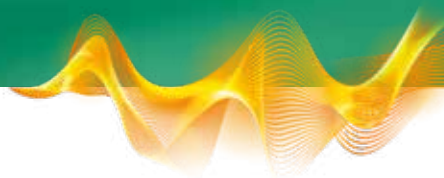




ON-TRACK FOR TAILORED FIRE PROTECTION



Future-proof fire protection solutions
for rail vehicles

Fire detection systems
Extinguishing systems
Water mist systems

WAGNER[®] 



Challenges

FIRE PROTECTION IN RAIL VEHICLES.

Trains are one of the most important means of transport worldwide. Investments in rail-bound long-distance and regional transport, including subways, increase every year.

Demand for modern safety equipment for rail vehicles is growing. This is the result of rising numbers of passengers as well as increasing levels of automation. New vehicles with continuous interior concepts without gangway doors and the increasingly common relocation of train stations and sections of track underground pose additional challenges. New regulations which increasingly call for active fire protection for rail vehicles are another important factor. Protecting passengers and staff is top priority in the event of fire. However, fire protection concepts designed to meet this protection

objective also serve to protect property for rail vehicles and infrastructure, including train stations and tunnels. In addition to fire hazards posed by electrical systems, switchover devices and machine rooms with electric and diesel engines, vandalism in the passenger area must be factored in as well. Modern fire protection solutions from WAGNER offer the optimal conditions to fully meet the increasingly strict requirements of railway operators and system vendors.



The requirements on intelligent fire protection solutions

- Top priority is the protection of passengers and staff
- Optimal operating safety and preventing scheduling delays and interruptions caused by false alarms
- Easy maintenance and higher train availability
- TSI-conform (Technical Specifications for Interoperability in EU Rail Transport)
- Tested fire protection products for a fire protection concept planned based on the specific safety requirements at hand
- Reliable, technologically refined

system solutions which can be integrated flexibly

- Efficient protection solutions with low operating costs for continuous operation and investment protection

Developed for virtually every field

- High-speed trains
- Regional trains
- Locomotives
- Railcars (DMU, EMU)
- Subway
- Rack railways
- Peplemovers
- Sleeping cars



Solutions

INDIVIDUAL FIRE PROTECTION WITH A SYSTEM.

The complexity of modern rail vehicles and their many fire risks require individual fire protection concepts to be developed.

For instance, overheating and short circuits in technical areas and at the brakes can start fires. Vandalism and fire risks from smoking violations are serious factors in passenger areas. This requires an integrative fire protection concept which includes quick, false-alarm-proof detection as well as automatic fire suppression.

Smoke detection saves time

Detecting smoke as early as possible is crucial in rail transport. For one thing, protecting the occupants, evacuating as quickly as possible and taking effective countermeasures are the top priorities. For another, the damage caused to the trains and the railway infrastructure itself must be kept as low as possible.

An early fire detection system already detects even the tiniest quantities of smoke particles in the phase known as pyrolysis, i.e. before the smoke becomes

visible. To do so, air sampling smoke detectors constantly take air samples, enabling highly sensitive, fire detection at the earliest possible time. In combination with additional point-type, heat or flame detectors, they ensure immunity to false alarms in the detection of fire development, in order to take the necessary countermeasures for the danger at hand.

Naturally safe extinguishing

The use of an automatic fire suppression in conjunction with reliable early smoke detection is a decisive factor in case of emergency in order to confine the fire as quickly as possible and preclude greater damage.

Automatic fire suppression systems protect:

- Switchover devices
- Electrical cabinets
- Machine rooms
- Sleeping cars and couchettes
- Passenger areas
- Driver's cabs
- Lavatories

When selecting an automatic fire suppression system, one must take the protected area which it is to be used for into consideration. For instance, passenger areas make exclusive use of water mist extinguishing technology so as not to put people at risk with extinguishing gas. These fire suppression systems use water sprayed from nozzles in fine droplets as the extinguishing agent. This can bind a large amount of energy with a small amount of water. As an additional side-effect,



False alarm safe multi-criteria detectors for use in many different areas.



WAGNER offers unique technology allowing fine droplets of water mist to be created, even at low hydraulic pressure.

the fine droplets wash out the smoke gases given off, which dramatically increases visibility in the neighbouring areas. Installation of the tanks for the water supply takes place in existing empty space within the construction.

Extinguishing systems in technical areas

Gas extinguishing systems and technical aerosols are both used in technical areas and anywhere not accessed by either staff or passengers. These make use of natural extinguishing gases such as nitrogen. This extinguishing agent poses no risk to the electrical systems. The gas extinguishing systems are configured as modular systems based on the size of the areas to be protected.

