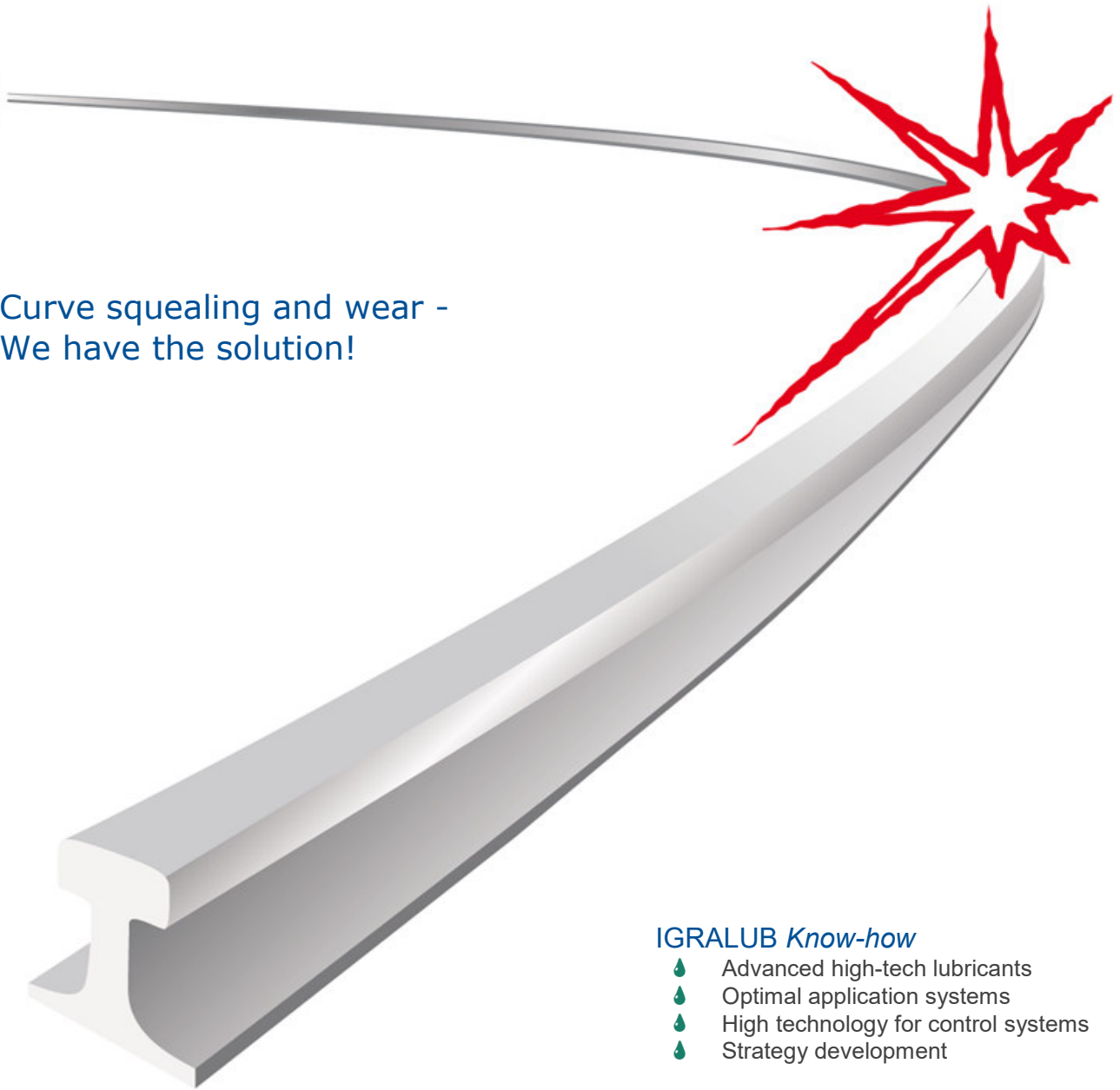


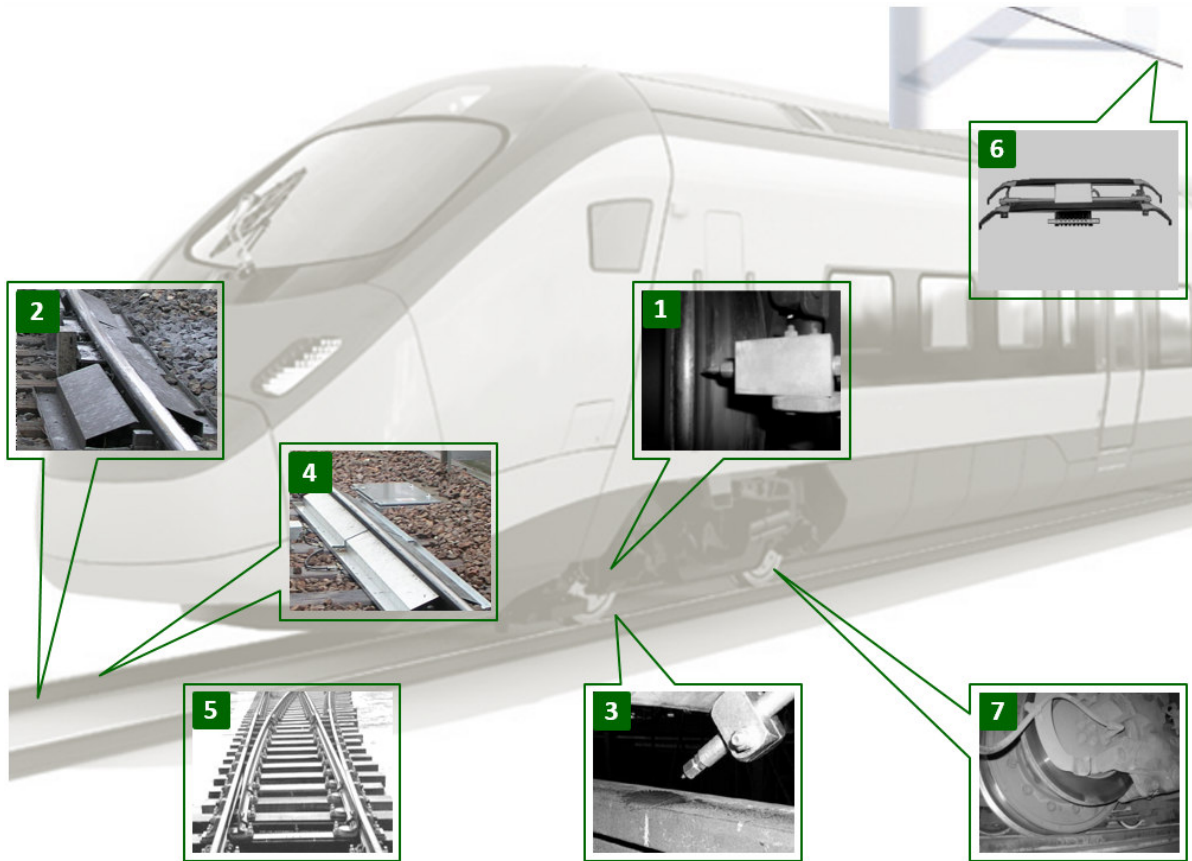
HIGH PERFORMANCE SPECIALTY  
LUBRICANTS FOR RAILWAY TECHNOLOGY

Curve squealing and wear -  
We have the solution!



**IGRALUB *Know-how***

- Advanced high-tech lubricants
- Optimal application systems
- High technology for control systems
- Strategy development



|          |                                  |          |                                  |
|----------|----------------------------------|----------|----------------------------------|
| <b>1</b> | <b>Wheel flange<br/>on-board</b> | <b>2</b> | <b>Rail flank<br/>stationary</b> |
|----------|----------------------------------|----------|----------------------------------|

**RailLub®**



**RailLub® TS**



RailLub was developed to reduce the roll and sliding friction between wheel flange and rail flanks that occur under extreme pressure stresses during the operation of rail vehicles. Thus, the life cycle can be effectively extended.

RailLub

- achieves substantial wear reduction
- low dosing, high performance
- strongly adhesive, no slinging off
- stable lubricating film
- carry-over effect wheel – rail – rail – wheel
- increases safety, reduces derailment risk
- biodegradable – easily degradable in accordance with OECD 301 B

RailLub TS has been tested and approved by well-known users. The consistency was especially designed for these installations.

