When it comes to emissions, we’re minimalists. For the environment’s sake.

VOSS Automotive
Line and connection system for SCR technology
Responsibility fills the air.

Exhaust limit values have been around for some time. However, since 2005 (Euro IV), Europe has had limit values for nitrogen oxides in the exhaust that are so low that truck manufacturers were forced to develop measures to reduce these. The escalation of the limit values by Euro V (2006) and Euro VI (2013) has the effect that all manufacturers must employ elaborate technologies to reduce harmful emissions. Similar emission reduction standards were introduced in the US and Japan. With some delay, this trend is even apparent in Brazil and China. Consequently, the objective is to reduce nitrogen oxides (NOx) across the board. And dramatically so.

The automobile industry has confronted this challenge, and in Europe, has backed “Selective Catalytic Reduction (SCR)” technologies to cut nitrogen oxides almost without exception. The specific benefit: Not only are the limit values adhered to; the diesel consumption declines as well.

Responsibility is best shared.

We have made it our challenge to accompany the automobile industry in all its development efforts. For example, in our field of line and connection systems, we were involved with SCR technologies from the very beginning. We have been looking for innovative solutions jointly with you, our customers, and together have raised the bar.

Our future-proof solutions and innovative ideas have made us the international partner of choice and world market leader. As a pioneer in this technology, our contribution is that the maximal efficiency of NOx reduction is ensured under any condition. It is no wonder that all renowned manufacturers in Europe and market leaders in Japan, China and the USA employ VOSS line and connection technology for their SCR systems. This is rooted in the confidence in our expertise, the economics and the sense of responsibility for safety and a clean environment.
Expertise is revealed when the customer becomes the measure of all things.

From the beginning, we have supported the SCR developments in the automobile industry with our line and connection technology, and already began developing coolant-heated AdBlue®/DEF lines in 2004. This was followed by other developments, such as electrically heated AdBlue®/DEF lines. Just like our unique approach, these and other developments have made us into the technology leader in the field of line and connection technology. In this role, our expertise spans across all versions of the various SCR systems and all available versions and variants made by the system suppliers.

Expertise is driven by one’s perspective.

We always look at challenges through your eyes. We are interested in every detail: system specifications, modeling specific idiosyncrasies and framework conditions. Only when we have fully understood the underlying conditions do we begin with our development, while working closely with you to develop a system proposal that is specifically tailored to your unique vehicle situation.

We then develop prototypes in a next step, and put these through their paces in laboratory tests. And only when we – and more importantly you – are absolutely convinced that all components work as you intended, do we begin with production, which of course includes a certified quality management system. Because our customers are at home around the world, we developed processes and production systems that are standardized worldwide throughout all our factories.

Our job is to support you unconditionally; entirely driven by your needs and entirely to your specifications. After all, you, the customer, are the measure of all things.
Expertise from the get-go.

2004
Development begins for coolant-heated AdBlue®/DEF lines

Development begins for electrically heated AdBlue®/DEF lines for commercial vehicle applications per Euro V

2005
Series production begins for coolant-heated and electrically heated AdBlue®/DEF lines

2008
Next generation development of electrically heated SCR lines, including separately heatable connectors

2009
Development of electrically heated AdBlue®/DEF lines for cars

2010
New market segments are addressed: SCR lines for agricultural and construction equipment per EPA Nonroad Tier 4 and EU Stage IV

2011
Development of line systems for high-temperature applications in engine-proximate uses.
The trick lies in systems that can do any job in on-road and off-road uses.

“Won’t work” – two words we don’t want to hear at home, because it is our job to always find a solution. Whatever your requirements may be, we will provide you with a ready-to-install line and connection technology for your SCR system, or will develop a customized solution for the following applications:

**Truck**

Truck manufacturers have a broad product line of various vehicle classes and models. They are, therefore, interested in systems that can cover the entire range.

**Cars**

VOSS has also specialized in form-bent lines with a lower cross-section for a compact system design, a capability that follows the limited build space in cars.

**Agricultural and construction equipment**

The system design must hold up to heavy-duty uses for agricultural and construction equipment. This calls for a reliable seal of the line systems to prevent the ingress of water, dust and dirt, and to safeguard against extreme vibrations. Because of the limited build space, the trend for tractors has been toward electric heating systems.

**Bus**

The construction features of buses frequently place SCR components in great distances to each other – which is why highly efficient electrically heated line systems are the preferred approach in this field. VOSS has developed core competencies in designing these specialized systems.
Guideline for your successful SCR system.

We have a declared objective to ceaselessly improve your satisfaction with innovative concepts and system solutions for line and connection technology. With our systematic approach to the product development process we enable you to realize your development targets quickly and pragmatically. In the course of projects for new SCR line systems and for new requirements in existing systems we create a concept on the basis of your specifications, consisting of a vehicle-specific routing, individual heating performance and a well-tuned mix of components and materials. The next process steps provide detail coordination and the fast implementation up to series production.

Four steps to success:

1. Your specific requirement profile

2. Our solution concept, fleshed out with prototypes

3. Mutual detail coordination

4. Release for series production and realization of the concept
Anyone who is passionate about what they do does not rest on their laurels, but instead, constantly attempts to improve on what has been achieved. Escalating system specifications (pressure, temperature, de-freezing periods) only serve to make us work harder when looking for matching solutions. This is why we are able to provide you with well-conceived solutions for the most varied application conditions and assembly situations. We can address any situation with unheated, electrically heated, coolant-heated and hybrid systems.

One task. Several solutions. Customized.

Unheated SCR systems.

Certain application environments do not call for heated SCR systems, because the AdBlue®/DEF is unlikely to freeze. Our product line for unheated SCR systems: nylon tubes (straight and form-bent) and EPDM hoses with quick connection systems 241 (SAE J2044) and 246.
Coolant-heated SCR systems.