Competence on the rails

As an expert in fire protection in rail transport, WAGNER Rail represents intelligent fire protection systems

which are constantly being refined and improved. They form the basis for system solutions which WAGNER Rail uses to meet the ever more complex requirements for fire protection. The standard of protection this company provides remains internationally unparalleled to this day. The many years of experience in the planning of innovative new fire protection concepts for rail vehicles enables the qualified assessment of the predominate risks, and thus the development of optimised concept for the specific project in question.

The big advantage for customers is that WAGNER rail offers the entire spectrum of fire protection solutions from under one roof. WAGNER Rail offers its customers the complete package to fulfil all re-

quired international approvals: from planning, project engineering and commissioning to on-site service!

WAGNER Rail contributes its wealth of knowledge and experience towards new standards and guidelines through its cooperation in national and international committees in order to make rail transport even safer in the future.

Overview

COMPREHENSIVE SAFETY IN RAIL TRANSPORT.

As a certified manufacturer and installer of fire protection solutions in railway-specific applications, WAGNER is able to supply everything from a single source: from fire detection units and fire suppression to fire extinguishing.

Air sampling smoke detectors with intelligent detection of fire aerosol particles
A TITANUS *MULTI-SENS*[®] air sampling smoke detector with a patented analysis procedure for identifying types of false alarms and fires ensures highly sensitive detection

Air sampling smoke detector system
Analyses the air samples supplied for smoke aerosols

THE BENEFITS TO YOU

- ✓ **Safe**
Comprehensive fire protection for passengers, staff and property (investment protection)
- ✓ **Individual**
Innovative fire protection products for tailored protection concepts
- ✓ **Dependable**
Optimal operating safety and false alarm prevention
- ✓ **Simple**
Uncomplicated maintenance increasing train availability
- ✓ **Flexible**
Reliable, technologically refined system solutions which can be integrated flexibly
- ✓ **Tested**
Fulfilment of all major international standards and compliance with the TSI (Technical Specifications for Interoperability in EU Rail Transport)
- ✓ **Economical**
Low operating costs for continuous operation and increased investment security



Smoke detectors

Addressable optical point-type detector as alternative detection system; usable in the driver's cab as well as the passenger area

Nitrogen cylinder for extinguishing system

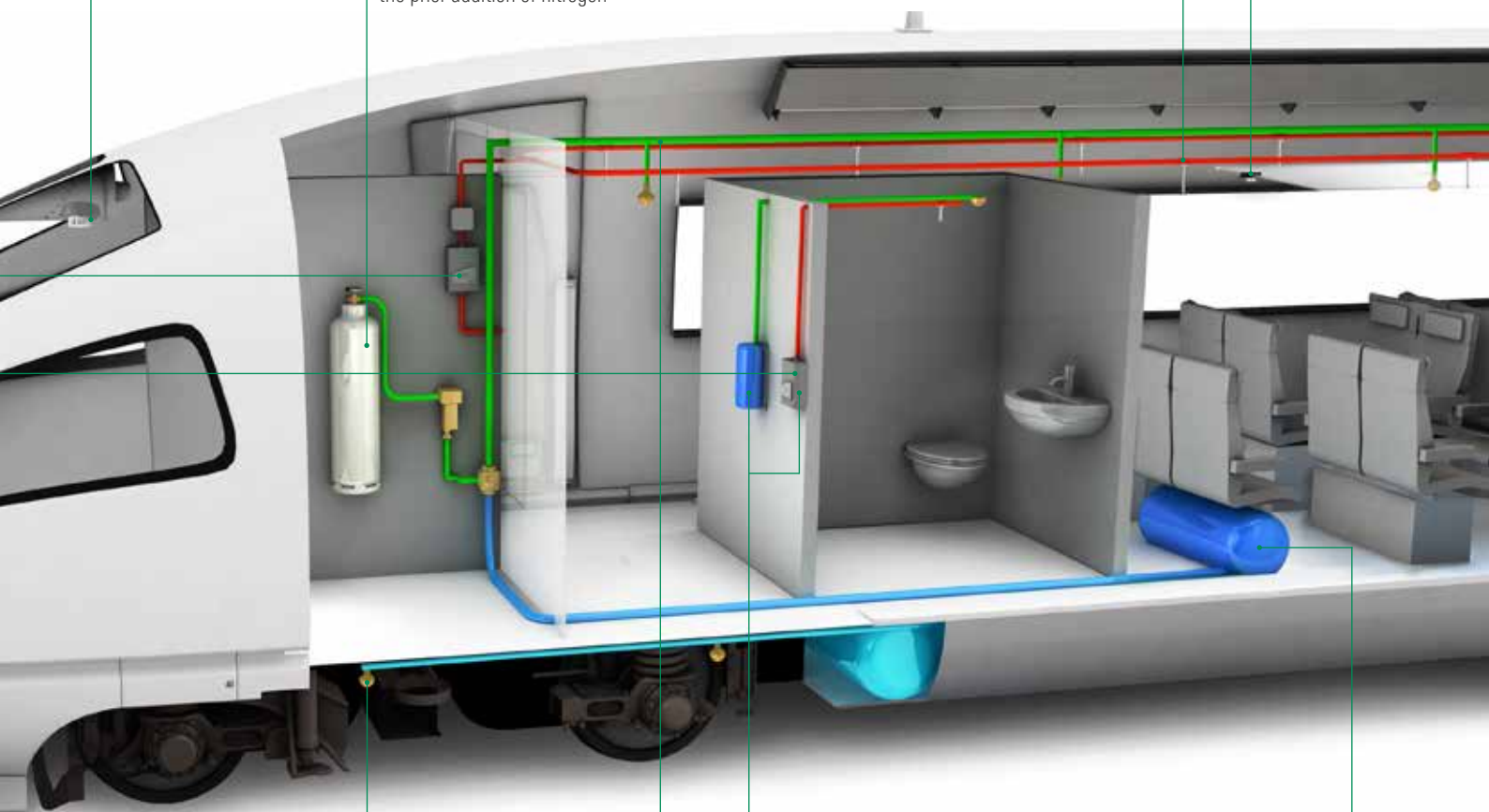
WAGNER's water mist technology bases on a two-phase flow technology. Very fine water droplets are generated by atomising the water at the nozzle itself as well as by the prior addition of nitrogen

