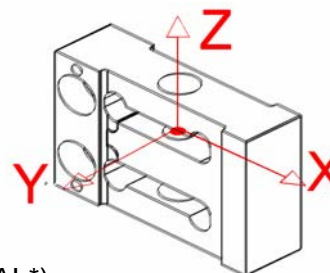


### Extraneous Load Factors

**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

$\sigma_{max}$  **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<sup>6</sup> 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<sup>6</sup>) use 75% of values shown.

### Deflection & Natural Frequency

Material	Capacity (lb)	Deflection (in.)	Natural Frequency (Hz)	$\beta$
(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.

This documentation was generated and completed to the best ability of FUTEK’s Engineering Team using FEA Analysis, Empirical data and Multiple Testing Simulations. The information and recommendations on this document are presented in good faith and believed to be correct however, FUTEK Advanced Sensor Technology makes no representations or warranties as to the completeness or accuracy of the information.

**Natural Frequency & Frequency Response Equation's:**

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

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

\*Where  $\beta$  values are obtained by Futek Engineers