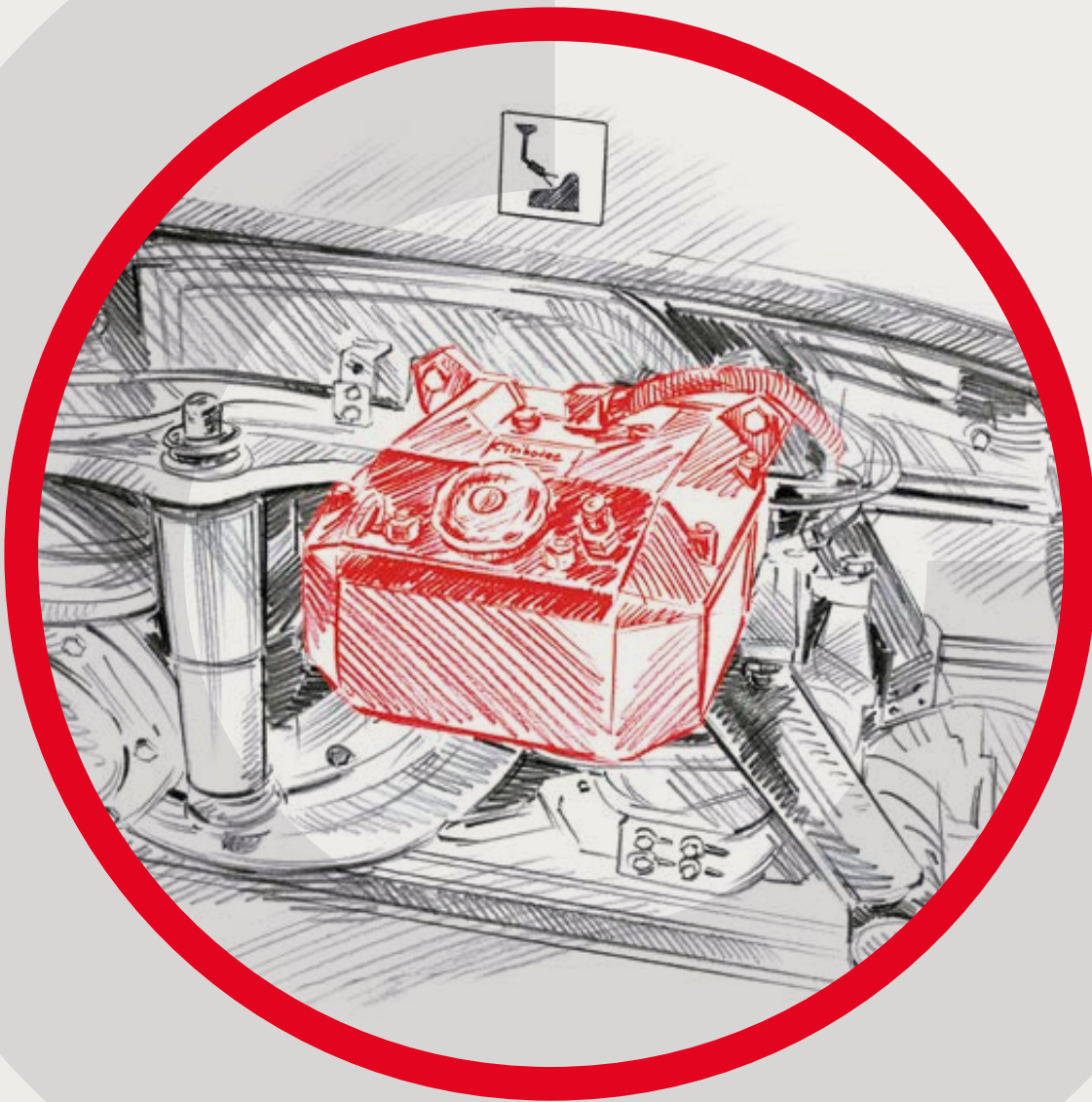




**FRICTION MANAGEMENT
SOLUTIONS**

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UNIVERSAL SYSTEM
FOR ALL CONDITIONS

Tribotec has developed a wide range of solutions for on-board and trackside applications of friction management materials. It can offer its customers devices based on standard components as well as solutions tailored to a specific project or application. When developing its devices, Tribotec closely cooperates with various research centers and test laboratories. Vibration tests, EMC tests and tests in climatic chambers are carried out. This, combined with more than thirty years of experience, ensures a high standard of quality for all products.

ON-BOARD SOLUTIONS

Tribotec has many years of experience in developing and supplying wheel flange and top-of-rail lubrication systems based on the principle of liquid lubricant spraying. It can offer its customers both standard solutions available at short notice and customer-specific designs for a specific vehicle or application. We have also developed an application system using solid sticks as a complement to the portfolio for customers who prefer this method of friction management.



TRACKSIDE SOLUTIONS

An integral part of our portfolio is our range of trackside friction management solutions. The basis of the offer is a standard set expanded according to the conditions of the specific application site. We work with our customers on the optimal placement of stationary lubricators to maximize their benefit for the infrastructure operator.



FEATURES AND BENEFITS

A properly implemented and adjusted friction management device brings the following benefits:

- Extended rail and wheel life
- Control of noise
- Reduce derailment risk
- Reduced traction energy consumption
- Extending reprofiling intervals and reducing vehicle downtime and repair costs

We keep in mind that the operational life of railway vehicles typically reaches several decades. Therefore, we provide support and service throughout the entire life of a vehicle equipped with our components.

From Tribotec, the customer receives everything from project planning, device development, production and delivery, to commissioning on the vehicle and assistance during testing from one source.

