7,144	5	57,8	90	108	11	125	2350	1500	250	600	189	20	107	7	18	95	100.8	272,7	601	1850
20.631.28	30.631.28										2850	2000												
20.631.38	30.631.38										3850	3000												
20.631.48	30.631.48										4850	4000												

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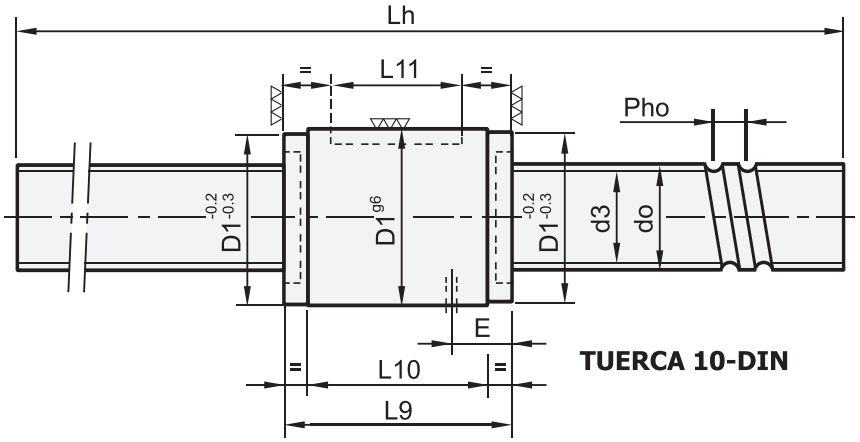
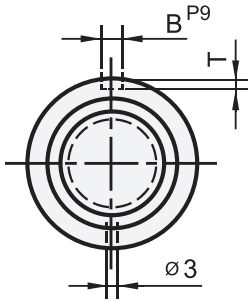
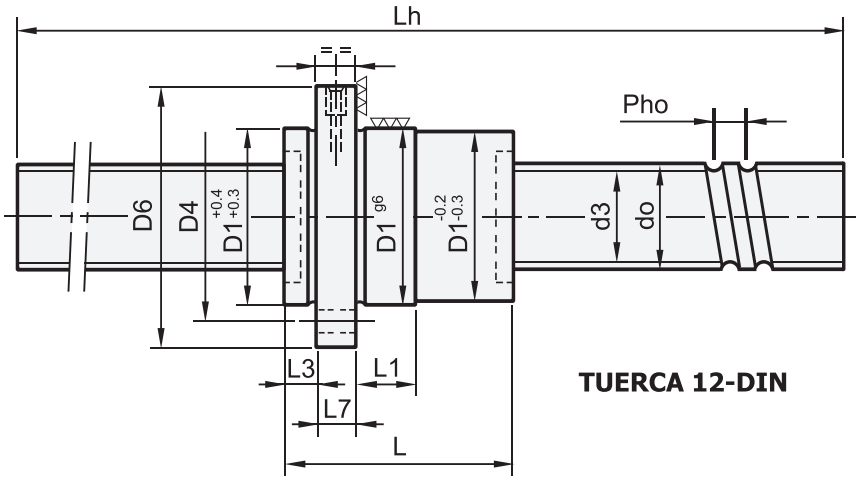
HUSILLOS LAMINADOS DE 1 ENTRADA
DIMENSIONES SEGUN DIN-69051-5

BALL SCREW ACCORDING DIN-69051-5



TUERCA 10-DIN





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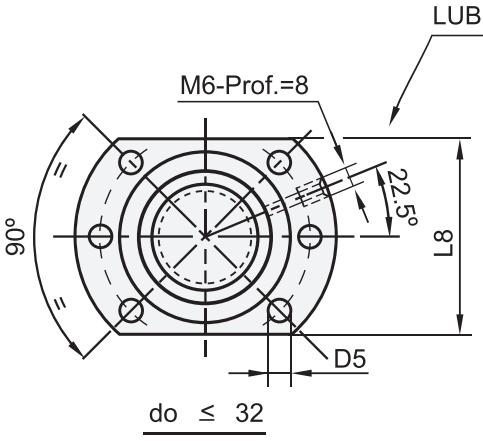

