

VOSS

# **SAFETY ON ALL TRACKS**

Fluid management systems for rail vehicle technology



[www.voss.net](http://www.voss.net)

# | That's who we are

## Fluid management for vehicle and machine construction

As a larger medium-sized group of companies, VOSS develops and produces line and connection systems for the automotive industry and mechanical engineering. The success of the VOSS Group is based on great customer proximity, committed employees, innovative products and the demand for permanent top quality for customers with the highest requirements.

With strategic corporate development, a responsible awareness of people, the environment and the region, VOSS has evolved over the past 90 years to an internationally successful group of companies.

## VOSS in figures

**23**

group companies  
in 13 countries

**>50.000**

marketable articles

Sales partners in

**>50**  
countries

**7.500**

employees

**899**

million euro turnover 2023



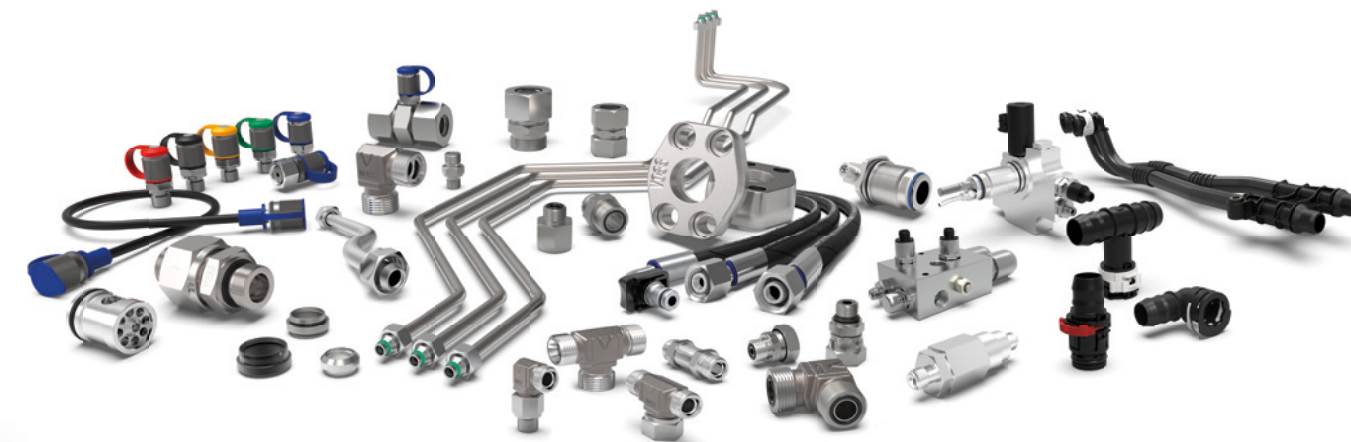
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# | Customized solutions for rail vehicles

In rail vehicle technology, reliable operation of line and connection systems is essential, especially for safety-critical and operationally relevant applications such as braking systems, fire extinguishing systems and drinking water supply.

VOSS offers customized, innovative solutions that are precisely tailored to the specific requirements of rail vehicle technology. With over 90 years of expertise, we develop products that meet the highest standards of fire protection, corrosion resistance and leakage safety. Robust, reliable and economical.

Our comprehensive range of connection technology extends from individual components to ready-to-install line systems - all from a single partner.





# | Applications

## Rail vehicles

- Freight train (crane, work train)
- Streetcar train
- High-speed train
- Long-distance and regional transport
- Etc.

## Drive types

- Diesel
- Electrical
- Hydrogen
- Battery
- Etc.



# | VOSS solutions



## Ready-to-install line systems and components

- ✓ Pre-assembled hose lines
- ✓ Ready-to-install lines
- ✓ Tube coupling technology
- ✓ Special solutions
- ✓ Accessories
- ✓ Clamps, strips and clamping straps
- ✓ Mobile and stationary pre-assembly devices

## System solutions for alternative fuels

- ✓ Ready-to-install stainless steel lines
- ✓ VOSS Lok<sup>40</sup>
- ✓ Valves for high-pressure applications

## Components for thermal management systems

- ✓ Thermal management lines
- ✓ Function-optimized quick connect systems
- ✓ Double flow stop valves
- ✓ Customized components

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# Ready-to-install line systems and components



