

TF

Carga Extra Leve

Referência	Diam. Externo	Diam. Interno	Compr. Total (mm)	Constante Elástica		40% do compr. total 1Milhão de ciclos		45% do compr. total 500mil ciclos		50% do compr. total 300mil ciclos	
				(N / mm)	(Kgf /mm)	Deflexão	Carga	Deflexão	Carga	Deflexão	Carga
TF 8 x 10	8	4	10	15.24	{ 1.55 }	4.0	58.8 { 6.0 }	4.5	68.6 { 7.0 }	5.0	78.5 { 8.0 }
15			15	10.16	{ 1.04 }	6.0		6.8		7.5	
20			20	7.62	{ 0.78 }	8.0		9.0		10.0	
25			25	6.10	{ 0.62 }	10.0		11.3		12.5	
30			30	5.08	{ 0.52 }	12.0		13.5		15.0	
35			35	4.36	{ 0.44 }	14.0		15.8		17.5	
40			40	3.81	{ 0.39 }	16.0		18.0		20.0	
45			45	3.39	{ 0.35 }	18.0		20.3		22.5	
50			50	3.05	{ 0.31 }	20.0		22.5		25.0	
55			55	2.77	{ 0.28 }	22.0		24.8		27.5	
60			60	2.54	{ 0.26 }	24.0		27.0		30.0	
65			65	2.35	{ 0.24 }	26.0		29.3		32.5	
70			70	2.18	{ 0.22 }	28.0		31.5		35.0	
75			75	2.03	{ 0.21 }	30.0		33.8		37.5	
80			80	1.91	{ 0.19 }	32.0		36.0		40.0	
TF 10 x 20			10	5	20	9.81		{ 1.00 }		8.0	
25	25	7.85			{ 0.80 }	10.0	11.3	12.5			
30	30	6.54			{ 0.67 }	12.0	13.5	15.0			
35	35	5.61			{ 0.57 }	14.0	15.8	17.5			
40	40	4.91			{ 0.50 }	16.0	18.0	20.0			
45	45	4.36			{ 0.44 }	18.0	20.3	22.5			
50	50	3.92			{ 0.40 }	20.0	22.5	25.0			
55	55	3.57			{ 0.36 }	22.0	24.8	27.5			
60	60	3.27			{ 0.33 }	24.0	27.0	30.0			
65	65	3.02			{ 0.31 }	26.0	29.3	32.5			
70	70	2.80			{ 0.29 }	28.0	31.5	35.0			
75	75	2.62			{ 0.27 }	30.0	33.8	37.5			
80	80	2.45			{ 0.25 }	32.0	36.0	40.0			
90	90	2.18			{ 0.22 }	36.0	40.5	45.0			

