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Forschungszentrum
Brandschutz

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Fire Research Center

*Cool down.
Fire Protection by*

minimax

RESEARCH

for a fire-proof future

Every year fires claim many human lives, in addition to billions of dollars in assets. In 1968, Minimax set up the "Fire Research Center", in order to provide new impulses for systematic fire protection research. Since then, full-scale emergencies have been staged here in keeping with the motto "We have a fire, so you don't". The test facilities are constantly being updated and expanded in accordance with new technical developments. The center's facilities were modernised in 1992 by installing a smoke gas cleaning system and a water retention system, making it one of Europe's most advanced and environmentally friendly fire research centers. In 1998, a spectator area was added, to allow visitors to observe fire tests in safety and comfort.

The fire hall and the technical centre have been renewed in 2009. Now, a fire test room with an area of 320 m² and a height of up to 15 m is available for tests. Through integration of a mobile suspended ceiling, the ceiling height can be lowered with minimal effort to 2 m.

The fire research center is used for the development of new and optimised fire detection and extinguishing systems, as well as for demonstrating the function of fire fighting concepts on a realistic scale. Decades of experience have made Minimax a recognised partner of fire protection inspection authorities.

Our customers include well-known corporations and mid-sized businesses, as well as insurance companies.

In addition, the fire research center allows to test the developed components under realistic conditions, i.e. in a fire. This is what makes Minimax components so effective and reliable.

Finally, the facilities of the fire research center are used for training purposes, to provide Minimax employees with the practical experience that you expect from fire protection experts.



As a special service, we analyse – in close cooperation with our customers – their specific fire protection problems, in order to develop tailor-made solutions.



**A highlight of the Fire Research Center:
Mobile suspended ceiling from 2 m up to 15 m**

Test-related data acquisition

Visual observation alone is not enough, especially when optimising extinguishing concepts and comparing various fire fighting methods. Visibility is often impaired by smoke and steam. In order to make qualitative and quantitative analyses, test-related data acquisition with computer-supported measuring systems is used. This allows to display and record numerous temperature measuring points during the fire tests. In addition, water pressures and flow rates and the concentration of various gases can be recorded. In special cases, concentrations of noxious substances are also measured.

Wind tunnel

The wind tunnel is approximately 20 m long and is used to simulate the conditions in pneumatic conveyor sections, e.g. in exhaust systems in the timber industry. The wind tunnel is used to further optimise Minimax spark extinguishing systems. The response behavior of the spark detectors and the spray pattern of the extinguishing nozzles can be analysed under realistic conditions and adapted to the local circumstances.

Permatec laboratory

Tests and demonstrations with the Permatec active fire prevention system are conducted in a separate area specially set up for the permanent inerting of rooms.

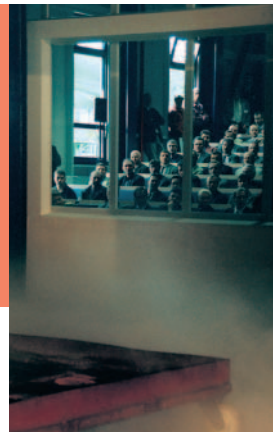
Component development

The fire research center is equipped not only for fire tests, but also for the testing of special components used in fire fighting systems.

Sprinklers and nozzles

In the sprinkler laboratory, various tests are carried out to make our components even more reliable. These include function, ageing and water shock tests, vacuum-resistance, heat-resistance and low-temperature resistance tests, tests to determine resistance to stress cracking and corrosion, and metallurgical tests.

The experienced fire research center team is ready to design tests adapted to individual fire risks and stage them in the fire test halls.



The spray pattern of nozzles can be analysed by means of a water density measuring rig and optimised for the specific application. A computer is used to measure how much water the nozzles spray per minute onto 100 measuring fields, which extend over a surface area of 5 x 5 m.

Valves and fittings

Valves and fittings with a diameter up to DN 200 can be tested on a 200 m test section. Endurance test runs and extreme flow rates can be simulated here in order to determine whether parts are affected by the water flow. Pressure surges can also be created here. The water (with flow rates of up to 15,000 l/min) is recirculated as a contribution to protecting the environment.

Detectors

Electronic fire and gas detectors are tested in practical situations and under boundary conditions in the detector application laboratory.

Water cannons (monitors)

Discharge ranges and flow rates of monitors are measured here.

Through close cooperation with many major testing and standardization committees on both the national and international level, Minimax frequently contributes to the development of new guidelines worldwide.