RailLub TS

- prevents curve squealing at the rail flanks
- thin film suffices, thanks to extraordinary adhesion
- passing wheels distribute the lubrication film evenly at a length of up to 3000 meters (1.86 miles)
- biodegradable – easily degradable according to OECD 301 B

SBB CFF FFS List-No.913-22-191

|          |                                 |          |                                   |
|----------|---------------------------------|----------|-----------------------------------|
| <b>3</b> | <b>Top of rail<br/>on-board</b> | <b>4</b> | <b>Top of rail<br/>stationary</b> |
|----------|---------------------------------|----------|-----------------------------------|

**HeadLub®**



**HeadLub® TS**



HeadLub Top-of-Rail Conditioner against curve squealing. High-pressure lubricant compound, contains selective, chemically treated solid lubricants which cause a conditioning effect upon the rail.

HeadLub

- reduces wear and abrasion
- squealing is immediately eliminated
- extraordinary adhesion
- obtains a dry surface coating with depth effect
- adheres to a wet rail over prolonged periods
- water repellent, long-term protection
- biodegradable – easily degradable according to OECD 301 B

HeadLub TS is a Top-of-Rail Conditioner against curve squealing for stationary installations and consists of synthetic esters, fatty soaps, fatty lubricants and additives. Its properties accelerate the surface smoothing between the top of the rail and the wheel surface. HeadLub TS

- reduces wear and abrasion to a minimum
- the unpleasant squealing is immediately eliminated
- a very thin application offers long-term protection due to excellent adhesion
- achieves dry surface coating with depth effect, which adheres longer to the wet rails and acts water repellent
- the passing wheels distribute the film evenly at a length of up to 1000 meters (0.62 miles)
- biodegradable - easily degradable according to OECD 301 B

**RAILWAY TECHNOLOGY**

|                 |                                |
|-----------------|--------------------------------|
| <b>5 Switch</b> | <b>6 Contact wire de-icing</b> |
|-----------------|--------------------------------|

**SwitchLub**



SwitchLub is a combination of chemically treated solid lubricants and a solvent-free, synthetic base.

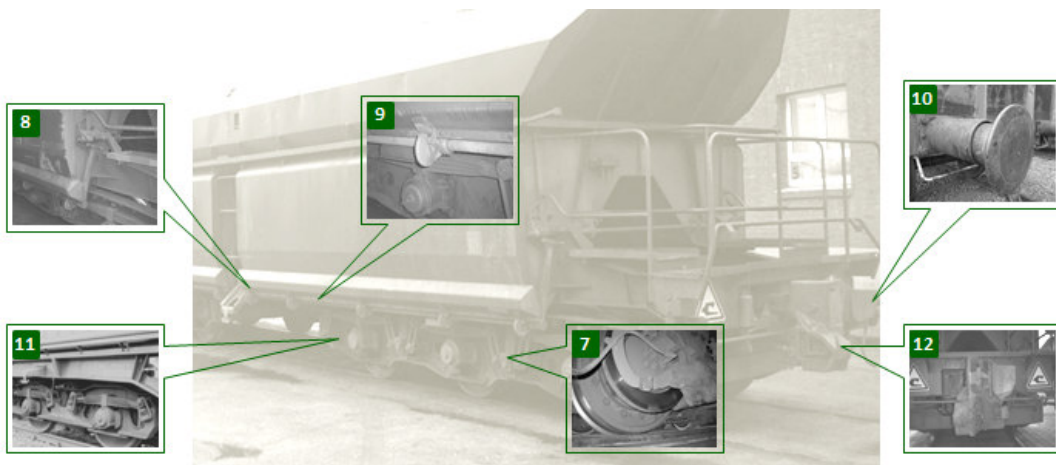
- 💧 Decreases the occurring sliding friction
- 💧 reduces wear greatly
- 💧 already upon lower dosing, a strong-adhering lubricating and adhesion-preventing film forms between the friction sections
- 💧 reduces the re-lubrication intervals significantly
- 💧 offers excellent corrosion protection
- 💧 guaranteed consistent function from -40°C (F) to +180°C (+356°F)
- 💧 prevents icing and can be applied at up to -25°C (F)
- 💧 is stable at extreme pressure and heat stress for a long time period
- 💧 guarantees a constant lubrication
- 💧 biodegradable - easily degradable according to OECD 301 B

**Pantotec DK**



During the winter months, prevents icing of the contact wire of trolley buses, Trams and other rail vehicles with overhead wire.

