

Lubricant Consult GmbH



Transportation





LUBCON

Special Lubricants for Rail Transportation Systems



Different Railway Systems

Tram



Metro / Light Rail



High Speed / Cargo



Groove Rail



Vignole Rail



LUBCON® Special Lubricants for Train, Rail and Wheel

Weichen
Switches



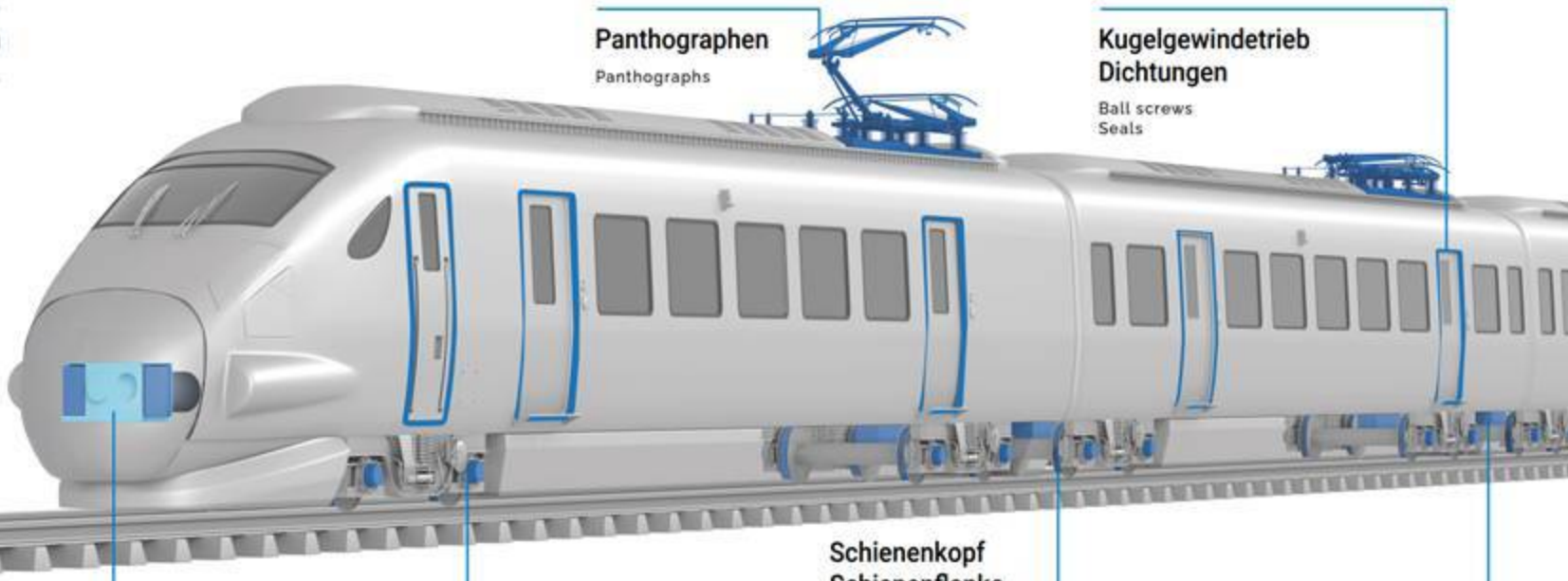
Panthographen
Panthographs

Radsatzlager
Wheelset bearings

Kugelgewindetrieb
Dichtungen
Ball screws
Seals

Schienenkopf
Schienenflanke
Spurkranz
Top of rail
Rail edge
Wheel flange

Verbindungen
Fahrmotor
Connections
Traction motors





LUBCON covers rolling stock and infrastructure



**Clutches
Buffers**

*Grizzlygrease No. 3
Grizzlygrease Bio 1-1000*



Wheelset bearings

*Turmogrease Li 802 EP
Turmoplex 3 EP*



**Ball screws
Seals
Guiding systems**

*Turmotemp N 182
Turmogrease SKL series
Turmogrease PP 300*



Panthographs

*Terrasol 40 CW
Turmogrease HDC 2*



Switches

*Terrasol SWA series
Terrasol 100 WT
Sintono Terra W DB*



**Connections
Traction motors**

Turmogrease L 802 EP plus



Top of Rail

Sintono Terra HLK



**Rail edge
Wheel flange**

*Sintono Terra SK-RE series
Sintono Terra HLK*



WFL



Switch



TOR



Wheel Bearing



Traction Motor



Door

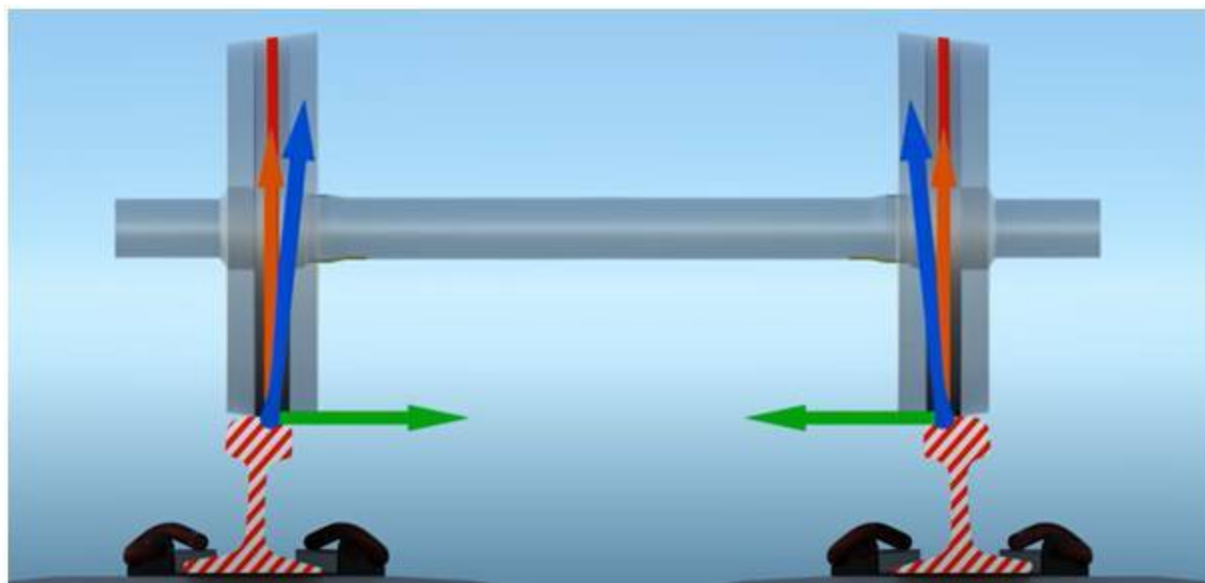


Air Compressor

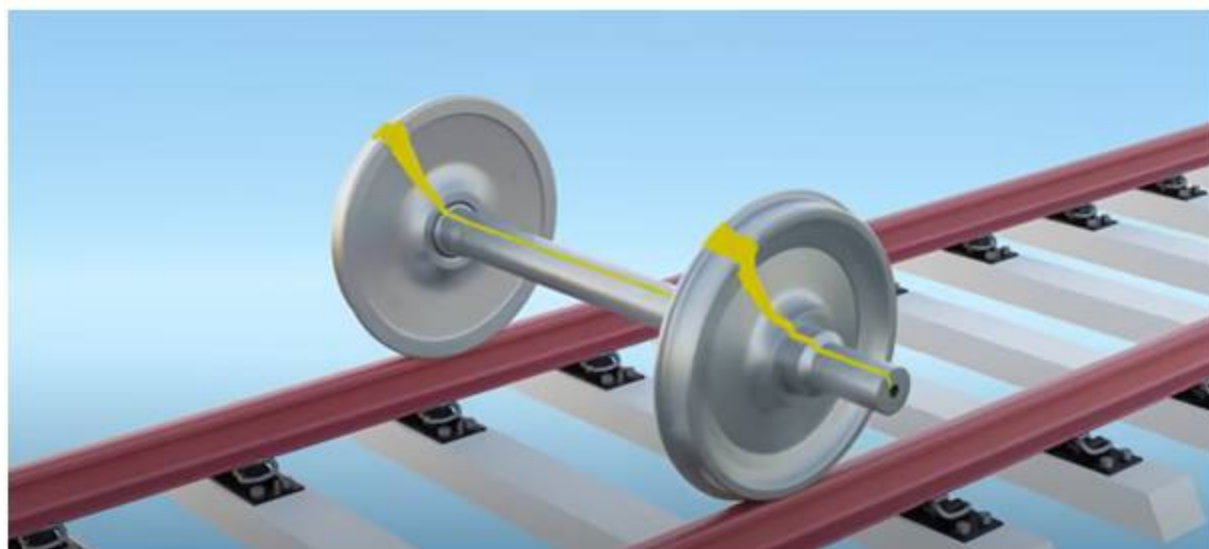


