



## Buildings & Industrial

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### ***Fire safety consultancy and design***

- Expert statement
  - Protection of glass facades along escape and rescue routes in a hospital of Aarhus Denmark
  - Protection of cable routes in server rooms
  - Determination of the influence of large ceiling heights on the efficiency of automatically activated water mist systems in parking lots and industrial plants
  - Transferability of test results on the real situation in a creep of the Roseberry Park Hospital, Middlesbrough
  - Transferability of test results for the protection of a large transformer onto other large objects with different sizes
  - Determination of the influence of the ceiling height on the efficiency of automatically activated water mist systems in OH1-applications
  - Usage of water mist system for the protection of water soluble substances in the museum of natural history in Copenhagen
- Fire safety concepts
  - for a conversion project of the Kaiserliche Matrosenstation Kongaes in Potsdam
  - for a conversion project of a rent multiple purpose storage hall in Brandenburg
  - for a conversion project of an industrial building into a school canteen kitchen in Berlin (Großküche Spandau)
  - various apartment buildings
- Plant design for a water mist system for the fire protection
  - of an engine test fire protection concept (FEV Europe GmbH)
  - of coal conveyor belts in the power station of Evonik Industries AG
  - in a furniture market Hardeck Bochum
  - for variable ceiling heights in Hotel Rokin Amsterdam
  - for server areas of the Paribas Bank Paris
  - for machinery spaces on inland passenger vessels
- Plant design and evidence of fire safety
  - for the compensations measures of the structural fire safety with water mist fire-fighting systems in the Elbwerkstätten in Hamburg



- for the compensations measures of the structural fire safety with water mist fire-fighting systems for a visitor center “Kornspeicher Hobrechtsfelde”, community of Panketal
- Development of a fire test concept for high rise buildings (Turmcenter in Frankfurt/Main)
- Independent assessment about the execution of fire testing of another test institute for office applications
- Verification of the fire safety concept and of the realization of the fire precautions of a Hotel in Potsdam (Hotel Villa Monte Vino)
- Preparation of tender documents for a water mist system provided for the high-rise building of Charité Universitätsmedizin Berlin (university hospital of Berlin)
- Research in standards for the planning of a water mist system provided for the high-rise building of the Charité Universitätsmedizin Berlin (university hospital of Berlin)
- Basic design and execution planning for a water mist system in order to protect coal conveyor belts in the power station of “Chemiepark Marl” Evonik GmbH
- Research on approval standards on the procedures for water mist systems in ordinary hazard applications on behalf of IWMA (International Water Mist Association)
- Fire safety planning of a fire-fighting system of the Royal Mecca Clock Tower as an high-rise building
- Patent research about water mist technologies

## **Smoke and fire tests**

### For the approval of fire-fighting systems of the manufacturer

- Fire tests for the protection of general storages (OH3 according to VdS standards)
- Fire tests for the protection of parking decks onboard of RO-RO passenger ferries (IMO)
- Fire tests for the protection of office applications (OH1 according to VdS standards)
- Fire tests for approval of sidewall nozzles according to VDS regulations

### For the approval of an specific application of a fire-fighting systems

- Hot smoke tests to visualize the smoke extraction in an atrium of an office building (Energieforum Stralauer Platz, Berlin)
- Investigations on gas and temperature development during thermal runaways of lithium-ion batteries from car industries (BMW)
- Fire tests for the protection of plastic producing industries (Thule GmbH)
- Fire tests for the protection of shipboard presses (Fagus-Grecon)
- Fire tests for the protection of large transformers for an operator in Singapore (Deluge Fire Protection)



- Fire tests for the protection of large cable tunnels for an operator in Singapore (AECOM)
- Fire tests for the protection for the national archive of France (l'Établissement public de maîtrise d'ouvrage des travaux culturels [EMOC])

## ***Simulations & calculations***

- Expert statement and CFD simulation for Hotel Fontenay (Hamburg) to evaluate the performance of a fixed water mist system to protect the glazing in the atrium
- Evidence of smoke extraction measures of a retirement home (Wasserstadt Oberhavel)
- Evidence of smoke extraction measures of the refurbishment of an airplane hangar of the airport in Hannover/Langenhagen

## **Rail & Rolling Stock**

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### ***Fire safety consultancy and design***

- Expert statement regarding application of CEN/TS14972 for FOGTEC water mist systems in rolling stock
- Expert statement regarding transmissibility of smoke test in the project SBB8
- Expert statement about an application of water mist systems in Italy as FCCS according to TSI LOC&PAS 2015
- Expert statement and analysis of products for use in rolling stock according to EN 45545 (e.g. for OSG screened products)
- Expert statement for necessary fire testing of sandwich components according to EN 45545 for OWS
- Expert statement for derogation of applying EN 45545-2 simplification rules for locomotives of CAF
- Fire safety approval support (national) for Windhoff MPV vehicles for UK
- Support by assessment and fire safety approval of new developed components for fire-fighting systems in rolling stock
- Preparation of a guideline regarding application of fire safety concepts for national approval of a monorail vehicle project incl. infrastructure
- Preparation of test specifications incl. final assessment of conducted tests in accordance with EN 45545 for hybrid locomotives (as subcontractor of TÜV Rheinland)
- Consulting and support on application of EN45545 for ALMiG compressors
- Evaluation of fire load and requirements of materials according to EN45545 for IVU Box Panel
- Collecting fire safety certificates for various projects of ABB incl. checking of certificates and managing necessary fire certificate inventory lists for approval at authorities (e.g. projects of RE460, X2000)



