Apéndice B

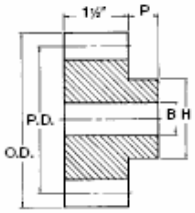
CATÁLOGOS DE PIEZAS COMERCIALES, GRÁFICAS Y TABLAS DE APOYO

Tabla B-1
Referencia del engrane

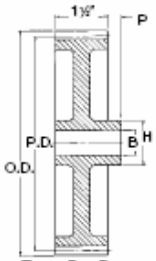
Martin Steel & Cast Stock Spur Gears

20° Pressure Angle

8 DP
1½" Face



Type B



Type B_2, B_3

Type B
Plain With Hub All Steel

Type B_3
Web With Spokes Cast

Steel

No. Teeth	Catalog Number	Pressure Angle (Deg.)	Diameter		Type	Bore (Inches)		Hub (Inches)		Weight Lbs. (App.)
			Pitch	Outside		Stock	Max.*	Diameter	Proj.	
12	TS812	20	1.500	1.750	B	¾	¾	1⅛	⅜	0.7
14	TS814	20	1.750	2.000	B	¾	⅞	1⅛	⅜	1.0
15	TS815	20	1.875	2.125	B	¾	¾	1⅛	⅜	1.2
16	TS816	20	2.000	2.250	B	¾	⅞	1⅛	⅜	1.4
18	TS818	20	2.250	2.500	B	¾	1⅛	1⅜	⅜	1.9
19	TS819	20	2.375	2.625	B	¾	1¼	2	⅜	2.3
20	TS820	20	2.500	2.750	B	¾	1⅜	2⅛	⅜	2.5
22	TS822	20	2.750	3.000	B	¾	1½	2⅛	⅜	3.2
24	TS824	20	3.000	3.250	B	¾	1⅝	2⅛	⅜	3.9
26	TS826	20	3.250	3.500	B	¾	1⅝	2¼	⅜	4.6
28	TS828	20	3.500	3.750	B	¾	1⅝	2¼	¼	5.2
30	TS830	20	3.750	4.000	B	1	1⅝	2¼	⅜	5.6
32	TS832	20	4.000	4.250	B	1	1⅝	3¼	⅜	6.6
36	TS836	20	4.500	4.750	B	1	2¼	3½	⅜	8.6
40	TS840	20	5.000	5.250	B	1	2¼	3½	⅜	10.2
42	TS842	20	5.250	5.500	B	1	2¼	3½	1	11.4
44	TS844	20	5.500	5.750	B	1	2¼	3½	1	12.3
48	TS848	20	6.000	6.250	B	1	2¼	3½	1	14.2

Cast

No. Teeth	Catalog Number	Pressure Angle (Deg.)	Diameter		Type	Bore (Inches)		Hub (Inches)		Weight Lbs. (App.)
			Pitch	Outside		Stock	Max.*	Diameter	Proj.	
52	TC852	20	6.500	6.750	B	1	1⅜	3	1	11.9
56	TC856	20	7.000	7.250	B	1	1⅜	3	1	13.0
60	TC860	20	7.500	7.750	B_3	1	1⅜	3	1	12.0
64	TC864	20	8.000	8.250	B_3	1	1⅜	3	1	12.1
72	TC872	20	9.000	9.250	B_3	1	2⅛	3¼	1	14.4
80	TC880	20	10.000	10.250	B_3	1⅜	2⅛	3¼	1¼	17.0
88	TC888	20	11.000	11.250	B_3	1⅜	2⅛	3¼	1¼	19.0
96	TC896	20	12.000	12.250	B_3	1⅜	2¼	3½	1¼	23.7
112	TC8112	20	14.000	14.250	B_3	1⅜	2¼	3½	1¼	25.0
120	TC8120	20	15.000	15.250	B_3	1⅜	2¼	3½	1¼	25.8
128	TC8128	20	16.000	16.250	B_3	1⅜	2¼	3½	1¼	28.0
144	TC8144	20	18.000	18.250	B_3	1⅜	2¼	3½	1¼	32.0
160	TC8160	20	20.000	20.250	B_3	1¾	2¼	3½	1¼	34.8

