



Carga Média

Referência	Diam. Externo	Diam. Interno	Compr. Total (mm)	Constante Elástica		25.6% do compr. total 1Milhão de ciclos		28.8 do compr. total 500mil ciclos		32% do compr. total 300mil ciclos	
				(N / mm)	(Kgf /mm)	Deflexão	Carga	Deflexão	Carga	Deflexão	Carga
TM 8 × 10	8	4	10	42.57	{ 4.34 }	2.6	107.9 { 11.0 }	2.9	122.6 { 12.5 }	3.2	137.3 { 14.0 }
15			15	28.38	{ 2.89 }	3.8		4.3			
20			20	21.28	{ 2.17 }	5.1		5.8			
25			25	17.03	{ 1.74 }	6.4		7.2			
30			30	14.19	{ 1.45 }	7.7		8.6			
35			35	12.16	{ 1.24 }	9.0		10.1			
40			40	10.64	{ 1.09 }	10.2		11.5			
45			45	9.46	{ 0.96 }	11.5		13.0			
50			50	8.51	{ 0.87 }	12.8		14.4			
55			55	7.74	{ 0.79 }	14.1		15.8			
60			60	7.09	{ 0.72 }	15.4		17.3			
65			65	6.55	{ 0.67 }	16.6		18.7			
70			70	6.08	{ 0.62 }	17.9		20.2			
75			75	5.68	{ 0.58 }	19.2		21.6			
80			80	5.32	{ 0.54 }	20.5		23.0			
TM 10 × 20			10	5	20	30.64		{ 3.12 }		5.1	
25	25	24.51			{ 2.50 }	6.4	7.2				
30	30	20.43			{ 2.08 }	7.7	8.6				
35	35	17.51			{ 1.79 }	9.0	10.1				
40	40	15.32			{ 1.56 }	10.2	11.5				
45	45	13.62			{ 1.39 }	11.5	13.0				
50	50	12.26			{ 1.25 }	12.8	14.4				
55	55	11.14			{ 1.14 }	14.1	15.8				
60	60	10.21			{ 1.04 }	15.4	17.3				
65	65	9.43			{ 0.96 }	16.6	18.7				
70	70	8.75			{ 0.89 }	17.9	20.2				
75	75	8.17			{ 0.83 }	19.2	21.6				
80	80	7.66			{ 0.78 }	20.5	23.0				
90	90	6.81			{ 0.69 }	23.0	25.9				
TM 12 × 20	12	6	20	44.27	{ 4.51 }	5.1	226 { 23.0 }	5.8	255 { 26.0 }	6.4	284 { 29.0 }
25			25	35.42	{ 3.61 }	6.4		7.2			
30			30	29.51	{ 3.01 }	7.7		8.6			
35			35	25.30	{ 2.58 }	9.0		10.1			
40			40	22.14	{ 2.26 }	10.2		11.5			
45			45	19.68	{ 2.01 }	11.5		13.0			
50			50	17.71	{ 1.81 }	12.8		14.4			
55			55	16.10	{ 1.64 }	14.1		15.8			
60			60	14.76	{ 1.50 }	15.4		17.3			
65			65	13.62	{ 1.39 }	16.6		18.7			
70			70	12.65	{ 1.29 }	17.9		20.2			
75			75	11.81	{ 1.20 }	19.2		21.6			
80			80	11.07	{ 1.13 }	20.5		23.0			
90			90	9.84	{ 1.00 }	23.0		25.9			





