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**Principles for the testing of technical installations in accordance with the Model Test
Ordinance by registered inspectors recognised under building law**

(Model Testing Principles)

Version 21/10/2025¹

Content:

1. General information
 - 1.1 Purpose
 - 1.2 Explanatory notes
2. Test principles
3. Documentation to be provided
4. Test report
5. Tests
 - 5.1 Ventilation systems
 - 5.1.1 General requirements
 - 5.1.2 Components, construction products and types, installation-specific requirements
 - 5.1.3 Power supply
 - 5.1.4 Measurement, control and regulation technology
 - 5.1.5 Interdependencies and links with other installations
 - 5.1.6 Intended interaction (system interaction test, WPP)
 - 5.2 Pressure ventilation installations
 - 5.2.1 General requirements
 - 5.2.2 Components, construction products and types, installation-specific requirements
 - 5.2.3 Power supply
 - 5.2.4 Measurement, control and regulation technology
 - 5.2.5 Interdependency and links with other installations
 - 5.2.6 Intended interaction (system interaction test, WPP)
 - 5.3 CO warning systems
 - 5.3.1 General requirements
 - 5.3.2 Components, construction products and types, installation-specific requirements
 - 5.3.3 Power supply

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Draft

- 5.3.4 Measurement, control and regulation technology
- 5.3.5 Interdependency and links with other installations
- 5.3.6 Intended interaction (system interaction test, WPP)
- 5.4 Smoke extraction systems
 - 5.4.1 General requirements
 - 5.4.2 Components, construction products and types, installation-specific requirements
 - 5.4.2.1 General test steps
 - 5.4.2.2 Specific test steps
 - 5.4.3 Power supply
 - 5.4.4 Measurement control and regulation technology
 - 5.4.5 Interdependencies and links with other installations
 - 5.4.6 Intended interaction (system interaction test, WPP)
- 5.5 Fire extinguishing systems
 - 5.5.1 General requirements
 - 5.5.2 Components, construction products and types, installation-specific requirements
 - 5.5.2.1 Testing of all fire extinguishing systems
 - 5.5.2.2 Automatic fire extinguishing systems (extinguishing agent: water)
 - 5.5.2.2.1 General test steps
 - 5.5.2.2.2 Specific test steps
 - 5.5.2.3 Automatic fire extinguishing systems (other extinguishing agents)
 - 5.5.2.3.1 General test steps
 - 5.5.2.3.2 Specific test steps
 - 5.5.2.4 Non-automatic fire extinguishing systems
 - 5.5.3 Power supply
 - 5.5.4 Measurement control and regulation technology
 - 5.5.5 Interdependencies and links with other installations
 - 5.5.6 Intended interaction (system interaction test, WPP)
- 5.6 Fire detection systems
 - 5.6.1 General requirements
 - 5.6.2 Components, construction products and types, installation-specific requirements
 - 5.6.2.1 General test steps
 - 5.6.2.2 Specific test steps
 - 5.6.3 Power supply
 - 5.6.4 Measurement control and regulation technology
 - 5.6.5 Interdependencies and links with other installations

Draft

- 5.6.6 Intended interaction (system interaction test, WPP)
- 5.7 Alarm systems
 - 5.7.1 General requirements
 - 5.7.2 Components, construction products and types, installation-specific requirements
 - 5.7.2.1 General test steps
 - 5.7.2.2 Specific test steps
 - 5.7.3 Power supply
 - 5.7.4 Measurement control and regulation technology
 - 5.7.5 Interdependencies and links with other installations
 - 5.7.6 Intended interaction (system interaction test, WPP)
- 5.8 Safety lighting
 - 5.8.1 General requirements
 - 5.8.2 Components, construction products and types, installation-specific requirements
 - 5.8.3 Power supply
 - 5.8.4 Measurement control and regulation technology
 - 5.8.5 Interdependencies and links with other installations
 - 5.8.6 Intended interaction (system interaction test, WPP)
- 5.9 Emergency power supply systems
 - 5.9.1 General testing requirements
 - 5.9.2 Components, construction products and types, installation-specific requirements
 - 5.9.3 Power supply
 - 5.9.4 Measurement control and regulation technology
 - 5.9.5 Interdependencies and links with other installations
 - 5.9.6 Intended interaction (system interaction test, WPP)
- 5.10 Electrical installations[□]
 - 5.10.1 General requirements
 - 5.10.2 Components, construction products and types, installation-specific requirements
 - 5.10.3 Power supply from photovoltaic systems

