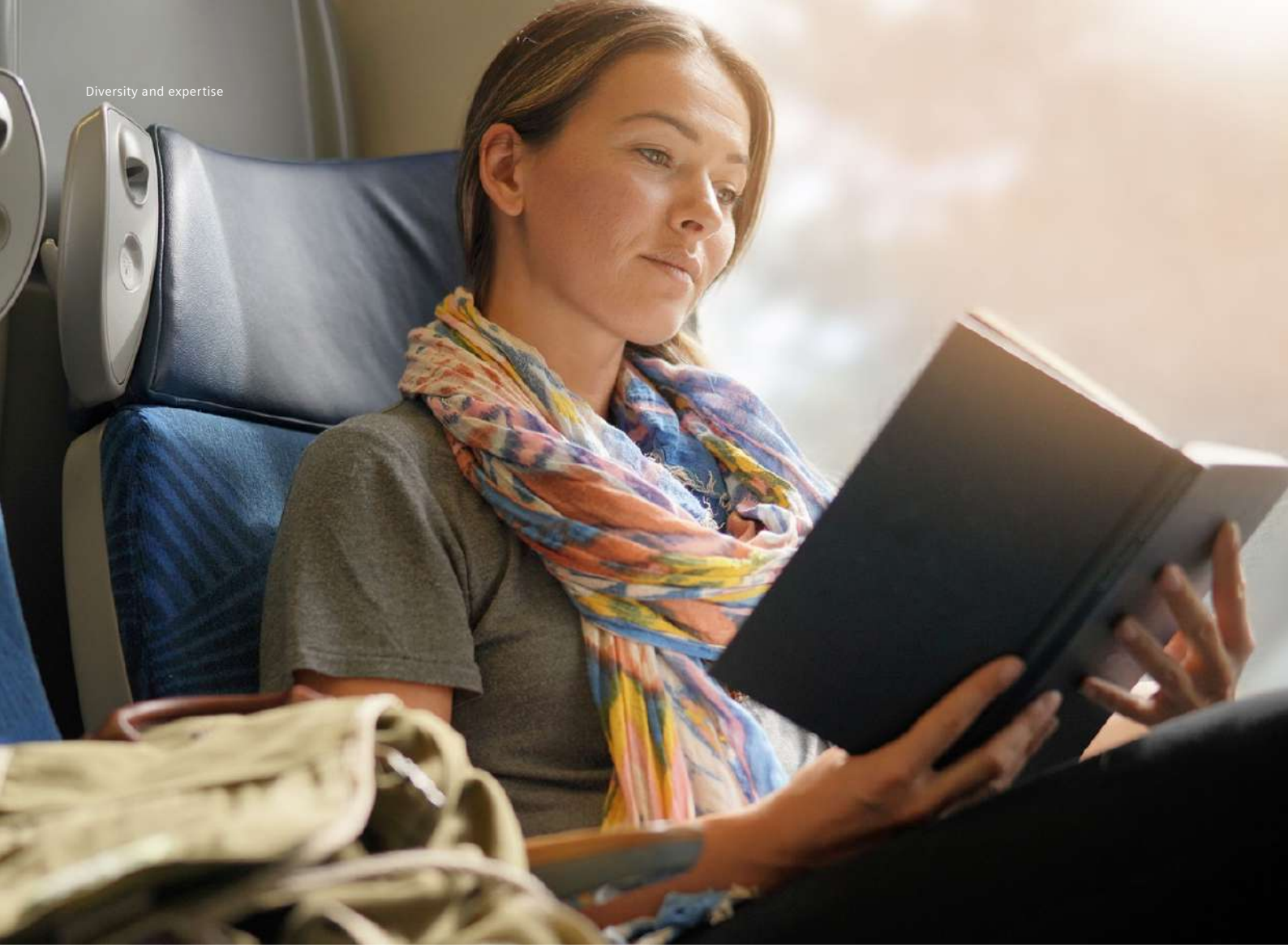
RAILWAY APPLICATIONS

Fire protection solutions for rolling stock

Protection matters

GIELLE
fire protection since 1965

www.gielle.it



Safety on Board

Rail transport is one of the safest and most efficient means of travel, but the risks associated with fire remain a critical concern. A single spark in a technical compartment, a short circuit in an electrical cabinet, or overheating batteries can quickly escalate into a serious incident. The confined environment of a train makes evacuation challenging, while smoke and toxic gases can spread rapidly through passenger areas. Beyond the immediate threat to human life, fires on board rolling stock can cause extensive material damage, prolonged service interruptions, and long-term reputational losses.