Air sampling pipe with aspiration apertures

Routes air samples conveyed from the monitored area by vacuum to the detection unit

Smoke detectors

Addressable optical point-type detector as an alternative detection system; usable in the driver's cab as well as the passenger area



Extinguishing system under the floor

Extinguishing gas cylinder with two extinguishing nozzles for active fire suppression in technical areas and under the floor

Pipe system for extinguishing system

Inconspicuous extinguishing nozzles spray fine water mist in the event of fire

WC Compact

Self-sufficient water mist system for fire suppression in small passenger areas. Fire detection can be conducted by TITANUS *MULTI-SENS*® or point-type detectors

Supply tank for water mist system
WAGNER's low-pressure technology allows space-saving extinguishing water supply in places such as under seats, the floor or the roof

Systems

FOR RELIABLE EARLY FIRE DETECTION.

WAGNER is the technology leader in the field of early fire detection and already has decades of experience as a manufacturer of highly sensitive air sampling smoke detectors designed to detect the tiniest quantities of smoke particles.



TITANUS® aspirating smoke detectors for various applications.

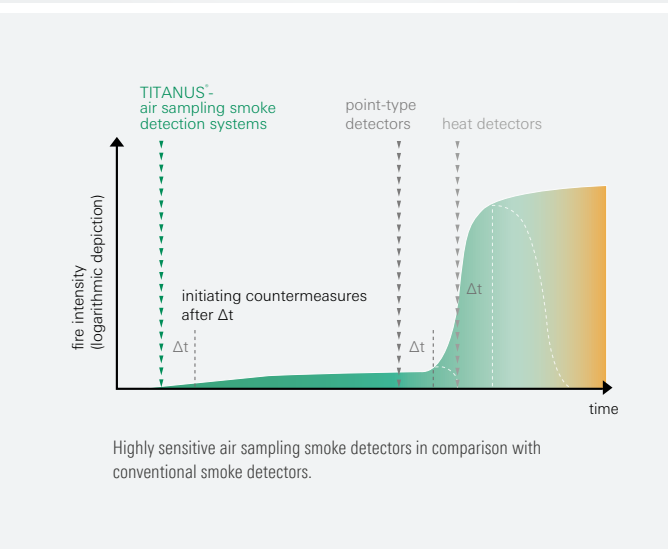
TITANUS® air sampling smoke detection systems