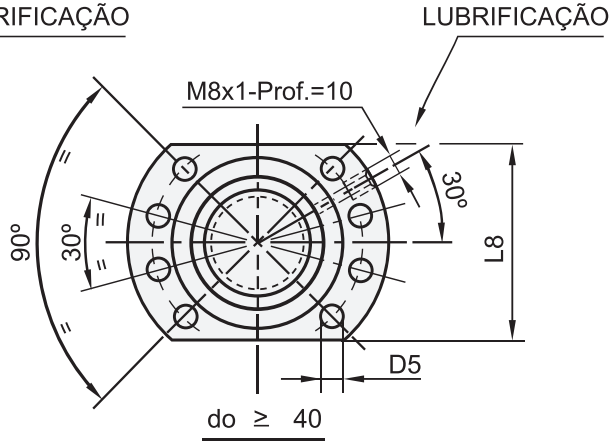

TUERCA 10 DIN	Diameters end Lengths					Single DIN Serie 10					Single DIN Serie 12								Load Capacity (KN)		Axial clearence Max.	Ref. Série 12
	d0	d3	Pho	Lh	D1	L9	L10	L11	BxT	E	D6	D4	D5	L	L1	L7	L3	L8	Cam	Coam		
10.1605-DIN	15,4	12,7	5	3000	28	40	25	20	5x2	10	48	38	5,5	50	10	10	6	40	10,5	14,9	0,08	12.1605-DIN
10.2005-DIN	19,4	16,7	5	6000	36	40	25	20	5x2	10	58	47	6,6	50	10	10	6	44	12	19,3	0,08	12.2005-DIN
10.2505-DIN	24,4	21,7	5	6000	40	40	25	20	5x2	10	62	51	6,6	50	10	10	6	48	14,2	26,6	0,08	12.2505-DIN
10.3205-DIN	31,4	28,7	5	6000	50	46	31	25	6x2,5	10	80	65	9	57	10	12	6	62	20,6	47,2	0,08	12.3205-DIN
10.3210-DIN	32,1	27,5	10	6000	50	68	48	30	6x2,5	13,5	80	65	9	77	10	12	6	62	35,4	63	0,12	12.3210-DIN
10.4005-DIN	39,3	36,7	5	6000	63	51	36	30	6x2,5	10	93	78	9	65	10	14	7	70	27,9	76,1	0,08	12.4005-DIN
10.4010-DIN	39,3	34,1	10	6000	63	68	48	30	6x2,5	13,5	93	78	9	80	20	14	7	70	43,4	80,3	0,14	12.4010-DIN
10.5010-DIN	49,2	44	10	6000	75	90	69	40	6x2,5	14,5	110	93	11	104	20	16	7	85	79,5	184,3	0,14	12.5010-DIN
10.6310-DIN	62,2	57	10	6000	90	90	69	40	6x2,5	14,5	125	108	11	106	20	18	7	95	88,5	235,5	0,14	12.6310-DIN