Gielle has decades of experience in developing fire protection solutions that meet these challenges head-on. Our systems are designed specifically for the demanding environment of rolling stock, where safety, reliability, and compliance are non-negotiable.

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Smart solutions
for every journey

Railway Fire Protection Requirements

The goals of fire protection in this environment are clear: save lives, minimize the spread of smoke and flames, protect sensitive infrastructure, and ensure continuity of service. Achieving these objectives requires solutions that are robust enough to withstand the rigors of railway operation, yet sensitive enough to detect the earliest signs of fire.

In addition, every system must comply with strict international standards such as EN 45545 for fire safety in railway vehicles, EN 54 for detection and alarms, and EN 50155 for the resilience of onboard electronic equipment. Compliance with these regulations guarantees not only safety but also trust, reassuring both operators and passengers.

Gielle Fire Protection Solutions

At Gielle, we provide complete, modular solutions that address every stage of fire risk: from early detection to suppression and system management.

Detection is the first line of defense. Our systems incorporate highly sensitive smoke detectors and temperature sensors capable of identifying even the smallest trace of combustion. Unlike conventional detectors, they are designed to function reliably in the harsh conditions of rolling stock, where vibration, dust, and changing temperatures are part of daily operation. Detection is connected to intelligent control panels that immediately alert the crew and, when necessary, trigger automatic suppression.

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Suppression must be fast, effective, and safe. For passenger areas, Gielle employs fine water mist systems that quickly lower temperature, control smoke, and extinguish flames with minimal water use—safe for both passengers and sensitive electronic equipment.

For technical compartments such as underfloor rooms, battery enclosures, and electrical cabinets, clean agent gases or advanced aerosol technologies are used. These systems suppress fire without leaving residues, preventing additional damage to the very equipment they are designed to protect.

Integration ensures reliability. Gielle's control systems can be seamlessly connected to the onboard train management systems, allowing real-time monitoring and remote diagnostics.

Redundancy and fail-safe designs guarantee that the system remains operational even under fault conditions, providing constant protection during every journey.

Application Areas

Each train area has unique fire risks, and Gielle solutions are designed accordingly. Driver cabs and locomotives need rapid detection and suppression, passenger compartments require discreet protection, and technical rooms, battery enclosures, and electrical cabinets demand specialized safeguards.

Tailored to each zone, Gielle ensures comprehensive coverage for modern rolling stock.

Safety at any speed: fire protection solutions for rail vehicles

- **High-speed trains**
- **Long-distance trains**
- **Regional & local trains**
- **Commuter trains, metros & trams**
- **Monorail**
- **Work trains**
- **Locomotives**

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Solutions for your industry

No matter the type of rail vehicle, fire protection must deliver reliability, speed, and safety for passengers and staff. Gielle provides tailored solutions that adapt to different operating environments and vehicle designs, ensuring maximum protection at any speed.

Time advantage

Valuable time advantage thanks to reliable and early fire detection.

False alarm-proof

Very high immunity to false alarms thanks to fire pattern recognition.