Pantograph

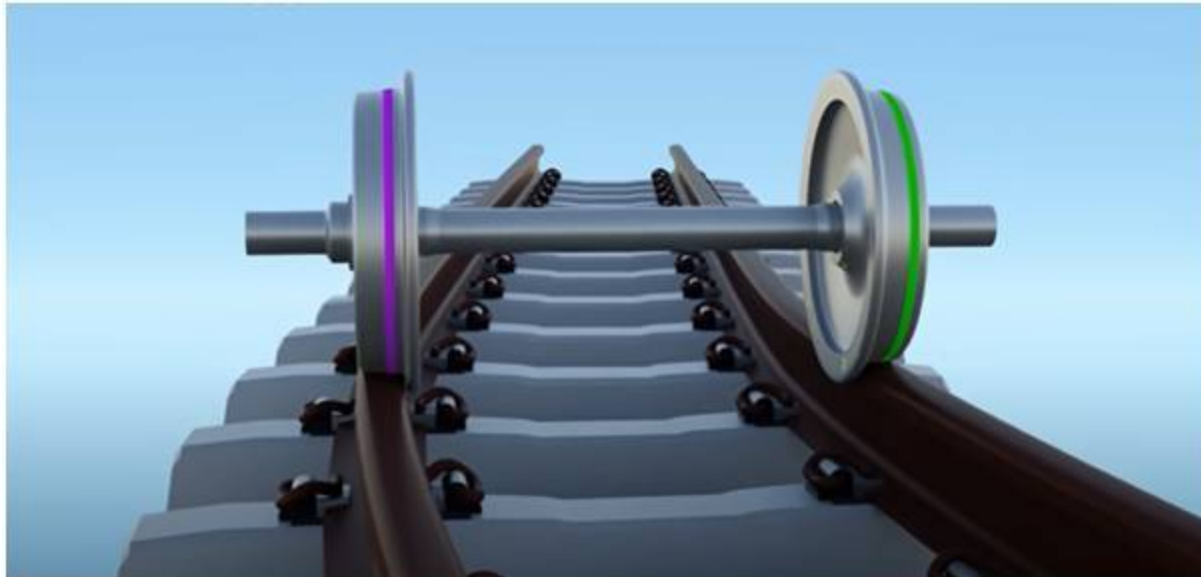
Wheel / Rail principle



- Semiconical shape of wheel
- Wheels center themselves on the rails

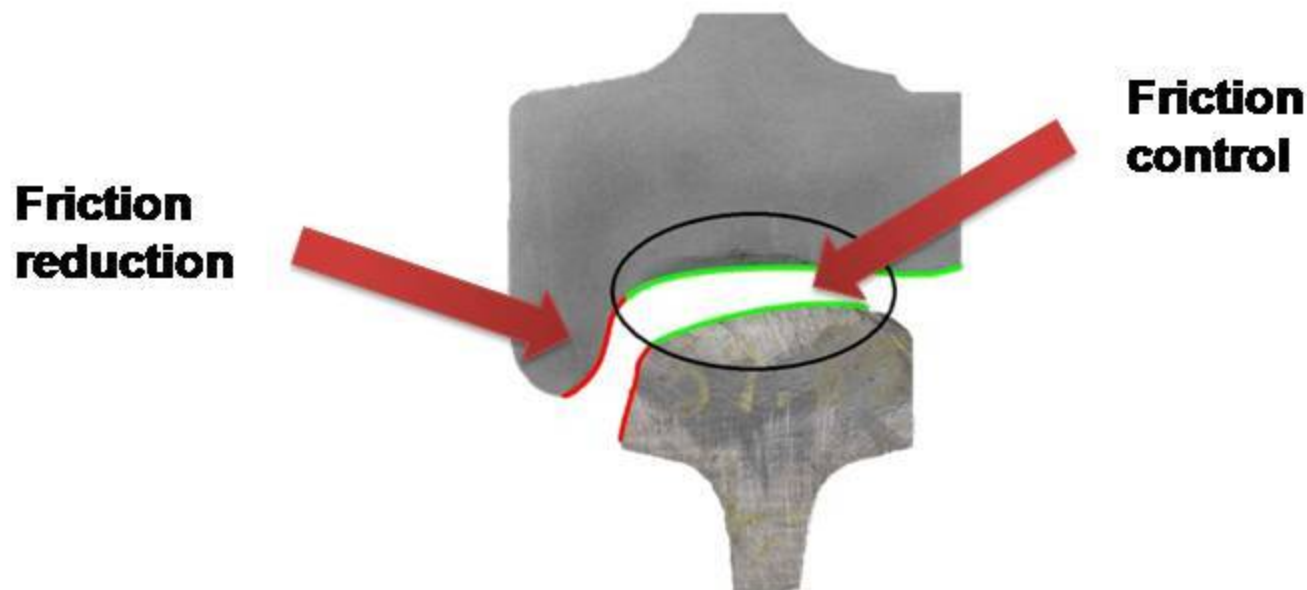


- Wheels are mounted on a fixed axle
- Both wheels are rotating at the same speed



- In curves the outer wheel is covering a longer distance
- The inner wheel compensates the distance by jumping/slipping
- If this process reaches a certain frequency, this can be heard as squealing noise.
- Heavy wear can be expected

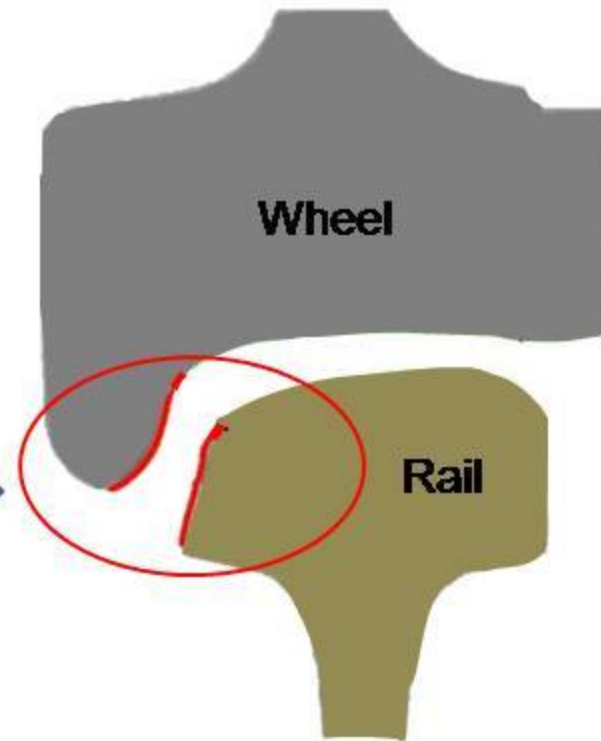
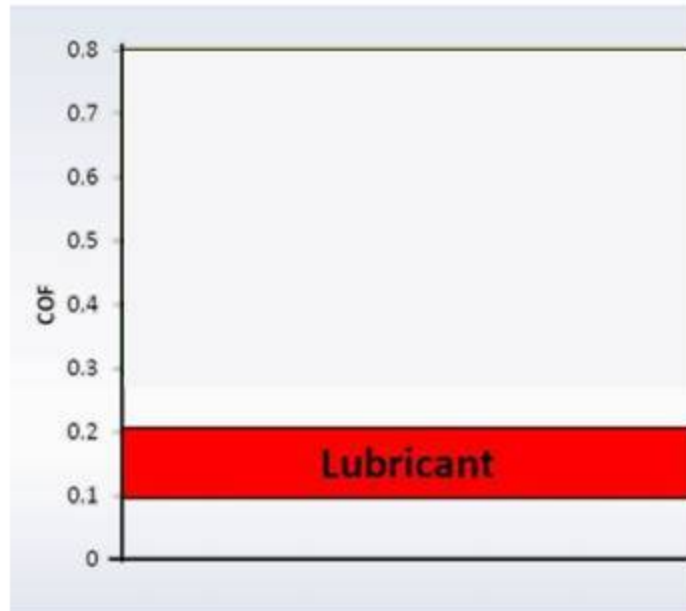
- The utmost goal is to control the friction on the Railhead
- To reduce the wear on the Wheelflange the friction must be reduced



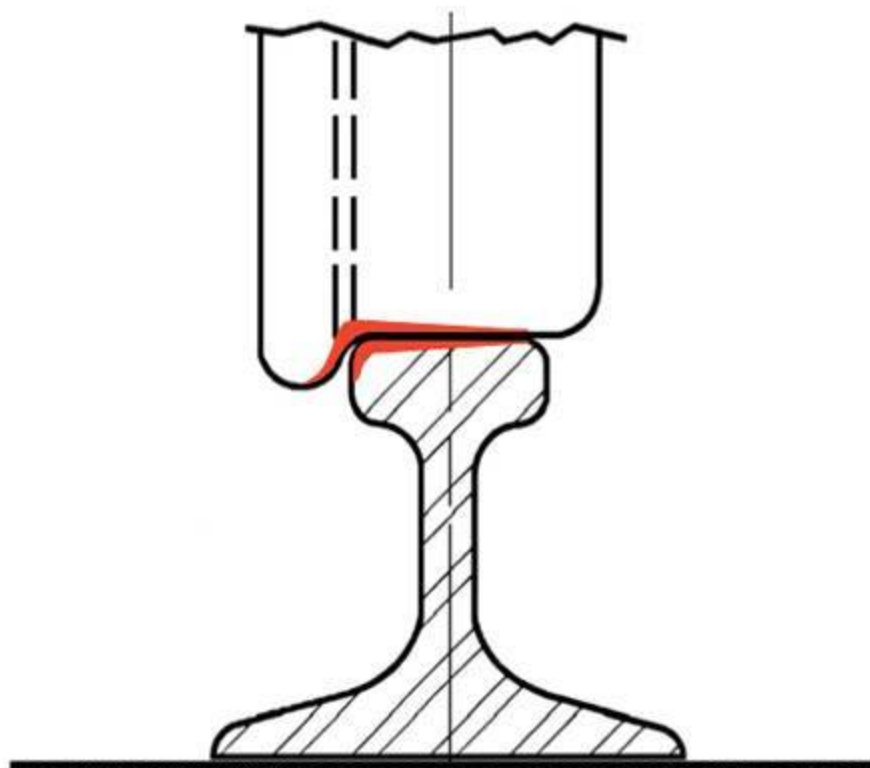


Wheel Flange / Rail Edge

Wheel Flange / Rail Edge Lubrication

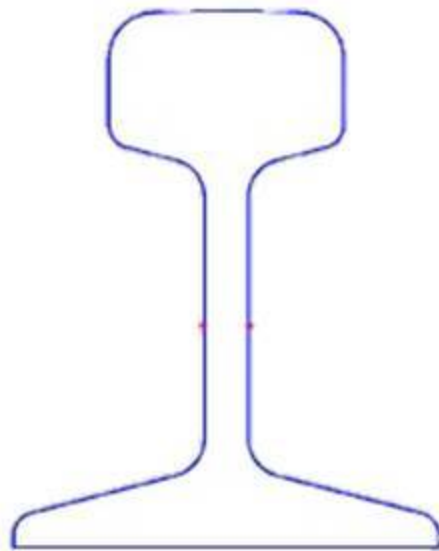


Problems

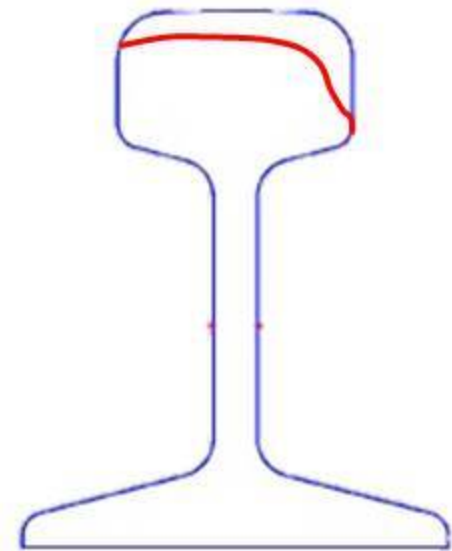
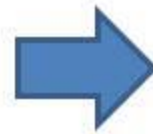


Wear on wheel and rail

Problems



New rail



Wear rail

Problems

Wear



Before



After



SINTONO TERRA SK-RE
OG P E 00 K -40



Date of issue: 06.02.2014

SINTONO TERRA SK-RE is a solid-free special grease for wheel flange lubricators. This avoids sedimentations and obstructions under pressure in automatic lubrication systems.