[□] According to national law

Draft

1. General information

1.1 Purpose

The aim of the testing of technical installations is to determine the effectiveness and operational safety, including the intended interaction (system interaction test) in accordance with the building permit in order to comply with requirements under building law.

During the testing, the laws, regulations, guidelines, technical building regulations and decrees necessary for the assessment must be observed. The generally recognised best engineering practices are to be taken into account.

All parts of the installation are to be inspected during the testing process. Sampling tests are only permitted insofar as this is explicitly stated for the individual test points in accordance with Section 5 of these Testing Principles (in the case of tests after construction or substantial modifications, § 2(2) MPrüfVO [Model Test Ordinance] Points 1 to 3 as a 'initial test sample – (S)', for Point 4 as a 'recurring sample – (SW)').

The registered inspector is responsible for ensuring that the type and scope of the testing carried out by him or her on the individual installation are necessary and sufficient (Section 5 of these Testing Principles).

Where deviations from the Testing Principles are made during the test referred to in Section 5, the test report shall describe and justify that equivalence is ensured for the assessment of installation safety.

If the documentation and the condition of the installation indicate that significant alterations have been made to the installation or its environment since the last test, the recurrent test must be carried out as an initial test, provided that there are no deviations from the approved fire protection concept that require approval.

1.2 Explanatory notes

The system interaction test is the interdisciplinary test of the intended interactions of installations subject to testing on the basis of § 2 of the Model Test Ordinance (M-PrüfVO). The interaction between the installation to be tested and other installations must be checked against the approved fire protection certificate and the safety-related control concept requirements set out therein.

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The test for effectiveness and operational safety also includes identifying any possible negative effects between installation components (interaction).

The safety-related control concept includes a description of the basic principles of the functional control relationships between the relevant installations that are subject to testing and other installations relevant to fire protection in order to ensure proper operation.

Verification of these individual functions must be provided by means of a system interaction test carried out by registered inspectors for safety-related installations.

If a safety-related control concept (across all trades involved) has been approved under building law through a fire protection certificate and is represented by a fire control matrix, this does not need to be checked by the registered inspector for safety installations

When conducting random checks, care must be taken to ensure that the scope of the check is sufficiently large (at least 25 per cent) and does not include the same installation components as in the previous recurring checks (last random sample). The aim is to cover the entire scope of the installation to be inspected in a maximum of four recurring tests.

If the random check reveals a defect, then 100 per cent of the installation must always be checked.

By way of derogation, a sample check of the detectors in a surveillance area with at least one detector per detector group is sufficient for the automatic detectors referred to in 5.6.2.2, if an installer certificate or periodic maintenance certificate is presented. If there are any discrepancies with the installer certificate, a 100 per cent test must also be carried out for automatic detectors. This also applies accordingly to the functional tests for natural smoke extraction devices per installation group in accordance with 5.4.2.

Cable penetration seals are to be checked in random samples (1 per cent, but at least one penetration seal) during the initial test to ensure correct installation; if necessary also during destructive testing. If any faults are found in the sample, additional new samples must be taken during the initial test as part of the re-testing. The number of samples must be doubled in each case. If cable penetration seals are no longer easily visible and verifiable (e.g. inside suspended ceilings), proof of the presence of a penetration seal must be carried out by testing with tools (e.g. endoscope). This must be pointed out and at least the installer's certificate of conformity must be requested.

