# Deep groove ball bearings for spreader rolls in paper machines

FAG

**Examples of Application Engineering**

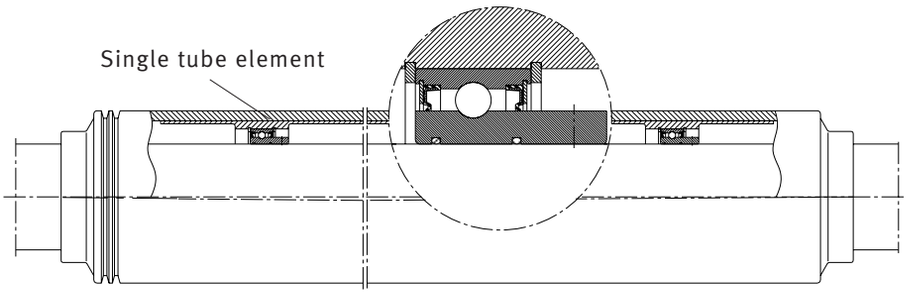
**WL 13 509 GB-D**

Spreader rolls in paper machine. Operator: UPM-Kymmene, Jämsänkoski/Finland

Spreader rolls are found wherever material is produced in lines or webs such as in paper machines, processing or converting machines and textile machinery.
They expand or spread the lines running over them to web widths and flatten creases and any middle or end parts of the web which are loose. Any variations in tension across the web are levelled out to the greatest possible extent and wild formation is corrected by even pulling at the sides.
The spreader rolls work in diverse parts of paper machines:
- the wire section
- the press section
- the dryer section
- in front of and behind the size press
- in front of the calender and reeler

There are several spreader rolls from Stowe Woodward AG, Germany in the wet end and dryer sections of the machines at UPM Kymmene, Jämsänkoski/Finland.
FAG developed specially-designed deep groove ball bearings **Z-566840.KL** for this manufacturer and they have proven themselves over and over again. With these bearings a life of up to six years can be reached without a hitch.
Spreader rolls consist of a curved stationary axle symmetrical to their longitudinal axle around which the roll shell rotates. A number of single tube elements made of steel and with the same diameter make up the roll shell.
In wide machines the roll can consist of up to 30 tube elements. Each single tube element is mounted with one deep groove ball bearing, rotates freely and is self aligning.

SCHAEFFLER GROUP
INDUSTRIAL




The single tube elements may also be equipped with a flexible rubber cover both in the wet and in the dryer sections.
Specially-designed roll end seals prevent moisture and dust from penetrating into the roll. The drive is actuated either by the web which runs over the roll or by a drive wheel attached to the roll.

## Operating conditions and bearing requirements

Depending on the mounting position in the paper-making machine, the roll shell bearings may be subject to either very high speeds and/or high operating temperatures, e.g. during the infrared drying process in coating machines. The bearing arrangement is designed for a high degree of operational reliability as the whole spreader roll would have to be dismounted even if just one bearing failed.
With the relatively small wrap angle the web tension (wire, felt, and paper webs) causes only slight stressing at times < 1 kN. The choice of the bearing type deep groove ball bearing is put down to the low load and the easy accessibility of the bearing's outer ring.

## Technical Data

| | |
|---|---|
| Machine | PM 5 |
| Paper type | Roto gravure paper |
| Paper weight | 48 - 56 g/m² |
| Daily production | 620 t |
| Speed | 1 200 m/min |
| Width of paper web | 8 400 mm |
| Roll diameter | 340 mm |
| Length of roll shell | 9 450 mm |
| Wrap angle | 20 - 30° |
| Web pull | 4 kN/m |
| Temperature | +40 °C |

## Bearing clearance

Variations in web tension cause the single tube elements to tilt. With high speeds at times and possible tilting a larger radial clearance according to C3 provides tilting space which is adequate enough. The tube elements can thus freely adjust.

## Tolerances

Since the bearing outer ring rotates with the single tube element and roll shell, it has a tight fit in the tube element with an M6 housing tolerance and is axially attached by retaining rings.
Contrary to this, the inner ring has a very loose fit due to the curved roll axle and for mounting reasons. Two O rings evenly centre the inner ring and hold it securely on the axle.
A bolt prevents the bearing inner ring from turning as well.

## Lubrication

The choice of lubricant is determined by the easy accessibility and the 8 000 operating hours per year (for-life lubrication) which are required. Low-friction greases are advantageous for high speeds and low loads. Depending on the temperature types of grease group GA48 (e. g. at 90 °C) and special greases are used.
The lubrication of the bearing is ensured for long periods of use by a grease quantity based on speed calculated in test runs.

## Sealing

The base oil is separated from the lubricating grease by the rotating outer ring's centrifugal acceleration. It attempts to escape through the sealing seat in the outer ring. This is prevented by sealing elements which are particularly tested for their oil tightness. A slight sealing gap between sealing elements and inner ring shoulder ensures easy accessibility of the outer ring.
An allowance for accommodating tilting movements of the single tube elements is taken into consideration when dimensioning the sealing gap.

**Schaeffler KG**
Heavy Industries
Pulp & Paper
Georg-Schäfer-Str. 30
97421 Schweinfurt (Germany)
Phone +49 9721 91-0
Fax +49 9721 91-3435
E-Mail pulp_paper@schaeffler.com
Internet www.fag.com

WL 13509 / GB-D / 2007101 / Printed in Germany by Druckhaus WEPPERT GmbH