ON-BOARD WFL AND TOR APPLICATIONS

Increasingly demanding requirements for environmental quality, environmental friendliness, sustainability and cost-effectiveness are also placed on railway vehicles. Tribotec's on-board friction management applications help vehicle manufacturers and their operators to meet such requirements.

LIQUID LUBRICANT-BASED EQUIPMENT

Based on our many years of experience, we produce equipment suitable for

- Trams/LRV's
- Multiple train units
- Locomotives
- Metros
- Special vehicles

The technology behind our solution is widely used in the market. The dose is preset in the pump and the lubricant is delivered to the nozzles using compressed air as the transport medium.

The lubrication circuit is based on a single-line system, the individual components do not contain any moving parts and therefore require almost no maintenance.

A simple device is available as a basic, quick and functional friction management solution.



Our decades of experience allow us to also provide more complex customer solutions based on specific project requirements. We then adapt the design of individual components and the layout of the lubrication system itself for a specific vehicle to these requirements.

We can adapt the shape of the lubrication device to fit the space....



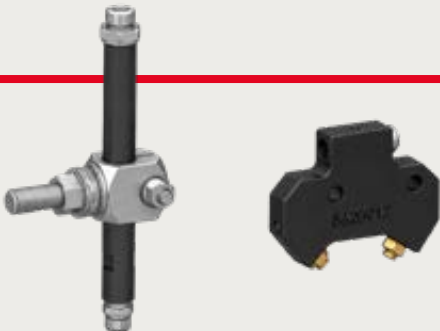
... or we equip the lubrication device with two pumps for the possibility of spraying according to the direction of the curve/travel.

For vehicles without their own compressed air source, we can supply a separate compressor unit for roof installation...



.. and if there is not enough space on the vehicle, we can prepare a custom-made device connecting all the necessary components into one compact unit.

An integral part of the delivery is a set of nozzles adapted to the application of a specific device, whether it is TOR or WFL. For vehicles typically operated in urban areas on grooved rail infrastructure, we supply double lubrication nozzles. These are usually adapted to the shape of the specific wheel profile used by the vehicle operator.



The on-board systems are designed with open control architecture. Control is provided by the vehicle's on-board control network using input and output signals from the lubrication system. The device can be controlled based on GPS position, time, distance traveled or curve detection. A separate control unit is supplied upon customer request.



Additional components are available for lubrication systems that can expand the functionality of the device and make the work of operating personnel easier. Curve sensor - with the ability to distinguish left/right curve direction.

Filling panels and flaps with indicators of lubricant level in the reservoir



Heating elements for the lubricant reservoir.

SOLID STICKS-BASED EQUIPMENT

A simple yet effective solution for friction management is a system using solid stick lubricants. In the basic version, the lubricant is continuously applied to the wheel using spring-loaded applicators mounted on the chassis. The applicators can be easily adapted to a specific vehicle type.

The main advantages of this solution are

- Easy installation
- Easy adaptation to the vehicle
- Low operating costs and simple maintenance

With a minor modification, even this simple lubrication device can be turned into an intelligent solution that brings significant savings in consumables. This further improves operating economy and contributes more to operational sustainability. By replacing the spring in the applicator with a simple actuator and connecting it to the vehicle control system, the operator obtains a device that combines the advantages of solid stick lubrication and advanced control. The pressure of the lubricating element can then be controlled similarly to a liquid lubricant system, for example based on GPS or curve detection. This turns continuous lubrication into targeted application, reducing stick consumption and extending refilling intervals.

We also offer our customers sticks of various sizes.



TRACKSIDE EQUIPMENT

For heavily loaded sections of track, where rail traffic causes high wear and excessive noise, Tribotec offers the MKO system. This is a decentralized system that works with a central lubrication pump supplying lubricant to individual lubrication points on the rail. For the treatment of two rails, or for independent use as TOR and WFL, it is possible to place two independently operating pumps in one installation cabinet. These are capable of supplying different lubricants or friction modifiers to different application points in a separately adjustable operating mode.

The basic control is carried out using inductive sensors, but other control methods are also possible, for example from switch control or traffic signal controllers. The operating mode of the device is adaptable to the operating conditions at a specific location. It is possible to set the working time of the lubrication pump and the lubricant dosage according to the number of passing axles, the lubricant level in the tank is constantly monitored. A rain sensor can also be used to deactivate the lubricator in the event of rain.

For locations without a power source, the device can be retrofitted for operation with solar panels.

Local control can also be replaced with a remote-control module enabling operation via a web interface.



TRIBOTEC ALSO SUPPLIES SANDING SYSTEMS FOR ALL TYPES OF ROLLING STOCK, YOU CAN FIND OUT MORE IN THE TRIBOTEC “SANDING SYSTEM” CATALOG.



WHO WE ARE



WE ARE A CZECH MANUFACTURER OF CENTRAL LUBRICATION SYSTEMS, LUBRICATION TECHNOLOGY, HYDRAULICS AND SPECIAL SYSTEMS FOR RAIL VEHICLES.

FOR RAIL TRANSPORT WE PRODUCE:

- sanding systems
- wheel flange lubrication systems
- systems for railhead conditioning
- stationary track lubricators for rail curves and rail heads.

CUSTOMIZED SOLUTIONS are our key strength. Product development focuses on standard solutions that allow a wide range of modifications according to specific technical specifications with low project preparation costs. We offer consultation and advice, including the preparation of system variants according to customer requirements. We also develop and produce technically unique solutions and one-off products that are designed according to the required functional and performance parameters of the equipment.

We provide installation, assembly and commissioning directly at the customer's site. Our after-sales support includes **servicing, preventive maintenance, spare parts supply and consulting.**

Our products for rail transport are certified in accordance with TSI.

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