SINTONO TERRA SK-RE contains synergistically acting additives avoiding metal contact between friction partners in case of boundary lubrication conditions. Therefore, reduction of friction and wear at high surface pressure.

Special properties

- Very good conveyable and sprayable in the whole temperature range
- Easily biodegradable
- Remarkable adhesive properties
- Very high load carrying capacity
- Excellent corrosion and wear protection
- Very good resistance to water
- High work resistance
- Reduces noise level

Product Characteristics	Value	Dimension	Norm / Standard
Colour	light brown		
Density at 20 °C	0.94	g/cm ³	DIN 51757
Operating temperature range	-40 to 120	°C	
Operating temperature range short time	130	°C	
Thickener	Silicate		
Base oil	biodegradable ester		
Kin. viscosity of the base oil at 40 °C	80	mm ² /s	DIN EN ISO 3104
Worked penetration	400 - 430	mm/10	DIN ISO 2137
Consistency class (NLGI)	00		DIN 51818
Dropping point	> 250	°C	DIN ISO 2178
Resistance to water	1 - 90		DIN 51807
Biodegradability (OCED) after 21 days	> 70	%	OECD 301
Water hazard class (WGR)	1		

Application

SINTONO TERRA SK-RE is a special grease for lubricating the wheel flange at normal speed range.

Packaging units

5 kg bucket, 10 kg bucket, 25 kg hobcock, 50 kg hobcock, 180 kg drum, special packing on request

Biodegradable

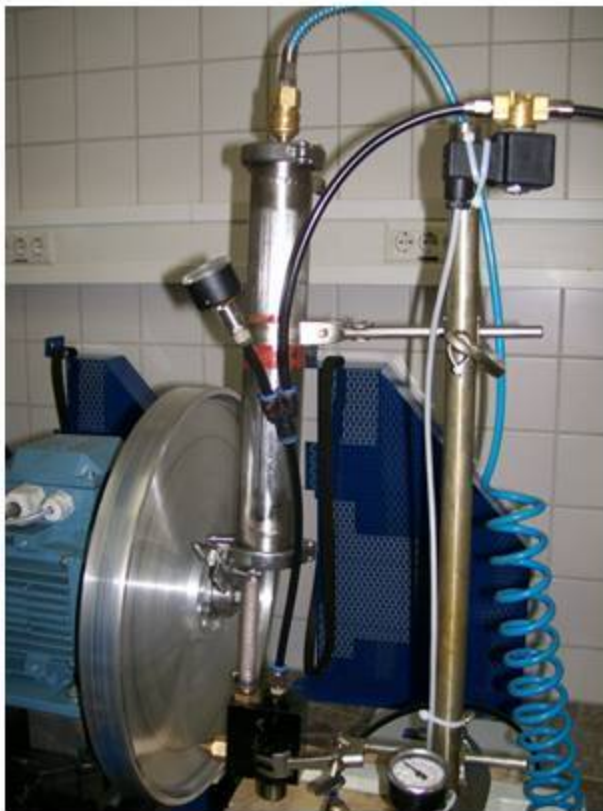
Solid free for low maintenance

Reduce wear

High adhesive strength

Low consumption

Adhesion Test Rig

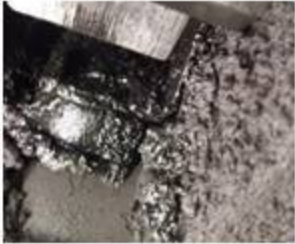


Lubcon inhouse test rig

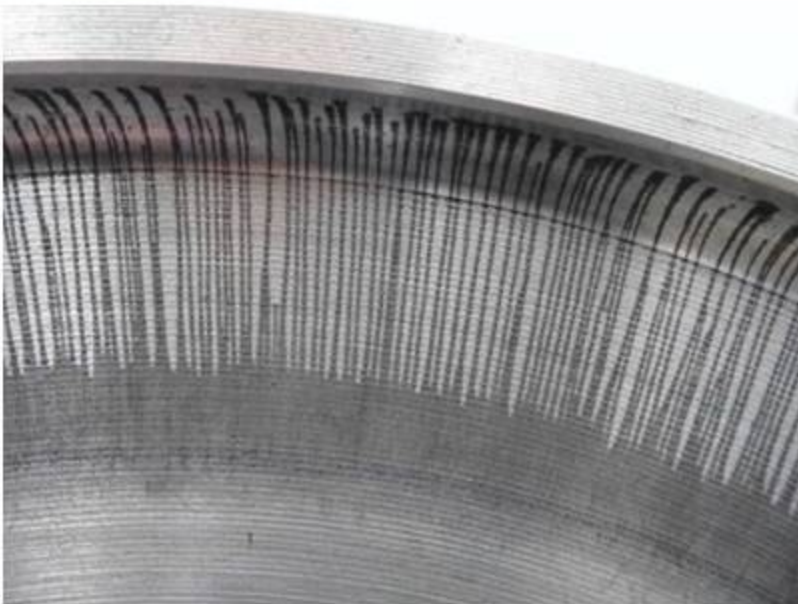


Customer (DB) test rig

Strong Adhesion / Test

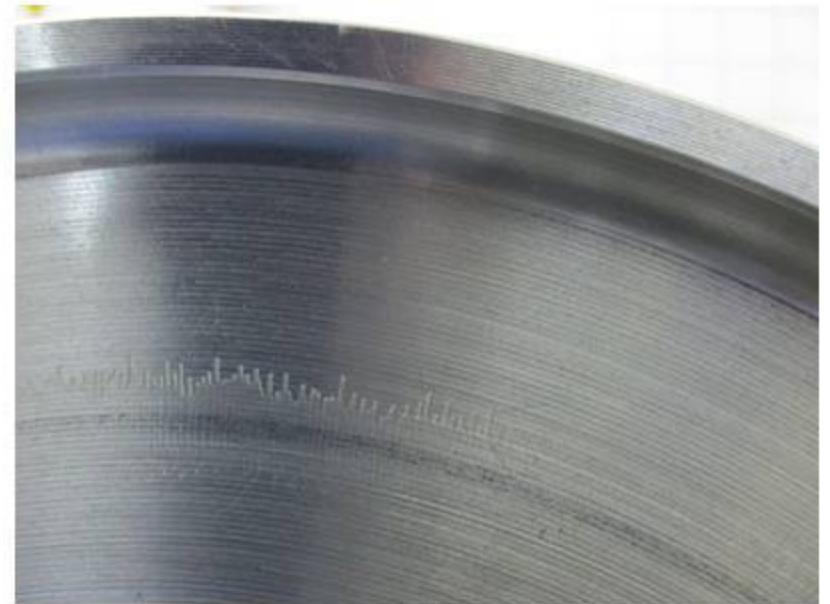


100 km/h



Competitor

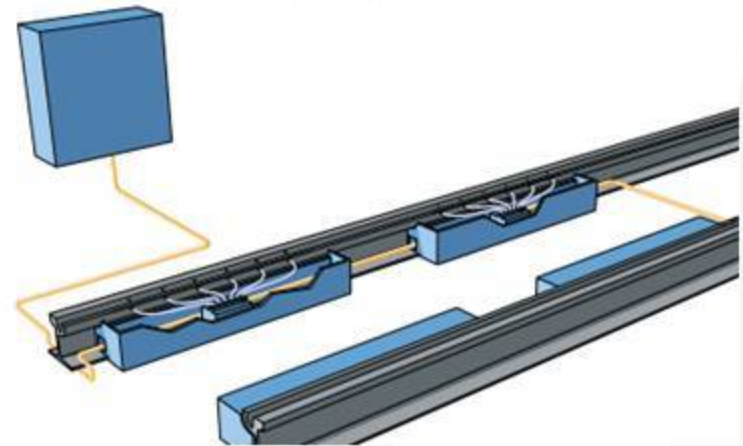
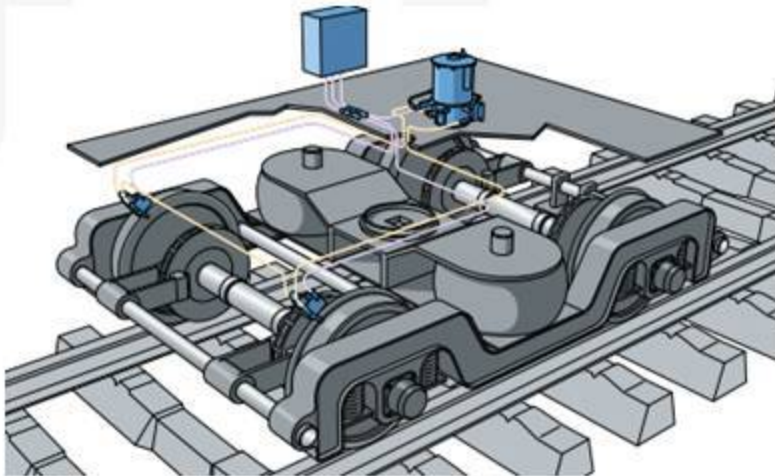
Igralub



Lubcon Sintono Terra SK-RE

Application systems

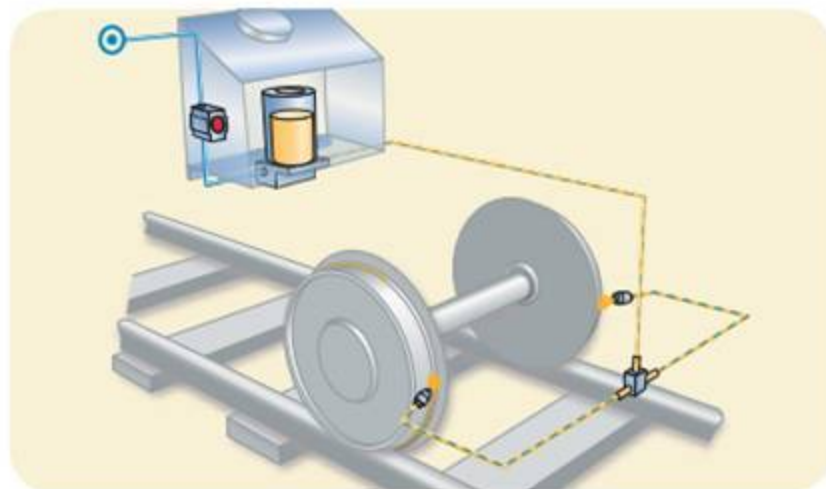
- **Top of Rail and Wheelflange products can be applied either with an On-board system or a stationary system**