Bored-to-Size

No. Teeth	Catalog Number	Pressure Angle (Deg.)	Diameter		Type	Bore (Inches)		Set Screw	Hub (Inches)		Weight Lbs. (App.)
			Pitch	Outside		Stock	Keyway		Diameter	Proj.	
12	TS812BS 3/4	20	1.500	1.750	B	¾	⅜ X ⅜	(1) 10-24 @ 90	1⅛	⅜	0.70
14	TS814BS 3/4	20	1.750	2.000	B	¾	⅜ X ⅜	(1) 1/4-20 @ 90	1⅛	⅜	1.00
15	TS815BS 3/4	20	1.875	2.125	B	¾	⅜ X ⅜	(1) 1/4-20 @ 90	1⅛	⅜	1.20
15	TS815BS 7/8	20	1.875	2.125	B	⅞	⅜ X ⅜	(1) 1/4-20 @ 90	1⅛	⅜	1.20
16	TS816BS 7/8	20	2.000	2.250	B	⅞	⅜ X ⅜	(1) 1/4-20 @ 90	1⅛	⅜	1.40
16	TS816BS 1	20	2.000	2.250	B	1	¼ X ¼	(1) 5/16-18 @ 90	1⅛	⅜	1.40
18	TS818BS 7/8	20	2.250	2.500	B	⅞	⅜ X ⅜	(1) 1/4-20 @ 90	1⅜	⅜	1.90
18	TS818BS 1	20	2.250	2.500	B	1	¼ X ¼	(1) 5/16-18 @ 90	1⅜	⅜	1.90
18	TS818BS 1-1/8	20	2.250	2.500	B	1⅛	¼ X ¼	(1) 5/16-18 @ 90	1⅜	⅜	1.90
20	TS820BS 7/8	20	2.500	2.750	B	⅞	⅜ X ⅜	(1) 1/4-20 @ 90	2⅛	⅜	2.50
20	TS820BS 1	20	2.500	2.750	B	1	¼ X ¼	(1) 5/16-18 @ 90	2⅛	⅜	2.50
20	TS820BS 1-1/8	20	2.500	2.750	B	1⅛	¼ X ¼	(1) 5/16-18 @ 90	2⅛	⅜	2.50
22	TS822BS 7/8	20	2.750	3.000	B	⅞	⅜ X ⅜	(1) 1/4-20 @ 90	2⅛	⅜	3.20
22	TS822BS 1	20	2.750	3.000	B	1	¼ X ¼	(1) 5/16-18 @ 90	2⅛	⅜	3.20
22	TS822BS 1-1/8	20	2.750	3.000	B	1⅛	¼ X ¼	(1) 5/16-18 @ 90	2⅛	⅜	3.20
24	TS824BS 7/8	20	3.000	3.250	B	⅞	⅜ X ⅜	(1) 1/4-20 @ 90	2⅛	⅜	3.90
24	TS824BS 1	20	3.000	3.250	B	1	¼ X ¼	(1) 5/16-18 @ 90	2⅛	⅜	3.90
24	TS824BS 1-1/8	20	3.000	3.250	B	1⅛	¼ X ¼	(1) 5/16-18 @ 90	2⅛	⅜	3.90

* Recommended maximum bore with keyway and set screw.

20° P.A. Gears Will Not Operate With 14½° P.A.

Tabla B-2
Referencia de la cremallera

Stock Gears Numbering System

Martin

Letters (Prefix) Indicate Material and Type Gear.
Letters (Suffix) Indicate Hardened, Number of Threads, Direction of Rotation and KW and SS.
Numbers Indicate Pitch, Number of Teeth, and Ratio (Suffix).

Spur Gears

S=Steel
TS=Steel 20°
C=Cast
TC=Cast 20°
H=Hardened Teeth
NM=Non-Metallic
Note: Pressure Angle is Shown as a Suffix to Part Number of All Our Spur Gears.

Examples
S620-14½° (Steel 6P 20T-14½°PA)
TS620-20° (Steel 6P 20T-20°PA)
C660-14½° (Cast 6P 60T-14½°PA)
TC660-20° (Cast 6P 60T-20°PA)
S620H-14½° (Steel 6P 20T-Hardened 14½°PA)
NM620-14½° (Non-Metallic 6P 20T-14½°PA)

Rack

R=Rack — Steel
RA=Rack — Steel Heavy Backing
TR=Rack — Steel 20° Heavy Backing
R20=Rack — Steel 20° Wide Face

Examples
R-6X2 (14½° STD Backing 6PX2' Long)
RA-6X4 (14½° Heavy Backing 6PX4' Long)
TR-6X6 (20° STD Width 6PX6' Long)
R20-6X6 (20° Wide Face 6PX6' Long)

Bevel Gears

B=Bevel — Cast Iron Gears
B=Bevel — Steel Pinions
BS=Bevel — Steel Gears
BS=Bevel — Steel Pinions
Note: B Steel Pinions May Run With BS Gears of Same Ratio

