## Profile guide rails

Technical Information

A profile guide rail permits linear motion with the aid of balls. By using balls between the rail and carriage, a profile guide rail achieves extremely precise linear motion. Compared to a conventional slide way, the coefficient of friction is only one-fiftieth.

By arranging the rows of balls to provide two-point contact and with four rows of balls having a contact angle of 45° each, the profile guide rail combines a constant base load rating in all primary load directions with exceptional operating characteristics. As a result, the profile guide rail can be used in a variety of orientations for a wide range of applications.

Profile guide rails with the same size designation are interchangeable. This allows individual carriages or rails to be replaced or added at any time. Our profile guide rails correspond to the market standard and can replace linear guides of the same design by other manufacturers.

Accuracy Classes

Profile guide rails are available in three accuracy classes. The maximum relative tolerance for each accuracy classes stated.

ground contact face

ground contact face

rail dimension (mm)
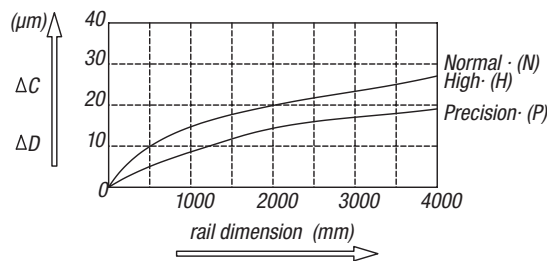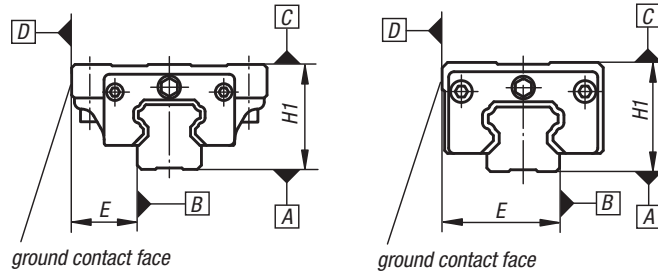
		Accuracy Class		
		Normal (N)	High(H)	Precision (P)
maximum deviation for systems with one carriage	height tolerance H1	±0,1	±0,04	-0,04
	tolerances of lengths E	±0,1	±0,04	-0,04
maximum deviation for systems with several carriages	Δ H1	0,03	0,02	0,01
	Δ E	0,03	0,02	0,01
run parallelism of the surface C in terms of the surface A		see diagram		
run parallelism of the surface D in terms of the surface B		see diagram		

Pretensioning Classes

In view of the diverse needs of the user, profile guide rails are available in four different pretensioning classes. A higher pretensioning improves the rigidity and reduces the elastic deformation upon load alternations.

Class	Pretensioning	Pretensioning force	Application with	Application Examples
Z0	without pretensioning	0	- constant direction of load - imprecise assembly surfaces	- linear motion slides - sliding and pulling devices
Z1	light pretensioning	0,02 C (C = dynamic load rating)	- constant direction of load - minor jolts and vibrations - minor loads	- graving machines - packaging machines - industrial handling
Z2	average pretensioning	0,05 C (C = dynamic load rating)	- high accuracy required - torque load	- positioning units - fast feeding units - metrology
Z3	average pretensioning	0,07 C (C = dynamic load rating)	- high requisite rigidity - jolts and vibrations - heavy loads	- processing centres - grinders - large horizontal boring machines

Calculating the lifespan

The nominal lifespan L can be calculated using the following formula:

$$L = \left(\frac{C_{dyn}}{P} \right)^3 \cdot 50000 \text{ m}$$

L = nominal lifespan (m)
C_{dyn} = dynamic load rating (N)
P = dynamically equivalent load (N)