- Feasibility study on active fire-fighting solutions in the Vereinatunnel/Autoverlad

## ***Fire safety concepts***

- Fire safety concept and statement for traction converters of Mitsubishi for Deutsche Bahn's refurbishment project ICE 2
- Fire safety concept for VOITH Gravita 10BB Locomotives
- EN 45545 and EN 50553 fire safety concept support and preparation for high speed trains in Sweden

## ***Fire risks analyses***

- for traction converters of ABB for Deutsche Bahn's refurbishment project ICE 1
- for Eurotunnel's Shuttle Locomotives
- for various projects for Stadler Bussnang
- for GT6/8 and GT8-100D/2S-M vehicles of VBK

## ***Smoke and fire tests***

- Fire test for assessing fire-fighting systems according to UNI 11565
- Fire tests in accordance with ARGE-Guideline Part 2 for EC250 vehicles
- Fire tests to approve a various water mist and aerosol fire-fighting systems
- Smoke tests for Rheinbahn Düsseldorf, Alstom SBB, Bombardier DoSTo Israel, Bombardier Do2010, Bombardier APM, various Stadler Flirt vehicles (e.g. Jungfraubahn, GySev, IC PKP), Gold Coast Line LRV's, HKX, Line U6 Vienna, MTTrens Sao Paulo, Pesa DMU 120, Zentralbahn, Tunnel emergency vehicles Dräger, VIA Essen, C30 Metro Stockholm, Harsco vehicle for Gotthard Tunnel, Toronto Rocket Trains and many others.
- Hot smoke tests Metro KVB
- Oxygen tests in order to evaluate the efficiency of an gaseous extinguishing system for Stadler Flirt vehicles
- Oxygen tests in order to evaluate the efficiency of an gaseous extinguishing system incl. evaluation of possible concentrations for evacuation in engine rooms of vehicles for SJ
- Fire tests to approve a fire-fighting system in hydrogen powered trams
- Fire tests to approve the detection and fire-fighting system for Israeli State Railways
- Fire tests to approve a water mist system in divers switch gear systems
- Fire tests in accordance with EN 50553 for assessing the fire extinguishing system used in Euro Dual Locomotives of Stadler Valencia



## ***Simulations & calculations***

- Heat Release Rate calculations and statement in relation to use the Duggan method for light rail vehicles in London
- Evacuation calculations according to Predtetschenski and Milinski for monorail vehicles
- Computer simulations (CFD) for assessing fire detection systems according to EN 50553 for Euro Light and Euro Dual locomotives of Stadler Valencia
- Computer simulations (CFD) regarding evacuation scenarios for BVG

## ***Seminars***

- Carrying out seminars regarding EN 45545 series (e.g. for BBR, SIMONA, SOLARIS)
- Carrying out seminars regarding NFPA 130 (e.g. for TSL-ESCHA)

## **Tunnel & Metro**

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### ***Fire safety consultancy and design***

- Expert statement on a tender process for a semi stationary foam extinguishing system for the tunnel Grouft-Stafelter Luxemburg
- RAMS study for Eurotunnel's SAFE fire-fighting system
- Design evaluation of fixed fire-fighting system for Abu Dhabi tunnel
- Assessment of CFD simulation accuracy with fixed fire-fighting systems in road tunnels
- Evaluation of safety concept for Budapest M4 Metro
- Expert statement and fire tests to assess the performance of a water mist system as compensation for platform screen doors (PINTSCH BAMAG Antriebs- und Verkehrstechnik GmbH)
- Expert statement about usability of PVC foil as advertising media in underground stations of Munich metro

### ***Smoke & fire tests***

- Smoke and fire tests for the approval of detection system in a station concourse of S21
- Deluge and ventilation system tests in Washington street tunnel in Seattle
- Fire tests for water mist systems for Eurotunnel's SAFE Stations
- Fire test program for fixed fire-fighting systems for Highways Agency
- Fire test program for fixed fire-fighting systems for Tunnel Mont Blanc
- Fire test program for fixed fire-fighting systems for FOGTEC



## **Smoke & fire tests**

- Various CFD simulations as an approval for the smoke extraction and evacuation concepts of according to EBA for Metro stations in Berlin (Krebs+Kiefer Service GmbH)
- CFD simulations for water based fixed firefighting system in underground station S21 (Deutsche Bahn)

## **Research Projects**

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- SUVEREN (Safety of City Underground Structures due to the use of New Energy Carriers) Research projekt)
- Platform Screen Door (PSD) Research Project
- IWMA Project on Fire Test Protocol Comparison
- SOLIT<sup>2</sup> Tunnel Safety Research Project
- REDOMIR (Oil Mist Fire and Explosions)
- SOLIT Tunnel Safety Research Project
- UPTUN (Upgrading of Tunnels)
- FIT (Fire in Tunnels)

**MORE COMPREHENSIVE LIST OF REFERENCES AVAILABLE ON REQUEST**