## Pre-assembled hose lines

for all applications in rail vehicles

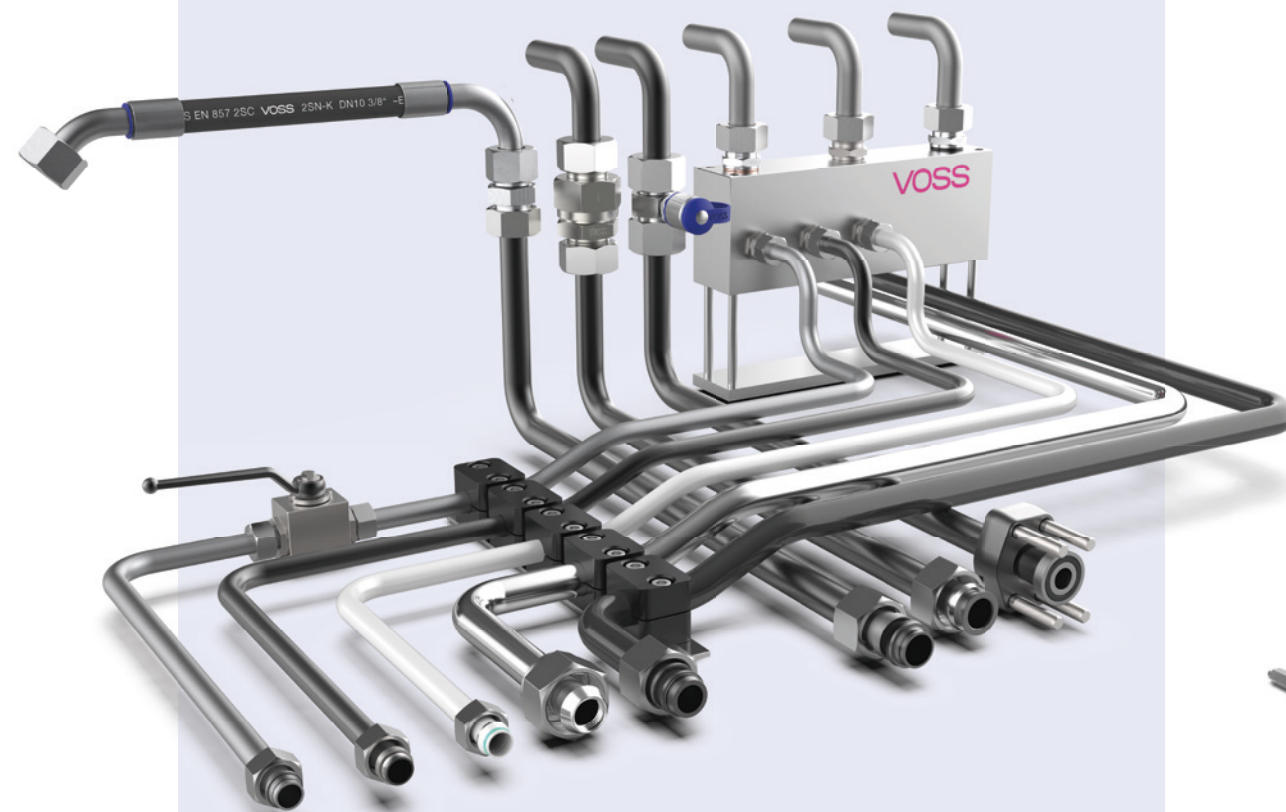
- Certified according to EN 45545-2 / ISO 15540 / HL3
- For all types of applications: compressed air, fuel, water, pneumatics, hydraulics etc.
- Electrically conductive and non-conductive versions
- Fittings made of steel with VOSS coat corrosion protection or made of stainless steel
- Alternatively available with plug-in system VOSSPlug



## Ready-to-install lines

according to individual customer requirements

- Pre-formed steel and stainless steel tubes with perfectly matched individual components
- End machining for various connection systems, e.g. VOSSRing<sup>M</sup>, and tube forming systems, e.g. VOSSLok<sup>40</sup>
- Ready-to-install assemblies and kits
- Integration of flexible lines on request
- Component labeling with individual specifications, e.g. GS1



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## Tube coupling technology

The established tube couplings made of steel with VOSS coat corrosion protection and stainless steel in accordance with ISO 8434 for all applications in rail vehicles

- Metallic and soft-sealing cutting ring systems
- Tube forming system VOSSForm
- VOSSRing<sup>M</sup> for steel and stainless steel tubes



