High Precision & Precision Lead Screws

Lead Screws and Components

Berg is a pioneer in the development of lead screws. Providing cost effective solutions to linear actuation problems. The close tolerance, free running nuts are ideal for miniature applications requiring rotary to linear or linear to rotary actuation.

For applications requiring precision positioning, Berg also manufactures Anti-Backlash Nuts. This device, consisting of only three components, utilizes the constant force of a compression spring to push two nut halves apart. This action eliminates any play (backlash) which exists between the internal thread of the nut and the external screw thread. To ensure accuracy and repeatability the nut can be fine tuned through the use of the many available spring constants, to meet any pre-load design requirements.

Lead Screw Specification	**High Precision**	**Standard Precision**
Lead Error	+/- .006 in./ft.	+.012 in./ft.
Repeatability	.00005 in.	.0002 in.
Straightness	.003 in./ft.	.006 in./ft.
Backlash	.003 in. (zero when using Anti-Backlash nut)	.006 in.
Temperature Range	-50˚F to + 200˚F	
Breakaway Torque	0-3 oz-in. (standard nut)	

Figure 9.1

Figure 9.2

Figure 9.3

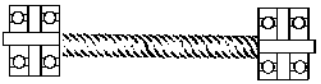

Figure 9.4

Load- In order to properly incorporate a lead screw into a design, load requirements must be taken into account. Maximum load values for the nuts are listed in the tables on the following pages. These numbers are based on the shear of the nuts and does not take shaft buckling into account (see Max. Column Load formula below). Wherever possible, nuts should be positioned so as to be put in tension, pulling the load. This eliminates the need for buckling considerations. Listed below are some helpful formulas to assist in proper lead screw selection.

Maximum Column Load $(F) = K \times C \times 10^6 \times d^4 / D^2$

Where**:**

K = End support factor

.025 one end fixed, other free (Figure 9.1)

1.00 simple supports both ends(Figure 9.2)

2.00 one end fixed, one simple (Figure 9.3)

4.00 both ends fixed (Figure 9.4)

C = Material factor

13.4 for Stainless Steel screws

4.8 for Aluminum screws

d = Root diameter of the screw

D = Length between the nut and the support bearing

Torque to Move a Load $(T) = (F \times L) / (2 \times \pi \times E)$

Where**:**

F = Load

L = Lead

E = Efficiency (consult Berg Engineering Department for efficiency values)

Horsepower (HP) = Torque (in. lbs.) x RPM / 63,025