Examples
B1040-2 (Cast 10P 40T 2:1 Ratio)
B1020-2 (Steel 10P 20T 2:1 Ratio)
BS1040-2 (Steel 10P 40T 2:1 Ratio)
BS1020-2 (Steel 10P 20T 2:1 Ratio)

GEARS

Miter Gears

M=Miter — Steel Gears
A or B=Larger Bore (Suffix)
HM=Miter-Hardened Teeth
K=KW & SS

Examples
M824 (Steel 8P 24T)
M824A (Steel 8P 24T Larger Bore)
M2424BR (Brass 24P 24T)
HM1020 (Steel-Hardened Teeth 10P 20T)
HMK1020 (Steel-Hardened 10P 20T With KW & SS)

Worm

W=Worm — Steel
WH=Worm — Steel With Hub Projection
WG=Worm — Steel Hardened Ground Threads
WHG=Worm — Steel Hardened Ground Threads With Hub Projection
L=(Prefix) Longer Face
D or Q=(Suffix) Double or Quadruple Thread
R=Right Hand

Examples
W6R (Steel 6P Right Hand)
WH6R (Steel with Hub Projection 6P Right Hand)
WG6R (Steel-Hardened Ground Threads 6P Right Hand
WHG6R (Steel with Hub Projection Hardened Ground Threads 6P Right Hand)
LW6R Steel Long Face 6P Right Hand)
W6DR (Steel 6P Double Thread Right Hand)

Worm Gears

W=Worm Gear — Cast Iron
WB=Worm Gear — Bronze
D or Q=Double or Quadruple Thread (Suffix)
R=Right Hand (Suffix)

Examples
W660R (Cast Iron 6P 60T Right Hand)
WB660R (Bronze 6P 60T Right Hand)
W660DR (Cast Iron 6P 60T Double Thread Right Hand)

Tabla B-3
Propiedades del acero 1018

AISI 1018 Steel, cold drawn

Component	Wt. %
C	0.14 - 0.2
Fe	98.81 - 99.26
Mn	0.6 - 0.9
P	Max 0.04
S	Max 0.05

Physical Properties	Metric	English	
Density	7.87 g/cc	0.284 lb/in³	
Mechanical Properties			
Hardness, Brinell	126	126	
Hardness, Knoop	145	145	Converted from Brinell hardness.
Hardness, Rockwell B	71	71	Converted from Brinell hardness.
Hardness, Vickers	131	131	Converted from Brinell hardness.
Tensile Strength, Ultimate	440 MPa	63800 psi	
Tensile Strength, Yield	370 MPa	53700 psi	
Elongation at Break	15 %	15 %	In 50 mm
Reduction of Area	40 %	40 %	
Modulus of Elasticity	205 GPa	29700 ksi	Typical for steel
Bulk Modulus	140 GPa	20300 ksi	Typical for steel
Poisson's Ratio	0.29	0.29	Typical For Steel
Machinability	70 %	70 %	Based on AISI 1212 steel. as 100% machinability
Shear Modulus	80 GPa	11600 ksi	Typical for steel
Electrical Properties			
Electrical Resistivity	1.59e-005 ohm-cm	1.59e-005 ohm-cm	annealed condition; 0°C (32°F)
Electrical Resistivity at Elevated Temperature	2.19e-005 ohm-cm	2.19e-005 ohm-cm	annealed condition; 100°C (212°F)
Electrical Resistivity at Elevated Temperature	2.93e-005 ohm-cm	2.93e-005 ohm-cm	annealed condition; 200°C (390°F)
Thermal Properties			
Specific Heat Capacity	0.486 J/g-°C	0.116 BTU/lb-°F	annealed; 50-100°C (122-212°F)
Thermal Conductivity	51.9 W/m-K	360 BTU-in/hr-ft²-°F	estimated based on similar materials

