

## APPLICATION NOTES

The **SN** series linear ball bearings have a ball cage mounted between the rail and the slider. During movement of the slider relative to the rail, the cage moves a distance equal to half the stroke of the slider. The stroke ends when the slider contacts the bent tabs situated at the ends of the ball cage.

The ball cage usually moves in function of the slider because of the rolling motion of the balls in the raceways. Sometimes however, instead of rolling, the balls slip, causing a loss of synchronism between cage and slider, resulting in premature contact of the ball cage with the end stops thus reducing the theoretical stroke.

The theoretical stroke can be restored by slipping the slider through the ball cage until there is simultaneous contact between the end stops of the track-rail, cage and slider. This procedure is known as re-phasing. There will be a strong resistance to sliding during the rephasing stage, resulting in a temporary increase in the load applied to the track-rail.

Ball cage slipping can be caused by inaccurate assembly, movement dynamics, load values and load variations.

To reduce to a minimum the inconvenience caused by an out of phase ball cage, the recommendations given below should be followed.

**The stroke should be constant for the entire working cycle and should preferably be as close as possible to the nominal stroke of the linear bearing.** For applications using variable strokes, it is important to accept the possibility of rephasing the ball cage, and ensuring that there is sufficient drive capacity to allow for an occasional increase in traction, amounting to an increase in the coefficient of friction till about 0.1.

An alternative solution, already adopted by several customers, consists of periodically inserting into the working cycle a movement without load, and equal to the maximum stroke allowed by the bearing. This either prevents the ball cage from moving out of phase or rephases it automatically.

In cases where a pair of parallel linear bearings is used, any errors in parallelism or planarity of the contact surfaces during assembly will intensify phase displacement and consequent rephasing activity. If at the planning or design stage, it is anticipated that rephasing problems will occur, it is advisable to specify "**linear ball bearings with increased clearance**".

**SN products can be used for horizontal movements only.**

When using linear ball bearings in the **SN** series with multiple independent or synchronised sliders, if there is any uncertainty regarding the precision of the fixing surfaces for the track-rails and sliders, it's strongly recommended to use **linear bearings with increased clearance**.

For any further information, please contact our engineering department.

## TEMPERATURE

**SN** products can be used in environments with temperatures of up to +170°C (+338 °F) (over 130°C [266°F] it is necessary to use a high temperature grease). For use at higher temperatures, contact our engineering department.

## ANTICORROSIVE PROTECTION

All the elements (slider, ball cage and rail) are protected against corrosion by **electrolytic zinc plating** in compliance with ISO 2081 standards.

Upon request, other surface treatments can be done.

For any further information, please contact our engineering department.

## LUBRICATION

This is largely dependent upon the working environment. Under normal conditions, lubrication should be scheduled for every **100 km** of slider travel, using a good quality lithium-soap grease of medium consistency and of the type normally used for rolling element bearings.