Spherical Roller Bearings in a Two Pocket Pressure Grinder

Examples of Application Engineering

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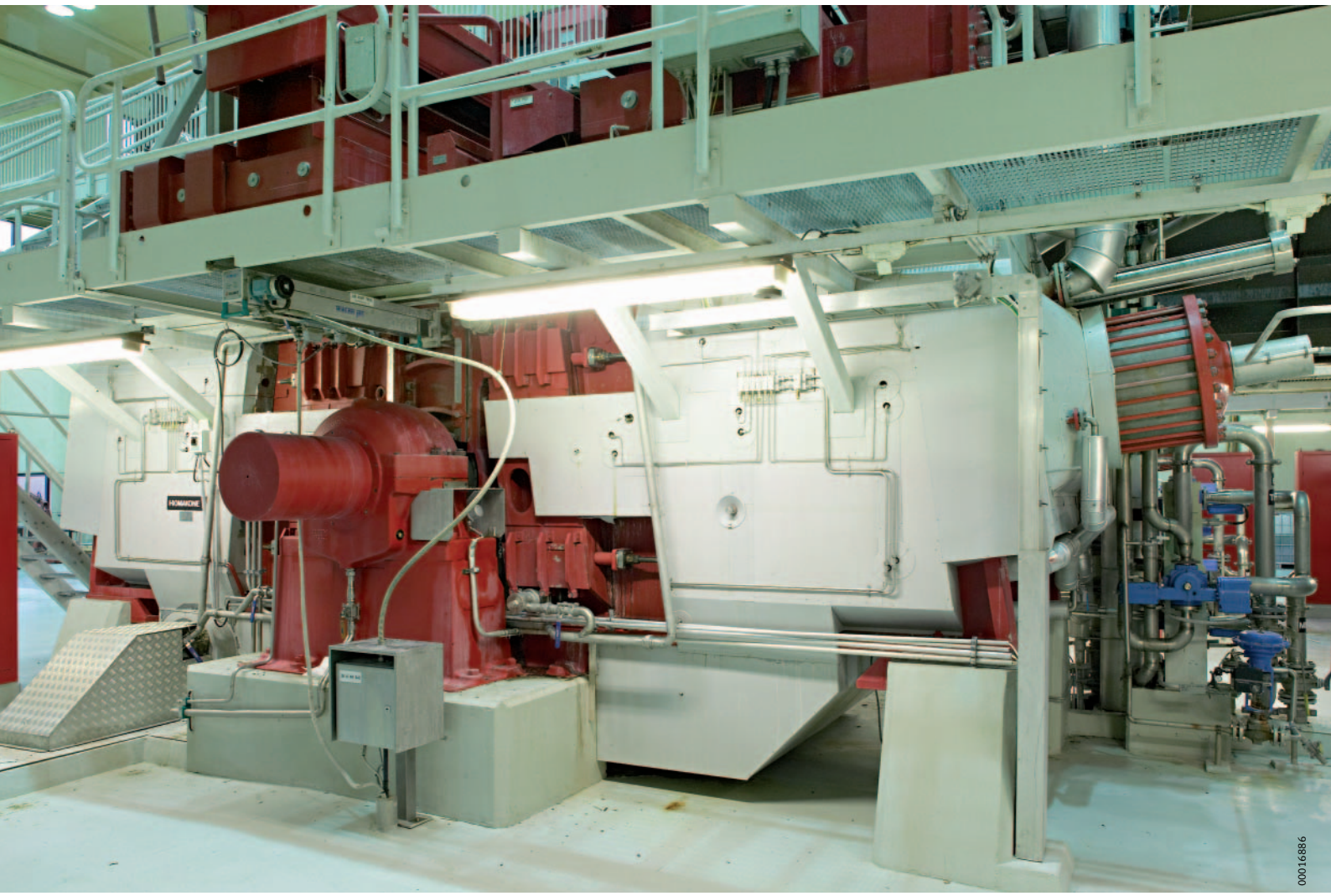

Figure 1 · Two pocket pressure grinder

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One of the raw materials of which paper is made is ground wood pulp. By definition this is a pulpy mass consisting of wood fibres and water.

Ground wood pulp is produced from wood logs on so called wood grinders, *Figure 1*.

The debarked and cut to length logs are pressed length-wise against a rotating stone.

Operating data of a two pocket pressure grinder

Drive power	7 000	kW
Speed	300	min^{-1}
Weight of stone assembly	23,8	t
Grinding pressure	500	kN
Maximum radial load per bearing	≈510	kN

Special demands on bearing arrangements

Maximum reliability is required, since failure of the wood grinder would badly disrupt paper production. Therefore, a minimum calculated bearing life L_{h10} = 100 000 h should be obtained.

The rolling bearings should compensate for misalignment and shaft deflections.