- The High Power Light Source optical detection process ensures sensitivity that is up to 2,000 higher than conventional smoke detectors
- Smoke detection sensitivity individually adjustable as needed
- Dependable monitoring of air conduits such as supply and exhaust air for air conditioning systems in spite of high air flows
- Intelligent fire pattern analysis with LOGIC·SENS identifies and suppresses false variables, even under tough conditions
- PIPE-GUARD air flow monitoring reliably reports stoppages or breakages in the air sampling pipe system, as well as interruptions in the sampling unit
- Virtually air sampling points as protection from sabotage and vandalism
- Large operating temperature spectrum from -40 °C to +60 °C
- Robust and immune to vibrations, dust, dirt and drops in temperature

Innovation:

TITANUS MULTI·SENS®

- The new dimension in early fire recognition
- Intelligent air sampling smoke detector which can tell what's burning
- Patented multi-dimensional analysis method reliably detects types of false alarms and fires and automatically analyses and assesses them
- For instance, smoke aerosols from a cigarette are evaluated so that they send an information message instead of a fire alarm
- This reliably prevents false alarms and their consequences, such as emergency stops and evacuation, as well as the costs these incur
- Ideal detection unit in conjunction with self-contained fire protection system for lavatories



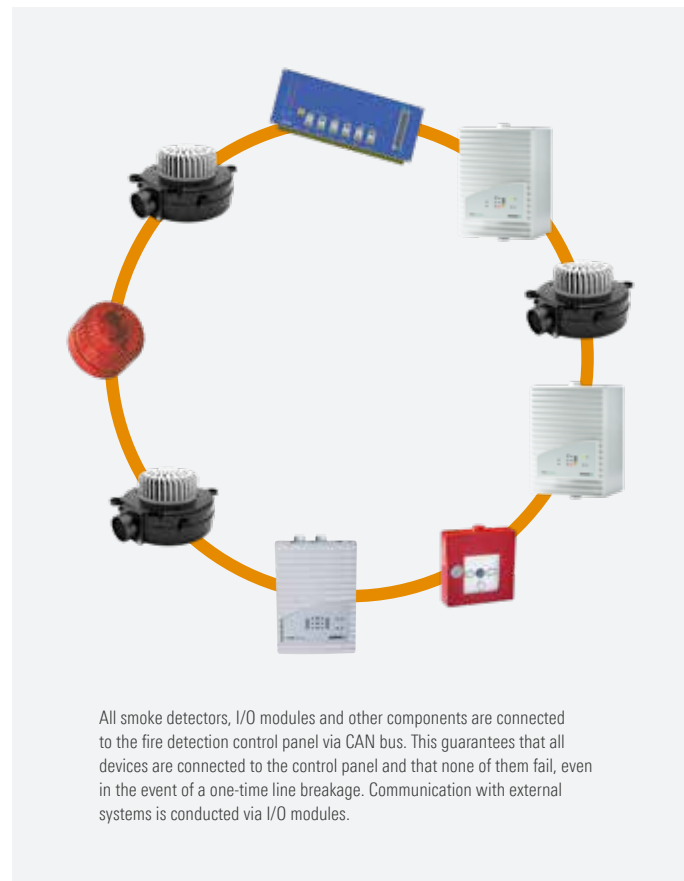


Innovation: Self-contained fire protection system for lavatories

- Self-contained water mist system for small passenger areas combines smoke detection (such as TITANUS MULTI-SENS® or point-type detectors) with water mist fire suppressions
- Extinguishing agent supply just where it's needed
- Extinguishing water reservoir suitably designed to be separate from the rest of the train's extinguishing system
- The train can continue to drive after the system has been triggered, since the train's entire extinguishing unit is not used – only the lavatory is blocked off
- Reliable differentiation between cigarette smoke (disturbance variable/no fire alarm) and smoke from an actual fire. This reduces false alarms, since smoking in the train lavatories is one of the most frequent triggers of false alarms

Rail 256 fire detection system

- Designed in cooperation with AOA to meet heightened safety requirements
- AOA system components are combined optimally with WAGNER systems using specially developed I/O modules
- This allows system solutions with SIL-1 and SIL-2 requirements to be achieved
- Smoke, heat and temperature detectors as well as alarm and fire suppression components are connected directly to the detectors; up to 64 components are possible in the latest version
- The newest version allows direct train bus connection via CAN-open and/or ethernet





Systems

FOR AUTOMATIC FIRE SUPPRESSION.

The smoke detection is supplemented by the installation of automatic extinguishing and fire suppression systems based on current national and international standards and guidelines.

