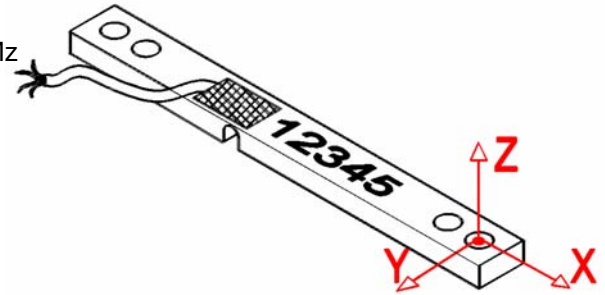**FUTEK**
ADVANCED SENSOR TECHNOLOGY, INC.

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.*)	0.25	734.78	11769.63	97436.56	19525.03	68958.60	8374.34
	0.5	629.37	9717.03	69999.38	16184.95	49633.98	6912.28
	1.0	412.03	6116.87	26539.13	9413.14	18538.52	4271.47
	2.0	355.37	4617.90	19055.32	6845.69	13371.81	3222.67
	5.0	237.16	1863.48	5505.70	3816.56	6195.15	3339.65
	10	206.36	1261.25	2557.27	3001.74	3631.74	2493.52
	25	217.73	217.73	2007.15	2007.15	2107.61	2107.61

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)	Deflection (in.)	Natural Frequency (Hz)	β
(S.S.*)	0.25	0.007	150	0.0145
	0.5	0.010	180	0.0146
	1.0	0.009	270	0.0146
	2.0	0.012	330	0.0147
	5.0	0.007	570	0.0220
	10	0.009	700	0.0222
	25	0.020	730	0.0227

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

Natural Frequency & Frequency Response Equation's:

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

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

*Where β values are obtained by Futek Engineers

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.

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