Carga Média

Referência	Diam. Externo	Diam. Interno	Compr. Total (mm)	Constante Elástica		25.6% do compr. total 1Milhão de ciclos		28.8 do compr. total 500mil ciclos		32% do compr. total 300mil ciclos	
				(N / mm)	(Kgf /mm)	Deflexão	Carga	Deflexão	Carga	Deflexão	Carga
TM 14 × 25	14	7	25	47.64	{ 4.86 }	6.4	304 { 31.0 }	7.2	343 { 35.0 }	8.0	383 { 39.1 }
30			30	39.70	{ 4.05 }	7.7		8.6		9.6	
35			35	34.03	{ 3.47 }	9.0		10.1		11.2	
40			40	29.77	{ 3.04 }	10.2		11.5		12.8	
45			45	26.47	{ 2.70 }	11.5		13.0		14.4	
50			50	23.82	{ 2.43 }	12.8		14.4		16.0	
55			55	21.65	{ 2.21 }	14.1		15.8		17.6	
60			60	19.85	{ 2.02 }	15.4		17.3		19.2	
65			65	18.32	{ 1.87 }	16.6		18.7		20.8	
70			70	17.01	{ 1.73 }	17.9		20.2		22.4	
75			75	15.88	{ 1.62 }	19.2		21.6		24.0	
80			80	14.89	{ 1.52 }	20.5		23.0		25.6	
90			90	13.23	{ 1.35 }	23.0		25.9		28.8	
100	100	11.91	{ 1.21 }	25.6	28.8	32.0					
TM 16 × 25	16	8	25	62.64	{ 6.39 }	6.4	402 { 41.0 }	7.2	451 { 46.0 }	8.0	500 { 51.0 }
30			30	52.20	{ 5.32 }	7.7		8.6		9.6	
35			35	44.74	{ 4.56 }	9.0		10.1		11.2	
40			40	39.15	{ 3.99 }	10.2		11.5		12.8	
45			45	34.80	{ 3.55 }	11.5		13.0		14.4	
50			50	31.32	{ 3.19 }	12.8		14.4		16.0	
55			55	28.47	{ 2.90 }	14.1		15.8		17.6	
60			60	26.10	{ 2.66 }	15.4		17.3		19.2	
65			65	24.09	{ 2.46 }	16.6		18.7		20.8	
70			70	22.37	{ 2.28 }	17.9		20.2		22.4	
75			75	20.88	{ 2.13 }	19.2		21.6		24.0	
80			80	19.57	{ 2.00 }	20.5		23.0		25.6	
90			90	17.40	{ 1.77 }	23.0		25.9		28.8	
100	100	15.66	{ 1.60 }	25.6	28.8	32.0					
125	125	12.53	{ 1.28 }	32.0	36.0	40.0					
TM 18 × 25	18	9	25	79.03	{ 8.06 }	6.4	510 { 52.0 }	7.2	569 { 58.0 }	8.0	637 { 65.0 }
30			30	65.86	{ 6.72 }	7.7		8.6		9.6	
35			35	56.45	{ 5.76 }	9.0		10.1		11.2	
40			40	49.39	{ 5.04 }	10.2		11.5		12.8	
45			45	43.90	{ 4.48 }	11.5		13.0		14.4	
50			50	39.51	{ 4.03 }	12.8		14.4		16.0	
55			55	35.92	{ 3.66 }	14.1		15.8		17.6	
60			60	32.93	{ 3.36 }	15.4		17.3		19.2	
65			65	30.40	{ 3.10 }	16.6		18.7		20.8	
70			70	28.22	{ 2.88 }	17.9		20.2		22.4	
75			75	26.34	{ 2.69 }	19.2		21.6		24.0	
80			80	24.70	{ 2.52 }	20.5		23.0		25.6	
90			90	21.95	{ 2.24 }	23.0		25.9		28.8	
100	100	19.76	{ 2.01 }	25.6	28.8	32.0					
125	125	15.81	{ 1.61 }	32.0	36.0	40.0					



