



FOGTEC[®] FIRE PROTECTION





**Modern Trends of Fire Protection in Rolling Stock
Warszawa, 18.05.2016**

**High-pressure water mist active firefighting systems;
first testing
experiences according to Italian Standard UNI 11565**

Michele Barbagli (FOGTEC, Germany)

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FOGTEC Fire Protection



Head Quarter in Cologne

Sales Office Nord, Hamburg

Office Asia, Mumbai, India

Office China, Shanghai, China

Office Middle East, Riad

Office South America, Sao Paulo

FOGTEC France, Paris

FOGTEC Spain, Madrid

FOGTEC Austria, Vienna



Stationary product range (Fixed Systems)

Mecca Clock Tower



**City Hall
Cibeles
Madrid**



**National Archive
Paris**



Elbe Philharmonic Hall Hamburg



Tunnel product range (Tunnel Systems)



Eurotunnel F/UK

Dartford M25

Newcastle Tyne Crossing





FOGTEC Rail Systems – Track guided vehicles

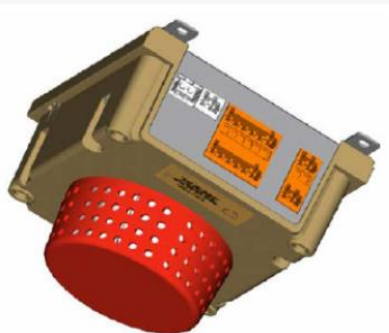
FOGTEC Rail Systems

Rail Systems

- **Head Office in Cologne**
- **Specialised on development and marketing for complete fire protection solutions in rolling stock applications**
 - **Fire detection / fire suppression**
 - **Add on products**
- **Development and manufacturing of plug-and-play modules**
- **Consulting work in regard to Fire Protection in Rolling Stock**
- **Full Time Rolling Stock Team**

FOGTEC Rail Systems – Fire Detection Systems

- Centre and Control Units
- Smoke Detectors
- Smoke Aspiration Systems
- Temperature Detectors
- Linear Heat Detectors
- Gas Sensors
- Communication Interfaces



FOGTEC Rail Systems – Fire Fighting Systems

- **Gas Systems (Nitrogen)**
- **Aerosol Systems**
- **Water Mist Systems**
- **Combinations**



FOGTEC Rail Systems

Certifications

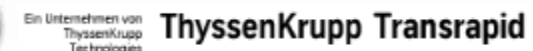


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Memberships



Rail Systems – Customers – OEMs



Rail Systems – Customers – Operators



Applications – Examples of References

High Speed



Intercity



Regional



DoubleDeck



Special



Applications – Examples of References

E-Locos



D-Locos



Metro



Light Rail



Monorail



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Background UNI11565

The Italian case

- Italian Railway Network characterized by many tunnels:
 - RFI network has 339 tunnels longer than 1 km
 - The new High Speed Lines are characterized by a lot of km in tunnels (i.e.: the HS Florence – Bologna HS line length is 78,5, out of which 73 km in tunnels)

- For that reason Italy requires safety measures in addition to the ordinary ones

Background UNI11565

These additional measures have been requested by a

Ministerial Decree:

DM 28/10/2005 «Safety in Railway Tunnels»

§1.5.7 «Extinguishing Fixed Systems»:

shall be installed in all vehicles suitable extinguishing fixed automatical systems...

Background UNI11565

An ANSF-led working group edited the new standard UNI11565 to set the technical requirements to fulfill the DM.

UNI 11565 was published on 18th December 2014

TITLE

Railway vehicles - Design, installation, validation and maintenance of fire detection and extinguishing systems for railway vehicles
General principles

Background UNI11565

UNI 11565:

Background is the ARGE guidelines, adapted to the specificity of the Italian market

Defined standard layouts:

- **Single deck**
- **Double deck**
- **Compartment**

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Testing experience

FOGTEC carried out the first testing according to the new norm with two well-known partner laboratories (LAPI in Italy and IFAB in Germany) under supervision of Italcertifier (Italy).

All layouts where tested based on the already proven FOGTEC-design for ARGE-based tests.

Testing experience

TEST OF THE FIRE EXTINGUISHING SYSTEM IN THE PASSENGER AREAS

- Application: water mist systems
- Scope: verify if, in case of fire, the survival conditions for passengers and train staff are maintained for at least 15 minutes from the extinguishing system activation.
- The fire has to be «under control»: it is not required the complete fire suppression.

Testing experience

Two types of test:

Thermal test, characterized by burning of liquid or liquefied ignition source and using of non-railway conform and non-flame retardant materials for the surroundings, and «Luggage» test, characterized by burning of solid ignition source and using railway conform materials

Two types of nozzle positioning: under one nozzle and between the nozzles

All possible combinations must be tested

Testing experience

Data to be recorded during the test:

- Temperature: at the ceiling and at 1.6 m height above floor level and 1.5 m distance from the fire;**
- Oxygen concentration: at 1.6 m height above floor level or and 1.5 m distance from the fire**
- CO₂, CO, HCN concentrations: at 1.6 m height above floor level and at 2 m distance from the fire**
- Visibility value: at 5 m from the fire and at 1.6 m height above floor level, only for statistical purposes**

Testing experience

**Main results in line with what already experienced with ARGE guidelines.
Some minor specific modifications needed.**



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Conclusions

- **The test scenarios are a good adaptation of the traditionally tested ARGE-layouts to the fleet types used in Italy**
- **The values to be measured are in line with ARGE experience**
- **The smaller and narrower volumes (shorter seat-spacing, higher seatbacks) do hide the fire strongly, so the fire fighting performance is reduced**
- **The visibility test is only for statistic purposes, but the validity and the target is still not clear**

Conclusions

- **Pretty important difference, in comparison with previous experiences (ARGE):**

Technical requirements are mainly related to vehicle engineering

So a significant shift of technical and homologation responsibility from the firefighting system manufacturer to the vehicle manufacturer.

Conclusions

Pros	Contra
General layout not far away from previous experiences	Lack of research and testing experience to validate the models
Very complete and all-covering	In some parts lack of details with big space of interpretation
„Once for all“ validation concept – avoidance of project specific testing	Some materials required are of difficult sourcing outside Italy (still links to UNI11170)
Very good applicability to the Italian rolling stock fleet	High increase of system costs due to complexity of requirements (vehicle manufacturer's burden)
Very clear in SIL requirements	Not available in English language

Any question...?



Q & A

**Thank you very much for your
kind attention !**

The Smarter Way of Fire Fighting