



Drying cylinder lead side

## FAG TORB

The ideal non-locating bearing for drying cylinders in paper machinery

Paper lines have to operate smoothly, ideally round the clock 360 days a year. Paper webs that are 2,000 meters long and up to 10 meters wide are produced from cellulose pulp or recycled paper within minutes, depending on the machine used. This is extremely tough on cylinders, rolls, and of course rolling bearings. They have to work smoothly and they have to work well. Only rolling bearings that can continuously withstand shaft deflections, linear expansions, moisture, and high temperatures ensure long-term smooth operation.

In a paper machine, the freshly formed fiber fleece is firstly pressed out mechanically to remove a large proportion of the water. In the next step, the fleece is passed over steam heated drying cylinders, evaporating the remaining water.

During heating of the machine, these cylinders expand by a few millimeters in an axial direction. This expansion must be compensated by the non-locating bearing.



Find out more about Schaeffler's solutions for all the challenges of the paper industry.

We pioneer motion

**SCHAEFFLER**

# Non-locating bearing

## Requirements for the drying cylinder bearing support

The locating bearing on the drive side of these cylinders is always a radial spherical roller bearing. Various options are available for the non-locating side.

Nowadays, it is common to use toroidal roller bearings as non-locating bearings on these cylinders in large and high-speed paper machinery.

The drying cylinders in large paper machinery can be up to 11 m wide and the angular offset in the bearings can be up to 0.3°.

The steam temperature may be as hot as 190°C. Under these conditions, the cylinders can expand by up to 12 mm during heating.

The non-locating bearing must compensate for any angular offset and expansion, without creating constraining forces in the bearing support.

## Technical data

The drying section of a large, very high-speed newsprint machine has the following data:

- Paper web width: Approx. 8000 mm
- Cylinder diameter: 1800 mm
- Machine speed: Approx. 1900 m/min
- Bearing speed: 336 rpm

## Operating conditions in the dry section

In such a paper machine, a toroidal roller bearing C3152-XL-K-W209B-C4 has been successfully in use as a non-locating bearing.

Even with a linear expansion of up to 8 mm (axial offset between the inner and outer ring), this bearing can still accommodate an angular offset of 0.3°.

The basic rating life L10h is easily sufficient and the bearing operates safely outside of its slippage range.

A case-hardened inner ring is preferably used in this application to absorb expansions and stresses that arise during heating and to minimize the risk of a crack in the inner ring with subsequent damage to the journal.

The internal clearance group 4 (C4) is selected due to the temperature differences that occur between the inner and outer ring during the heating process.

The bearings are lubricated by a recirculating oil lubrication system, as is usually the case with drying cylinder bearings.

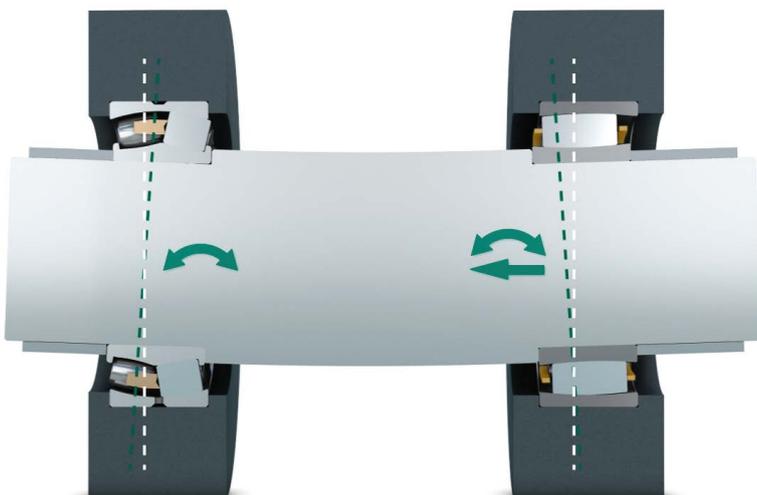
This means that part of the external heat from the steam heated cylinders is dissipated by the bearing.

The bearing then runs at a temperature of approximately 90°C, allowing a satisfactory viscosity ratio  $\kappa$  to form.

## Customer benefits

With the TORB bearing from the FAG brand, the customer receives a high-performance non-locating bearing that meets all requirements:

- Longer system life and increased operational reliability
- Reduced axial vibrations
- Improved smooth running in the entire speed range
- Interchangeable with standard bearings



The optimal locating/non-locating bearing system for the paper industry: a spherical roller bearing as the locating bearing (left) and TORB as the non-locating bearing (right)

## Schaeffler Technologies AG & Co. KG

Georg-Schäfer-Straße 30

97421 Schweinfurt (Germany)

www.schaeffler.com · raw.materials@schaeffler.com