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2. Test principles

- Building permit (including ancillary provisions/supplementary decisions)

In the version applicable at the time of the building permit:

- Model Building Code [Musterbauordnung]*
- Model Test Ordinance [Muster-Prüfverordnung – MPrüfVO]
- Model ordinances or model guidelines for special buildings and* garages*
- Model Administrative Regulation on Technical Building [MVV TB] * Specifications (or list of Technical Building Specifications*)
- Declarations of performance for harmonised construction products
- Proof of usability (e.g. general building inspection approvals)
- Proof of applicability (e.g. general type approvals)
- Generally accepted codes of practice

3. Documents to be provided, obligations of the client or operator

3.1 Documentation to be provided

The building owner or operator must provide the documents required for the test in German.

These include the following in particular:

1. Building permit (including ancillary provisions/supplementary decisions) including approved building templates
 - a) Fire protection certificate (including safety-related control concept)
 - b) Floor plan and sectional drawings of the building, indicating
 - floor space, room height and cubic volume
 - fire compartments, smoke compartments, functional units
 - walls, ceilings, closures and other structural elements with prescribed fire resistance
 - type and usage (number of people, garage parking spaces, etc.)
 - Escape routes
2. Performance declarations, usability certificates, applicability certificates, including associated technical documentation
3. Plans and diagrams of the installation including details of the significant components, installation locations, set-up sites, control devices and energy supply
4. Alarm procedures and evacuation plans (if created)
5. Installation measurements
6. Diagrams of electrical, signalling, and alarm systems

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7. Installation or functional description
8. Details on the fire extinguishing provisions
9. Test reports from the last test conducted
10. Construction and maintenance records
11. Measurement protocols on speech intelligibility for alarm systems

3.2 Human and financial resources to be provided

The client or operator is to assist the registered inspectors with the professionally qualified personnel required for the test and provide devices, work equipment and consumables (e.g. CO₂ cartridges, fuses).

4. Test report

A test report must be prepared for each test in accordance with this section of the Testing Principles.

Content:

- Type and location of the physical structure
- Building owner/operator (client)
- Name and address of the registered inspector
- Duration/time of test
- Nature and purpose of the structure
- Type and scope of test (before commissioning, after significant alterations, recurrent tests, test after correction of faults)
- Brief description of the structure, including details of the significant components
- Testing requirements and documents used
- Documents required, but not available
- Assessment standards (legal provisions, guidelines, technical rules)
- Design data
- Functional tests conducted
- Compilation of selected samples
- Safety devices
- Measurement results
- Notation of the measuring- and testing devices used
- Evaluation of measurement and test results
- Description and of deficiency assessment

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- Professional assessment of the further operation of the tested technical installation
- Deadline for rectification of defects
- Determination of rectification of deficiencies
- Assessment of effectiveness and operational safety, including the fire protection measures taken for the tested installations in accordance with the building permit
- Confirmation that these Testing Principles have been observed

5. Tests

5.1 Ventilation systems

5.1.1 General requirements

1. Conformity of the technical execution with the documents to be provided (e.g. fire protection certificate with regard to the arrangement and execution, M-LüAR [Model Guideline on Fire Protection Requirements for Ventilation Systems])
2. Suitability for the intended application (e.g. availability of proof of applicability and/or usability or performance declarations)

5.1.2 Components, construction products and types, installation-specific requirements

1. Ventilation unit

- Visual inspection of the condition of the components (e.g. ventilators, heat exchangers, mixing chambers, filters, housings, dampers, supply and drainage pipe connections) and the state of cleanliness
- Functional test (e.g. ventilators, damper control, repair switch, drive/flow monitoring, frost protection, smoke triggering mechanism)
- Measurements of the volume flow required under building law for the respective functional area, taking into account all of the components that influence the air flow (e.g. volume flow controllers, frequency converters, filters, operating selector switches)

