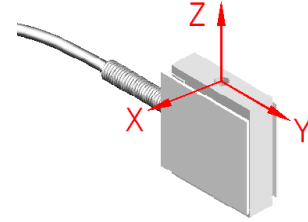


### Extraneous Load Factors



**Equation:**  $\sigma_{max} \geq (A)F_x + (B)F_y + (C)F_z + (D)M_x + (E)M_y + (F)M_z$

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

Model #	Capacity (lb)	A	B	C	D	E	F
LSB200 (AL)	0.0221 (10g)	41950	4626	138776	7710	93424	58957
	0.0441 (20g)	41950	4626	138776	7710	93424	58957
	0.1102 (50g)	29412	2896	90498	5430	67873	40724
	0.2205 (100g)	28118	3401	49887	6803	63492	36054
	0.5512 (250g)	21136	3991	26306	6894	48984	26306
	1	4228	1873	16973	4091	8267	9831
	2	3348	1711	8853	4522	6717	7185
	5	2761	2013	5071	5015	5419	6433
	10	2354	2095	1899	10039	11187	7408
	25	1979	1487	2042	5148	4149	6487
LSB200	50	2122	1839	1188	4392	3619	6317
	100	2236	1944	927	5142	4372	6367

All Force and Moment to be calculated using lb and in-lb units

$\sigma_{max}$  **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

Model #	Capacity (lb)	Deflection (in.)	Natural Frequency (Hz)	$\beta$
LSB200	0.0221 (10g)	0.004	140	0.0025
	0.0441 (20g)	0.008	140	0.0025
	0.1102 (50g)	0.010	200	0.0027
	0.2205 (100g)	0.008	300	0.0030
	0.5512 (250g)	0.007	530	0.0030
	1	0.004	930	0.0030
	2	0.004	1340	0.0030
	5	0.005	1900	0.0030
	10	0.004	3000	0.0030
	25	0.004	2770	0.0090
	50	0.004	3600	0.0090
	100	0.005	4,600	0.0090

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