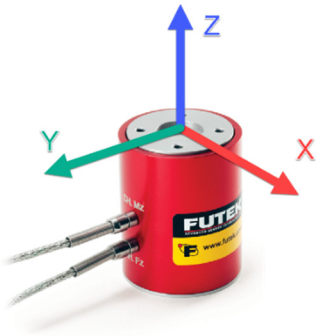
Extraneous Load Factors



Equation: $\sigma_{max} \geq AF_x + BF_y + CF_z + DM_x + EM_y + FM_z$

Extraneous Load Coefficients:

Current Version:

Capacity [lb/in-lb]	Material	A	B	C	D	E	F
50/50	*2024-T4*	*570*	*670*	*220*	*335*	*285*	*240*
100/100	*2024-T4*	*475*	*515*	*120*	*280*	*240*	*120*
200/200	*2024-T4*	*415*	*540*	*85*	*280*	*215*	*100*
500/500	*17-4 PH H900*	*205*	*740*	*80*	*395*	*120*	*90*

Legacy Versions:

Capacity [lb/in-lb]	Material	A	B	C	D	E	F
50/50 SN: 861833 and prior	*2024-T4*	*670*	*700*	*270*	*545*	*345*	*320*
100/100 SN: 820424 and prior	*2024-T4*	*490*	*700*	*150*	*570*	*250*	*155*
200/200 SN: 871242 and prior	*2024-T4*	*430*	*700*	*105*	*605*	*225*	*105*

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

σ_{max} Table:

Material	Static Load (=60% Y.S.)	Fatigue (Non-Reversing Loads)	Fatigue (Full Reversing Loads)
2024-T4	*28,000*	*18,000*	*15,000*
17-4 PH H900	*100,000*	*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 during the production of the transducer, for runout life (100 x 10^6) use 75% of values shown.**

Deflection & Natural Frequency

Current Version:

Capacity [lb/in-lb]	Z-Deflection [in]	Torsional Stiffness [in-lb/rad]	F_z Natural Frequency [Hz]*	β
50/50	*0.002*	*16,000*	*1800*	*0.11*
100/100	*0.002*	*22,000*	*2350*	*0.11*
200/200	*0.003*	*26,000*	*2700*	*0.11*
500/500	*0.002*	*160,000*	*2600*	*0.40*

Legacy Versions:

Capacity [lb/in-lb]	Z-Deflection [in]	Torsional Stiffness [in-lb/rad]	F_z Natural Frequency [Hz]*	β
50/50 SN: 861833 and prior	*0.002*	*15,000*	*1650*	*0.11*
100/100 SN: 820424 and prior	*0.002*	*20,000*	*2150*	*0.11*
200/200 SN: 871242 and prior	*0.003*	*23,000*	*2550*	*0.11*

***Natural frequencies results are based on FEA analysis. Analysis was performed assuming constrained fixed end.**

Natural Frequency & Frequency Response Equation's:

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

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

*** β values are obtained by FUTEK Engineering**