## Customized solutions and accessories

Special solutions according to customer specifications for fluid technology optimization

- Customized solutions
- Fittings for length compensation
- Throttle fittings
- Step sizes or special designs
- Check valves with special opening pressures

## Clamps, strips and clamping straps

in accordance with DIN 3015, 3016, 3570 and 3567 and EN 45545-2



# Ready-to-install line systems and components



## Ready-to-install stainless steel lines

according to individual customer requirements

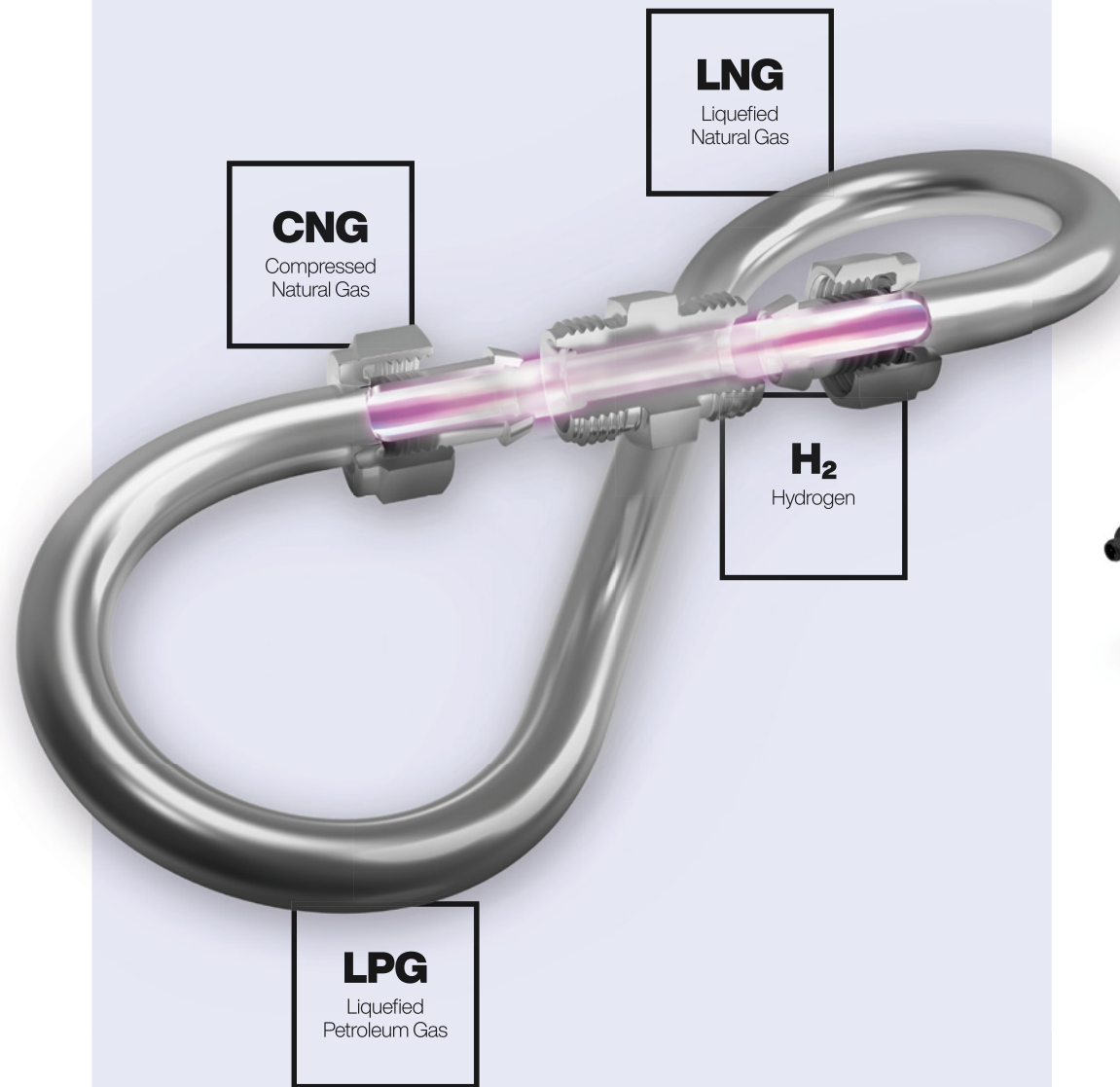
- Banded stainless steel tubes with perfectly matched individual components
- Special materials upon request
- End facing machining for different connection systems, e.g. VOSSLok<sup>40</sup>
- Completely pre-assembled modules
- Integration of flex lines upon request
- Different cleanliness standards according to customer requirements
- Upon request, with 100% inspection of tube geometry and tightness