TF

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Carga Extra Leve

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Referência	Diam. Externo	Diam. Interno	Compr. Total (mm)	Constante Elástica (N / mm) (Kgf / mm)		40% do compr. total 1Milhão de ciclos		45% do compr. total 500mil ciclos		50% do compr. total 300mil ciclos			
						Deflexão	Carga	Deflexão	Carga	Deflexão	Carga		
TF 12 × 20	12	6	20	13.62	{ 1.39 }	8.0	107.9	9.0	122.6	10.0	137.3		
25			25	10.90	{ 1.11 }	10.0		11.3		12.5			
30			30	9.08	{ 0.93 }	12.0		13.5		15.0			
35			35	7.78	{ 0.79 }	14.0		15.8		17.5			
40			40	6.81	{ 0.69 }	16.0		18.0		20.0			
45			45	6.05	{ 0.62 }	18.0		20.3		22.5			
50			50	5.45	{ 0.56 }	20.0		22.5		25.0			
55			55	4.95	{ 0.51 }	22.0		{ 11.0 }		{ 12.5 }		27.5	{ 14.0 }
60			60	4.54	{ 0.46 }	24.0		27.0		30.0			
65			65	4.19	{ 0.43 }	26.0		29.3		32.5			
70			70	3.89	{ 0.40 }	28.0		31.5		35.0			
75			75	3.63	{ 0.37 }	30.0		33.8		37.5			
80			80	3.41	{ 0.35 }	32.0		36.0		40.0			
90	90	3.03	{ 0.31 }	36.0	40.5	45.0							
TF 14 × 25	14	7	25	13.95	{ 1.42 }	10.0	142.2	11.3	156.9	12.5	176.5		
30			30	11.62	{ 1.19 }	12.0		13.5		15.0			
35			35	9.96	{ 1.02 }	14.0		15.8		17.5			
40			40	8.72	{ 0.89 }	16.0		18.0		20.0			
45			45	7.75	{ 0.79 }	18.0		20.3		22.5			
50			50	6.97	{ 0.71 }	20.0		22.5		25.0			
55			55	6.34	{ 0.65 }	22.0		24.8		27.5			
60			60	5.81	{ 0.59 }	24.0		{ 14.5 }		{ 16.0 }		30.0	{ 18.0 }
65			65	5.36	{ 0.55 }	26.0		29.3		32.5			
70			70	4.98	{ 0.51 }	28.0		31.5		35.0			
75			75	4.65	{ 0.47 }	30.0		33.8		37.5			
80			80	4.36	{ 0.44 }	32.0		36.0		40.0			
90			90	3.87	{ 0.40 }	36.0		40.5		45.0			
100	100	3.49	{ 0.36 }	40.0	45.0	50.0							
TF 16 × 25	16	8	25	16.56	{ 1.69 }	10.0	166.7	11.3	186.3	12.5	206		
30			30	13.80	{ 1.41 }	12.0		13.5		15.0			
35			35	11.83	{ 1.21 }	14.0		15.8		17.5			
40			40	10.35	{ 1.06 }	16.0		18.0		20.0			
45			45	9.20	{ 0.94 }	18.0		20.3		22.5			
50			50	8.28	{ 0.84 }	20.0		22.5		25.0			
55			55	7.53	{ 0.77 }	22.0		24.8		27.5			
60			60	6.90	{ 0.70 }	24.0		27.0		30.0			
65			65	6.37	{ 0.65 }	26.0		{ 17.0 }		{ 19.0 }		32.5	{ 21.0 }
70			70	5.91	{ 0.60 }	28.0		31.5		35.0			
75			75	5.52	{ 0.56 }	30.0		33.8		37.5			
80			80	5.18	{ 0.53 }	32.0		36.0		40.0			
90			90	4.60	{ 0.47 }	36.0		40.5		45.0			
100	100	4.14	{ 0.42 }	40.0	45.0	50.0							
125	125	3.31	{ 0.34 }	50.0	56.3	62.5							



Carga Extra Leve

Referência	Diam. Externo	Diam. Interno	Compr. Total (mm)	Constante Elástica		40% do compr. total 1Milhão de ciclos		45% do compr. total 500mil ciclos		50% do compr. total 300mil ciclos	
				(N / mm)	(Kgf /mm)	Deflexão	Carga	Deflexão	Carga	Deflexão	Carga
TF 18 x 25	18	9	25	20.09	{ 2.05 }	10.0	206 { 21.0 }	11.3	226 { 23.0 }	12.5	255 { 26.0 }
30			30	16.74	{ 1.71 }	12.0		13.5		15.0	
35			35	14.35	{ 1.46 }	14.0		15.8		17.5	
40			40	12.56	{ 1.28 }	16.0		18.0		20.0	
45			45	11.16	{ 1.14 }	18.0		20.3		22.5	
50			50	10.04	{ 1.02 }	20.0		22.5		25.0	
55			55	9.13	{ 0.93 }	22.0		24.8		27.5	
60			60	8.37	{ 0.85 }	24.0		27.0		30.0	
65			65	7.73	{ 0.79 }	26.0		29.3		32.5	
70			70	7.17	{ 0.73 }	28.0		31.5		35.0	
75			75	6.70	{ 0.68 }	30.0		33.8		37.5	
80			80	6.28	{ 0.64 }	32.0		36.0		40.0	
90			90	5.58	{ 0.57 }	36.0		40.5		45.0	
100			100	5.02	{ 0.51 }	40.0		45.0		50.0	
125			125	4.02	{ 0.41 }	50.0		56.3		62.5	
TF 20 x 25	20	11	25	25.24	{ 2.57 }	10.0	255 { 26.0 }	11.3	284 { 29.0 }	12.5	314 { 32.0 }
30			30	21.04	{ 2.15 }	12.0		13.5		15.0	
35			35	18.03	{ 1.84 }	14.0		15.8		17.5	
40			40	15.78	{ 1.61 }	16.0		18.0		20.0	
45			45	14.02	{ 1.43 }	18.0		20.3		22.5	
50			50	12.62	{ 1.29 }	20.0		22.5		25.0	
55			55	11.47	{ 1.17 }	22.0		24.8		27.5	
60			60	10.52	{ 1.07 }	24.0		27.0		30.0	
65			65	9.71	{ 0.99 }	26.0		29.3		32.5	
70			70	9.02	{ 0.92 }	28.0		31.5		35.0	
75			75	8.41	{ 0.86 }	30.0		33.8		37.5	
80			80	7.89	{ 0.80 }	32.0		36.0		40.0	
90			90	7.01	{ 0.72 }	36.0		40.5		45.0	
100			100	6.31	{ 0.64 }	40.0		45.0		50.0	
125			125	5.05	{ 0.51 }	50.0		56.3		62.5	
150	150	4.21	{ 0.43 }	60.0	67.5	75.0					
TF 22 x 25	22	11	25	31.38	{ 3.20 }	10.0	314 { 32.0 }	11.3	353 { 36.0 }	12.5	392 { 40.0 }
30			30	26.15	{ 2.67 }	12.0		13.5		15.0	
35			35	22.41	{ 2.29 }	14.0		15.8		17.5	
40			40	19.61	{ 2.00 }	16.0		18.0		20.0	
45			45	17.43	{ 1.78 }	18.0		20.3		22.5	
50			50	15.69	{ 1.60 }	20.0		22.5		25.0	
55			55	14.26	{ 1.45 }	22.0		24.8		27.5	
60			60	13.07	{ 1.33 }	24.0		27.0		30.0	
65			65	12.07	{ 1.23 }	26.0		29.3		32.5	
70			70	11.21	{ 1.14 }	28.0		31.5		35.0	
75			75	10.46	{ 1.07 }	30.0		33.8		37.5	
80			80	9.81	{ 1.00 }	32.0		36.0		40.0	
90			90	8.72	{ 0.89 }	36.0		40.5		45.0	
100			100	7.84	{ 0.80 }	40.0		45.0		50.0	
125			125	6.28	{ 0.64 }	50.0		56.3		62.5	
150	150	5.23	{ 0.53 }	60.0	67.5	75.0					



