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Bosch Rexroth 2010 Profile Deflection Calculator User Guide

Strut Profile	Horizontal	Vertical	Moment of Inertia	Moment of Inertia	Weight	Modulus of Elasticity	Moment of Inertia	Moment of Inertia	Weight	Modulus of Elasticity
Description	mm	mm	$I_x(\text{cm}^4)$	$I_y(\text{cm}^4)$	kg/M	N/mm ²	$I_x(\text{in}^4)$	$I_y(\text{in}^4)$	lbs/ft	E=
45x90	45.00	90.00	81.84	23.40	3.00	70000	1.97	0.56	2.02	$10 \times 10^6 \text{ lb/in}^2$

Position (end view of strut) >> Y = X = Width = plane perpendicular to force

Select Position: X
Select Strut: 45x90
Enter Length: 48 in / 1219.2 mm
Enter Force: 100 lbs / 444.8 n

	% of width	Pass/Fail	Point Load
Deflection 1	0.845 in / 16.40 mm	18.2%	FAIL
Deflection 2	0.04 in / 1.02 mm	1.1%	Pass
Deflection 3	0.01 in / 0.25 mm	0.3%	Pass

Strut Weight: 8.06 lbs / 3.65 kg
Size: 1.771 X 3.543 in / 45 X 90 mm

DISCLAIMER:
The Bending Analysis and the Buckling Calculator routines are tools to aid in the selection of profile and are not meant to substitute for proper engineering.
The values represented by these routines assume ideal conditions with perfectly centered loads and no torque applied. It is recommended that a safety factor of 4 is applied to the results of the buckling calculation, and that any design based upon these calculations be thoroughly evaluated by a Professional Engineer.

The Deflection Calculator is provided to assist in the selection of appropriate Bosch Rexroth extrusion profiles for a particular application (**See Disclaimer**). The Excel based spreadsheet contains a Data page listing the Moment of Inertia and Modulus of Elasticity for each profile. The Bending page contains pull-down windows and formula cells that calculate the Point-load deflection of a selected profile in three types of use. This page also displays the dimensions of the piece and calculates its weight.

To use the calculator simply input four choices in the white cells:

1. Select the orientation of the piece (X or Y) from the “**Select Position**” pull-down menu.
2. Select the extrusion profile strut from the “**Select Strut**” pull-down menu.
3. Type in the required length (inches) in the “**Enter Length**” white cell.
4. Type in the maximum load (pounds) in the “**Enter Force**” white cell.

The calculator will automatically update its fields as soon as the Enter key is depressed. It provides deflection values for the subject extrusion in three types of applications: **Cantilever**, **Free Span** and **Captured**. It will also recalculate each time any of the values in the four cells is changed.

The Pass/Fail comment is based on an arbitrary limit of 10% deflection (10% of the dimension of the plane perpendicular to the load). This value is considered a safe deflection that will cause no permanent distortion.

Caution: The calculator is provided in an unlocked format to allow advanced users to analyze the data and formulas. Because of this, it is possible to corrupt any cell in the spreadsheet. Use caution when navigating and saving the file. We recommend that an archive copy be stored in a separate folder.