On Board systems



On Board System



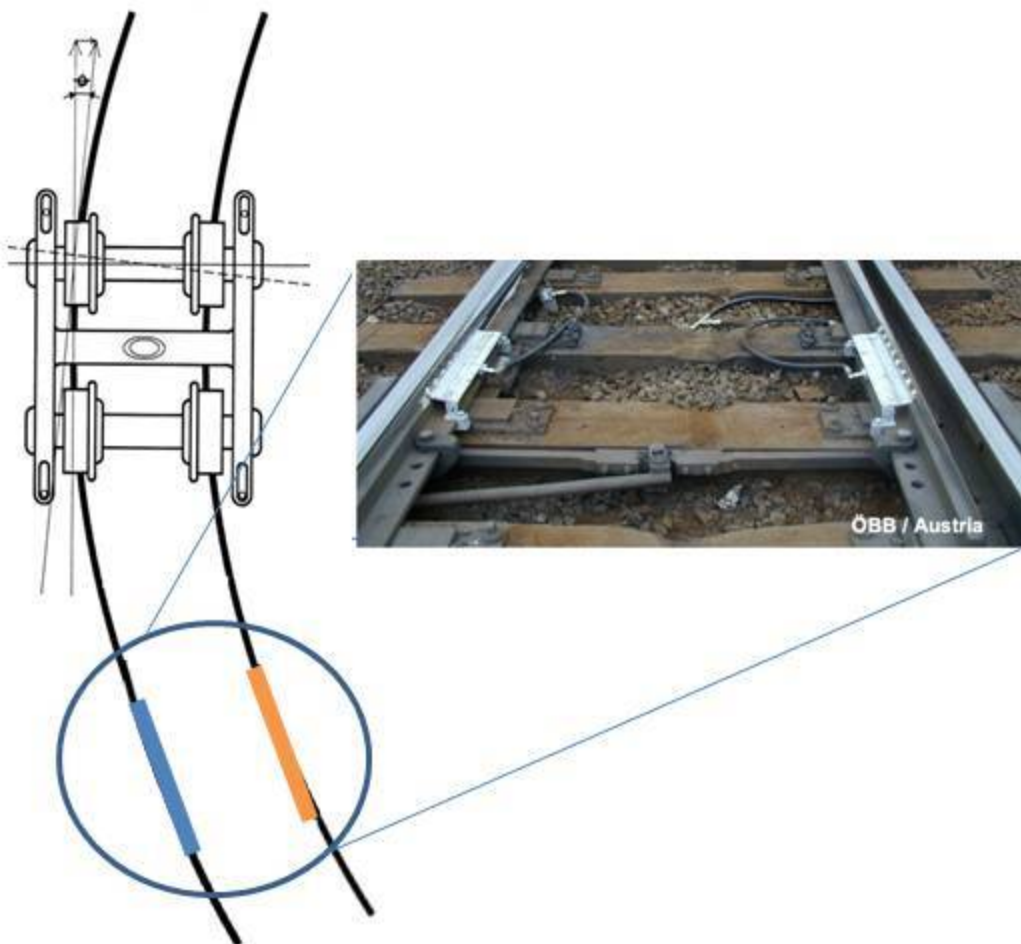
Amount : 0.03 – 0.05 g

GPS activated before the curve

Stationary Lubrication System



Max 8 applicator bars
Max tube length 25 meters
150 m before curve



Amount: 2 – 3 grams per bar

Interval: 60 – 80 axel

Carrying distance:

Narrow curve – up to 1,400 m

Long curve – up to 7,000 m



TRAM BREST - France Wear Reduction



Period	Line 1	Line 2	Line 3	Average	Travel distance before reprofiling	Wheel life increase
2015	2.89 mm	2.73 mm	2.89 mm	2.83 mm	13,000 km	

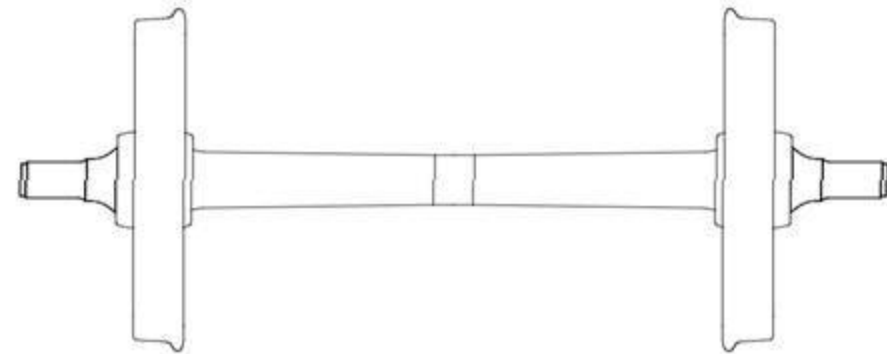
FUCHS TRAMLUB S5

2016	1.97 mm	2.14 mm	1.78 mm	1.96 mm	20,000 km	53.85%
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SINTONO TERRASK-RE

2017					25,000 km	
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92.31%



New wheel diameter = 608.5 mm

Minimum wheel diameter = 531 mm

Average material wear = 77.5 mm

343,000 km wheel life



TOR

Top of the Rail



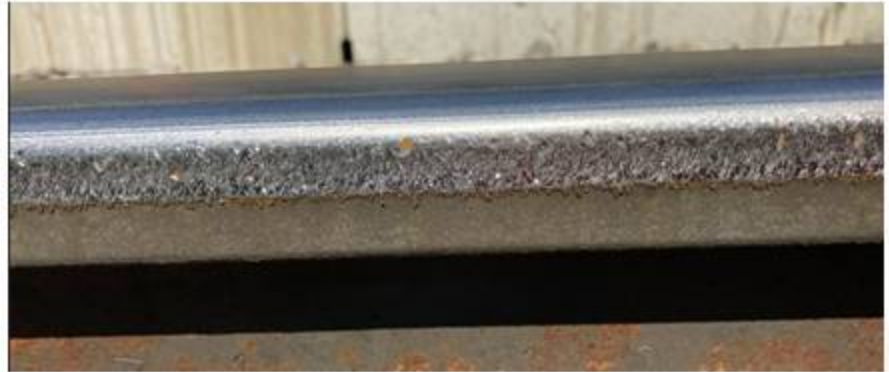
Typical signs on wheels



- **Wheel damages (breakouts)**
- **Wheel flats**



Typical signs on Rails



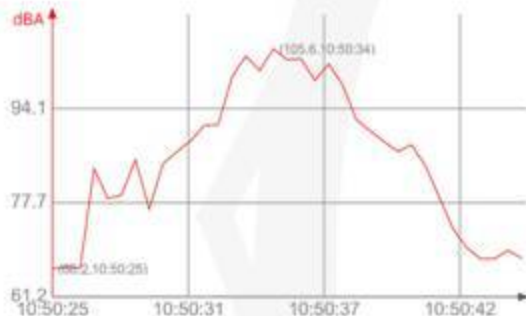
- **Harmonic slip waves**
- **Corrugation**
- **Wheel flange damages**

Squealing noise is audible wear !!

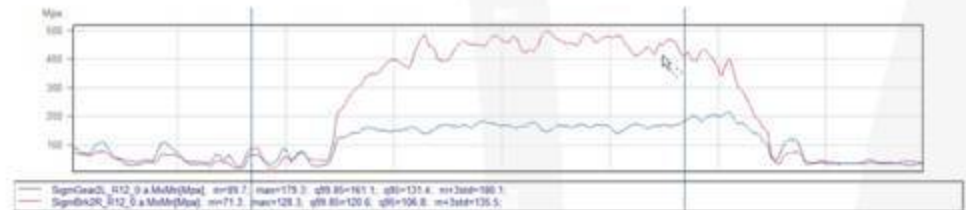
- Can be measured and quantified
- Varies due to weather conditions (Rain/high humidity reduces wear)

Data

Device name: UT353 BT Report name: (null)
Sampling Time: 0.5s Record Data: 35 Start: 2022/12/01 10:50:25 End: 2022/12/01 10:50:42
Max: 105.6dBA Alarm max: 100dBA Min: 66.2dBA Alarm min: 50dBA

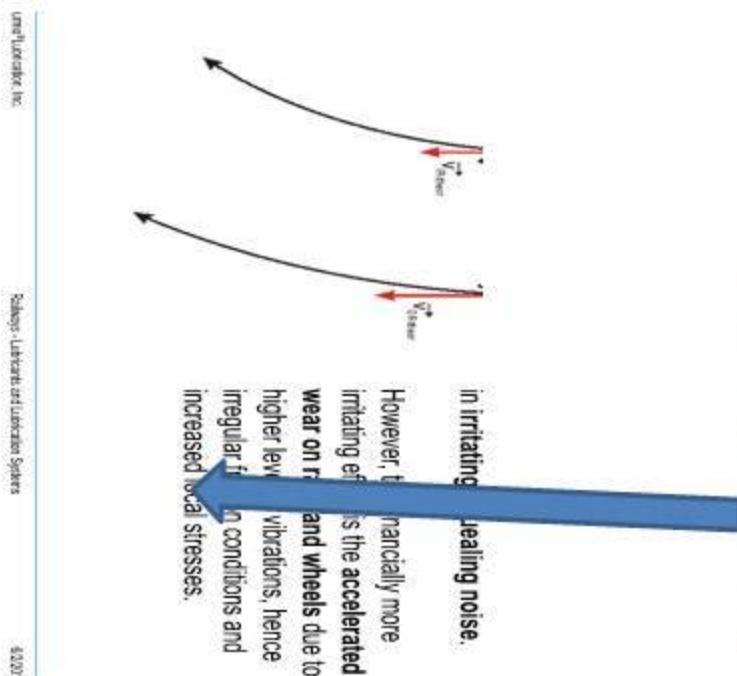
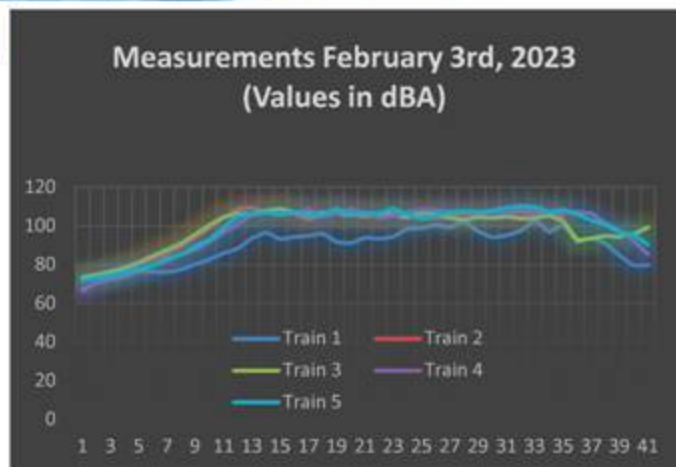


Measurement noise level dBA



Measurement with axle sensors (vibrations)