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				(N / mm)	(Kgf /mm)	Deflexão	Carga	Deflexão	Carga	Deflexão	Carga					
TF 25 × 25	25	13.5	25	39.20	{ 4.00 }	10.0	392	11.3	441	12.5	490					
30			30	32.67	{ 3.33 }	12.0		13.5		15.0						
35			35	28.00	{ 2.86 }	14.0		15.8		17.5						
40			40	24.50	{ 2.50 }	16.0		18.0		20.0						
45			45	21.78	{ 2.22 }	18.0		20.3		22.5						
50			50	19.60	{ 2.00 }	20.0		22.5		25.0						
55			55	17.82	{ 1.82 }	22.0		24.8		27.5						
60			60	16.33	{ 1.67 }	24.0		27.0		30.0						
65			65	15.08	{ 1.54 }	26.0		29.3		32.5		32.5	490			
70			70	14.00	{ 1.43 }	28.0		{ 40.0 }		31.5		{ 45.0 }	35.0	{ 50.0 }		
75			75	13.07	{ 1.33 }	30.0		33.8		37.5						
80			80	12.25	{ 1.25 }	32.0		36.0		40.0						
90			90	10.89	{ 1.11 }	36.0		40.5		45.0						
100			100	9.80	{ 1.00 }	40.0		45.0		50.0						
125			125	7.84	{ 0.80 }	50.0		56.3		62.5						
150			150	6.53	{ 0.67 }	60.0		67.5		75.0						
175			175	5.60	{ 0.57 }	70.0		78.8		87.5						
200			200	4.90	{ 0.50 }	80.0		90.0		100.0						
TF 27 × 25			27	13.5	25	47.11		{ 4.80 }		10.0		471	11.3	530	12.5	588
30					30	39.26		{ 4.00 }		12.0			13.5		15.0	
35	35	33.65			{ 3.43 }	14.0	15.8	17.5								
40	40	29.44			{ 3.00 }	16.0	18.0	20.0								
45	45	26.17			{ 2.67 }	18.0	20.3	22.5								
50	50	23.56			{ 2.40 }	20.0	22.5	25.0								
55	55	21.41			{ 2.18 }	22.0	24.8	27.5								
60	60	19.63			{ 2.00 }	24.0	27.0	30.0								
65	65	18.12			{ 1.85 }	26.0	29.3	32.5	32.5	588						
70	70	16.83			{ 1.72 }	28.0	{ 48.0 }	31.5	{ 54.0 }	35.0	{ 60.0 }					
75	75	15.70			{ 1.60 }	30.0	33.8	37.5								
80	80	14.72			{ 1.50 }	32.0	36.0	40.0								
90	90	13.09			{ 1.33 }	36.0	40.5	45.0								
100	100	11.78			{ 1.20 }	40.0	45.0	50.0								
125	125	9.42			{ 0.96 }	50.0	56.3	62.5								
150	150	7.85			{ 0.80 }	60.0	67.5	75.0								
175	175	6.73			{ 0.69 }	70.0	78.8	87.5								
200	200	5.89			{ 0.60 }	80.0	90.0	100.0								