2. Ventilation ducts

- Visual inspection of the internal and external condition (S) + (SW)
- Testing of fire resistant lines (SW)

3. Fire valves

a) Initial test – Function on all fire protection dampers

- external examination of the requirements according to the declaration of performance or proof of usability and technical documentation

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- internal visual inspection. e.g. via the inspection opening (especially the damper blade, triggering mechanism, seal)
 - Check of the required maintenance
 - Testing proper closure (functional test)
- b) Periodic tests (SW) – all test steps as in the initial test; the functional test may be reduced to one quarter if
- regular maintenance of all valves is demonstrated in accordance with the declaration of performance or proof of usability and technical documentation or declaration of performance,
 - none of the tested dampers is faulty,
 - after four consecutive tests have been carried out, all of the dampers have been checked by the registered inspector.
4. Shut-off devices to prevent the spread of fire (K-18017)
- a) Initial test – Function on all shut-off devices
- external testing of requirements in accordance with usability certificates and technical documentation
 - internal visual inspection, e.g. via inspection opening
 - Check of the required maintenance
 - Checking proper closure (functional test) of existing mechanical closing elements
- b) Periodic tests – all test steps as in the initial test
- The recurring functional test can be omitted if the internal visual inspection does not reveal any dirt deposits that could impair functionality.
5. Smoke protection dampers
- Execution of the installation based on the declarations of performance or proof of usability and applicability and technical documentation
- a) Internal visual inspection (in particular damper blade, seal, cleaning condition)
- b) Functional test by setting off the smoke triggering mechanism to ensure that the shut-off element closes and opens completely
6. Smoke triggering mechanisms
- a) Visual inspection
- b) Triggering process
7. Outside air/exhaust air openings
- Visual inspection of technical condition and cleanliness
8. Rooms with increased hygienic requirements in hospitals

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- a) Compliance with building regulation- and technical requirements with regard to hygiene and the ventilation system
- b) Air ducts and pressure conditions

5.1.3 Power supply

- 1. Visual inspection for an operational power supply
- 2. Functional test by switching on/off at least once (main switch)

5.1.4 Measurement, control and regulation technology (MCR technology)

Functional test of the control/regulation system with regard to the requirements under building law and the necessary processes for:

- 1. Controls and control displays
- 2. Protective devices (frost protection, flow)
- 3. Safety circuit in case of fault (e.g. garage ventilators)
- 4. Damper control

Where safety-related controls and functions are present and linked to a building automation system, the latter must not override the controls and functions.

5.1.5 Interdependencies and links with other installations

- 1. Functionality of the ventilation system regarding possible interference from other installations
- 2. Usability of the installations and peripheral devices applied

5.1.6 Intended interaction (system interaction test)

- 1. Intended transmission and reception of control commands and/or information to and from safety-related installations, and testing of the corresponding control scenario (control-related sequence)
- 2. Control systems based on the approved building plans

5.2 Pressure ventilation installations

5.2.1 General requirements

- 1. Conformity of the technical execution with the documents to be provided (e.g. M-DBA-RL¹) including the technical ventilation design in accordance with the intended purpose of the installation

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2. Compliance between the arrangement of the external air intake and the exhaust opening with the arrangement of the release devices to be provided
3. Arrangement of the triggering mechanism
4. Activation of the pressure ventilation installation
5. Measurements of door opening forces and flow velocities in the door cross-section, taking into account any doors opened at the same time in accordance with the test criteria
6. Door entry/exit function (door closer)
7. Visual inspection of the condition of the components (e.g. ventilators, housings, dampers, windows)
8. Determination of the sound pressure level

5.2.2 Components, construction products and types, installation-specific requirements

1. Use, installation and function
 - a) of overflow openings (e.g. with fire protection dampers, non-return dampers, multi-blade dampers)
 - b) of the exhaust openings (e.g. with smoke extraction dampers, windows/other openings)
 - c) of the exhaust fan
2. Suitability of the technical execution for the intended applications of external, supply air and exhaust air ducting (e.g. via fire-resistant ventilation and smoke extraction ducts)