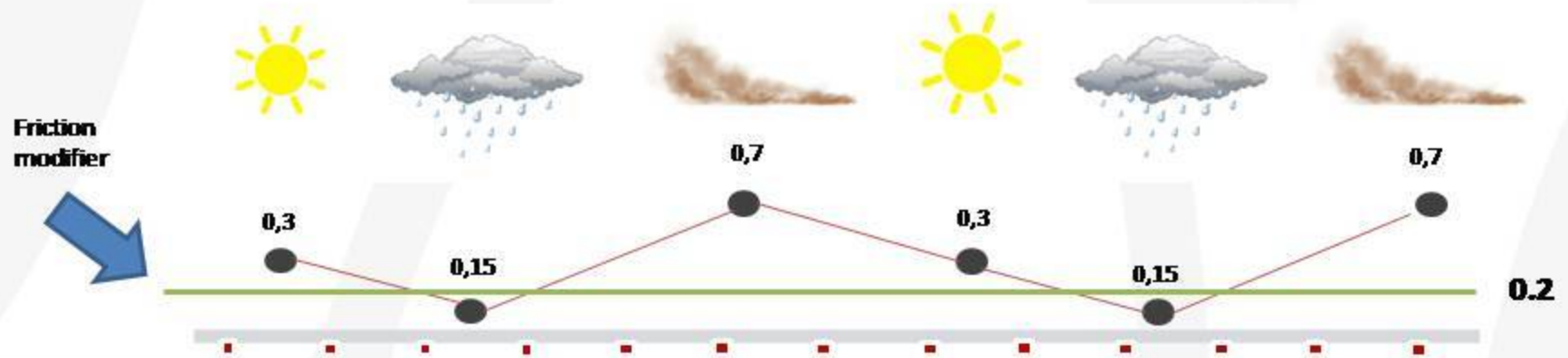
Example of TOR Curve noise



Corrugation

SUMMITA IQC (R&D)

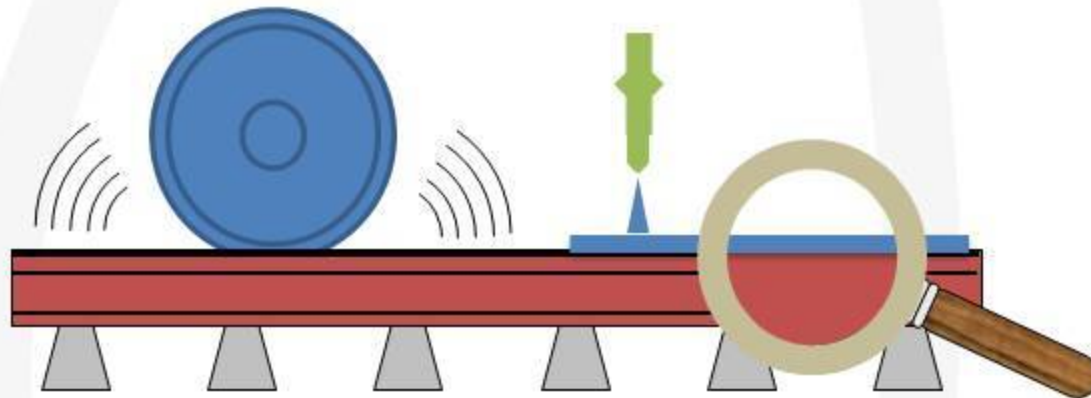
Friction coefficient along the Track



- The friction coefficient varies along the track
- Applying a friction modifier guarantees an even friction coefficient of 0.2 – 0.3
- Guarantees an equal wheel / rail contact condition on the whole network
- Reducing rolling- squealing noise and therefore reduces wear
- Produces controllable braking conditions

Solution: HLK friction modifier

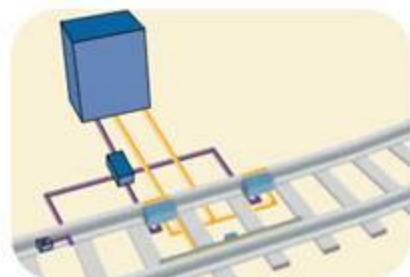
- **Control of the friction value by applying a friction modifier**
- **Reduces wheel slips and therefore wear and noise**



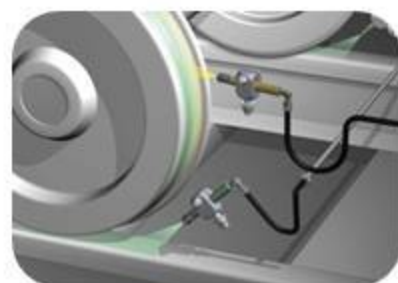
Filling the peaks and valleys



TOR



Stationary

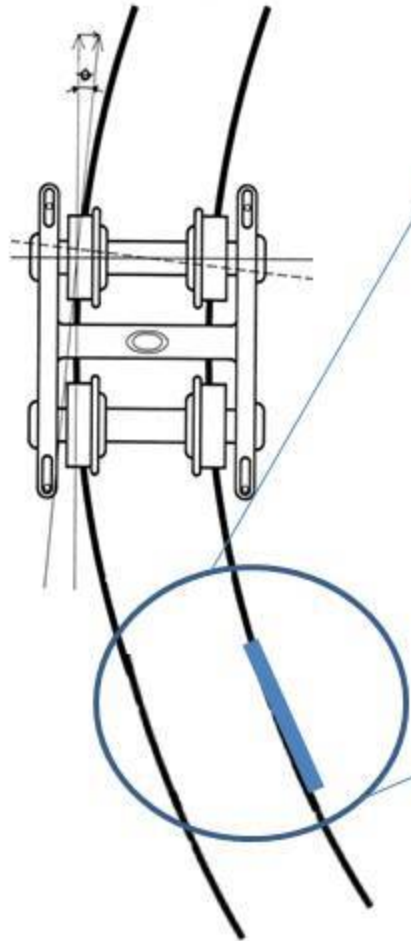


On Board

Application in curves

Reduce noise and wear

Sintono Terra HLK



Amount: 3 grams

Interval: 60 – 80 axel

Carrying distance: up to 700 meters

Example Doha Tram slow movement



Example before Friction modifier Application



Example after Friction modifier Application

Example with higher speed

Vorortelinie S45
Einfahrt Station Gersthof
25.11.2008

Regional Train Austria



SINTONO TERRA HLK



Detail image: 07.06.2016

Fully biodegradable

Special mixture
of solid lubricant

Optimize friction

Ultra Low Consumption
compared to water based TOR lubricant

BIODEGRADABLE is a special grade for the lubrication of systems based on biodegradable synthetic oil.
A combination of selected solid lubricants offers excellent wear-protecting properties to **BIODEGRADABLE**.

Special properties

- Easily biodegradable
- High pressure resistance
- High aging resistance
- Good pumpability at low temperatures
- Low pour point of the base oil

Product Characteristics

Product Characteristics	Value	Character	Item Number
Color	silver		
Density at 20°C	1,1	g/cm ³	DM 51057
Operating temperature range	-40 to 120	°C	
Thickness	500µm		
Base oil	Biodegradable ester		
kin. viscosity of the base oil at 40°C	45	mm ² /s	DM 51031 3000
kin. viscosity of the base oil at 100°C	9,2	mm ² /s	DM 51031 3000
Unworked penetration	305 - 335	mm/10	DM 510 2007
Load carry class (LCC)	8		DM 51006
Biodegradability after 28 days	1-20	%	DM 51008

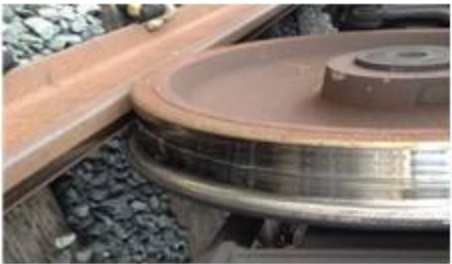
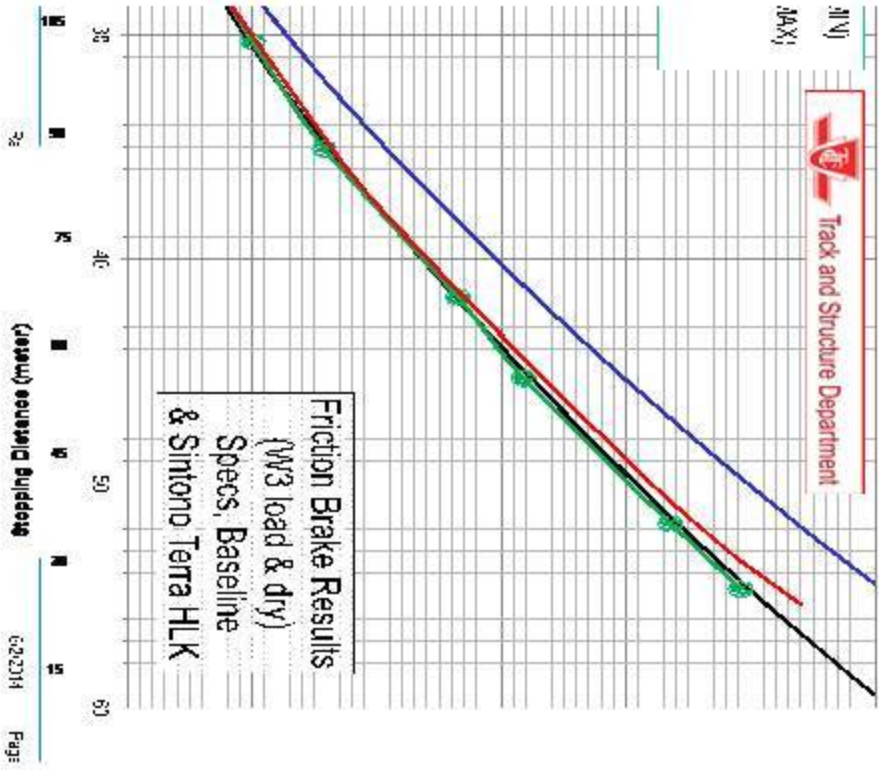
Packaging

4 x 1 kg can, 5 kg bucket, 25 kg hotback, 50 kg hotback, 100 kg drum



Braking

requirements and maintained the brake distance within all test conditions.