Carga Média

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				(N / mm)	(Kgf /mm)	Deflexão	Carga	Deflexão	Carga	Deflexão	Carga
TM 20 × 25	20	10	25	98.06	{10.00}	6.4	{ 628 { 64.0 }	7.2	{ 706 { 72.0 }	8.0	{ 785 { 80.0 }
30			30	81.71	{ 8.33 }	7.7		8.6			
35			35	70.04	{ 7.14 }	9.0		10.1			
40			40	61.28	{ 6.25 }	10.2		11.5			
45			45	54.48	{ 5.55 }	11.5		13.0			
50			50	49.03	{ 5.00 }	12.8		14.4			
55			55	44.57	{ 4.54 }	14.1		15.8			
60			60	40.86	{ 4.17 }	15.4		17.3			
65			65	37.71	{ 3.85 }	16.6		18.7			
70			70	35.02	{ 3.57 }	17.9		20.2			
75			75	32.69	{ 3.33 }	19.2		21.6			
80			80	30.64	{ 3.12 }	20.5		23.0			
90			90	27.24	{ 2.78 }	23.0		25.9			
100			100	24.51	{ 2.50 }	25.6		28.8			
125			125	19.61	{ 2.00 }	32.0		36.0			
150	150	16.34	{ 1.67 }	38.4	43.2						
TM 22 × 25	22	11	25	118.47	{12.08}	6.4	{ 765 { 78.0 }	7.2	{ 853 { 87.0 }	8.0	{ 951 { 97.0 }
30			30	98.73	{10.07}	7.7		8.6			
35			35	84.62	{ 8.63 }	9.0		10.1			
40			40	74.05	{ 7.55 }	10.2		11.5			
45			45	65.82	{ 6.71 }	11.5		13.0			
50			50	59.24	{ 6.04 }	12.8		14.4			
55			55	53.85	{ 5.49 }	14.1		15.8			
60			60	49.36	{ 5.03 }	15.4		17.3			
65			65	45.57	{ 4.65 }	16.6		18.7			
70			70	42.31	{ 4.31 }	17.9		20.2			
75			75	39.49	{ 4.03 }	19.2		21.6			
80			80	37.02	{ 3.78 }	20.5		23.0			
90			90	32.91	{ 3.36 }	23.0		25.9			
100			100	29.62	{ 3.02 }	25.6		28.8			
125			125	23.69	{ 2.42 }	32.0		36.0			
150	150	19.75	{ 2.01 }	38.4	43.2						
TM 25 × 25	25	12.5	25	152.50	{15.55}	6.4	{ 981 { 100.0 }	7.2	{ 1,098 { 112.0 }	8.0	{ 1,226 { 125.0 }
30			30	127.08	{12.96}	7.7		8.6			
35			35	108.93	{11.11}	9.0		10.1			
40			40	95.31	{ 9.72 }	10.2		11.5			
45			45	84.72	{ 8.64 }	11.5		13.0			
50			50	76.25	{ 7.78 }	12.8		14.4			
55			55	69.32	{ 7.07 }	14.1		15.8			
60			60	63.54	{ 6.48 }	15.4		17.3			
65			65	58.65	{ 5.98 }	16.6		18.7			
70			70	54.46	{ 5.55 }	17.9		20.2			
75			75	50.83	{ 5.18 }	19.2		21.6			
80			80	47.66	{ 4.86 }	20.5		23.0			
90			90	42.36	{ 4.32 }	23.0		25.9			
100			100	38.13	{ 3.89 }	25.6		28.8			
125			125	30.50	{ 3.11 }	32.0		36.0			
150	150	25.42	{ 2.59 }	38.4	43.2						
175	175	21.79	{ 2.22 }	44.8	50.4						
200	200	19.06	{ 1.94 }	51.2	57.6						