Tabla B-4
Factor de tamaño para diseño de ejes

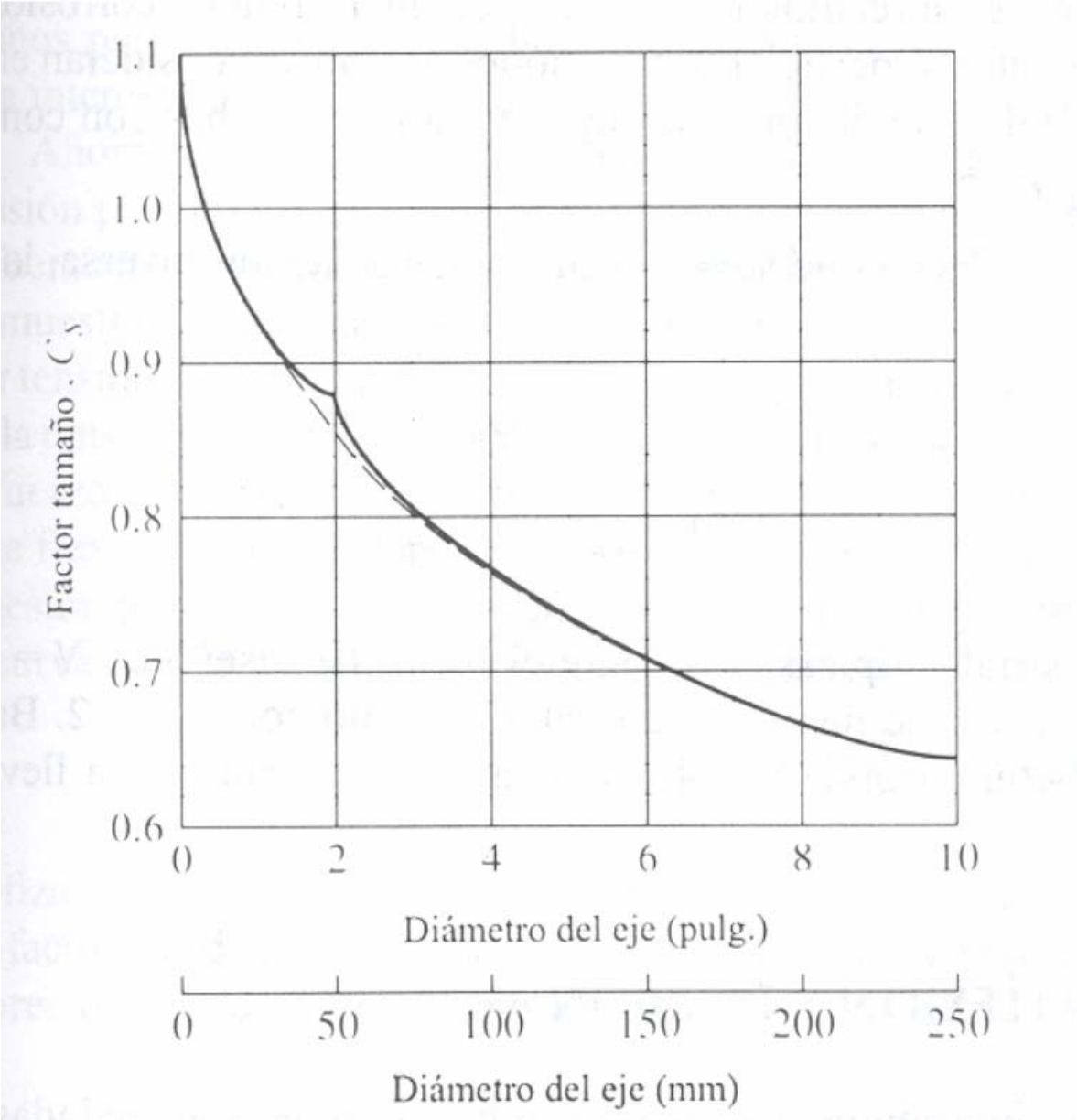


Tabla B-5
Tensión por durabilidad contra resistencia al esfuerzo por tracción para acero forjado para varias condiciones superficiales

