



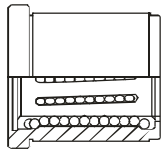
BALL GUIDANCE

PRODUCT DESCRIPTION

BALL GUIDE BUSH

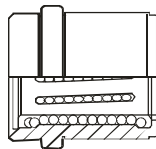
BOLEXP ball guidance bushes are made up of an outer casing of steel for rolling, hardened and ground, which holds fixed inside a high-resistance bronze cage for guiding the balls running along the cage. The translation system consists of several rows of precision balls circulating endlessly.

The great novelty of BOLEXP ball guidance bushes is that balls do not run aligned, with the translation motion, but at a slight angle, thus enlarging the contact area with the shaft and enabling greater load capacity. This patented system represents an utter innovation in the linear guidance market. An all-metal structure makes bushes extremely resistant to high temperatures. BOLEXP bushes are supplied in a variety of three outer forms, all of them equipped with the same inside structure.



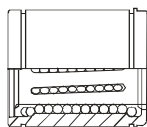
Model 801

Bush with an outer cylindrical body and a flange at the end for fixing it.



Model 802

Bush with two outer cylindrical bodies and a center flange for fixing it between two plates.



Model 803

Bush with an all-cylindrical outer body and two ferrules at the ends for fixing it with security spring rings.

GUIDE COLUMN

BOLEXP guide column is made of steel 1.5732 with surface hardening, obtaining a hardness of 62-64 RHc, and a depth from 1.00 to 1.20 mm., leaving the shaft core soft so that it can absorb the bending it might be required to. In guide manufacturing, some features are considered to be essential, including the quality of steel, surface hardness and precision and quality of the finish.

FEATURES

Determining the adequate ball bush size is based on the requirements of the tool to be constructed and the load capacity needed, as well as bush lifetime and operating security.

Use the maximum recommended loads listed in Table I below for calculations.

Made in accordance with report by I.G.A.J. (Generalitat de Catalunya)

TABLE I					
MODEL	Maximum Recommended Load (N)	MODEL	Maximum Recommended Load (N)	MODEL	Maximum Recommended Load (N)
B8012035	1,250	B8022026	1,250	B8031630	882
B8012535	1,250	B8022035	1,915	B8031635	1,250
B8012545	1,985	B8022526	1,250	B8032035	1,250
B8012555	2,721	B8022535	1,985	B8032045	1,912
B8013245	1,691	B8022545	2,721	B8032535	1,250
B8013263	3,015	B8022555	3,456	B8032545	1,985
B8014045	1,691	B8023245	2,574	B8032555	2,721
B8014063	3,015	B8023263	3,897	B8033245	1,691
B8021222	882	B8024045	2,574	B8033263	3,015
B8021622	882	B8024063	3,897	B8035045	1,691
B8021626	1,250	B8031230	882	B8034063	3,015

Use the following formula to calculate nominal life for ball bushes.

$$Lh = (833/H*Nosc)*(C/P) \text{ in hours}$$

Lh= Nominal lifetime in operating hours

H= Single-way length of oscillatory motion travel in m.

Nosc= Come-and-go motion frequency in 1/min.

C= Load capacity in N.

P= Equivalent rolling load in N.

Calculation example:

An injection mould expulsion is guided by four bushes reference B8022535 (C=1,985). The load on each bush is of P=200N, the column travel is of H=0.25 m., the come-and-go motion frequency is of Nosc=10 1/min. Nominal lifetime has to be calculated.

Solution: $Lh = (833/0.25*10)*(1,985/200) = 300,000$ hours

Load capacities and lifetime calculations for bushes shown here above are applicable under precisely defined conditions. Any adverse condition may reduce significantly both measurements.

TRAVEL ACCURACY

Travel accuracy with a guidance system using shafts with BOLEXP ball linear rolling depends on several factors, such as the positioning precision of bushes or shafts, quality of shafts, free length between shaft supports and length of the bush in relation to the area to be slid. These influences depend basically on the type of application and the load to be supported.

On the whole, the required travel accuracy must be ensured by the features and design of the assembly, as well as by the precise manufacture of adjacent pieces.

Fixing the shaft at its two ends is recommended, particularly in the case of high loads, whenever the project allows it.

LUBRICATION

In order to ensure long durability for BOLEXP ball bushes, proper lubrication and maintenance are a must. The channels that the balls run along must be free of any interfering particles. Moreover, it is recommended to use oil lubrication so as to ensure proper lubrication for the whole of rolling items and, if necessary, to remove all impurities.

We suggest the use of CLP oils according to DIN 51524, within the range of viscosities from ISO VG 64 to 100. Although grease can also be used for lubrication, this is not highly recommended as it fixes dirt particles much more easily.

BOLEXP ball bushes are supplied oiled for its conservation and must be lubricated when necessary. The conservancy fluid is compatible and can be mixed with mineral-based lubricants, making it unnecessary to wash bushes before assembling them.

SHAFT EXECUTION

Shafts for BOLEXP ball bushes must be hardened and ground. The ends require a tapering so that rollings cannot be damaged during the assembling. In order to fully benefit from high travel accuracy and load capacity of BOLEXP ball bushes, the shafts around which bushes slid must exhibit the best quality and a properly hard layer.

ASSEMBLING AND FIXING

BOLEXP ball bushes can be mounted either in holes with tolerance H7 or in such a way that they can be manually slid into their cartridge. Never hit them with hammers or any other impacting tool. Otherwise, the bush structure could be damaged.

It is recommended to mount at least two units in parallel disposal so as to avoid possible rotation motions in the travelling of items. Bush length is also suggested to be at least twice its diameter in order to minimize the rotation motion of balls, whenever this is possible.

Rotation motions are not advised in this type of bushes, whose function is that of translation.