Carga Média

Referência	Diam. Externo	Diam. Interno	Compr. Total (mm)	Constante Elástica		25.6% do compr. total 1 Milhão de ciclos		28.8 do compr. total 500mil ciclos		32% do compr. total 300mil ciclos	
				(N / mm)	(Kgf /mm)	Deflexão	Carga	Deflexão	Carga	Deflexão	Carga
TM 27 × 25	27	13.5	25	178.47	18.20	6.4		7.2		8.0	
30			30	148.73	15.17	7.7		8.6		9.6	
35			35	127.48	13.00	9.0		10.1		11.2	
40			40	111.55	11.37	10.2		11.5		12.8	
45			45	99.15	10.11	11.5		13.0		14.4	
50			50	89.24	9.10	12.8		14.4		16.0	
55			55	81.12	8.27	14.1		15.8		17.6	
60			60	74.36	7.58	15.4		17.3		19.2	
65			65	68.64	7.00	16.6	1,147	18.7	1,285	20.8	1,432
70			70	63.74	6.50	17.9	{117.0}	20.2	{131.0}	22.4	{146.0}
75			75	59.49	6.07	19.2		21.6		24.0	
80			80	55.77	5.69	20.5		23.0		25.6	
90			90	49.58	5.06	23.0		25.9		28.8	
100			100	44.62	4.55	25.6		28.8		32.0	
125			125	35.69	3.64	32.0		36.0		40.0	
150			150	29.75	3.03	38.4		43.2		48.0	
175			175	25.50	2.60	44.8		50.4		56.0	
200	200	22.31	2.27	51.2		57.6		64.0			
TM 30 × 25	30	15	25	219.31	22.36	6.4		7.2		8.0	
30			30	182.75	18.64	7.7		8.6		9.6	
35			35	156.65	15.97	9.0		10.1		11.2	
40			40	137.07	13.98	10.2		11.5		12.8	
45			45	121.84	12.42	11.5		13.0		14.4	
50			50	109.65	11.18	12.8		14.4		16.0	
55			55	99.68	10.16	14.1		15.8		17.6	
60			60	91.38	9.32	15.4		17.3		19.2	
65			65	84.35	8.60	16.6	1,412	18.7	1,579	20.8	1,765
70			70	78.32	7.99	17.9	{144.0}	20.2	{161.0}	22.4	{180.0}
75			75	73.10	7.45	19.2		21.6		24.0	
80			80	68.53	6.99	20.5		23.0		25.6	
90			90	60.92	6.21	23.0		25.9		28.8	
100			100	54.83	5.59	25.6		28.8		32.0	
125			125	43.86	4.47	32.0		36.0		40.0	
150			150	36.55	3.73	38.4		43.2		48.0	
175			175	31.33	3.19	44.8		50.4		56.0	
200	200	27.41	2.80	51.2		57.6		64.0			
TM 35 × 40	35	17.5	40	187.50	19.12	10.2		11.5		12.8	
45			45	166.67	17.00	11.5		13.0		14.4	
50			50	150.00	15.30	12.8		14.4		16.0	
55			55	136.36	13.91	14.1		15.8		17.6	
60			60	125.00	12.75	15.4		17.3		19.2	
65			65	115.38	11.77	16.6		18.7		20.8	
70			70	107.14	10.93	17.9		20.2		22.4	
75			75	100.00	10.20	19.2	1,912	21.6	2,160	24.0	2,400
80			80	93.75	9.56	20.5	{195.0}	23.0	{220.3}	25.6	{244.7}
90			90	83.33	8.50	23.0		25.9		28.8	
100			100	75.00	7.65	25.6		28.8		32.0	
125			125	60.00	6.12	32.0		36.0		40.0	
150			150	50.00	5.10	38.4		43.2		48.0	
175			175	42.86	4.37	44.8		50.4		56.0	
200			200	37.50	3.82	51.2		57.6		64.0	