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Referência	Diam. Externo	Diam. Interno	Compr. Total (mm)	Constante Elástica		40% do compr. total 1Milhão de ciclos		45% do compr. total 500mil ciclos		50% do compr. total 300mil ciclos	
				(N / mm)	(Kgf / mm)	Deflexão	Carga	Deflexão	Carga	Deflexão	Carga
TF 30 × 25	30	16	25	56.62	{ 5.77 }	10.0	569 { 58.0 }	11.3	637 { 65.0 }	12.5	706 { 72.0 }
30			30	47.19	{ 4.81 }	12.0		13.5			
35			35	40.44	{ 4.12 }	14.0		15.8			
40			40	35.39	{ 3.61 }	16.0		18.0			
45			45	31.46	{ 3.21 }	18.0		20.3			
50			50	28.31	{ 2.89 }	20.0		22.5			
55			55	25.74	{ 2.62 }	22.0		24.8			
60			60	23.59	{ 2.41 }	24.0		27.0			
65			65	21.78	{ 2.22 }	26.0		29.3			
70			70	20.22	{ 2.06 }	28.0		31.5			
75			75	18.87	{ 1.92 }	30.0		33.8			
80			80	17.69	{ 1.80 }	32.0		36.0			
90			90	15.73	{ 1.60 }	36.0		40.5			
100			100	14.16	{ 1.44 }	40.0		45.0			
125			125	11.32	{ 1.15 }	50.0		56.3			
150			150	9.44	{ 0.96 }	60.0		67.5			
175			175	8.09	{ 0.82 }	70.0		78.8			
200	200	7.08	{ 0.72 }	80.0	90.0						
TF 35 × 40	35	19	40	47.94	{ 4.89 }	16.0	765 { 78.0 }	18.0	863 { 88.0 }	20.0	961 { 98.0 }
45			45	42.62	{ 4.35 }	18.0		20.3			
50			50	38.36	{ 3.91 }	20.0		22.5			
55			55	34.87	{ 3.56 }	22.0		24.8			
60			60	31.96	{ 3.26 }	24.0		27.0			
65			65	29.50	{ 3.01 }	26.0		29.3			
70			70	27.40	{ 2.79 }	28.0		31.5			
75			75	25.57	{ 2.61 }	30.0		33.8			
80			80	23.97	{ 2.44 }	32.0		36.0			
90			90	21.31	{ 2.17 }	36.0		40.5			
100			100	19.18	{ 1.96 }	40.0		45.0			
125			125	15.34	{ 1.56 }	50.0		56.3			
150			150	12.79	{ 1.30 }	60.0		67.5			
175			175	10.96	{ 1.12 }	70.0		78.8			
200	200	9.59	{ 0.98 }	80.0	90.0						
TF 40 × 40	40	22	40	62.67	{ 6.39 }	16.0	1,000 { 102.0 }	18.0	1,128 { 115.0 }	20.0	1,255 { 128.0 }
45			45	55.70	{ 5.68 }	18.0		20.3			
50			50	50.13	{ 5.11 }	20.0		22.5			
55			55	45.58	{ 4.65 }	22.0		24.8			
60			60	41.78	{ 4.26 }	24.0		27.0			
65			65	38.56	{ 3.93 }	26.0		29.3			
70			70	35.81	{ 3.65 }	28.0		31.5			
75			75	33.42	{ 3.41 }	30.0		33.8			
80			80	31.33	{ 3.20 }	32.0		36.0			
90			90	27.85	{ 2.84 }	36.0		40.5			
100			100	25.07	{ 2.56 }	40.0		45.0			
125			125	20.05	{ 2.04 }	50.0		56.3			
150			150	16.71	{ 1.70 }	60.0		67.5			
175			175	14.32	{ 1.46 }	70.0		78.8			
200			200	12.53	{ 1.28 }	80.0		90.0			
225			225	11.14	{ 1.14 }	90.0		101.3			
250	250	10.03	{ 1.02 }	100.0	112.5						
275	275	9.12	{ 0.93 }	110.0	123.8						
300	300	8.36	{ 0.85 }	120.0	135.0						

