



# Reduce rail fleet energy use and environmental impact



## Environmental benefits

- 13% lower bearing friction cuts energy use per train by 1%
- Fewer resources required for the same power generation
- 17% longer bearing grease life
- Reduced manufacture of new bearings, grease and seals

**The SKF CTBU with SKF Low Friction Railway Bearing Seal reduces bearing friction torque by 13%.**



## SKF compact tapered bearing unit (CTBU) with SKF Low Friction Railway Bearing Seal can help fleets meet their operational and environmental goals.

From freight operations to passenger locomotives and beyond, rail operators must reduce maintenance costs while increasing energy efficiency to meet increasingly strict environmental standards and legislation. Consequently, extremely efficient wheelset bearing units requiring minimal maintenance are needed. Wheelset bearing units must be able to operate under fully loaded cars and under extreme climate conditions – all while saving energy and reducing environmental impact.

The design of the SKF CTBU with SKF Low Friction Railway Bearing Seal is based on extensive research and development to reduce the frictional moment and wear. Using this seal helps reduce energy use when hauling railway vehicles.

When compared with SKF CTBUs equipped with the previous generation of seals – which represent the industry standard – the SKF CTBU with this new generation seal reduces bearing friction torque by 13%. This represents a significant reduction in friction leading to lower power losses



and fewer resources required to generate the same railway power.

The new seal also reduces temperatures by 5 °C compared to the previous seals, enabling about a 17% increase in grease life to extend maintenance intervals and reduce lubrication costs. From an environmental perspective, the increased seal and grease life increases bearing life and reduces the need to manufacture new bearings, grease and seals.

Ultimately, these combined benefits will contribute to a reduction in greenhouse gas emissions and help to conserve the Earth's resources.

SKF BeyondZero solutions can help reduce CO<sub>2</sub> emissions, preserve limited resources and protect the environment from the use and spread of toxic substances. For more details, including documentation of reduced environmental impact, visit [www.beyondzero.com](http://www.beyondzero.com).



## Increase maintenance intervals and energy efficiency using SKF solutions.

A key component to reducing maintenance costs is increasing the time between maintenance intervals. Through its optimized design, the SKF CTBU equipped with SKF Low Friction Railway Bearing Seal provides 13% lower bearing power losses. This helps to reduce operating temperature by 5 °C (at 850 r/min), delivering about 17% longer grease life for extended maintenance intervals. Ultimately, the new seal design increases the bearing life for low speed passenger trains and freight trains.

The main features of the seal include an enhanced geometric design, plus optimized choice of seal material and surface roughness on the contacting areas. This seal design also fulfills the UIC 515-1 requirements for contaminant ingress, especially water.

### Operational benefits

- 13% lower friction and extended maintenance intervals
- 5 °C lower temperatures enable 17% longer grease life
- 1% less energy used per train
- Lower operating costs
- Reduced risk of false hot box detection

### Energy saving example

#### Assumption

- freight car fleet 200 000 cars in operation
- average speed 80 km/h
- wheel diameter 900 mm
- seal life 800 000 km
- bearing frictional moment without seals 11,5 Nm

#### Estimated energy consumption based on two seals per bearing unit

Seal design	Traditional seal	Energy Efficient seal
Seal frictional moment [Nm]	4	2
Total frictional moment [Nm]	15,5	13,5
Energy used [MJ]	27 556	24 000

#### Energy saving

Based on one bearing unit  $\frac{27\,556 - 24\,000}{27\,556} = 0,129$  equal to 13%

Energy saving ratio 13%

Based on 200 000 freight cars in operation at an average speed of 80 km/h the total power saving is 160 MW. This leads to an energy saving of 1,6 TWh for the fleet over the life of the seals.

The total energy saving for the complete train is approximately 1%.

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