FAG Wheelset and Gear Bearings in Berlin Rapid Transit Trains

Examples of Application Engineering

Publ. No. WL 07 511 EA

Berlin rapid transit train, class 481, developed by Bombardier Transportation

In August 2004, just in time for the 80th anniversary of the Berlin rapid transit system, S-Bahn Berlin GmbH received the last of 1000 class 481 cars from Bombardier Transportation. Since 1996, 120 cars for these two-car trains have been delivered each year and together have already run about 250 million kilometers. At an order volume of more than one billion Euros, this was one of the largest vehicle procurement programmes in Germany in the past few decades.

The S-Bahn trains form the backbone of public transportation in the German capital, thanks to the excellent network and the high reliability and speed of this traffic system. Each day, the trains carry 1.2 million passengers on a 328-kilometer rapid transit network with 164 stations in Berlin and Brandenburg.

Depending on the required capacity, the coaches can be combined into three sizes of rapid transit trains: two-car trains, four-car trains and eight-car trains. Each two-car train can carry up to 394 passengers.

Since 1999, FAG Kugelfischer AG has been supplying all axle box bearings and gear bearings for the class 481 trains.

A Member of the
Schaeffler Group

Bogie and wheelsets

The bogie is equipped with pneumatic springs and two radially adjustable wheelsets which – thanks to a split axle box housing – can be dismounted easily from the bogie.
A housing ring, to which all add-on units are attached, protects the wheelset bearings after dismounting.

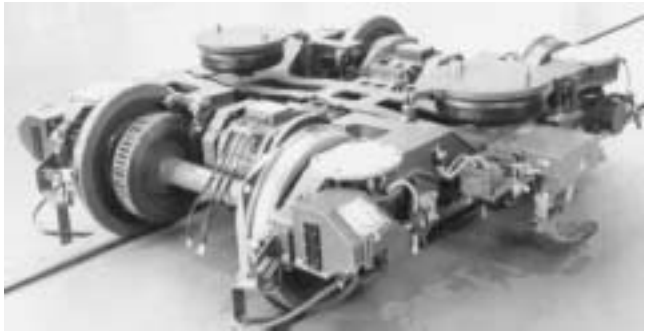


Photo: Courtesy of the manufacturer

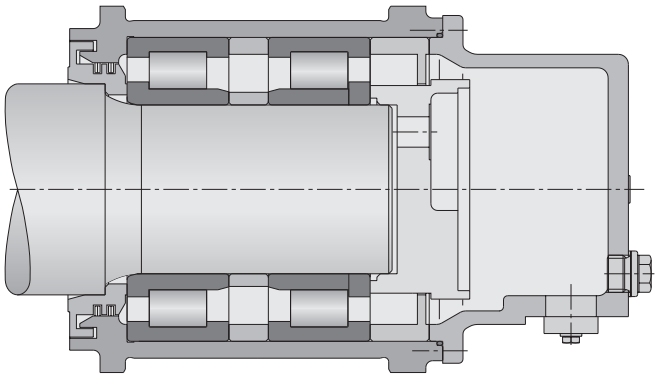
Vehicle data

Dead weight of two-car train	59 000 kg
Max. load per two-car train	33 000 kg
Max. radial load per axle box bearing	70 kN
Max. speed	100 km/h

Three motor bogies and one carrying bogie per two-car train.

Wheelset bearings

The forces to be transmitted are taken up by WJ and WJP cylindrical roller bearings.
As the bearings are separable, their individual components can be mounted and dismounted separately.
Types WJ and WJP were developed especially for use in rail vehicles under adverse conditions (corresponding to catalog bearings NJ and NJP).
Two cylindrical roller bearings of types
FAG WJ100x180TVP and
FAG WJP100x180P.TVP each are installed in each wheelset.
To save weight, the housing ring and the housing cover were made of cast aluminium.
Thanks to this measure, the total weight of one housing plus bearings is only 25 kg.

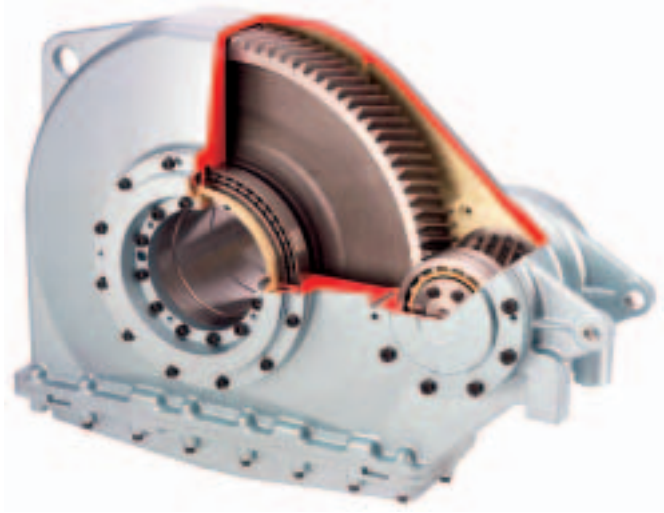


Lubrication and sealing

The bearings are lubricated with a lithium soap base grease with EP additives.
On the wheel side, the bearings are sealed by a double lamellar ring seal and a labyrinth.

Gear/gear bearings

Single-stage helical spur gear.



Pinion shaft (input shaft):
2 angular contact ball bearings **FAG 7216B.MP.P6.S1.UA70**
1 cylindrical roller bearing **FAG NU217E.801554**

Output shaft:
2 tapered roller bearings
FAG 801019 (Ø 196.850 x 257.175 x 39.688 mm)

FAG Kugelfischer AG
Product Line Railway
Postfach 1260
D-97419 Schweinfurt
Tel.: +49 9721 913978
Fax: +49 9721 913788
E-mail: rail_transport@fag.de
www.fag.com

98.5/09/04 Printed in Germany by Weppert GmbH & Co. KG