

# Flexible and powerful solution for locomotives and railcars

## Your benefit in practice



### Eco Gear GLS 75 W 90 | GLS 75 W 110

Synthetic gear oils for the lubrication of wheelset and axle drives used in electric and diesel-powered locomotives and railcars.

Developed for:

- Spur and bevel gears -
- Hypoid gears with and without axle offset



### Advantages of Eco Gear GLS 75 W 90 and 75 W 110

- Extraordinary load-carrying capacity
- Significant reduction of micropitting
- Long-term wear protection
- Reliable corrosion protection
- Long lubricant service life
- Extended oil change intervals



### Flexible use in a wide range of applications

- Long-distance passenger transport
- Regional passenger transport
- Trams and light rail vehicles
- Freight trains
- Shunting and shunting operations
- Maintenance and special vehicles



### Approvals

- VOITH Turbo 132.00374401, SIEMENS Traction Gears GmbH (formerly Flender T7302), STADLER Rail (running), AS Drives, CAF MiiRA (running), WINDHOFF



### Operating conditions and requirements

- Highest speeds
- High number of load changes and shock loads with frequent acceleration and braking or change of direction
- High power density, high share of full load, partial overload operation
- High thermal loads

High-performance gear oil with the load-carrying capacity from API GL-5 specification and the running time profile typical for industrial applications



## Your benefit



### Safe operation

ADDINOL Eco Gear GLS achieves highest load-carrying capacity and above-average protection of the components against wear. The gear-boxes run stable and trouble-free.



### Above-average oil life

High-quality synthetic base oils and a specially developed additive system remain very stable over long operating intervals. Extended operating intervals are achieved with reduced maintenance requirements; CO<sub>2</sub> emissions are minimised.



### Long service life of the components

Components are reliably protected against wear and corrosion, micropitting and abrasion are prevented.

# ADDINOL Eco Gear GLS

High-performance lubricants

## DSW21

Sustainable mobility in public transport

### Location

Dortmund | Germany

### Test vehicles

DUEWAG/SIEMENS light rail vehicle type B  
| ALSTOM/BOMBARDIER Flexity NGT&Z

### Gearboxes in use

AS DRIVES, SIEMENS Traction Gears

### Lubricant used

ADDINOL Eco Gear GLS 75 W 110

### Mileage

up to 650,000 km, 8 years  
Intermediate inspection after every 12 months

### Goal

Damage-free operation up to 1.2 million kilometres

Extended oil change interval

Less maintenance effort

Simplification of oil types

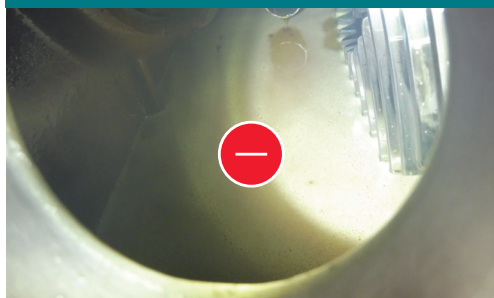
Reliable, economical operation

### Challenge

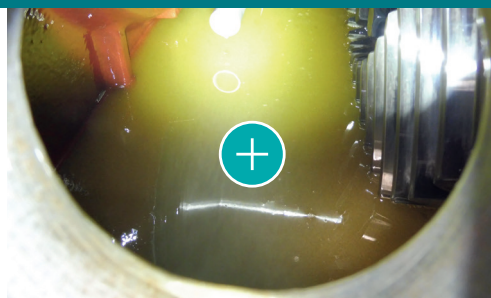
Trams operate permanently in start-stop mode, i.e. alternating loads are typical during operation due to strong acceleration and repeated braking processes. With the use of ADDINOL Eco Gear GLS, stable, damage-free operation was achieved despite the loads, downtimes were reduced and the cost of maintenance minimised.



## Comparison of boundary surface properties and gear surfaces of previous oil / ADDINOL



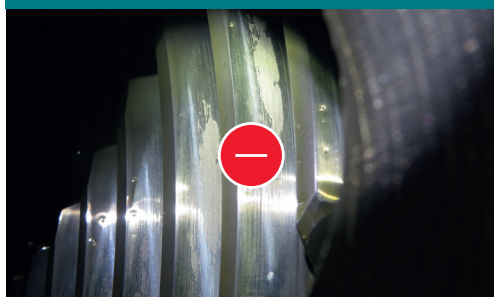
Previous oil: distinct surface foam visible, evaporation of volatile components



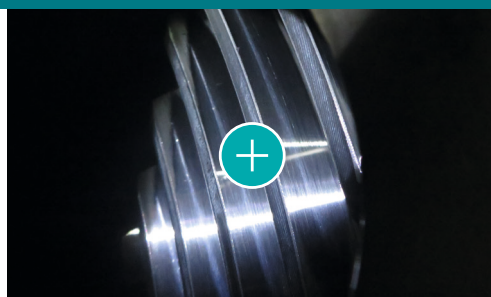
ADDINOL Eco Gear GLS 75 W 110: no evaporation, no surface foam

### Foaming tendency at operating temperature

The low foaming tendency of ADDINOL Eco Gear GLS ensures a stable lubricating film even under severe conditions, the risk of surface damages is effectively minimised.



