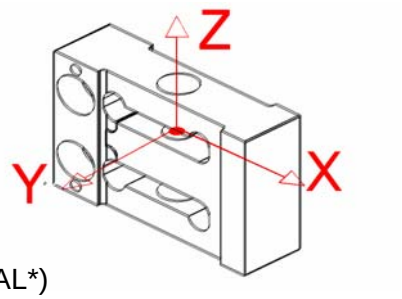
Extraneous Load Factors



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

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

Material	Capacity (lb)	A	B	C	D	E	F
(AL*)	2.2	636.93	142.30	6036.79	177.25	891.21	1282.21
	5	389.60	130.57	1915.97	214.10	558.09	787.82
	10	321.34	121.13	1267.21	194.88	446.15	622.42
	25	213.58	99.84	540.41	170.52	303.73	411.97
	50	164.26	75.92	298.83	171.92	236.89	290.62
	100	147.40	54.72	165.25	175.84	217.64	206.04
(S.S.*)	200	60.53	153.77	192.77	242.88	140.01	225.66
	500	44.21	135.29	130.79	209.25	163.64	188.33

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

Material	Capacity (lb)	Deflection (in.)	Natural Frequency (Hz)	β
(AL*)	2.2	0.0080	280	0.0344
	5	0.0065	468	0.0344
	10	0.0060	687	0.0346
	25	0.0055	1134	0.0346
	50	0.0055	1593	0.0351
	100	0.0060	2157	0.0351
(S.S.*)	200	0.0055	1773	0.1133
	500	0.0075	2499	0.1046

*FN results are based on calculation of deflection & weight scene on Sensor arm.

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