5.2.3 Power supply

1. Visual inspection
 - a) of the connection to general power supply (GS)
 - b) of the connection to safety power supply system (SS)
2. Functional testing of the switching processes between the general power supply and the safety power supply (i.e. switching from GS to SS and back from SS to GS)

5.2.4 Measurement and control technology

Functional test of the control/regulation system with regard to the requirements under building law and the necessary processes for:

1. Controls and control displays
2. Protective devices
3. Damper control

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4. Switching in the event of failure of the operational replacement equipment required to maintain the overpressure
5. Building automation (e.g. exhaust vents, shading)

Where safety-related controls and functions are present and linked to a building automation system, the latter must not override the controls and functions.

5.2.5 Interdependencies and links with other installations

1. Functionality of the pressure ventilation installation regarding possible interference from other installations
2. Usability of the installations and peripheral devices applied

5.2.6 Intended interaction (system interaction test)

1. Intended transmission and reception of control commands and/or information to and from safety-related installations, and testing of the corresponding control scenario (control-related sequence)
2. Control systems based on the approved building plans

5.3 CO warning systems

5.3.1 General requirements

1. Conformity of the technical execution with the testing principles
2. Usability

5.3.2 Components, construction products and types, installation-specific requirements

A CO warning system includes all construction products (such as intake points, measuring points, ducts, transmission equipment, backup power supply, control unit, visual and audible signalling devices, etc.) that are needed to maintain the operation of the CO warning system.

5.3.3 Power supply

Connection to a battery as a backup power source or connection to an emergency power supply system

5.3.4 Measurement and control technology

1. Condition test
 - a) Arrangement and number of measuring points
 - b) Assignment of measuring points to ventilation sections

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- c) Arrangement of optical and acoustic signal transmitters
 - d) Accessibility and operation of the installation
- 2. Functional test
 - a) Setting the switching points for the mechanical ventilators
 - b) Fault report in the event of failure or malfunction of the CO warning system
 - c) of optical and acoustic signal transmitters
 - d) for electrochemical measurement cells, the target/actual comparison of all measurement cells
 - e) for suction systems, the target/actual comparison of the measuring transducer display
 - f) Tightness of all measuring gas pipelines
 - g) Determination of the response time of the longest measuring cable
- 5.3.5 Interdependencies and links with other installations
 - 1. Functionality of the CO warning system with regard to possible interference from other installations
 - 2. Usability of the installations and peripheral devices applied
- 5.3.6 Intended interaction (system interaction test)
Control systems based on the approved building plans
- 5.4 Smoke extraction systems
 - 5.4.1 General requirements
 - 1. Conformity of the technical execution with the documents to be provided (e.g. fire protection certificate)
 - 2. Conformity of the installation with the measurements
 - 3. Random plausibility check of the calculation at initial test
 - 4. Implementation of the requirements classes defined in the safety-related control concept
 - 5. Suitability for the intended application (e.g. availability of proof of applicability and/or usability or performance declarations)
 - 6. Usability of the installations and peripheral devices applied
 - 5.4.2 Components, construction products and types, installation-specific requirements
 - 5.4.2.1 General test steps
 - 1. Arrangement of the vent/inflow openings and suction/outflow openings in the effective area

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2. Visual and functional inspection of

- a) Dampers
- b) Vent and outflow openings and/or external air and exhaust air openings as well as at their closures
- c) Proof of effectiveness, if necessary by means of a smoke test, during initial testing only

5.4.2.2 Specific test steps

1. Mechanical smoke extraction systems

- a) Visual inspection of the condition of all smoke extraction systems (e.g. ventilators, connection to the sewer system)
- b) Usability for the intended applications (e.g. snow load, wind load, proof of application and/or usability or declaration of performance, resistance to temperature/time, bridging of engine protection if necessary)
- c) Measurements of volume flows, if required under building law
- d) Arrangement and execution of the smoke extraction pipes and supply air ducts
- e) Execution of the assembly of the smoke extraction dampers

