

# Loading versus Lifetime

## Ball Bearing and Linear Ball Bearing Stages

Load capacity and life expectancy for ball bearing and linear bearing stages are inversely related. As the load on the stage increases, the life expectancy of the stage will decrease.

To calculate the life of a stage for a particular applied load (AL) in a normal loading condition, determine the maximum loading (ML) capability of the stage and then determine the loading percentage (LP) of the stage.

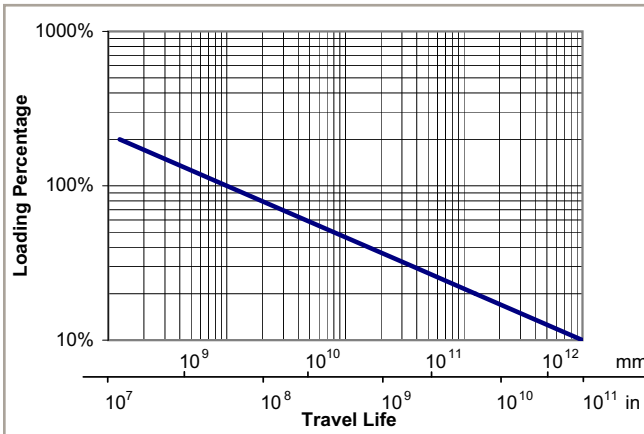
$$LP = AL \div ML * ALC * 100\%$$

Where:

ALC = 1.0 for smooth operation with no shocks

ALC = 1.5 for shock operating conditions

Locate the applicable loading percentage on the vertical axis and read the corresponding life (in millions of inches travel) from the horizontal axis. This is the expected life of the stage for the applied load (AL).



## Air Bearing Stages

Since Aerotech air bearings have no contacting elements, they have a virtually unlimited life. Care must be taken to ensure that the stage is operated with adequate air pressure.

To protect the stage against under-pressure, Aerotech recommends an in-line pressure switch. This is typically a 5 V TTL level signal and is tied to the controller E-stop input.

Air supply must be clean, dry to 0° dewpoint, and filtered to 0.25 μm or better. Nitrogen is recommended at 99.9% purity. Typical operating pressure is 80 psi, regulated to ±5 psi.