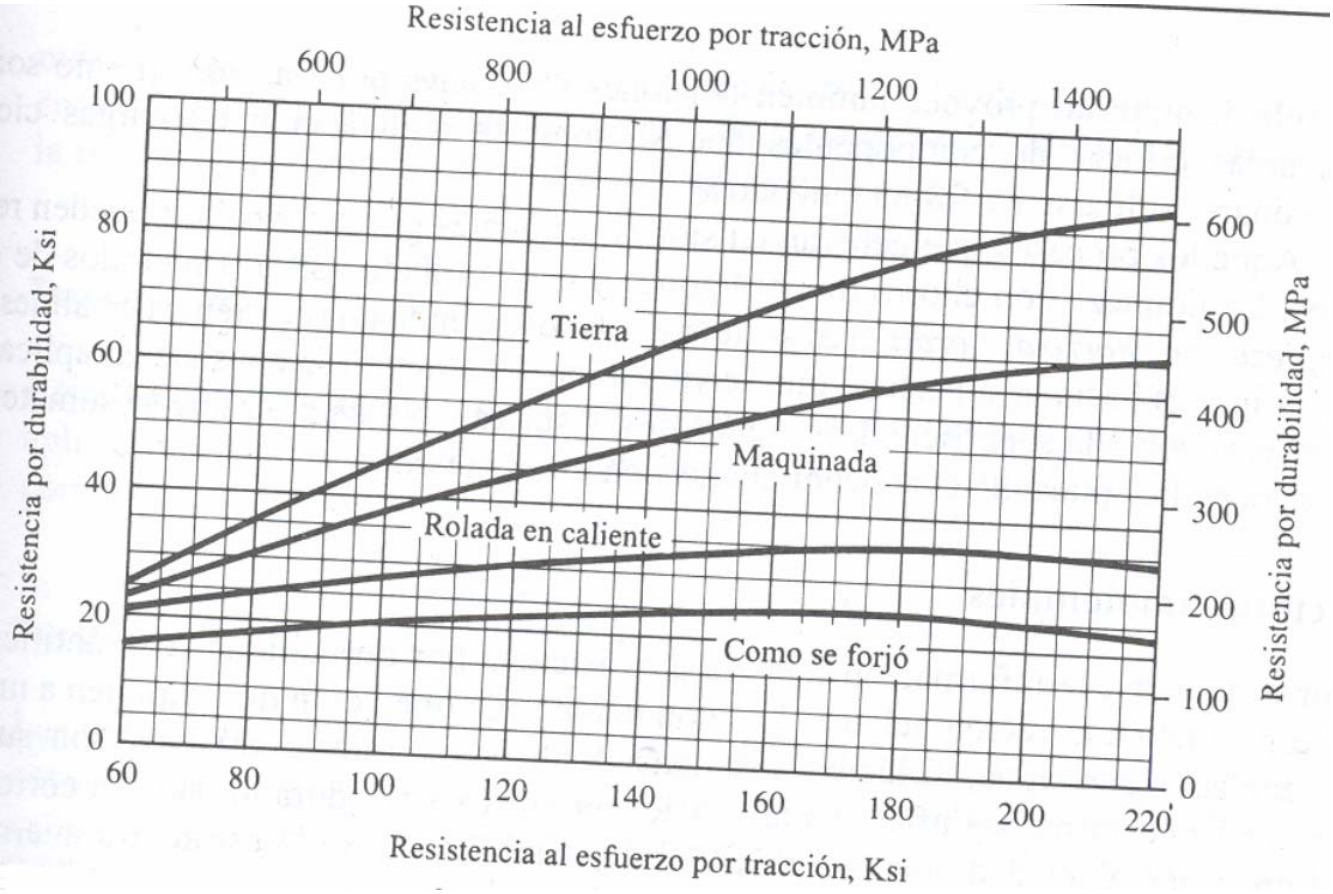
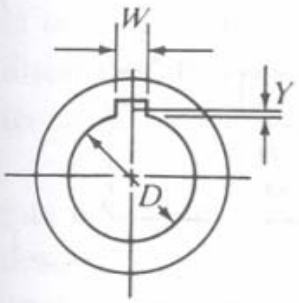


Tabla B-6
Tamaño de cuña contra tamaño de flecha

Diámetro nominal de la flecha		*Tamaño nominal de la cuña*		
			Altura, H	
Más de	*Hasta (incluso)*	*Espesor, W*	*Cuadrada*	*Rectangular*
5/16	7/16	3/32	3/32	
7/16	9/16	1/8	1/8	3/32
9/16	7/8	3/16	3/16	1/8
7/8	1 1/4	1/4	1/4	3/16
1 1/4	1 3/8	5/16	5/16	1/4
1 3/8	1 3/4	3/8	3/8	1/4
1 3/4	2 1/4	1/2	1/2	3/8
2 1/4	2 3/4	5/8	5/8	7/16
2 3/4	3 1/4	3/4	3/4	1/2
3 1/4	3 3/4	7/8	7/8	5/8
3 3/4	4 1/2	1	1	3/4
4 1/2	5 1/2	1 1/4	1 1/4	7/8
5 1/2	6 1/2	1 1/2	1 1/2	1
6 1/2	7 1/2	1 3/4	1 3/4	1 1/2
7 1/2	9	2	2	1 1/2
9	11	2 1/2	2 1/2	1 3/4
11	13	3	3	2
13	15	3 1/2	3 1/2	2 1/2
15	18	4		3
18	22	5		3 1/2
22	26	6		4
26	30	7		5