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				(N / mm)	(Kgf/mm)	Deflexão	Carga	Deflexão	Carga	Deflexão	Carga
TF 50 × 50	50	27.5	50	78.44	{ 8.00 }	20.0	1,569 {160.0}	22.5	1,765 {180.0}	25.0	1,961 {200.0}
55			55	71.31	{ 7.27 }	22.0		24.8		27.5	
60			60	65.37	{ 6.67 }	24.0		27.0		30.0	
65			65	60.34	{ 6.15 }	26.0		29.3		32.5	
70			70	56.03	{ 5.71 }	28.0		31.5		35.0	
75			75	52.30	{ 5.33 }	30.0		33.8		37.5	
80			80	49.03	{ 5.00 }	32.0		36.0		40.0	
90			90	43.58	{ 4.44 }	36.0		40.5		45.0	
100			100	39.22	{ 4.00 }	40.0		45.0		50.0	
125			125	31.38	{ 3.20 }	50.0		56.3		62.5	
150			150	26.15	{ 2.67 }	60.0		67.5		75.0	
175			175	22.41	{ 2.29 }	70.0		78.8		87.5	
200			200	19.61	{ 2.00 }	80.0		90.0		100.0	
225			225	17.43	{ 1.78 }	90.0		101.3		112.5	
250			250	15.69	{ 1.60 }	100.0		112.5		125.0	
275			275	14.26	{ 1.45 }	110.0		123.8		137.5	
300			300	13.07	{ 1.33 }	120.0		135.0		150.0	
350			350	11.21	{ 1.14 }	140.0		157.5		175.0	
400			400	9.81	{ 1.00 }	160.0		180.0		200.0	
450			450	8.72	{ 0.89 }	180.0		202.5		225.0	
500	500	7.84	{ 0.80 }	200.0	225.0	250.0					
TF 60 × 60	60	33	60	94.07	{ 9.59 }	24.0	2,260 {230.5}	27.0	2,540 {259.0}	30.0	2,820 {287.6}
70			70	80.63	{ 8.22 }	28.0		31.5		35.0	
80			80	70.56	{ 7.19 }	32.0		36.0		40.0	
90			90	62.72	{ 6.40 }	36.0		40.5		45.0	
100			100	56.44	{ 5.76 }	40.0		45.0		50.0	
125			125	45.16	{ 4.60 }	50.0		56.3		62.5	
150			150	37.63	{ 3.84 }	60.0		67.5		75.0	
175			175	32.25	{ 3.29 }	70.0		78.8		87.5	
200			200	28.22	{ 2.88 }	80.0		90.0		100.0	
225			225	25.09	{ 2.56 }	90.0		101.3		112.5	
250			250	22.58	{ 2.30 }	100.0		112.5		125.0	
275			275	20.53	{ 2.09 }	110.0		123.8		137.5	
300			300	18.81	{ 1.92 }	120.0		135.0		150.0	
350			350	16.13	{ 1.64 }	140.0		157.5		175.0	
400			400	14.11	{ 1.44 }	160.0		180.0		200.0	
450			450	12.54	{ 1.28 }	180.0		202.5		225.0	
500	500	11.29	{ 1.15 }	200.0	225.0	250.0					
TF 70 × 70	70	38.5	70	114.29	{ 11.65 }	28.0	3,200 {326.3}	31.5	3,600 {367.0}	35.0	4,000 {407.9}
80			80	100.00	{ 10.20 }	32.0		36.0		40.0	
90			90	88.89	{ 9.06 }	36.0		40.5		45.0	
100			100	80.00	{ 8.16 }	40.0		45.0		50.0	
125			125	64.00	{ 6.53 }	50.0		56.3		62.5	
150			150	53.33	{ 5.44 }	60.0		67.5		75.0	
175			175	45.71	{ 4.66 }	70.0		78.8		87.5	
200			200	40.00	{ 4.08 }	80.0		90.0		100.0	
225			225	35.56	{ 3.63 }	90.0		101.3		112.5	
250			250	32.00	{ 3.26 }	100.0		112.5		125.0	
275			275	29.09	{ 2.97 }	110.0		123.8		137.5	
300	300	26.67	{ 2.72 }	120.0	135.0	150.0					
350	350	22.86	{ 2.33 }	140.0	157.5	175.0					