No influence on braking

Test at Hyderabad Metro

Brake Test with **Sintono Terra HLK** at Hyderabad Metro, India



Train: Hyundai Rotem

No of Cars: 3

Data collected from TIMS (Train Integrated Management System)

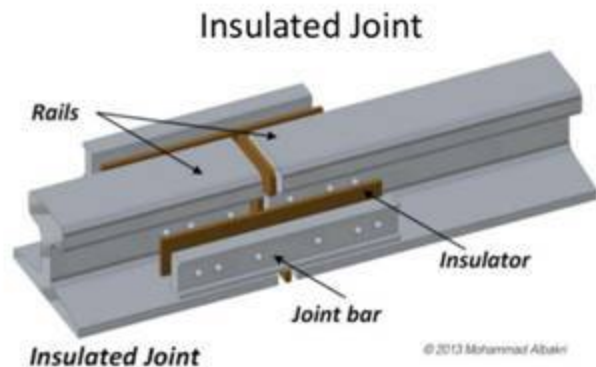
Speed	Braking Distance in Dry	Barking Distance with Lubricant	Braking Distance with Lubricant under Wet condition
25 km/h	30.9 m	28.4	27.5
45 km/h	82.7 m	82.1	81.1

The above reading were under permissible limits and customer placed an order after this trial. (Pictures & E-Mail reference Below).

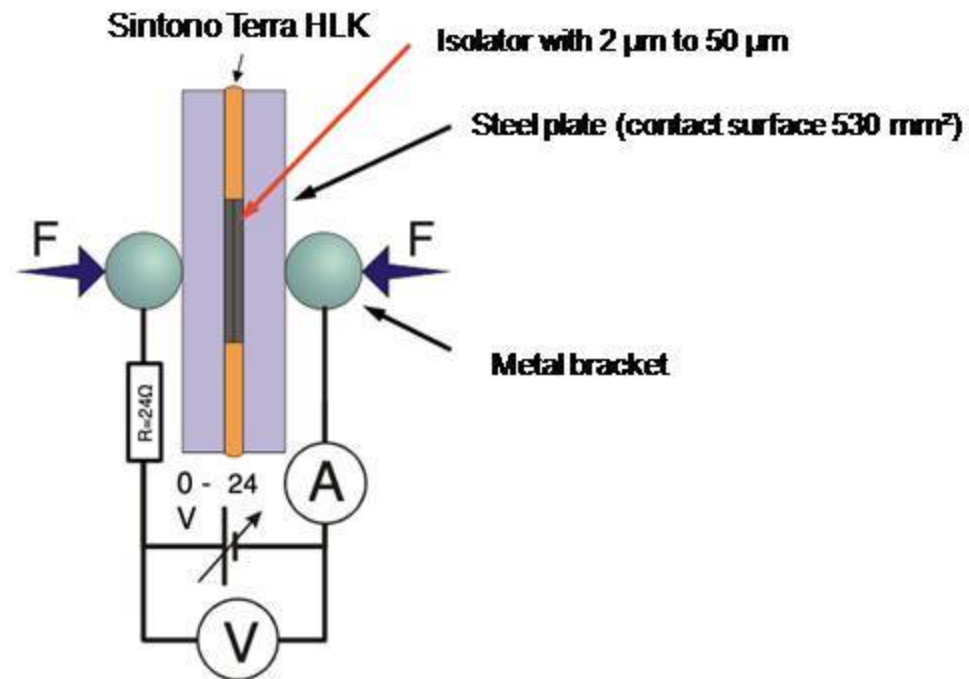


Signaling

Insulation joint

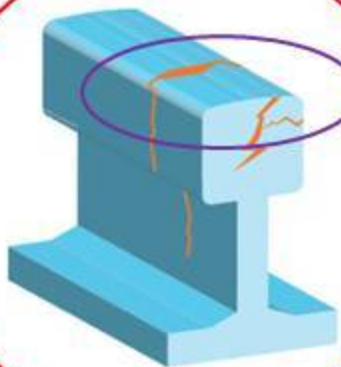
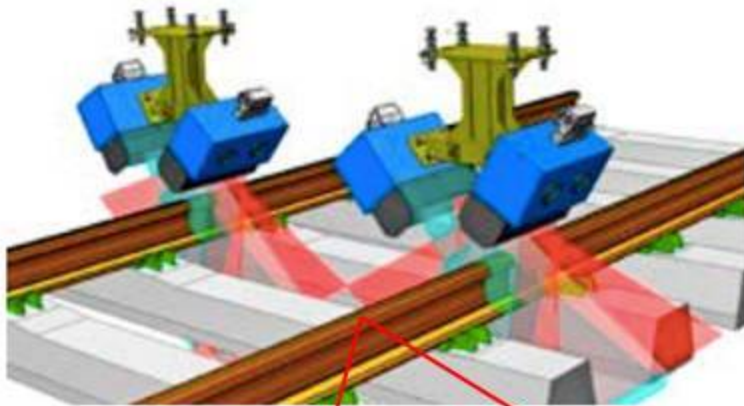


Extreme test with large quantity



No influence on signaling

Rail Inspection System



Optical

Ultrasonic



No influence on inspection



Freigabeprotokoll

für den Schmierstoffeinsatz bei der Deutschen Bahn AG

Schmierstoff: **Sintono Terra HLK, Fa. Lubricant Consult GmbH**

Anwendungen: **biologisch schnell abbaubares Schienenkopfkonditionierungsmittel (DB-Mat.Nr.: 991 955)**

Fachabteilung: Deutsche Bahn AG
DB Systemtechnik
Tribologie/Tribotechnik
Völckerstr. 5
80939 München

Qualifizierungsnachweise: Untersuchungsbericht 10-P-13664-TT213-102340-PR03 vom 10.03.2011 und die Fachtechnische Stellungnahme zur Überprüfung der Eignung des Reibwertmodifikators „Sintono Terra HLK“ aus Brems technischer Sicht (25.03.11, Dr. Peter Spiess, T.TVI 33).

Das Produkt hat die in den aufgeführten Nachweisdokumenten geprüften Qualifizierungsregeln der DB AG erfüllt und darf in einer Konditionierungsanlage eingesetzt werden, die nicht mehr Produkte pro Zentimeter ausbringt, als die während der Prüfungen eingesetzte Anlage der Fa. Hypower (0,70 cm³ nach 48 Achsen). Das Mittel darf nur in Bereichen mit Achszulasttechnik eingesetzt werden. Dabei ist zu beachten, dass ein Abstand zu Gleisverbindungen von mind. 500 m eingehalten werden muss. Weitere Prüfungsbesuche können dieses Dokument ergänzen.

Über einen Zeitraum von zwei Jahren sind Mottungen von Triebfahrzeugführern hinsichtlich schlagfertiger Schienen im Bereich der Anlagen zu dokumentieren und auszuwerten. Falls sich dabei Auffälligkeiten ergeben, sind die entsprechenden Anlagen zu deaktivieren.

Aus dieser vorläufigen Freigabe wird automatisch nach einer problemlosen zweijährigen Anwendung bei der DB AG eine reguläre Freigabe. Die Freigabe erlischt, wenn Änderungen der Rezeptur oder des Herstellungsverfahrens ohne Abstimmung mit der OE Tribologie/Tribotechnik vorgenommen werden oder unvorhergesehene Schwierigkeiten im Betriebseinsatz auftreten. (Das Freigabeprotokoll kann zur Vorlage beim Schmierstoffkauf der DB AG in Zusammenarbeit mit Ausschreibungen verwendet werden und wurde in Abstimmung mit T.TVI 1, Dr. Spiess erstellt.)

München, den 06.06.2011

L.V. Dr. Rick, T.TVI 33

I.A. Köfeler, T.TVI 33 (3)



Verband der Verkehrswirtschaftlichen Organisationen der Deutschen Eisenbahnverkehrsunternehmen (VVO)



DAkkS

DB 99192, Stand: 04.01.11, Seite 14, gültig für T.TVI 33



Germany Approval



SBB CFF FFS

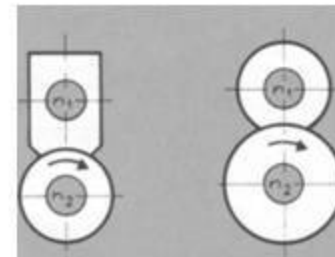
Amsler Test Rig



Type of friction test



Rolling

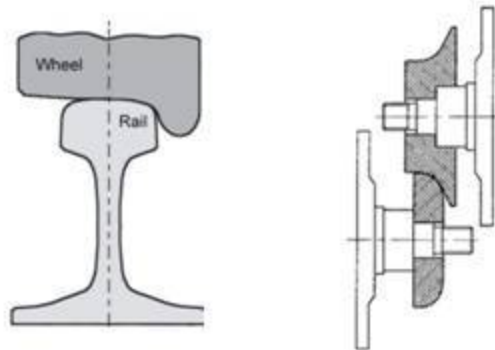


Sliding



Combination

2000 N load / 400 rpm



Simulation of contact surface

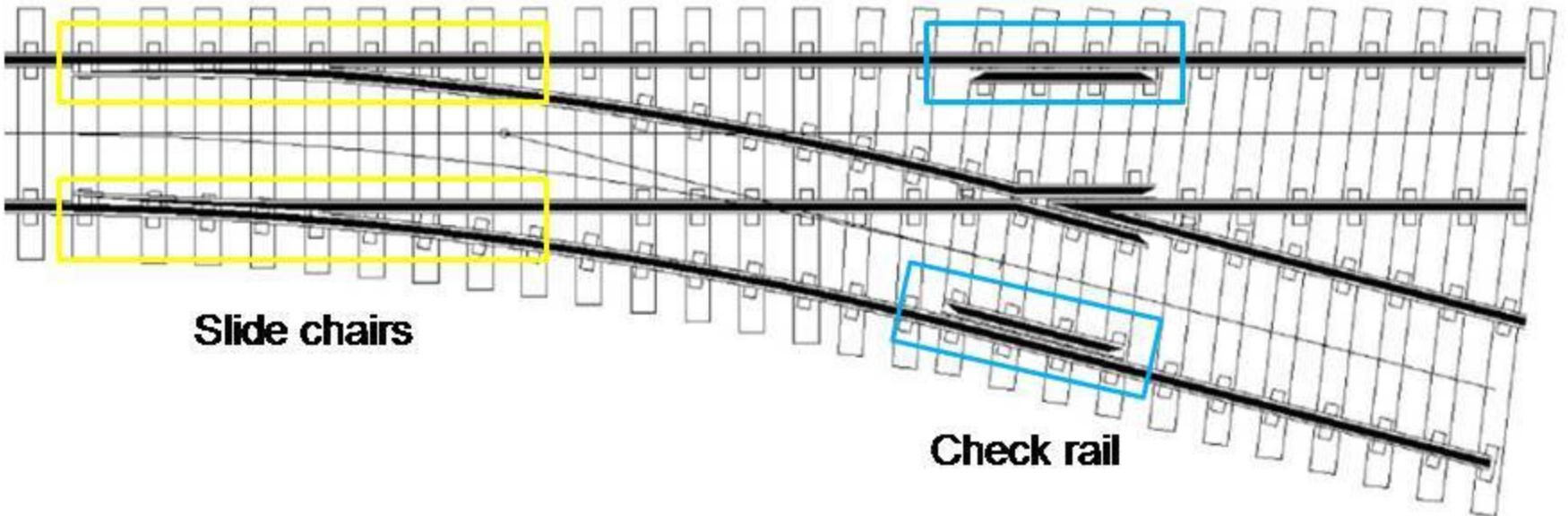
Switches



Switch maintenance Terrasol WSA series

- **Switches cost only 5 % of the total Railtrack budget**
- **But 17 % of the total budget needs to be spent on Switches**
- **Replacement of a Switch is approx. 35'000 USD**
- **Normal life span is 12 year, can be extended by 4 -6 years with a proper maintenance**





Slide chairs

Check rail

Problems

Slide chairs



Terrasol 100 SWA



TERRASOL 100 SWA



Date of issue: 02.05.2016

TERRASOL 100 SWA is a highly biodegradable special oil which was developed for the railway industry, especially for the lubrication of the wheelsets.

