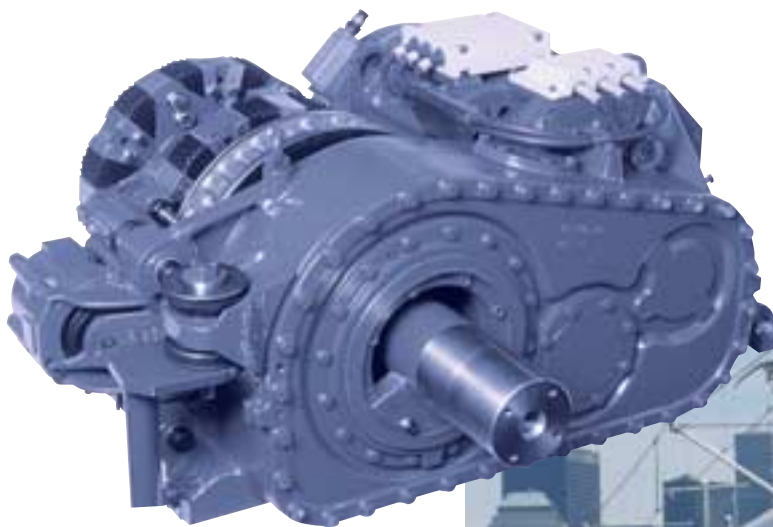


FAG Bearings for Voith Wheel Set Gearbox SZH 465 for the New Jersey Transit Low-Floor Light Rail Vehicle



Examples from Application Engineering

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Wheel set gearbox from Voith Turbo GmbH & Co. KG, Heidenheim - for New Jersey Transit low platform rail cars

Courtesy of Voith Turbo, Kinki Sharyo

The new New Jersey low-floor city train was designed and built by Kinki Sharyo.

The train set consists of an A and B car and an intermediate coach. By arranging auxiliary equipment on

top of the cars, a 70 percent low-floor design could be implemented.

The 42 vehicles are provided with an integrated fully spring suspended transverse drive unit which was developed and built by Voith.

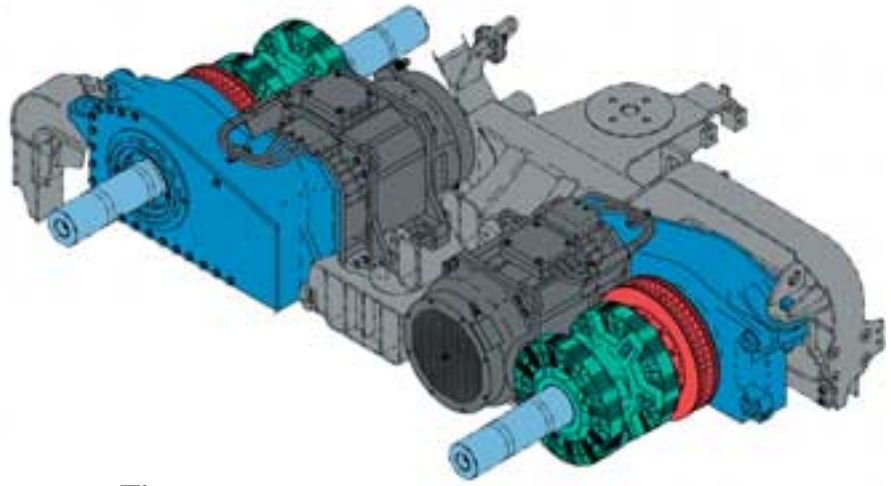
Both motor bogies are equipped with two drive units each.

FAG supplies the cylindrical roller bearings, the four-point bearings and the tapered roller bearings required for the wheel set gearbox.

Technical data

Gear ratio $i = 6.645$
Max. input speed $5\,000\text{ min}^{-1}$

Motor Alstom
Output power 140 kW
Top speed 90 km/h
Max. axle load $F_A = 12\,000\text{ kg}$



Gearbox concept

Input

The double-step helical spur gear is driven by an electrical motor through a torsionally-rigid, flexible diaphragm coupling.

Output:

The power is transmitted to the axle by a hollow shaft and wedge-package coupling acting as a universal joint. The hollow drive shafts additionally accommodate the brake disks. The gearbox housing is bolted directly to the motor and the fastening for the brake calipers is integrated into the gearbox housing. This results in an extremely axially compact unit, so that even with an internal bearing arrangement the earthing brush can be arranged within the bogie frame. The complete drive unit is spring-suspended in the bogie frame.

Bearing selection

Input shaft

The drive train between motor and gearbox is supported by three bearings in a locating-floating arrangement. The radial load is accommodated by two cylindrical roller bearings NJ215E and NU215E.

The locating bearing is formed by a cylindrical roller bearing combined with a four-point bearing. With its radially relieved outer ring the four-point bearing transmits exclusively axial loads.

The NJ215E cylindrical roller bearing acts as a floating bearing.

Intermediate shaft

The forces from the intermediate shaft are taken up by two NJ314E cylindrical roller bearings in a floating arrangement.

Output shaft

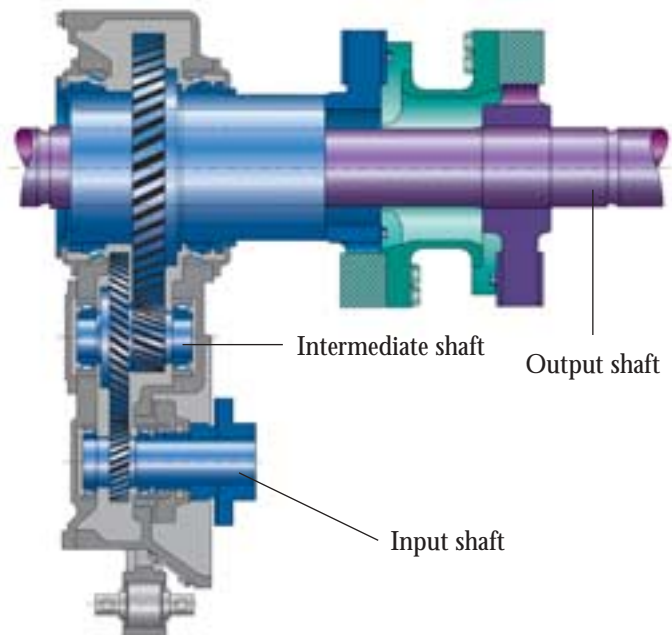
The output shaft with the large spur gear is supported by two FAG 543422 tapered roller bearings (254x325x39mm) in O arrangement.

Fits

The bearing inner rings are subjected to circumferential loads and therefore fitted tightly on the shaft. The outer rings are subjected to point load and are consequently loose fitted.

Lubrication and sealing

The gearbox has oil bath lubrication. The bearings are lubricated by the oil circuit of the gears. The shaft openings are protected by gap-type seals with grooves and oil return ducts in the covers.



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