Fire test areas

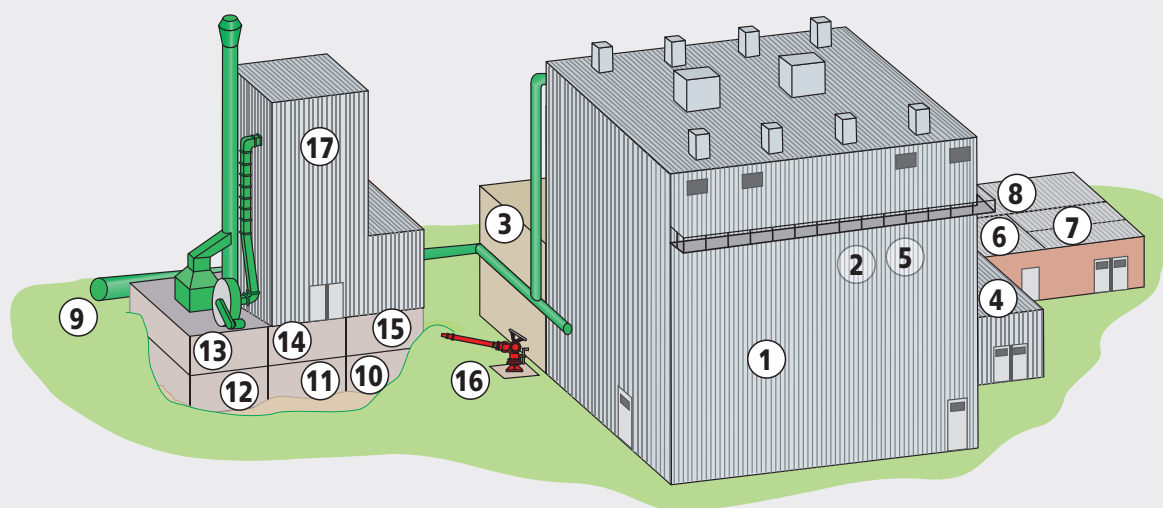
The main building has a floor space of 320 m². The height can be varied by means of a mobile suspended ceiling between 2 m and 15 m. The mobile ceiling is divided into 2 halves so that it is also possible to provide 2 parallel test setups. The building consists of a supporting exterior steel construction with sheet metal on the inside. An external water spray system has been installed to protect this building against overheating in large-scale tests.

In addition, there is a fire test hall that complies with the international standards for determining the application rates of gas extinguishing systems. This hall, with an area of 21.5 m² and a height of up to 5 m, can be used for various smaller fires.

The fire test areas are equipped with suitable extinguishing technology for the scenario being tested, based on the type and arrangement of the flammable materials. The capabilities here are as diverse as the available Minimax

products: pre-installed pipework enables the fast setup of sprinkler systems, deluge systems and fine water spray systems. All Argotec systems (with argon, nitrogen and CO₂) are available for special extinguishing purposes. A CO₂ low-pressure system and a liquid argon system (LAR) supply the fire test areas with large quantities of extinguishing gas if required. Smaller quantities are stored in high-pressure steel cylinders. High expansion foam generators can completely fill the fire test halls with foam within minutes.

The fire test center is supplied with mains water or water from the industrial water circuit reservoir. Several pumps with various pressures and flow rates allow the adaption to the respective test scenario. A pump system enabling operating pressures up to 250 bar was already installed in 1993 for the analysis and development of high-pressure watermist systems.



- 1 Fire test hall 1
(15 x 21 m, 2 m up to
15 m in height)
- 2 Fire test hall 3
(6.5 x 4 m, 5 m high)
- 3 Auditory
- 4 Control and water
supply room
- 5 Water density
measuring rig

- 6 EDP for measurements
- 7 Warehouse and
workshop
- 8 Valve test rig
- 9 Wind tunnel
- 10 Waste water collection
tank 1
- 11 Waste water collection
tank 2

- 12 Industrial water
circuit tank
- 13 Sprinkler laboratory
- 14 Engineering room 1
- 15 Engineering room 2
- 16 Monitor test stand
- 17 Smoke gas
cleaning system

ENVIRONMENT

our number one priority

Smoke gas cleaning system

The ultra-modern and spacious smoke gas cleaning system is based on the dry adsorption process and operates with the addition of hydrated lime and active charcoal. It has a nominal throughput of 30,000 m³/h and complies with the air quality control values stipulated by governmental emissions laws. The smoke gases are extracted from the fire test areas and are fed into the unit. A pre-defined partial vacuum can be calibrated in the test areas so that no gas emissions are released into the atmosphere.

Industrial water circuit

The water from cold tests, e.g. in measurements of the water distribution of sprinklers, is collected here. The water is pumped back so that it can be reused, conserving fresh water resources.

Waste water collection tanks

Extinguishing water from the test areas is collected in two tanks, each with a capacity of 70 m³, after passing a two-stage oil separator. The waste water is tested by an approved laboratory to ensure proper and cost-effective disposal.



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Our services at a glance:

- ▶ Pre-test consultation and conception of fire tests
- ▶ Execution of small-scale and large-scale spray and fire tests
- ▶ Complete documentation of tests including data and photos
- ▶ Support during approval process and acceptance tests
- ▶ Demonstration tests, e.g. for training purposes: from portable fire extinguishers to high rack storage fires

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