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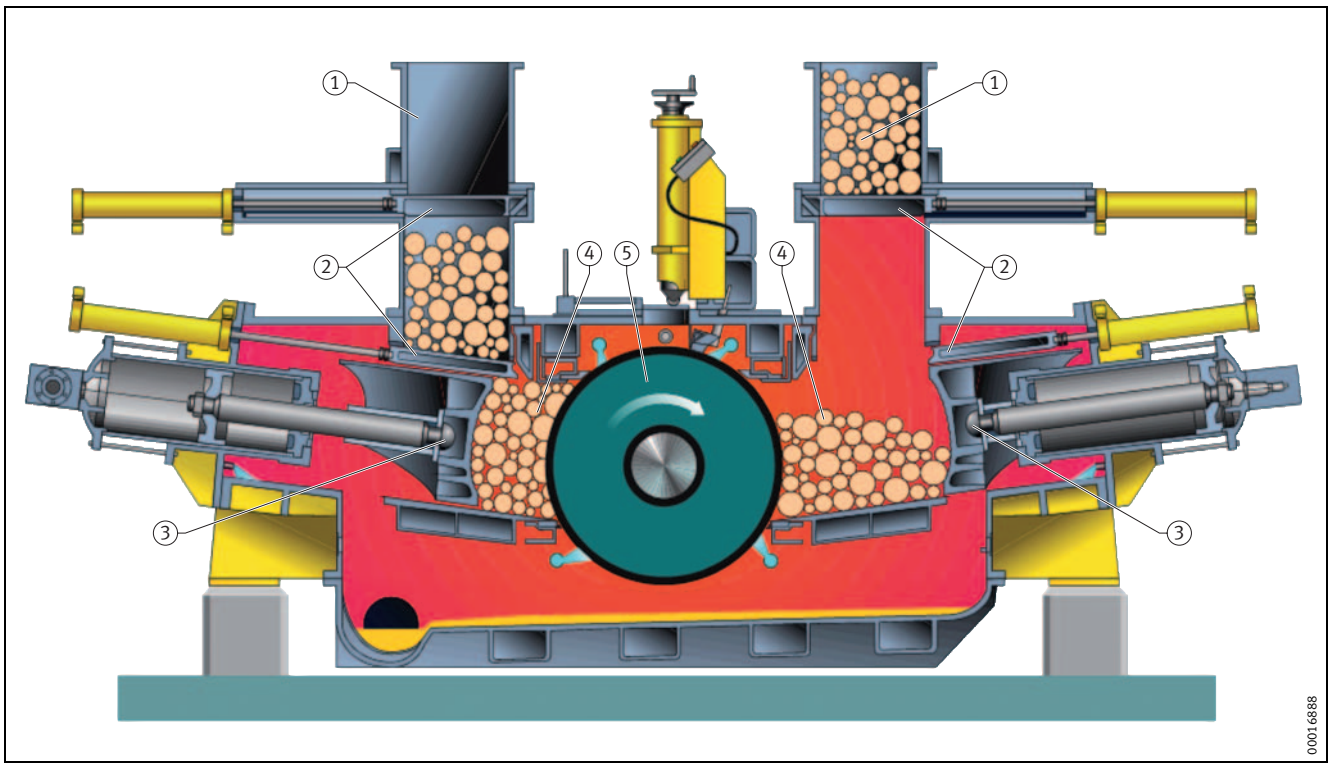

Figure 2 · Layout of a two pocket pressure grinder:
① Feeding chute, ② Gate, ③ Pressure shoe, ④ Pocket, ⑤ Stone assembly

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Bearing selection and dimensioning

The grinder shaft is supported in two FAG spherical roller bearings 23284-B-K-MB-C3, mounted directly on the conical shaft and secured by locknuts HM 3084, *Figure 2* and *Figure 3*.
These bearings were chosen because of their high load carrying capacity and their ability to compensate for misalignment.

Figure 3 · FAG spherical roller bearing

Lubrication and sealing

A satisfactory service life can only be obtained with the adequately lubricated bearings properly sealed against contamination.

The bearings are oil-lubricated, the oil being fed by a pump between the two roller rows. For this purpose, the bearing outer ring features a lubrication groove and holes.

The oil can flow off the bearing at both sides. Thus, an even oil flow through both rows of rollers and an even temperature distribution in the bearing is assured.

The oil flow is continuously controlled regarding quantity and temperature, separately for each bearing.

The oil flow and viscosity are determined according to the generated heat. The temperature must not exceed a certain level, in order to ensure a value $\kappa \geqq 2$. The oil also requires sufficient anti-wear additives.

The bearing housings are arranged outside the grinder casing. The housings are sealed by radially acting labyrinth seals.

The labyrinth gaps have additional sealing on the outside by means of covers.

Schaeffler Technologies GmbH & Co. KG

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

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