## VOSSLok<sup>40</sup>

Tube forming system for a safe and easy handling of connections in hydrogen applications

- Very simple and process-reliable pre-assembly and final assembly
- Reduction of leak paths thanks to high finish quality of the forming
- For metric and imperial tube dimensions
- High precision sealing even with volatile media (e.g. hydrogen) and at very high system pressures (700 bar), but also for low-pressure applications - one system for all requirements
- Fast and more process-reliable forming process
- Also applicable for CNG, LNG, LPG and various other industrial gases



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## Valves for high-pressure applications

System components for the transportation and storage of hydrogen

- On tank valve for high-flow refueling and removal of gaseous hydrogen
- End plug unit for hydrogen tanks
- Space-optimized, mechanical pressure regulator unit
- Customized check valves for controlled flow in hydrogen systems

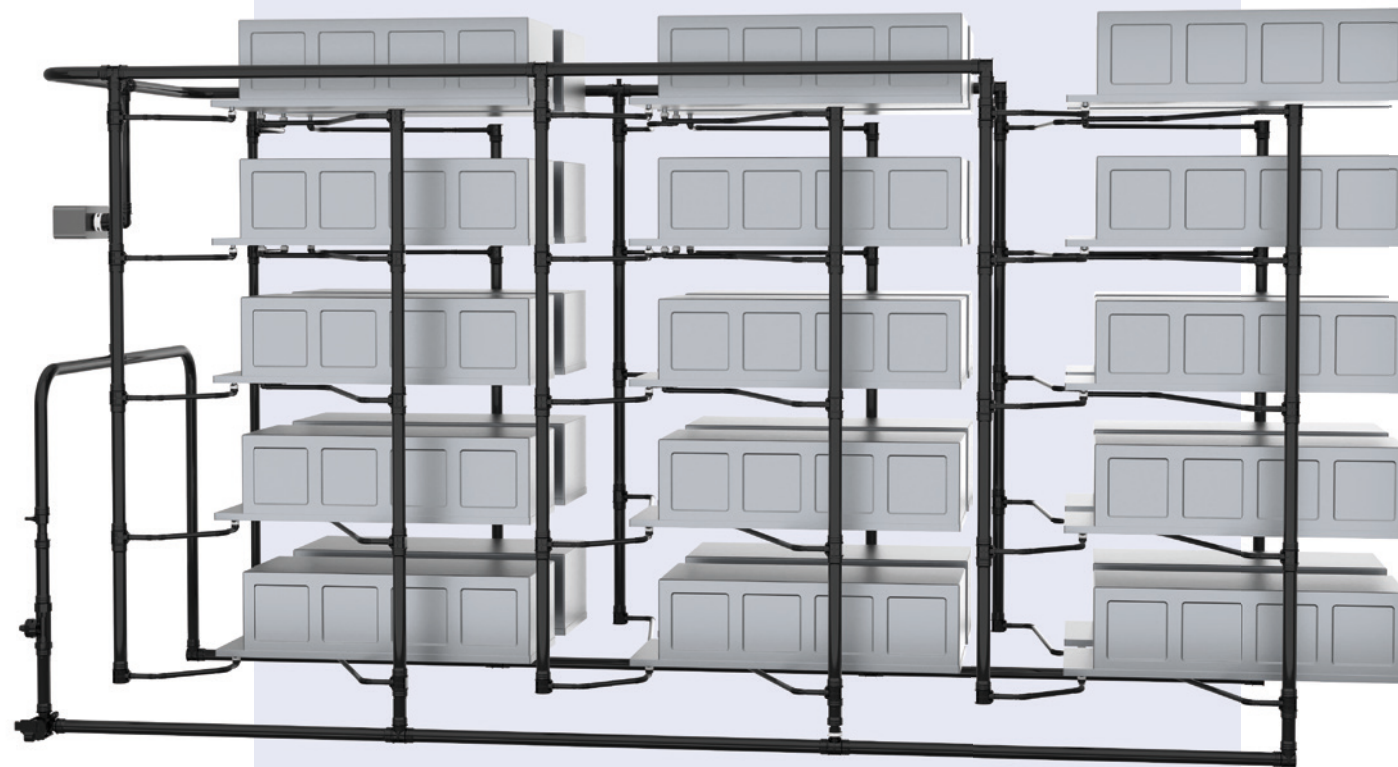
# Ready-to-install line systems and components



