Bearings for Spreader Rolls in a Giant Paper Machine

FAG

Examples of Application Engineering

WL 13 520 EA

Spreader Roll built by Finbow Oy/Metso, Finland, original equipment manufacturer

Finbow Oy supplied spreader rolls for the press section for the world largest Stora Enso Paper Machine at Langerbrugge in Belgium, producing 400 000 t/y of news paper (45 g/m^2).
Spreader rolls consist of a stationary axle, which is bent symmetrically to its longitudinal axis. To enable the roll shell to follow the bent axle, it consists of several tube-shaped steel sections with identical diameters. Every tube element is supported by a deep groove ball bearing in such way that it can rotate freely and has angular freedom. The outer ring of these bearings rotates.
Special seals at the roll ends protect the bearings inside the roll from moisture and dust.
Depending on the specific application, the individual sections are provided with a shared flexible rubber cover. They are relatively light and – at a max. wrap angle of 30 degrees – only slightly loaded by the web tension.
Where the web and wire wraps around the lower part of the spreader roll, i.e. where the web moves upward, the bearing load is reduced even more.
In paper, textile and foil production, spreader rolls have to guide the web smoothly and without creases. In the wet section, the rolls operate at approx. 40 °C. In the finishing section they are exposed to ambient temperatures up to 160 °C (radiation from infra red drying).
Usually the rolls are driven by the web (wire) running over them, reaching today speeds of up to 2 000 m/min.

Hybrid bearings: steel rings/ceramic balls

Advantages of the hybrid bearings

- Lower friction; as a result, considerably less driving power is required
- Performance not impaired by slippage because of better tribological properties due to the combination of materials
- Higher accelerations and speeds due to slighter gravitational forces and lower friction.

Technical data

Roll diameter	≈450 mm
Roll length	11100 mm
Weight of roll	≈73000 N
Speed	2000 m/min^{-1}

Bearings

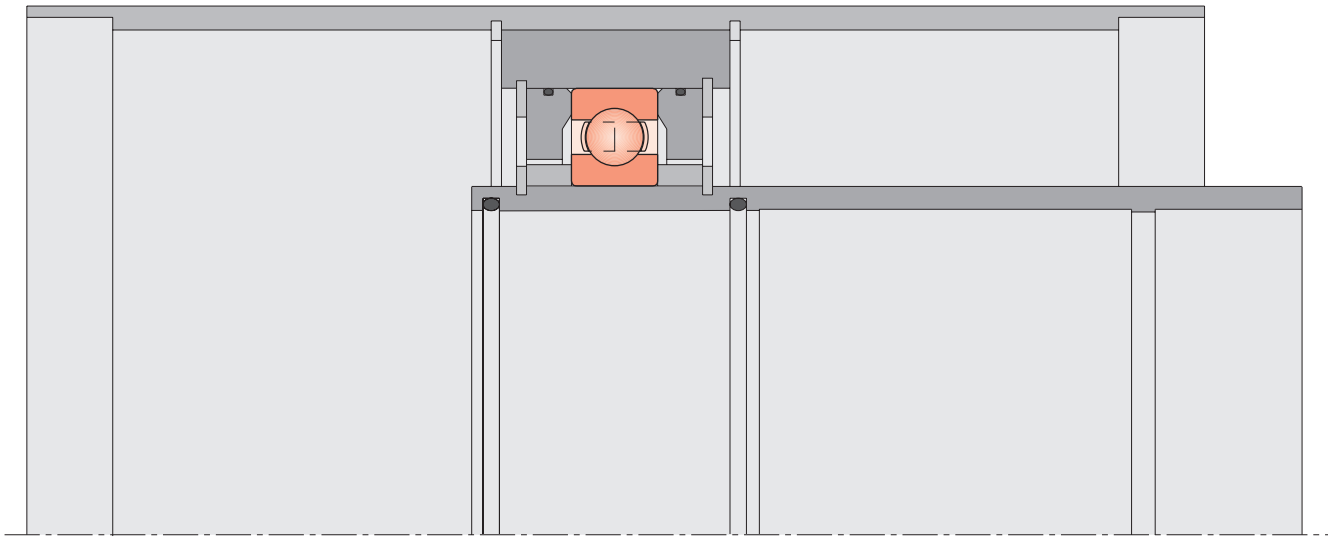
Every tube element of the spreader roll is supported by a special deep groove ball bearing **F-HC807861.KL** with ceramic balls and a pressed steel cage.
The bearing dimensions are 300 × 380 × 38 mm. In order to reduce the revolving mass (ball-cage assembly) only half the number of balls is provided for.

Bearing clearance, tolerances, fits

Differences in the web (wire) tension can cause the individual roll sections to tilt relative to each other.
The required radial clearance C3 permits a sufficiently large tilting clearance even at higher speed.
For the high speed, a P5 running accuracy acc. T52BW is used.
The rotating outer ring is fitted tightly in the tube with tolerance M6. The inner ring is fitted loosely on the stationary axle for easy mounting.

Lubrication, sealing

Proven, low-friction special aerospace grease is used providing a long service lifetime.
With the outer ring rotating – depending on the grease type – there is a risk of the base oil being centrifuged from the lubricating grease.
This requires a particularly good “oil tightness” to keep the separated base oil reliably within the bearing.
A specially developed sealing concept for this application is used.



Spreader roll bearing arrangement

Benefits for the customer

- Lower operating temperature/ less power consumption
- Longer grease service life
- No separate relubrication required

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99/01/07 Printed in Germany by Druckhaus WEPPERT GmbH