- 💧 Mixture of glycols, polymers and additives
- 💧 no resin formation at the contact wire
- 💧 very high adhesion and sticks to the contact wire in dry weather for several days
- 💧 eco-friendly
- 💧 can be mixed with water
- 💧 upon heavy rain or snowfall the process has to be repeated
- 💧 can be sprayed on accurately over a contact wire de-icing structure upon request, IGRALUB offers suitable systems.



|  |                  |  |
|--|------------------|--|
| <b>7 Disk brakes eliminate squeaking</b> | <b>10 Buffer</b> | <b>11 Prevention of bearing spring fractures</b> |
| <b>8 Valve activation mechanism</b>      |                  |  |
| <b>9 Thumbs waves stock agency</b>       | <b>12 Clutch</b> |  |

**PasteLub® 10/12**



Separating and lubrication agent on metallic basis developed according to the most recent findings in tribology.

- 💧 Effective at temperatures from -180° (C, F) to +1300°C (2,372°F)
- 💧 anti-oxidation additive with wear reducing and corrosion preventing inhibitors
- 💧 excellent long-term protection against seizing
- 💧 resistant against moisture, spray and salt water
- 💧 protects against corrosion and is water repellent
- 💧 pressure-resistant, strongly adhesive, does not gum up
- 💧 eliminates squealing, noise dampening
- 💧 increases sealing effect
- 💧 prevents freezing, seizing and fusing.
- 💧 biodegradable - easily degradable according to OECD 301 B

**DB** Substance Number: SAP 744 132

**PasteLub® R**

Consists of synthetic esters, polymers, solid lubricants and additives.

PasteLub R

- 💧 reduces occurring friction losses at extreme pressure stresses
- 💧 substantially reduces material wear
- 💧 excellent long-term protection against seizing and corrosion
- 💧 very suitable for buffers and rolling mill pins
- 💧 free of lead, chlorine, sulphur, phosphor, mineral oil and canola oil
- 💧 solid lubricant share > 25%
- 💧 thin application forms a insoluble lubricant film
- 💧 extremely strong adhering on buffer plates
- 💧 economical in consumption
- 💧 film is not washable in a washing facility.

**DB** Substance Number: SAP 954 065

**HT PU 680**

High temperature lubrication fat with synergetic acting EP-supplements.

HT PU 680

- 💧 excellent pressure absorption capacity
- 💧 water-proof
- 💧 strong adhesion
- 💧 corrosion protection
- 💧 high oxidation stability
- 💧 aging-resistant
- 💧 increased pressure resistance <350 bar
- 💧 good sealing effect
- 💧 resistant against aggressive media
- 💧 special use at the Railroad for spring bolt lubrication and corrosion protection.

**DB** Substance Number: SAP 815 846

*Request a sample with the corresponding consultation!*

## RAILWAY TECHNOLOGY

### Evaluation

- Analysis of the problems at the location.
- Effectiveness tests.



### Strategy planning

- Innovative solutions.
- Project support and monitoring.
- Optimizing of existing systems and applications.



### Execution

- Support of the installation and start-up.
- High-performance products.



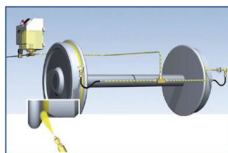
### Ongoing support

- Training and advising of the staff at the location.
- Service and maintenance of the systems.

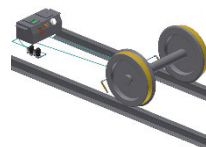


## Application systems installed by IGRALUB

### Mobile spray facilities (on-board)



Wheel flange lubrication



Rail-head conditioning

### Controller



TOR Control with GPS



Manual

### Stationary lubrication facilities

Rail flanks lubrication



Rail-head conditioning



## Environmental protection



Most effective environmental protection is a lubricant that achieves the greatest effect with the smallest quantity and verifiably reduces the friction to a minimum. Also one that can be biodegraded at the highest degree. Therefore, IGRALUB only uses environmentally appropriate lubricants, which are not compromises and offer optimal performance.

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