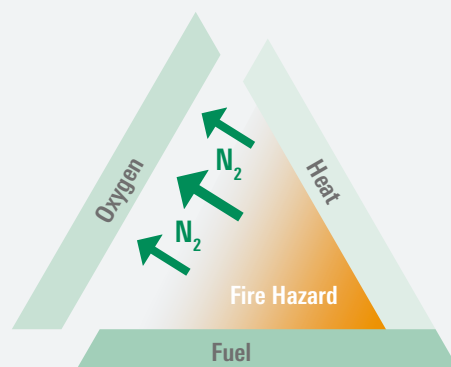
Gas extinguishing systems

- Ideal for areas such as electrical and control cabinets, as well as electrical devices under the floor, in locomotives and in tractor units and railcars
- Use of chemical extinguishing gases such as Novec™ 1230 or natural extinguishing gases such as nitrogen. Feeding nitrogen into the protected area lowers the oxygen concentration, thus suppressing fire generation and spreading – without damage or residue!
- Modular gas extinguishing systems configured for the size of the areas to be protected
- Self-contained extinguishing systems and automatic extinguishing systems, which are activated by the fire detection control panel
- Guarantees effective and dependable extinguishing of incipient fires
- Eliminates risks to electrical systems caused by extinguishing agent residue

Aerosol systems

- Ideal extinguishing system for use in small technical containers and rooms
- Especially low weight makes it usable wherever nitrogen is too heavy
- When activated, extinguishing systems release fine aerosols which reliably suppress fires in enclosed areas

Operating principle of the gas extinguishing system



Nitrogen (N_2) reduces O_2 concentrations to prevent fires from breaking out and spreading.



Water mist system for fire suppression with low-pressure technology

- Suppresses smoke and fire development
- For use to protect persons in passenger areas
- Even small amounts of water bind large amounts of energy
- Fine droplets wash smoke gases out of the air while they are forming, increasing visibility in the adjoining areas
- Unique two-phase water mist technology: Fine water droplets are produced at low hydraulic pressure of max. 10 bar at the nozzle
- Low-pressure technology reduces weight as opposed to high-pressure technology and reduces both pressure requirements for the material used as well as the quantity of water to be supplied
- Individually adapted water tanks enable space-saving utilisation of existing empty spaces
- High-pressure steel tanks or pipelines are no longer needed



Triggered water mist system distributing fine mist spray in the passenger area.

References

ON THE MOVE ON RAILROADS WORLDWIDE.

WAGNER protects rail vehicles in many countries of the world with its tailored fire protection solutions. Here is a small sample of the many possibilities of use.



VELARO EUROSTAR, 2011



WAGNER has a global network of branch offices and local partners and is experienced in handling the various national safety requirements.



THAMESLINK UK, 2013



AEROEXPRESS MOSCOW, 2013



SUBWAY MUNICH C2 CAR, 2015



AZERBAIJAN SLEEPING CAR, 2016/2017



The modular configuration of WAGNER Rail systems enable individual solutions which can also be offered locally at the customer's site – with services in the respective national language.



LOK 2000 TYP Re 460, 2014



RAILJET ITALY, 2016



About us

FIRE PROTECTION FROM A SINGLE SOURCE.

WAGNER has already been developing and implementing technical fire protection systems for 40 years.

The company has long since established itself internationally as an innovative solution and system provider and ranks among the top technology leaders worldwide in the fields of early fire detection and prevention. The rail business has been a focus activity for WAGNER Bayern GmbH and WAGNER Schweiz AG in Munich and Switzerland, respectively, since 1989. Thanks to the successful growth of the rail business since that time, their competences were bundled into WAGNER Rail GmbH in 2016. Since then, the company has been offering the entire spectrum of fire protection solutions from early fire

detection to fire suppression using the parent company's decades of experience and expertise in a wide array of fields. Comprehensive services such as service, installation, commissioning, maintenance and training round our offer out. An extensive sales and service network as well as many cooperative efforts and partners allow WAGNER to react optimally to the circumstances on national markets worldwide and fully meet the respective standards, approvals and guidelines in many countries.



Outstanding systems

WAGNER fire protection systems fulfil the following standards and guidelines:

- EN 45545
- EN 50128
- EN 50129
- EN 50155
- EN 50121-3-2
- EN 50553
- EN 54
- Systems can be certified in accordance with SIL1 and SIL2
- ARGE guidelines
- GOST Russia
- TrenItalia (Spec. No. 306158)



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WAGNER sets standards in fire protection – with innovative and comprehensive solutions

Fire detection and alarm systems

Very early fire detection systems (TITANUS®)

Active fire prevention (OxyReduct®)

Fire extinguishing (FirExting®)

Hazard management (VisuLAN®)

BETTER SOLUTIONS IN FIRE PROTECTION

WAGNER®