Previous oil: premature micropitting



ADDINOL Eco Gear GLS 75 W 110: no signs of micropitting, abrasion or fatigue damage

### FZG load-bearing capacity

ADDINOL Eco Gear GLS has an extraordinary micropitting resistance. This property pays off especially with the typical loads caused by the start-stop operation of the trams. The surfaces are reliably protected against fatigue damage, but also against scuffing and abrasion at high surface pressures.

## SWISS FEDERAL RAILWAYS (SBB)

Flexibility and efficiency

### Location

Switzerland, Europe

### Test vehicles long-distance

STADLER  
Giruno | ALSTOM Astoro | BBC RE 460

**Regional transport** STADLER Flirt |  
BOMBARDIER FV-Dosto | SIEMENS DTZ | ...

### Gearboxes in use

VOITH, SIEMENS, STADLER, FIAT, IGW, BBC, ...

### Lubricant used

ADDINOL Eco Gear GLS 75 W 90  
ADDINOL Eco Gear GLS 75 W 110

### Mileage

depending on fleet  
350,000 up to 1,000,000 km

intermediate inspection depending  
on mileage

### Goal

Extended oil change intervals

Reduced maintenance effort

Simplification of oil types (from 9 to 1  
with two different viscosities)

Ensuring of low-wear and long-term  
reliable operation.

### Step-by-step optimisation of oil mileage with ADDINOL Eco Gear GLS 75 W 90 per 1 million kilometres

#### Previous oil change interval

185 Tkm	185 Tkm	185 Tkm	185 Tkm	185 Tkm
---------	---------	---------	---------	---------



#### First extension – VOITH approved

250 Tkm	250 Tkm	250 Tkm	250 Tkm
---------	---------	---------	---------



#### Second extension – VOITH recommendation

350 Tkm	350 Tkm	350 Tkm
---------	---------	---------



#### Optimum extension – VOITH Special Approval

530 Tkm	530 Tkm
---------	---------



Tkm = Thousand kilometres

### Challenges presented in the example of STADLER Flirt

The field test for the VOITH Turbo approval was carried out in close cooperation with SBB. In local transport, SBB favours traction units of the sprint-strong STADLER Flirt generations 1 to 3. Two-stage spur gear units with hollow shaft SZH 595 from VOITH Turbo are used in the SBB's FLIRT fleet. These are designed for highly variable loads due to complex operating conditions.

### Field test

As part of the release procedure, the oil was analysed at regular intervals and achieved the best results:

- only a slight increase in the iron and copper content  
→ extraordinarily good wear protection over significantly extended running times
- slight increase in acid number and viscosity as an indicator of low ageing over the test period and far beyond, compliance with the limit values is expected up to over 600,000 kilometres  
→ above-average ageing stability even under high loads
- highest stability of the additive system developed by ADDINOL  
→ high functional safety for operation
- very good values for air separation capacity and low foaming tendency  
→ stable lubricating film, even well beyond the usual mileage

### Conclusion on the use of ADDINOL Eco Gear GLS at SBB

After completing the tests with the predecessor vehicles of all 13 fleets, the SBB will only require one gear oil type with two viscosities/SAE classes where nine different gear oil brands were used before. In addition, an extension factor of at least 1.5 for the oil change intervals

is being aimed at. As things stand today, this will be easily achieved and is already being significantly exceeded. Thanks to the use of ADDINOL Eco Gear GLS, the SBB will be able to sustainably optimise their maintenance effort, warehousing and logistics.

## TRACKSIDE, SHUNTING AND CONSTRUCTION TRAIN SERVICES, SPECIAL VEHICLES

Stable and safe locomotive operation

### Location

Germany, Austria, Europe

### Test vehicles

Heavy shunting operation | construction and maintenance vehicles with low speed

### Gearboxes in use

AS DRIVES, GMEINDER, VOITH Turbo, HENSCHEL

### Lubricant used

ADDINOL Eco Gear GLS 75 W 90 |  
GLS 75 W 110

### Mileage

depending on application

### Goal

Stable operation despite high and low temperatures, changing loads, partly strong mixed friction conditions

### Challenge

Depending on the operation, three areas of requirements must be distinguished:

- Construction train service: cold start behaviour, mixed friction conditions, slow travel
- Trackside service: full load when starting up to driving speed, high drawbar performance
- Shunting service: frequent load peaks, strongly changing loads and directions

### Load-bearing capacity

In this area of requirements, an above-average load-bearing capacity is extremely important in order to prevent surface damage and to ensure reliable operation

### Magnetic rod in the gearbox at regular inspections



Competition: significant formation of wear metals due to insufficient load carrying capacity of the lubricating film



ADDINOL Eco Gear GLS 75 W 110: no formation of abrasion

### Extra tip!

#### ADDINOL Hydrodynamic Transmission oil SGL 18 and SGL 18 S for optimum power transmission

- High service life of the components
- Long operating intervals
- Stable lubricating film
- Suitable for a wide temperature and load range

#### Eco Gear GLS 460 S for curved-tooth couplings

- Low-wear load transmission
- Minimisation of friction
- Reduction of the operating temperature
- Long service life of the couplings