The engine coolant system in the vehicle may be integrated into the SCR system in order to use it for heating the lines, the pump module and the AdBlue®/DEF reservoir, but also for cooling the dosing module. In electrically heated SCR systems, the coolant lines can be used to heat or cool only specific components (e.g., the AdBlue®/DEF reservoir). These “hybrid systems” need the expertise of a system partner who can blend together all heating concepts.

Coolant-heated AdBlue®/DEF lines are always customized. We have comprehensive experience customizing layouts and designing vehicle-specific routings (more than 2 million lines sold), and therefore always have a solution that is right for you at hand.

Our product line for coolant lines includes mono- and multilayer tubes, corrugated tubes and hoses with various quick connect system versions. We will naturally support you in your concept development and validation efforts with our versatile infrastructure for testing and prototyping, and are, of course, available for on-site support for vehicle analyses and installation service.
**Electrically heated SCR systems.**

The demands on SCR systems continue to escalate. The focus is on ensuring a defined de-freezing performance for a broad range of vehicles and engines. Energy consumption and weight of the components have to be reduced. The available build space is scaled down. The function must be assured under all pressure and temperature conditions and under the most demanding uses.

By giving electrically heated SCR lines and connections made by VOSS the nod, you are deciding in favor of a solution that has been deployed millions of times in a wide range of applications with the technical and economic benefits of a well-conceived heating concept.
The VOSS heating concept means:

- Short de-freezing periods
- Low heating power
- Efficient heating, flexible to variants, by thermally chambered heating elements that are wound on the outside of the tube
- Reliable de-freezing at the connection points with heated quick connectors using a controlled heating wire routing
- The AdBlue®/DEF cannot compromise the heating element
- 100 % leak-proof, material-bonded connection between tube and quick connector by means of laser welding
- Only a few installation steps with the utmost in process reliability
- Compressed development schedules and cost reduction with customized solutions using standard components
- Field experience with an installed base of more than 2 million lines
- < 6 ppm complaint rate

Technical features of the electrically heated SCR lines and connectors:

- Tube sizes 4x1, 5x1, 6x1 and 8x1, hoses ID 3.2 and 4 mm
- Suitable for Euro VI and successors
- Complete assortment of quick connectors in various sizes (1/4", 5/16", 3/8") in straight and elbow configurations (90° and other angles), special designs upon request
- High temperature configuration up to 160 °C (long term) and 180 °C (short term)
- Operationally reliable heated bursting pressures at temperatures up to 180 °C
- < 100 mbar pressure differential for lines up to a length of 12,000 mm
- No noise emission from moving line components
- Suitable, tested and approved for truck, cars, as well as heavy-duty off-road applications; extremely resistant to dirt, vibrations and high-pressure cleaning
- Purity levels compliant with automotive standards

Example for determining the de-freezing properties at 14 W/m and -40 °C ambient temperature
Do not expect half-baked solutions, but the entire product line instead.

Anyone who wants to supply forward-looking solutions cannot stop at the halfway mark. Our product line therefore encompasses all components for line and connection technology – everything – designed to work together and to match to your SCR system.

The right line for any system.

**AdBlue®/DEF lines**
- With and without electric heating
- Nylon tubes
- EPDM hoses
- High-temperature configurations for engine-proximate application

**Coolant lines**
- Monolayer tubes from hydrolysis-stabilized polyamide
- Multilayer tubes from PA/PP
- Hoses from EPDM
- Corrugated tubes from hydrolysis-stabilized polyamide
Always the matching connection.

- VOSS quick connect system 241 for SAE J2044 connections, electrically heated and unheated
- VOSS quick connect system 246, electrically heated and unheated, particularly suited for tight build space conditions
- Multi-connections to concurrently connect AdBlue®/DEF and coolant at module interfaces
- Stainless steel or nylon in-line connector with fir-tree and O-ring seal

These round out the system.

- Valves
- Filters
- Heat protection
- Mounting parts
The most important thing one can offer the customer is proximity.

Our customers’ vehicles travel on every road on earth – and off-road as well. Consequently, our production facilities and development offices are located around the globe.

We can accompany you as an international partner, and with regard to production, development and technical support we are positioned internationally to match your needs. Our 2,200 employees at 16 locations support our worldwide presence. VOSS has a locally established team in all countries where strict exhaust standards are in effect or being implemented shortly; this includes Europe, the US and Japan just as much as Brazil, China and India. VOSS manufactures prototypes and series production within the reach of customers – in internationally networked plants with standardized production lines.

We continue to build on this worldwide presence; positioning us to perform our role as a system partner to the international automobile industry with even greater skill going forward.
Europe
The VOSS central facility for production and development is Germany. The headquarters in Wipperfürth is the central point from which we manage the company’s business affairs – expanded by a number of subsidiaries and sales offices since the 70s. With more than 500 employees, our plant in Poland is of distinguished importance in our production network. Manufacturing processes for line assemblies serve as a model for our plants in Mexico and China.

North America
VOSS has been operating subsidiaries in Fort Wayne and Seattle, USA since 1996, and also in Saltillo, Mexico since 2011. These handle development, technical support and production of line assemblies, especially for SCR applications on trucks and off-road vehicles.

South America
The competence center for extrusion of nylon tubes is situated in São Paulo. Two factories produce line assemblies and quick connect systems for pneumatic, fuel and SCR applications.

Asia
In 2007, VOSS started a factory and development center in Jinan, and a sales center in Shanghai. These cover the entire product spectrum. Going forward, SCR technology will be a primary focus. VOSS is represented in Japan by way of a sales center with technical support for the entire product range. VOSS has been represented in India for years by way of a joint venture. All Indian truck manufacturers use VOSS products in their compressed-air brakes.