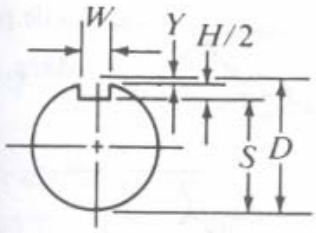
Nota: Se recomiendan los valores que no aparecen en las áreas sombreadas. Las dimensiones están en pulgadas
Fuente: ANSI Standard B17.1-1967, *Keys and Keyseats* (American Society of Mechanical Engineers, Nueva Yo

Tabla B-7
Dimensiones para cuñeros paralelos



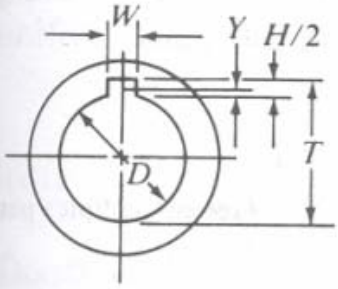
(*a*) Altura de la cuerda

$$Y = \frac{D - \sqrt{D^2 - W^2}}{2}$$



(*b*) Profundidad del cuñero del eje

$$S = D - Y - \frac{H}{2} = \frac{D - H + \sqrt{D^2 - W^2}}{2}$$



(c) Profundidad del cuñero de la maza

$$T = D - Y + \frac{H}{2} + C = \frac{D + H + \sqrt{D^2 - W^2}}{2} + C$$

Símbolos

C = Tolerancia
+0.005" de espaciamiento para cuñas paralelas
–0.020" de interferencia para cuñas ahusadas
D = Diámetro nominal del eje o interior, pulg
H = Altura nominal de la cuña, pulg
W = Ancho o espesor nominal de la cuña, pulg
Y = Altura de la cuerda, pulg

Tabla B-8
Radios y chaflanes para cuñas que se sugieren

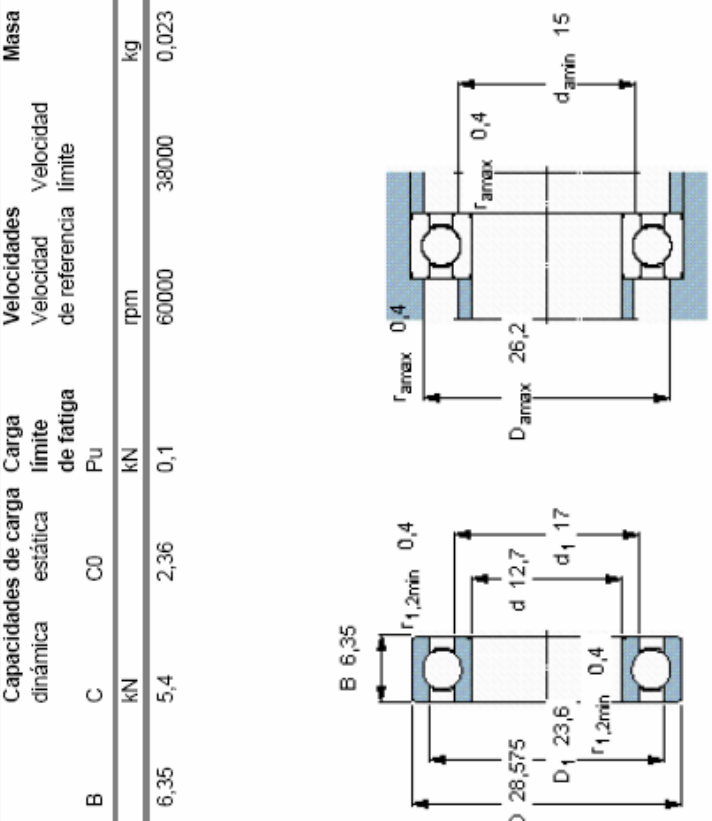
Profundidad del cuñero H/2			
Más de	*Hasta (incluso)*	*Radio del chaflán*	*Chaflán a 45°*
1/8	1/4	1/32	3/64
1/4	1/2	1/16	5/64
1/2	7/8	1/8	5/32
7/8	1 1/4	3/16	7/32
1 1/4	1 3/4	1/4	9/32
1 3/4	2 1/2	3/8	13/32

Nota: Todas las dimensiones se dan en pulgadas.
Fuente: ANSI Standard B17.1–1967, *Keys and Keyseats* (American Society of Mechanical Engineers, Nueva