TERRASOL 100 SWA contains additives and acid inhibitors which prevent oxidation, rust formation and guard of the steel from electrolytic corrosion properties and corrosion resistance.

The specially selected fuel is treated, guarantees easy and fast handling of old and therefore the highest possible maintenance intervals.

Special properties

- Easily biodegradable
- Excellent rust protection
- High oxidation resistance
- Excellent corrosion protection
- Very good adhesion properties

Product Characteristics	Value	Character	Standard
Color	opaque black		
Density at 20°C	0,92	g/cm ³	EN 15757
Operating temperature range	-20 to 140	°C	
Oil type	ester		
Kinematic viscosity at 40°C	105	mm ² /s	EN ISO 3104
Kinematic viscosity at 100°C	54,6	mm ² /s	EN ISO 3104
Viscosity index (VI)	174		EN ISO 3104
Pour point	-30	°C	EN ISO 3104
Flash point	> 200	°C	EN ISO 3104

Application

Developed for all kinds of vehicles in the area of rail-vehicles.

Rollers of axle bearings, brake rollers and hangers can be successfully lubricated with this product even along period in the areas of rolling plates as well as in loading devices, assembling cars. Fine mechanical cleaning is not required.

For the **TERRASOL** series a special, specific application was developed, that is able to apply easily and evenly the oil on the steel surfaces of the wheelsets.

It is used for applications recommended and granted.

Lubrication intervals

Compared with the conventional lubricating oils the maintenance intervals can be extended several times. When using the product as an alternative lubricating grease, the maintenance intervals are nearly the same, but the cleaning intervals are smaller by a multiple.

Packaging

4 x 5 l canister, 20 l canister, 60 l drum, 200 l drum

Biodegradable

Non dust attracting

UV resistance

Water repellent

Good creeping properties

Long lubrication interval

Available in various viscosities for winter and summer condition

Terrasol 100 SWA

Consumption

1.3 liters = 12-15 switches (8-12 lube points)



	12 Jul 2018	02 Aug 2018	12 Sep 2018	
Shell Avania EP 2 Grease				 <p>Shell <u>Avania EP 2</u> - 2 weeks <u>re-lube cycle</u></p>
	Dirty & Sticky	Dirty & Need to Re-lube	Dirty & Dry	
Lubcon <u>Terrasol</u> 100 SWA				<p>LUBCON <u>Terrasol 100 SWA</u> - 2 months <u>re-lube cycle</u></p>
	Clean & Lubricated	Clean & Lubricated	Clean but Need to Re-lube	

SL 60



**Optional 5 liter back tank
43-54 switches**

- **Battery operated**
- **Faster relubrication**
- **Easier application with spray lance**
- **More efficient use of lubricant per liter**
- **Reservoir good for 12-15 switches**

Comparison



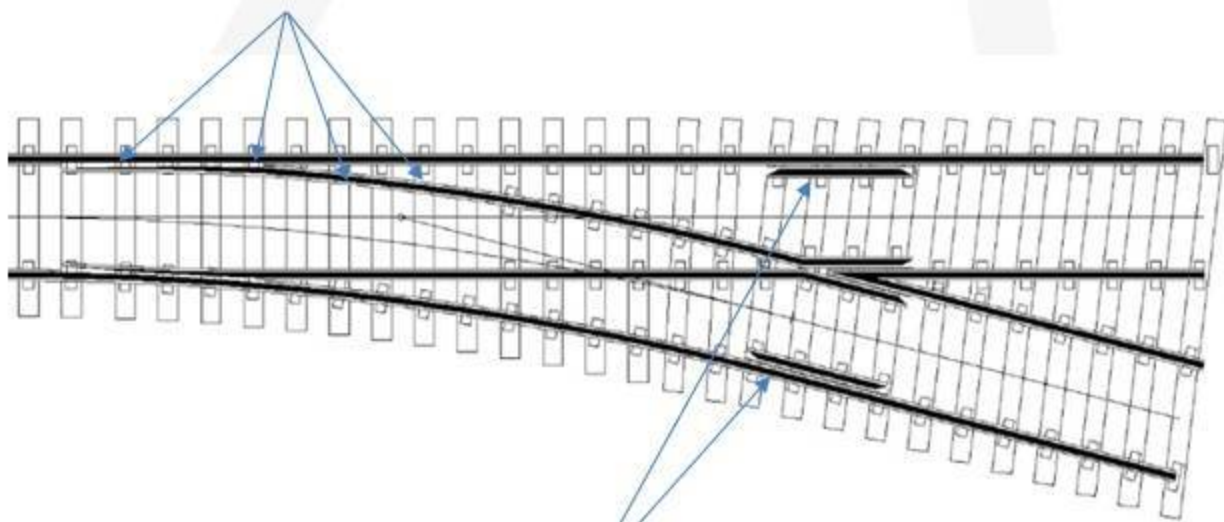
Manual



Speed efficiency

Slide Chairs and Check Rails

- **The slide chairs should always be covered with a thin oil film Terrasol WSA/WT 100**



- **Check rails should constantly be greased with Grizzly Grease Bio 1-1000 to avoid damaging the Wheel backside**

Check Rail



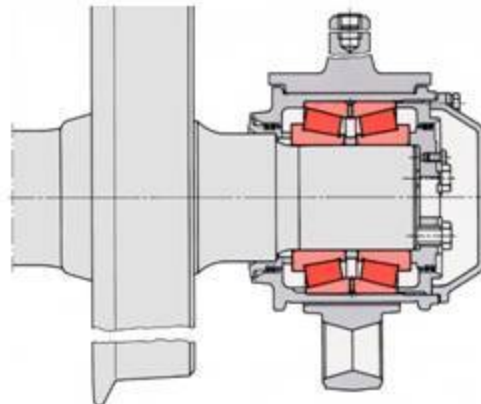
Micromax 120
Grizzlygrease No. 1



Wheel Bearing

Wheelset Bearing lubrication Turmogrease Li 802 EP

- **Wheelset Bearings have to support the full weight of the Train**
- **A good bearing runs smoothly, has low vibrations and saves Energy**
- **Service interval normally 1.2 million running kilometers or two years**
- **Lubcon achieved on tests more than 2 million running kilometer**
- **FAG/Schaeffler has approved our Turmogrease Li 802 EP**




TURMOGREASE LI 802 EP
 KP HC 2 N -40


Date of issue: 07.05.2018

TURMOGREASE LI 802 EP is a multipurpose long-term lubricant for high loads. The special base of mixture and additives of TURMOGREASE LI 802 EP help to optimize general lubricant properties.

Special properties

- Excellent corrosion protection
- Excellent nonferrous metal protection and aging protection
- High lubricating film stability
- Ideal high and low temperature performance

Product Characteristics	Value	Dimension	Norm / Standard
Colour	Brown		
Density at 20°C	0,89	g/cm ³	DIN 51757
Operating temperature range	-40 to 140	°C	
Thickener	Lithium soap		
Base oil	Synth. HC / Mineral oil		
Kin. viscosity of the base oil at 40°C	82	mm ² /s	DIN EN ISO 3104
Kin. viscosity of the base oil at 100°C	12,5	mm ² /s	DIN EN ISO 3104
Worked penetration	265 - 295	mm/10	DIN ISO 2137
Consistency class (NLGI)	2		DIN 51818
Dropping point	> 190	°C	DIN ISO 2176
Resistance to water	1 - 90		DIN 51807
Corrosion protection (SKF-Emcor) 1% NaCl	0 / 0		DIN 51802
Speed factor of grease (n x dm)	1 000 000	mm/min	
FE9-Tests A/1500/6000-140 F10	165	h	DIN 51821
FE9-Tests A/1500/6000-140 F50	237	h	DIN 51821
Noise class	6 S1		FAG MGG-11
Starting running torque at -40°C	655 / 49	mNm	ASTM D 1478
Four-ball test O.K. load / welded load	2200 / 2400	N	DIN 51350

Application

Multipurpose high-performance grease for rolling and plain bearings for different demands. Special grease for the lubrication of linear guides and shaft bearings. The grease can also be applied in paint shops and areas with UV-radiation.

Packaging units

20 x 400 g cartridges, 6 x 1 kg cans, 25 kg hotblock, 180 kg drum

Very good mixed friction lubrication properties

All speeds up to 400 kmh

Wide temperature range

-40 - 140 C





Die Prüfstelle ist „Assoziierter Partner der Benannten Stelle Intemperabilität“ und vom Eisenbahn-Bundesamt anerkannt.

Deutsche Bahn AG
Systemverbund Bahn
DB Systemtechnik
Prüfstelle
Pionierstraße 10
32423 Minden

Bewertung zum Prüfbericht

Freigabeprüfung des Turmorgrease LI 802 EP als allgemeines Wälzlagerfett nach DB-Kenndatenblatt 000 000



zu Dokument: 09-I-7777-VTZ2443-BE015
Datum: 18.08.2009

Fachabteilung: DB Systemtechnik
VTZ 244.3
Tribologie/Tribotechnik
Völckerstr. 5
D-80939 München



Prüfung nach DIN EN ISO 10280
Deutsche Gesellschaft für Zertifizierung der Messungsinstrumente
und Messverfahren (DIN EN ISO 10280)

Die Bewertung bezieht sich ausschließlich auf die im Prüfbericht beschriebenen Prüfobjekte. Diese Bewertung darf nicht ohne schriftliche Genehmigung des Auftraggebers veröffentlicht werden. Eine ausgedehnte Verwertbarkeit bedarf zusätzlich der Zustimmung der Prüfstelle.