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				(N / mm)	(Kgf /mm)	Deflexão	Carga	Deflexão	Carga	Deflexão	Carga					
TM 40 × 40	40	20	40	244.79	{24.96}	10.2	2,510 {256.0}	11.5	2,820 {287.6}	12.8	3,140 {320.2}					
45			217.59	{22.19}	11.5	13.0		14.4								
50			195.83	{19.97}	12.8	14.4		16.0								
55			178.03	{18.15}	14.1	15.8		17.6								
60			163.19	{16.64}	15.4	17.3		19.2								
65			150.64	{15.36}	16.6	18.7		20.8								
70			139.88	{14.26}	17.9	20.2		22.4								
75			130.56	{13.31}	19.2	21.6		24.0								
80			122.40	{12.48}	20.5	23.0		25.6								
90			108.80	{11.09}	23.0	25.9		28.8								
100			97.92	{9.98}	25.6	28.8		32.0								
125			78.33	{7.99}	32.0	36.0		40.0								
150			65.28	{6.66}	38.4	43.2		48.0								
175			55.95	{5.71}	44.8	50.4		56.0								
200			48.96	{4.99}	51.2	57.6		64.0								
225			43.52	{4.44}	57.6	64.8		72.0								
250			39.17	{3.99}	64.0	72.0		80.0								
275			35.61	{3.63}	70.4	79.2		88.0								
300			32.64	{3.33}	76.8	86.4		96.0								
TM 50 × 50			50	25	50	306.25		{31.23}		12.8		3,920 {399.7}	14.4	4,410 {449.7}	16.0	4,900 {499.7}
55	278.41	{28.39}			14.1	15.8	17.6									
60	255.21	{26.02}			15.4	17.3	19.2									
65	235.58	{24.02}			16.6	18.7	20.8									
70	218.75	{22.31}			17.9	20.2	22.4									
75	204.17	{20.82}			19.2	21.6	24.0									
80	191.41	{19.52}			20.5	23.0	25.6									
90	170.14	{17.35}			23.0	25.9	28.8									
100	153.13	{15.61}			25.6	28.8	32.0									
125	122.50	{12.49}			32.0	36.0	40.0									
150	102.08	{10.41}			38.4	43.2	48.0									
175	87.50	{8.92}			44.8	50.4	56.0									
200	76.56	{7.81}			51.2	57.6	64.0									
225	68.06	{6.94}			57.6	64.8	72.0									
250	61.25	{6.25}			64.0	72.0	80.0									
275	55.68	{5.68}			70.4	79.2	88.0									
300	51.04	{5.20}			76.8	86.4	96.0									
350	43.75	{4.46}			89.6	100.8	112.0									
TM 60 × 60	60	30			60	367.48	{37.47}	15.4	5,640 {575.1}	17.3	6,350 {647.5}		19.2		7,060 {719.9}	
70					314.98	{32.12}	17.9	20.2		22.4						
80			275.61	{28.10}	20.5	23.0	25.6									
90			244.98	{24.98}	23.0	25.9	28.8									
100			220.49	{22.48}	25.6	28.8	32.0									
125			176.39	{17.99}	32.0	36.0	40.0									
150			146.99	{14.99}	38.4	43.2	48.0									
175			125.99	{12.85}	44.8	50.4	56.0									
200			110.24	{11.24}	51.2	57.6	64.0									
225			97.99	{9.99}	57.6	64.8	72.0									
250			88.19	{8.99}	64.0	72.0	80.0									
275			80.18	{8.18}	70.4	79.2	88.0									
300			73.50	{7.49}	76.8	86.4	96.0									
350			63.00	{6.42}	89.6	100.8	112.0									





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				(N / mm)	(Kgf /mm)	Deflexão	Carga	Deflexão	Carga	Deflexão	Carga
TM 70 × 70	70	38.5	70	379.46	38.69	17.9	6,800 {693.4}	20.2	7,650 {780.1}	22.4	8,500 {866.8}
80			80	332.03	33.86	20.5		23.0		25.6	
90			90	295.14	30.10	23.0		25.9		28.8	
100			100	265.63	27.09	25.6		28.8		32.0	
125			125	212.50	21.67	32.0		36.0		40.0	
150			150	177.08	18.06	38.4		43.2		48.0	
175			175	151.79	15.48	44.8		50.4		56.0	
200			200	132.81	13.54	51.2		57.6		64.0	
225			225	118.06	12.04	57.6		64.8		72.0	
250			250	106.25	10.83	64.0		72.0		80.0	
275			275	96.59	9.85	70.4		79.2		88.0	
300			300	88.54	9.03	76.8		86.4		96.0	
350			350	75.89	7.74	89.6		100.8		112.0	