Certified

Certified to international railway safety standards for reliable protection

Scalable

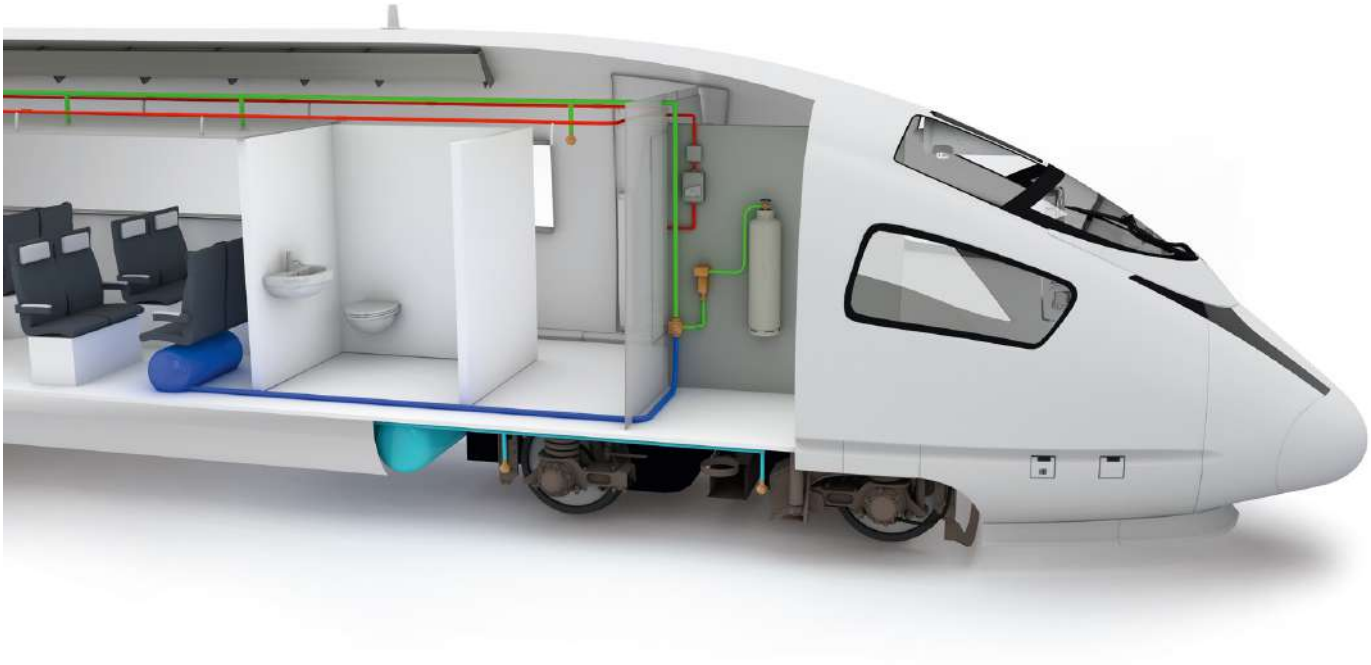
Our fire protection systems can be easily adapted to different requirements.

Non-destructive

Extinguish fires without damaging equipment or interiors

Eco-friendly

Our systems are safe for the environment and sustainable in use



Fire Detection Systems

An effective fire safety strategy for rolling stock begins with early and reliable detection. Because trains are constantly exposed to vibration, dust, temperature fluctuations, and changing airflow conditions, standard detection technologies often need to be adapted to the railway environment.

Early Recognition

Our solutions are designed to detect the earliest signs of fire—smoke, heat, or abnormal particles—before flames appear. Highly sensitive detectors can identify even minimal smoke in passenger areas and technical zones, while point or aspirating units continuously monitor enclosed spaces such as electrical cabinets, underfloor compartments, or battery enclosures.

Temperature sensors add another layer of safety, especially in areas with strong airflow, ensuring accurate alarms while reducing the risk of false triggers from dust or vibrations.

Intelligent Integration

All detectors are connected to intelligent control panels, which analyze incoming signals and decide whether suppression should be activated automatically. These panels also alert the train crew immediately, allowing them to take rapid action and follow emergency procedures.

Integration with onboard train management systems ensures that alarms are transmitted in real time to the driver's cab, control centers, or even remote monitoring platforms.

The result is a **fast, reliable, and coordinated detection strategy** that gives passengers maximum protection and operators full confidence in system performance.

WaterMist Systems

How it works

The Gielle watermist technology uses fine water droplets (mist) produced through specialized nozzles, often utilizing a two-phase atomization process. In some designs, existing compressed air or existing water tanks on the vehicle can be leveraged to generate the mist, reducing the need for entirely separate systems.

The mist is sprayed into passenger compartments, ceilings, and other zones to absorb heat, lower temperature, suppress flames, and also bind smoke particles, limiting spread of smoke. Importantly, this can be delivered at relatively low hydraulic pressure (e.g. around 8-10 bar) if the droplet generation is optimized.