## Thermal management lines

Individual solutions for coolant distribution based on line routing and function integration

- Integration of different connection systems, e.g., VOSS QC systems 270, 271, 272 and 246<sup>NX</sup>
- Realization of minimum installation space
- Component and installation space optimization through function integration in customer-specific manifolds and connectors
- Integration of temperature sensors possible
- Leak-tight and maintenance-free media-bearing systems along the entire service life of the vehicle
- Minimized pressure losses
- Hydraulic balancing through defined cross-section changes
- Various combinations of hose and tube, plain and corrugated tube, or straight and preformed lines possible
- Customized flexibility by different corrugated tube wave shapes



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## Complementary system components

Function-optimized quick connect systems

- Robust plastic connectors with fir-tree connection to plastic tubes
- Quick and safe assembly
- Very low system height
- Autolatch or double lock function for additional safety

Double flow stop valve

- Integrated into various VOSS quick connect systems
- Automatic closing and opening during assembly and disassembly
- Compact and robust design
- Consistent flow with very low pressure loss

Customized components

- Temperature and pressure sensors
- Venting valves for manual venting
- Customized components on request



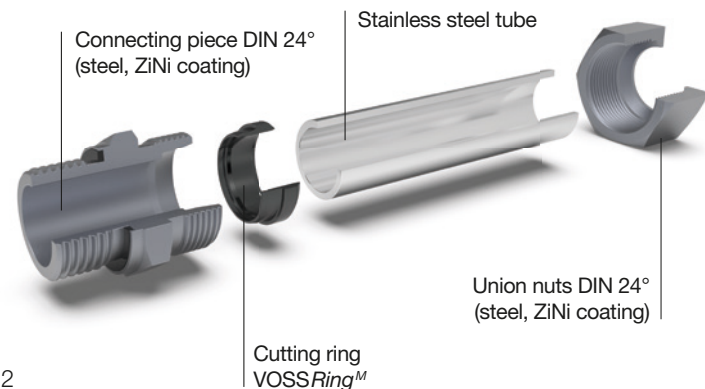
## Proven mixed construction

### The perfect example of seamless cooperation between steel and stainless steel

VOSS connection systems also score points from an economic point of view: Our *VOSS Ring<sup>M</sup>* consists of a special steel material which, due to its special hardness, also offers maximum safety in combination with stainless steel tubes.

This means that the *VOSS Ring<sup>M</sup>* can also be used without hesitation in composite construction between steel and stainless steel components while providing maximum functionality and load-bearing capacity.

#### Combining materials cost-effectively



## Corrosion protection

### VOSS coat – Corrosion resistance in perfection

Reliable corrosion resistance is of decisive importance for the functionality and longevity of our components.

Our VOSS coat surface coating is based on a zinc-nickel base and stands for corrosion protection in perfection. As a technological leader, we have been using VOSS coat consistently in the entire VOSS product line since 2007, thereby setting the market standard for corrosion-resistance areas.

#### Your assurance

- 1,000 hours of corrosion resistance under real-life conditions
- Technology-leading surface as a result of many years of experience, research and development
- Sustainable production in our own VOSS coat Competence Center with in-house electroplating
- Practice-oriented final assembly thanks to optimized coefficients of friction

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# Certification & approvals

VOSS products are certified according to the following standards:

- EN ISO 15540
- EN 45545-2
- NFPA 130
- EC79 for hydrogen applications
- Various product releases according to IACS
- ISO 9001
- ISO 14001
- DNV / GL
- EcoVadis

Other approvals on request.



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# Your advantages at a glance



**System consulting**  
Technical and economic service



**Compatibility**  
Market-compliant components and systems



**VOSS coat**  
Components with the proven zinc-nickel corrosion protection



**Assemblies**  
Pre-assembled assemblies and ready-to-install line systems



**Availability**  
All components worldwide in consistent VOSS quality



**Assembly**  
Safe assemblies and repeat installations



**Quality standard**  
Tested safety & quality of all installed components



**Application technology**  
Detailed theoretical and practical training



**Cost-effective solutions**  
Everything from a single source





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