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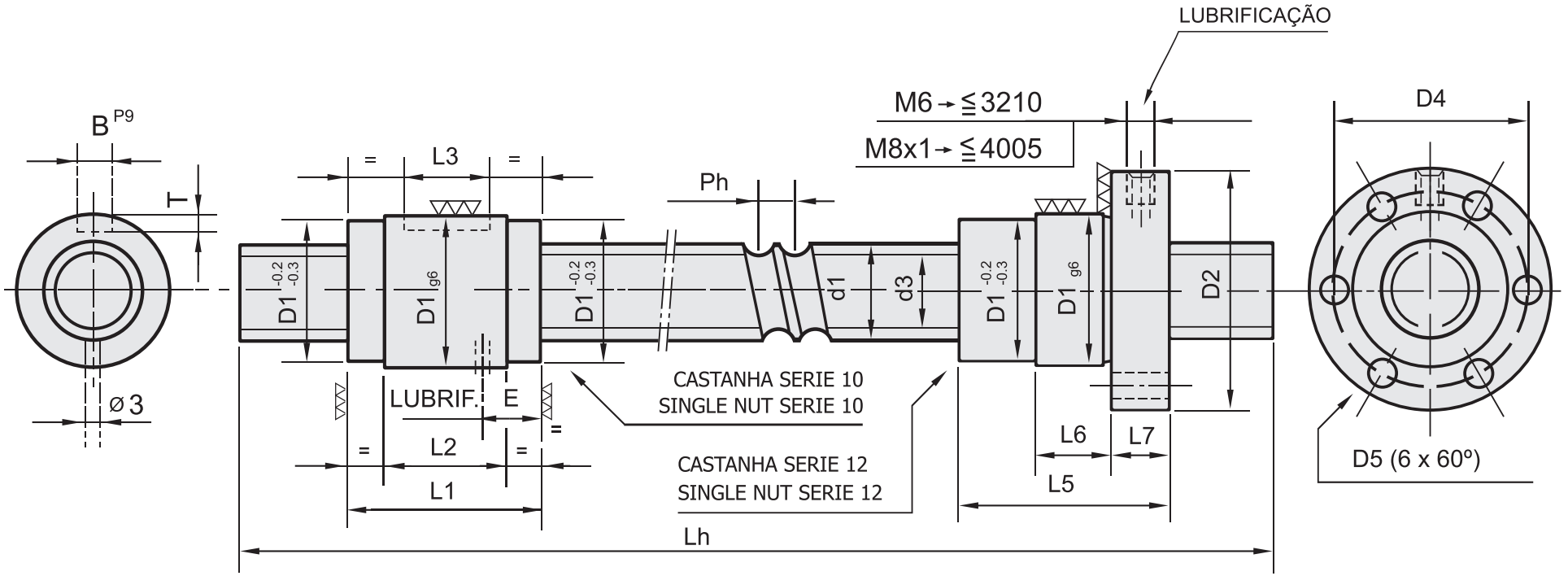
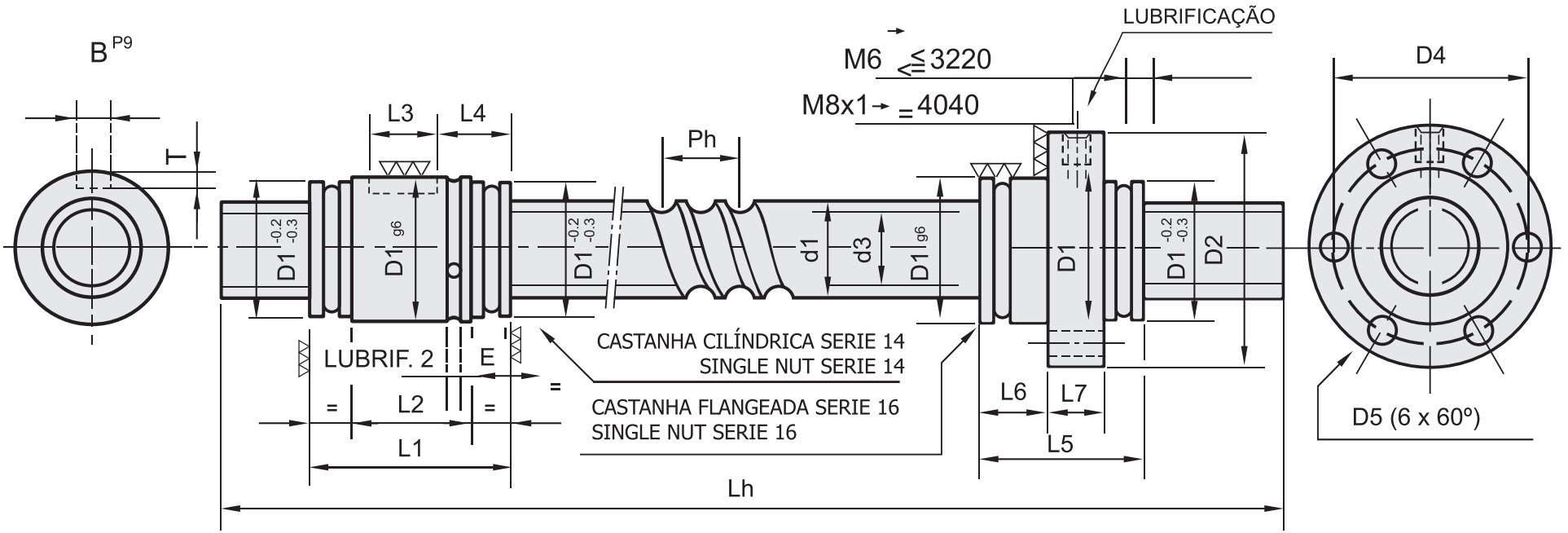


REF. SERIE 10	Diameters end lengths					Single Nut Serie 10					Single Nut Serie 12						Load Capacity (KN)		Axial clearence Max.	Ref. Série 12
	d1	d3	Ph	Lh	D1	L1	L2	L3	BxT	E	D2	D4	D5	L5	L6	L7	Ca	Coa		
10.1605	15,4	12,7	5	1500	28	40	25	20	5x2	10	48	38	5,5	46	10	12	9	16,5	0,08	12.1605
10.2005	19,4	16,7	5	2500	32	40	25	20	5x2	10	55	45	7	46	10	12	10,3	21,4	0,08	12.2005
10.2505	24,4	21,7	5	2500	38	40	25	20	5x2	10	62	50	7	48	10	14	12,1	29,5	0,08	12.2505
10.3205	31,4	28,7	5	4000	45	46	31	25	6x2,5	10	70	58	7	55	10	16	17,6	52,4	0,08	12.3205
10.3210	32,1	27,5	10	4000	53	68	48	30	6x2,5	13,5	80	68	7	75	16	16	30,3	70	0,12	12.3210
10.4005	39,3	36,7	5	4000	53	51	36	30	6x2,5	10	80	68	7	60	10	16	23,9	84,6	0,08	12.4005
10.4010	39,3	34,1	10	4000	63	68	48	30	6x2,5	13,5	95	78	9	75	16	16	37	89,3	0,14	12.4010
10.5010	49,2	44	10	5000	72	90	69	40	6x2,5	14,5	110	90	11	99	16	18	68	204,8	0,14	12.5010
10.6310	62,2	57	10	5000	85	90	69	40	6x2,5	14,5	125	105	11	101	16	20	75,6	261,5	0,14	12.6310

