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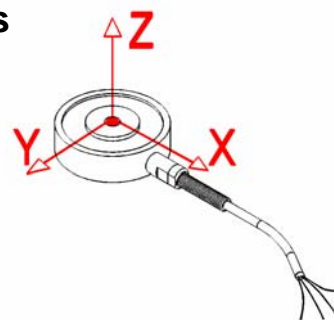
Equation: $\sigma_{max} \geq$ (A)Fx +(B)Fy +(C)Fz +(D)Mx +(E)My +(F)Mz

Material: 17-4 PH Stainless Steel

Material	Capacity (lb)	A	B	C	D	E	F
(S.S.*)	50	176.216	176.216	183.103	1026.924	1026.924	77.786
	100	63.590	63.590	101.609	603.172	603.172	57.025
	250	37.717	37.717	58.295	358.153	358.153	41.071
	500	12.561	12.561	28.112	176.697	176.697	26.635
	1,000	47.961	47.961	78.986	415.661	415.661	134.111

σ_{max} **Table**

Material	Static Load (=60% Y.S.)	Fatigue (Non Reversing Loads)	Fatigue (Full Reversing Loads)
17-4 PH 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)	I.D.	Deflection (in.)	Natural Frequency (Hz)	β
(S.S.*)	50	1/8"-3/16"	0.0004	10,200	0.0133
		1/4" - 3/8"		11,300	0.0106
	100	1/8"-3/16"	0.0008	9,600	0.0140
		1/4" - 3/8"		10,700	0.0144
	250	1/8"-3/16"	0.0010	12,200	0.0155
		1/4" - 3/8"		13,400	0.0129
	500	1/8"-3/16"	0.0010	16,800	0.0172
		1/4" - 3/8"		17,800	0.0146
	1,000	1/8"-3/16"	0.0013	19,600	0.0197
		1/4" - 3/8"		21,000	0.0171

*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:

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

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

*Where β values are obtained by Futek Engineers