5 Unterschriften

geprüft:
München, 18.08.2009
Ort, Datum

[Signature]
Unterschrift (VTZ 244.3, Male)

erstellt:
München, 18.08.2009
Ort, Datum

[Signature]
Unterschrift (VTZ 244.3, Horn)

freigegeben:
Minden, 24.08.09
Ort, Datum

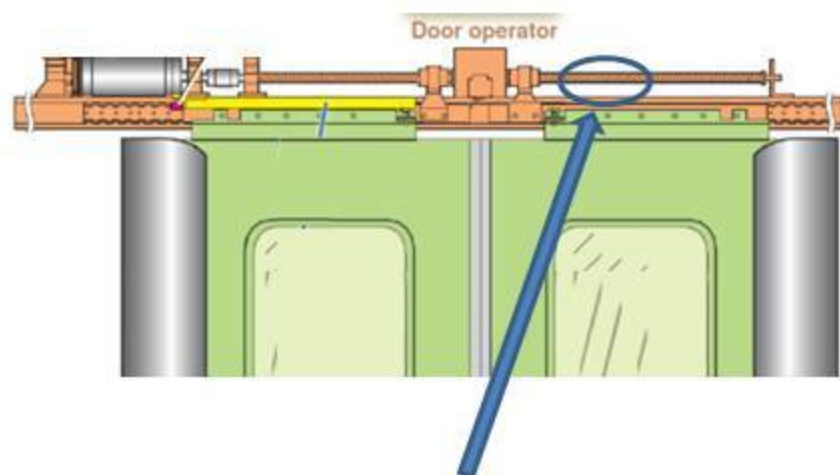
[Signature]
Unterschrift (Prüfstelle)

DB approval

Doors



Ball Screw



Thermoplex 2 TML special

Amount: 80 – 100 g

Interval: 6 – 12 months



Ball Screw



TURMOGREASE® SKL 18 VTF
(Freigabe / Approval:
IFE Automatic Door Systems)



High speed train

Train



6 -8 carriages



8 doors per carriage

Train set = 64 doors x 100g = 16 cartridges per year

100 train set = 1,600 cartridges per year

Ball Screw



Thermoplex 2 LLG special

400 g per door per year

OEM



First fill - Thermoplex 2 TML special



ULTIMATE
Qingdao Ultimate



Door Seals

Metro



Turmsilon LS 200/1
Elastolub SRV 300

500 g per train per year

High speed train



Silicon seal - Turmotemp N 182



Seals lubricant approval



EPDM seal
Turmsilon LS 200/1



Silicone seal
Turmotemp N 182

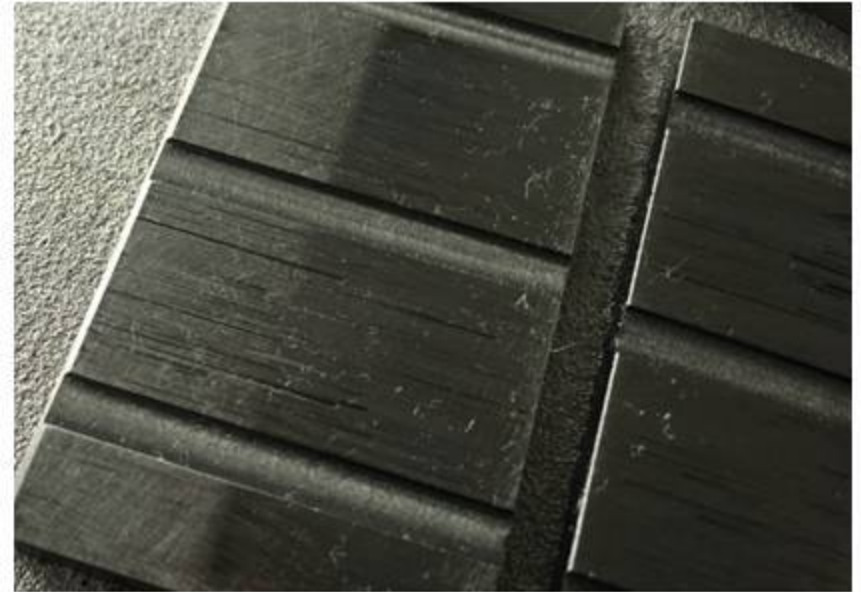
Air Compressor



Problems



Short oil change interval



Wear

Turmofluid TSE 100A

CUSTOMER SOLUTION

Reduced Maintenance and Repair Costs for Compressors in Rail Vehicles

January 2019

PROFILE

Machine:	Rotary-Vane Compressor	Lube-System:	-
Application:	Compressed Air Supply for Rail Vehicles	Lubricant:	Turmofluid TSE 100 A
Contact:	Tomasz Schedlin • tschedlin@lubcon.com		

14 months oil change



28 months oil change

(4 hours daily compressor operation)



Traction Motor

Traction Motor



Turmogrease L 802 EP Plus

1 million km



Gear bearing

Micromax 120
Turmogrease L 801 EP plus
18 months

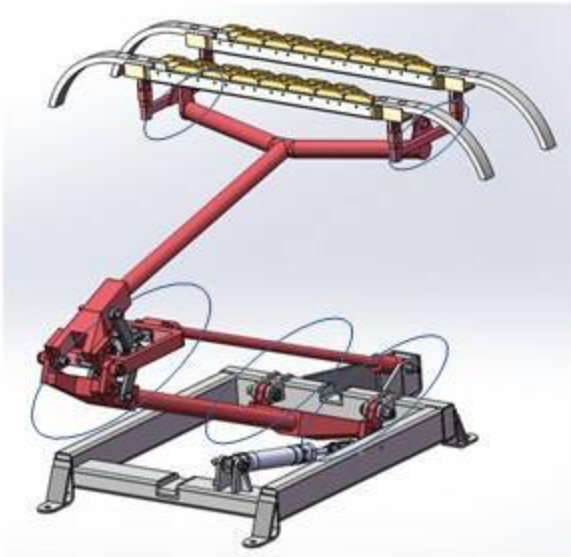


Pantograph

Problems

Harsh weather condition





Turmogrease HDC 2
(Bearing)



Terrasol 40 CW
(Catenary wire)



OEM Rolling Stock

ALSTOM

BOMBARDIER



CAF

HITACHI
Inspire the Next



 **中国中车**
CRRC



STADLER

HYUNDAI
Rotem





Stationary



Onboard



Conclusion

- **Lubcon offers a wide variety of products in the Railway Industry**
- **Our products are widely accepted and daily used worldwide**
- **We offer a professional service to support customers on their way to a higher efficiency and provide them cost saving solutions**
- **Our knowledge and our experience is our customer's advantage**

World Record Train with Lubcon

Lubcon took part in the world record of the longest passenger train with our wheel flange lubricant SK RE DB!!



- **Raethian Railways**
- **Oct. 30th, 2022**
- **1.9 km long (6´253 foot)**
- **100 Passenger cars**
- **WFL from Lubcon SK RE DB**
- **Numerous Videos available on Youtube**



Potential INDIA

List of Systems in India

SL NO	System	Locate	State / Union Territory	OEM of Coaches	Lines	Status
1	Ahmedabad Metro	Gandhinagar - Ahmedabad	Gujarat		2 Lines	Running
2	Chennai Metro	Chennai	Tamil Nadu	Alstom	2 Lines	Running
3	Delhi Metro	Delhi - Gurugram - Noida - Faridabad - Ghaziabad - Bahadurgarh - Ballabhgarh	Delhi - Haryana - Uttar Pradesh	Alstom, BEMIL & BOMBRAIDER	10 Lines	Running
4	Hyderabad Metro	Hyderabad - Secunderabad	Telangana	L&T Metro Rail Hyderabad Ltd	3 Lines	Running
5	Jaipur Metro	Jaipur	Rajasthan	BOMBRAIDER	1 Line	Running
6	Kanpur Metro	Kanpur	Uttar Pradesh	BOMBRAIDER	1 Line	Running
7	Kochi Metro	Kochi	Kerala	Alstom	1 Line	Running
8	Kolkata Metro	Kolkata - Howrah	West Bengal	ICF in collaboration with BHEL & Knorr-Bremse, Germany, Modern Coach Manufacturer	2 Lines	Running
9	Lucknow Metro	Lucknow	Uttar Pradesh	Alstom	1 Line	Running
10	Mumbai Metro	Mumbai	Maharashtra	Alstom, BEMIL & BOMBRAIDER	3 Lines	Running
11	Nagpur Metro	Nagpur	Maharashtra	BOMBRAIDER, Modern Coach Manufacturer	2 Lines	Running
12	Namma Metro	Bengaluru	Karnataka	BEMIL	2 Lines	Running
13	Noida Metro	Noida - Greater Noida	Uttar Pradesh	BOMBRAIDER	1 Line	Running
14	Pune Metro	Pune - Pimpri Chinchwad	Maharashtra	BOMBRAIDER	2 Lines	Running
15	Rapid Metro Gurgaon	Gurugram	Haryana	BOMBRAIDER	1 Line	Running

Potential INDIA

New Projects list of Systems in India					
SL NO	System	Locate	State / Union Territory	Lines	Status
1	Navi Mumbai Metro	Navi Mumbai	Maharashtra	1	Under Construction
2	Bhop Metro	Bhopal	Madhya Pradesh	2	Under Construction
3	Indore Metro	Indore	Madhya Pradesh	5	Under Construction
4	Patna Metro	Patna	Bihar	2	Under Construction
5	Agra Metro	Agra	Uttar Pradesh	2	Under Construction
6	Surat Metro	Surat	Gujarat	2	Under Construction
7	Thane Metro	Thane	Maharashtra	1	Approved
8	Allahabad Metro	Allahabad	Uttar Pradesh	2	Proposed
9	Varanasi Metro	Varanasi	Uttar Pradesh	2	Proposed
10	Vishakapatnam Metro	Vishakapatnam	Andhra Pradesh	3	Proposed
11	Meerut Metro	Meerut	Uttar Pradesh	2	Proposed
12	Guwahati Metro	Guwahati	Assam	4	Proposed
13	Greater Gwalior Metro	Gwalior	Madhya Pradesh	3	Proposed
14	Dehradun Metro	Dehradun	Uttarakhand	2	Proposed
15	Srinagar Metro	Srinagar	Jammu and Kashmir	2	Proposed
16	Coimbatore Metro	Coimbatore	Tamil Nadu	5	Proposed
17	Bareilly Metro	Bareilly	Uttar Pradesh	6	Proposed

THANK YOU FOR YOUR ATTENTION



LUBRICANT CONSULT GmbH | Gutenbergstr. 11-13 | 63477 Maintal, Germany | Phone: +49 6106 76500 | webmaster@lubcon.com

www.lubcon.com