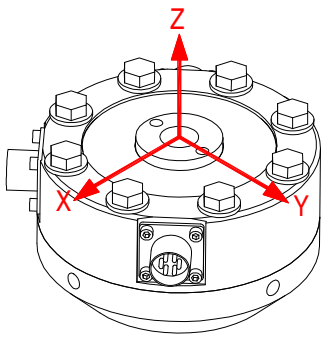
Extraneous Load Factors



Equation: $\sigma_{max} \geq$ (A)Fx +(B)Fy +(C)Fz +(D)Mx +(E)My +(F)Mz

Material: Aluminum 2024-T4 (*AL), 17-4 P.H. Stainless Steel

Model #	Capacity (lb)	A	B	C	D	E	F
MTA500	*250 (*AL)*	*67.3*	*67.3*	*23.8*	*37.3*	*37.3*	*47.9*
	*500 (*AL)*	*31.6*	*31.6*	*12.2*	*20.3*	*20.3*	*16.9*
	*1,000 (*AL)*	*16.6*	*16.6*	*6.3*	*12.7*	*12.7*	*5.8*
	2,000 (SS)	18.1	18.1	10.3	28.0	28.0	24.8
	5,000 (SS)	13.2	13.2	6.5	12.5	12.5	10.4
	10,000 (SS)	7.6	7.6	3.6	6.5	6.5	4.9

All force and moments to be calculated using lb & in-lb units

σ_{max} Table

Material	Static Load (=60% Y.S.)	Fatigue (Non Reversing Loads)	Fatigue (Full Reversing Loads)
2024-T4/T351	28,000	18,000	15,000
17-4PH S.S	87,000	78,000	62,000*

*Value is 75% of Fatigue Strength based on 10-20 x 10^6 cycles and allow for factors that influence Fatigue such as surface finish, stress concentrations, corrosion, temperature and other variables for the production of the transducer, for infinite Fatigue Life (100 x 10^6) use 75% of values shown.

Deflection & Natural Frequency

Model #	Capacity (lb)	Deflection (in.) (Fz Only)	Natural Frequency (Hz) (Fz Only)	β
MTA500	*250*	*0.0003*	*9,000*	*0.20*
	500	*0.001*	*7,000*	*0.20*
	1,000	*0.001*	*9,900*	*0.20*
	2,000	0.001	7,700	0.50
	5,000	0.002	7,000	0.50
	10,000	0.004	7,000	0.50

Natural Frequency & Frequency Response Equation's:

$$\text{Natural Frequency (FN)} = 3.13 \sqrt{\frac{1}{\frac{\beta}{Capacity} \bullet Deflection}} \text{ (Hz)}$$

$$\text{Frequency Response with load (FR)} = 3.13 \sqrt{\frac{1}{\frac{\beta + AppliedLoad}{Capacity} \bullet Deflection}} \text{ (Hz)}$$

*Where β values are obtained by Futek Engineers