Best suited for

Passenger areas (saloon coaches, sleeping / couchette cars).
Public zones, corridors, toilets onboard.
Interior ceiling voids or intermediate ceiling spaces where retention of aesthetic appearance and minimal intrusion is important.
Zones where human occupancy is continuous and safety and comfort are paramount.

Advantages

Very good at reducing smoke spread, cooling, and suppressing flames with a relatively small volume of water.
Safe for passengers, minimal collateral damage; water mist causes less damage to interiors and finishes than full volume sprinkler systems.
Can sometimes use existing infrastructure (compressed air, water tanks) to reduce weight and complexity.
Helps to limit fire spread until the train can stop or reach safe point.

Aerosol Systems

How it works

The Gielle aerosol system employs a stored cartridge of aerosol-producing agent that triggers either by electrical signal (e.g. via a smoke or heat detector) or via self-actuation when a set temperature threshold is exceeded. Once activated, the agent undergoes a controlled reaction which generates a fine aerosol.

This aerosol diffuses into the enclosed technical space, interrupting the chemical chain reaction of combustion, and simultaneously achieves a cooling effect on the fire source through physical interaction. Because the aerosol does not require large pressure vessels or complex pipe networks, the deployment is compact and tailored to spaces with limited room or ventilation constraints.

Best suited for

Enclosed technical compartments (e.g. electrical cabinets, underfloor switchgear, battery compartments)
Power packs, inverters or traction equipment
Locations where gas-based suppression systems are difficult to install because of size, cost, or ventilation openness

Advantages

Compact design: needs less structural space compared to bulky gas cylinder systems.
Reliable suppression even in “open” or ventilated technical areas (e.g., those with air-flow or openings), provided the aerosol discharge can fill the local volume.
Often lower installation complexity, less piping.
Minimal residue in comparison to some traditional extinguishing agents; often safe for electronics if the aerosol formulation is selected accordingly.

Gaseous systems

Rail vehicles require fast, reliable, and clean fire protection in technical and enclosed areas. Gielle gas extinguishing systems offer a residue-free solution that safeguards sensitive equipment while minimizing damage and downtime.

How it works

These systems work by releasing a controlled volume of inert gas into the protected zone, suppressing flames quickly without leaving harmful residues.

They are ideal for **engine compartments, electrical cabinets, battery rooms, and other technical spaces** where rapid suppression is critical and human occupancy is limited.

Integration & Safety

Connected to Gielle detection and control systems, gas extinguishing systems activate automatically at the first signs of fire, ensuring fast response and coordinated action. Proper design guarantees safety for personnel, while maintaining maximum protection for valuable equipment.

Key Benefits

Residue-free, clean protection
Rapid suppression in enclosed technical areas
Minimal impact on sensitive electronics
Fully compatible with detection and control systems

Gielle Industries

For over 60 years, we at Gielle have been dedicated to advancing fire protection with passion, innovation, and reliability. Since 1965, we have grown into an international reference point, offering complete **fire safety solutions** for every requirement—from detection and suppression systems to maintenance and consultancy services.

Today, we operate in **more than 40 countries worldwide**, combining global expertise with local presence. All our products and systems are certified and rigorously tested, ensuring maximum safety and compliance with the highest international standards.

Our Mission

With our constant focus on innovation and reliability, we set new standards in fire protection. Through our comprehensive solutions, we help companies worldwide to...

... safeguard people and property in every environment,
... ensure compliance with international safety standards,
... minimize downtime with reliable and residue-free technologies, and
... protect the planet with sustainable fire protection solutions.

MINING INDUSTRY
INDUSTRIAL FACILITIES
MARINE AND OFFSHORE
PUBLIC BUILDINGS
RECYCLING INDUSTRY
SERVER ROOMS
ARCHIVES AND MUSEUMS
CUSTOM SOLUTIONS

Solutions for every application

We offer a turnkey approach to fire protection by offering solutions that are designed, supplied and installed complete and ready to operate.

Visit our website **www.gielle.it**

Innovation in Fire Protection

Every environment has its own fire risk profile. That's why Gielle offers customizable solutions, whether for industrial facilities, transport vehicles, commercial buildings, or technical spaces.

If you want complete and dependable fire protection, look no further. Gielle offers expert solutions designed to meet your unique needs, protecting people, property, and operations across all industries.

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