IPIRANGA



REF. SERIE 14	Diameters end Lengths					Single Nut Serie 14						Single Nut Serie 16						Load Capacity (KN)		Axial clearence Max.	Ref. Série 16
	d1	d3	Ph	Lh	D1	L1	L2	L3	L4	BxT	E	D2	D4	D5	L5	L6	L7	Ca	Coa		
14.2510	24,4	21,9	10	2500	45	36	20	12,5	14,5	5x2	11,5	70	57	7	36	11	14	13,9	41,2	0,08	16.2510
14.2525	24,4	21,9	25	2500	45	39	23	16	14	5x2	10,5	70	57	7	39	14	14	17,7	47	0,08	16.2525
14.3220	31,4	28,7	20	4000	53	55	37	20	17,5	6x2,5	11	80	68	7	55	26	16	28,1	107,1	0,08	16.3220
14.3240	31,4	28,7	40	4000	53	50	32	20	15	6x2,5	11	80	68	7	50	21	16	15,2	45	0,08	16.3240
14.4040	39,4	34,3	40	4000	72	57	37	20	18,5	6x2,5	15	104	87	9	57	24	16	45	114,3	0,14	16.4040
14.5020	49,4	44	20	5000	85	65	45	30	24	6x2,5	20	125	105	11	65	27	18	50,4	171,5	0,14	16.5020
14.5050	49,4	44,2	50	5000	85	66	46	30	18	6x2,5	14,5	125	105	11	66	31	18	64,2	196,2	0,14	16.5050
14.6320	62,4	57	20	5000	105	65	47	30	24	6x2,5	20	145	125	11	65	27	20	55,8	217,3	0,14	16.6320

TECHICAL DATA SHEET FOR BALLSCREW DESUGN

IPIRANGA

COMPANY: _____

ADDRESS: _____

_____ FAX: _____

TELEPHONE Nº: _____ CONTACT PERSON: _____

E-MAIL: _____ DEPARTMENT: _____

NAME: _____ DATA: _____

APPLICATION TYPE: _____

PROTOTYPE: _____

MACHINE: _____

SPECIAL APPLICATION: _____

DRAWING Nº: _____

OPERATING CONDITIONS

Axial load F(N):	F_1: _____	F_2: _____	F_3: _____	F_4: _____
Rotate speed n(min-1):	n_1: _____	n_2: _____	n_3: _____	n_4: _____
Utilisation coefficient %:	q_1: _____	q_2: _____	q_3: _____	q_4: _____

Maximum static load: _____

N. Axial preload: _____

N. preload torque: _____ N/m

SERVICE LIFE

Machine operation in hours. _____

Ballscrew operation. _____ % of machine operation.

DIMENSSION OF SCREW AND NUT

Nominal diameter d_0 _____ mm

Pitch d_0 _____ mm

Right hand _____ mm

Left hand _____ mm

Longitud total de husillo _____ mm

Longitud de rosca _____

Nut refer.nº(según catálogo) _____

With wipers _____

Max. axial backlash _____

Single nut _____

Double nut _____

PITCH ACCURACY

Precision grade desired V300: IT.1: ◯ 6µm | IT.3: ◯ 12µm | IT.5: ◯ 23µm

---

ASSEMBLY CONDITIONS

Horizontal: ◯ | Vertical: ◯ | Rotating screw: ◯ | Rotating nut: ◯

Type of supports: (::----1) | (:----:2) | (::---:3) | (::--::4)

LUBRICATION

Grease: Oil: Continuous: Intermittent:

Operating temperature: normal _____ºC. | Maximum _____ºC.

QUANTITY

Quotation for: _____ pcs. Estimated demand: _____ pcs/month _____ pcs/year.

Delivery date required: _____ weeks.

Av. Amazonas, 976 - CEP: 90240-542 - Porto Alegre/RS
Fone/Fax: 51 3337.1481 - 3337.2870
vendas@ibatech.com.br
www.ibatech.com.br