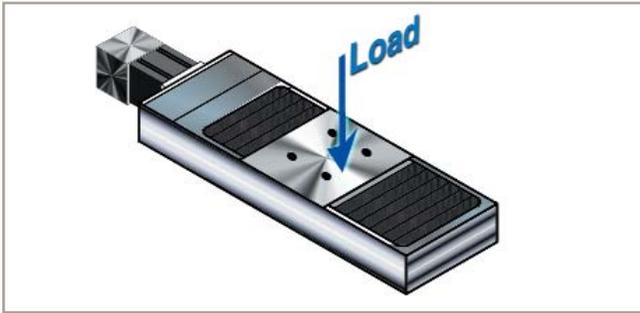# Cantilevered Loading

All maximum load values in the stage specification tables are based on the stage operating in a normal loading condition. A normal loading condition results when the load is attached to the stage with the center of gravity positioned directly above the bearings. The resultant gravity force vector acts downward on the support bearings and has a moment arm of zero.



A cantilevered loading condition results when the load is attached to the stage with the center of gravity not acting directly on the support bearings. In this configuration, the load acts on a moment arm and applies unequal loading to the support bearings. Aerotech has further divided the cantilever loading condition into two subsets, a side loading condition ($L_{SC}$) and a vertical loading condition ($L_{VC}$).

## Side Loading Conditions
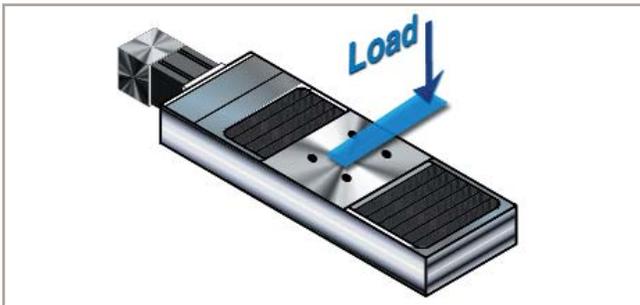


1) The stage tabletop is oriented in the horizontal plane, travel is in the horizontal direction, and the center of gravity is situated off to one side of the tabletop with the moment arm perpendicular to the direction of travel. This configuration is a side loading condition ($L_{SC}$).
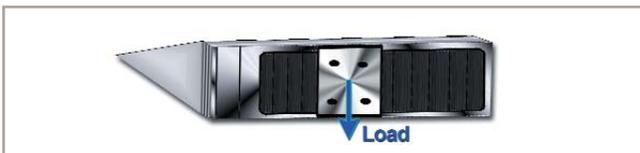
2) The stage tabletop is oriented in the vertical plane, the load is attached directly to the tabletop, and travel is in the horizontal direction. This configuration is a side loading condition ($L_{SC}$).

## Vertical Loading Conditions

1) The stage tabletop is oriented in the vertical plane, the load is attached directly to the tabletop, and travel is in the vertical direction. This is a vertical loading condition ($L_{VC}$).

2) The stage tabletop is oriented in the horizontal plane, travel is in the horizontal direction, and the center of gravity is situated beyond the tabletop with the moment arm parallel to the direction of travel. This configuration is a vertical loading condition ($L_{VC}$).



## Cantilevered Load Ratings

When the load on the stage tabletop results in one of the loading conditions specified before, the maximum load carrying capability of the stage is reduced. To determine the new load carrying capability of the stage, two factors must be known: the mass of the load, and the length of the moment arm that the center of gravity acts upon. This can be determined by measuring the distance from the payload center of gravity to the center of the stage tabletop.

In the specification section for each stage, Aerotech has supplied a cantilevered loading chart. These charts are similar to the example cantilevered loading chart shown on the right.
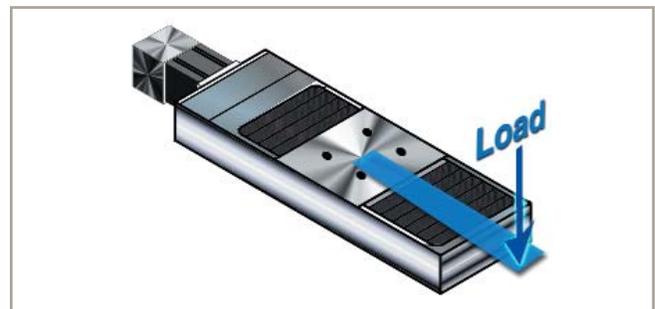
## Cantilevered Loading CONTINUED

The cantilevered loading chart shows the relationship between the offset distance of the center of gravity and the maximum possible load for each of the two loading conditions.