Tabla B-9
Referencia de rodamientos

Rodamientos rígidos de bolas, de una hilera

Dimensiones principales			Capacidades de carga dinámica	estática	Carga límite de fatiga	Velocidades Velocidad de referencia	Velocidad límite	Masa	Designación	
d	D	B	C	C0	Pu					* - Rodamiento SKF Explorer
mm			kN		kN	rpm		kg	-	
12,7	28,575	6,35	5,4	2,36	0,1	60000	38000	0,023	R 8	Sólo proveedores de recambios



Factores de cálculo

k_r 0,025
f_0 13

Tabla B-10
Referencia de tornillos

CODIGO		TG5SH06__	TG5SH08__	TG5SH10__	TG5SH11__	TG5SH13__	TG5SH16__
LONGITUD		DIAMETRO					
pulgs.	mm.	¼"	5/16"	3/8"	7/16"	½"	5/8"
		6mm	8mm	9mm	11mm	13mm	16mm
½	13	14.36	25.53	-	-		
5/8	16	14.68	25.53	-	-		
¾	19	15.21	25.53	-	-	78.19	-
1	25	15.85	27.02	38.83	55.11	80.96	158.83
1 ¼	32	17.23	30.21	44.68	63.09	91.28	158.83
1 ½	38	21.38	34.04	50.74	71.06	102.02	173.94
1 ¾	44	24.15	39.89	57.45	82.98	118.09	204.26
2	51	27.02	46.60	60.64	87.02	121.28	205.85
2 ½	64	31.17	56.06	82.34	114.15	162.02	263.30
3	76	41.49	65.43	97.23	134.89	188.83	296.81
3 ½	89	48.51	74.68	111.60	154.04	213.40	336.70
4	101	53.51	84.47	126.28	173.94	239.26	378.19
4 ½	114	65.43	102.13	151.60	205.85	284.04	446.81
5	127	75.64	110.96	167.55	231.38	314.36	493.94
5 ½	140	83.30	121.28	183.19	251.38	341.49	550.53
6	152	89.36	131.81	199.15	273.72	369.47	582.45
6 ½	165	300.21	388.30	529.04	695.43	884.26	1,202.98
7	178	319.79	423.40	564.68	733.83	954.36	1,326.38
8	203	341.38	448.62	596.28	777.66	1,016.91	1,381.49
9	229	360.85	472.98	632.77	823.51	1,070.21	1,507.77
10	254	381.49	495.43	669.26	875.21	1,132.87	1,601.17
11	279	403.09	517.77	717.87	902.98	1,215.11	1,634.89
12	305	422.66	540.32	757.13	945.96	1,263.72	1,771.28

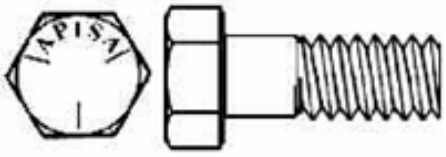


Tabla B-11
Referencia de tuercas

CODIGO	DIAMETRO
TUHL06SA	1/4" - 20
TUHL08SA	5/16" - 18
TUHL09SA	3/8" - 16
TUHL13SA	1/2" -13
TUHL16SA	5/8" - 11
TUHL19SA	3/4" - 10

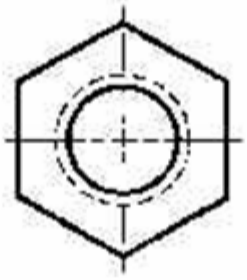


Tabla B-12
Tornillos de acero inoxidable

TORNILLOS ESTUFA CABEZA PLANA STANDARD ACERO INOXIDABLE 304		
Código	Diámetro pulgadas	Longitud pulgadas
1120-0106	4-40 (7/64")	3/8"
1120-0108	4-40 (7/64")	1/2"
1120-0110	4-40 (7/64")	5/8"
1120-0111	4-40 (7/64")	3/4"
1120-0204	5-40 (1/8")	1/4"
1120-0206	5-40 (1/8")	3/8"
1120-0208	5-40 (1/8")	1/2"
1120-0210	5-40 (1/8")	5/8"
1120-0211	5-40 (1/8")	3/4"
1120-0213	5-40 (1/8")	1"
1120-0214	5-40 (1/8")	1-1/4"
1120-0215	5-40 (1/8")	1-1/2"
1120-0217	5-40 (1/8")	2"
1120-0219	5-40 (1/8")	2-1/2"
1120-0221	5-40 (1/8")	3"
1120-0304	6-32 (9/64")	1/4"
1120-0306	6-32 (9/64")	3/8"
1120-0308	6-32 (9/64")	1/2"
1120-0310	6-32 (9/64")	5/8"
1120-0311	6-32 (9/64")	3/4"
1120-0313	6-32 (9/64")	1"
1120-0314	6-32 (9/64")	1-1/4"
1120-0315	6-32 (9/64")	1-1/2"
1120-0317	6-32 (9/64")	2"
1120-0404	8-32 (5/32")	1/4"
1120-0406	8-32 (5/32")	3/8"
1120-0408	8-32 (5/32")	1/2"
1120-0410	8-32 (5/32")	5/8"
1120-0411	8-32 (5/32")	3/4"
1120-0413	8-32 (5/32")	1"
1120-0915	1/4"-20	1-1/2"
1120-0916	1/4"-20	1-3/4"
1120-0917	1/4"-20	2"
1120-0919	1/4"-20	2-1/2"
1120-0921	1/4"-20	3"
1120-0923	1/4"-20	3-1/2"
1120-0925	1/4"-20	4"
1120-0926	1/4"-20	4-1/2"
1120-0927	1/4"-20	5"
1120-0929	1/4"-20	6"
1120-1008	5/16"-18	1/2"
1120-1011	5/16"-18	3/4"
1120-1013	5/16"-18	1"
1120-1014	5/16"-18	1-1/4"
1120-1015	5/16"-18	1-1/2"
1120-1016	5/16"-18	1-3/4"
1120-1017	5/16"-18	2"
1120-1019	5/16"-18	2-1/2"
1120-1021	5/16"-18	3"
1120-1023	5/16"-18	3-1/2"
1120-1025	5/16"-18	4"
1120-1026	5/16"-18	4-1/2"
1120-1027	5/16"-18	5"
1120-1029	5/16"-18	6"
1120-1108	3/8"-16	1/2"
1120-1110	3/8"-16	5/8"
1120-1111	3/8"-16	3/4"
1120-1113	3/8"-16	1"
1120-1114	3/8"-16	1-1/4"
1120-1115	3/8"-16	1-1/2"
1120-1117	3/8"-16	2"
1120-1119	3/8"-16	2-1/2"
1120-1121	3/8"-16	3"
1120-1123	3/8"-16	3-1/2"
1120-1125	3/8"-16	4"
1120-1126	3/8"-16	4-1/2"
1120-1127	3/8"-16	5"
1120-1129	3/8"-16	6"
1120-1313	1/2"-13	1"
1120-1315	1/2"-13	1-1/2"
1120-1317	1/2"-13	2"
1120-1319	1/2"-13	2-1/2"
1120-1321	1/2"-13	3"
1120-1323	1/2"-13	3-1/2"
1120-1325	1/2"-13	4"
1120-1327	1/2"-13	5"
1120-1329	1/2"-13	6"
1120-1525	5/8"-11	4"
1120-1719	3/4"-10	2-1/2"

Tabla B-13
Primera evaluación sensorial, nivel de agrado

BOLETA DE EVALUACION SENSORIAL
PRUEBA DE NIVEL DE AGRADO
ESCALA ESTRUCTURADA

Nombre:_____ Fecha:_____

Producto:_____

Característica:_____

Pruebe por favor las muestras en el orden que se le dan, e indique su nivel agrado con cada muestra marcando el punto en la escala que mejor describe su sentir con el código de la muestra. Por favor denos su razón para esta actitud

Código de las muestras

me gusta muchísimo	____	____	____	____
me gusta mucho	____	____	____	____
me gusta moderadamente	____	____	____	____
me gusta poco	____	____	____	____
no me gusta ni me disgusta	____	____	____	____
me disgusta poco	____	____	____	____
me disgusta moderadamente	____	____	____	____
me disgusta mucho	____	____	____	____
me disgusta muchísimo	____	____	____	____

Razón:

Gracias!

Tabla B-14
Segunda evaluación sensorial, nivel de dulzura

BOLETA DE EVALUACION SENSORIAL- PRUEBA DE ORDENACION DESCRIPTIVA

Nombre:_____Fecha:_____

Producto:_____

Característica:_____

Pruebe por favor las muestras en el orden que se le dan, e indique la intensidad de dulzura ordenándolas de la menos intensa (#1) a la más intensa (#4).

Código de las muestras

_____ _____ _____ _____

_____ _____ _____ _____

menos dulce más dulce

Comentarios:_____

_____

Gracias!