2. Natural smoke extraction system

- a) Visual inspection of the condition of all natural smoke extraction devices
- b) Execution of the assembly
- c) Functional test (SW)

5.4.3 Power supply

1. Visual inspection

- a) Connection of the fans to a safety power supply or to an alternative mandatory power supply (e.g. a fire brigade switch in accordance with DIN VDE 0100-560:2022-10 – section 560.3.19)
- b) Connection of natural smoke extraction devices to a type-related power supply (electric or pneumatic)

2. Functional test

Switching processes between the general power supply and the safety power supply (i.e. switching from GS to SS and back from SS to GS)

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5.4.4 Measurement and control technology

1. Functional testing of the control/regulation with regard to the requirements under building law (note: function-related process, e.g. programming) and the necessary processes, e.g. function and error simulation, of:
 - a) Controls and control displays (including repair switches)
 - b) Protective devices
 - c) Damper control
 - d) Building control technology (e.g. exhaust vents, smoke curtains, smoke protection gates)
2. Control of the components necessary for proper functioning of the smoke extraction system

Where safety-oriented controls and functions are present and linked to a building management system, the (possibly overarching) building management system is not to not override these controls and functions.

5.4.5 Interdependencies and links with other installations

1. Functionality of the smoke extraction system with regard to compliance with the safety-related control concept of the installations
2. Usability of the installations and peripheral devices applied
3. Impairment of the effectiveness of the smoke extraction system by other installations constructed after the initial test

5.4.6 Intended interaction (system interaction test)

1. Intended transmission and reception of control commands and/or information to and from safety-related installations, and testing of the corresponding control scenario (control-related sequence)
2. Control systems based on the approved building plans

5.5 Fire extinguishing systems

5.5.1 General requirements

1. Conformity of the technical execution with the documents to be provided (e.g. fire protection certificate)

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2. Conformity of the extinguishing agent stock quantity, including the input and reserve quantities in the structural system, with the planning requirements
3. Random plausibility check of the calculation at initial test
4. Compliance of the technical installation with the design and correct execution of the water connection in accordance with the planning requirements
5. Implementation of the requirements classes defined in the safety-related control concept
6. Suitability for the intended application (e.g. availability of proof of applicability and/or usability or performance declarations)
7. Usability of the installations and peripheral devices applied

5.5.2 Components, construction products and types, installation-specific requirements

5.5.2.1 Testing of all fire extinguishing systems

1. Frost protection
2. Adequate signage
3. Visual inspection of the entire installation and its components (suitability for intended purpose)
4. Test to check for the presence of technical plans for the design of the fire extinguishing system (declaration of conformity/proof of installation/regulations applied in the design of the fire extinguishing system)

5.5.2.2 Automatic fire extinguishing systems (extinguishing agent: water)

5.5.2.2.1 General test steps

1. Test step as defined in Section 5.5.2.1
2. Conformity of the installation with the measurements
3. Accessibility of the extinguishing water source
4. Checks on the extinguishing water supply in terms of flow rate and supply pressure in accordance with planning

5.5.2.2.2 Specific test steps

1. Pressure boosting system/fire extinguishing pump
 - a) Visual inspection of the condition
 - b) Flow and conveying pressure
 - c) Switch-on/switch-off pressure
 - d) Inlet pressure (avoidance of cavitation)
 - e) Switching frequency

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- f) Fault reports
- 2. Fire extinguishing control panels
 - a) Adequate ventilation and temperature
 - b) Reserve spray nozzles for presence
 - c) Signage/Labelling
 - d) Technical equipment with regard to intended use
- 3. Pipe network including nozzles
 - a) Visual inspection of the condition
 - b) Frost protection
 - c) Usability of nozzles
 - d) Arrangement and number of nozzles
 - e) Emptying
 - f) Impairment of the extinguishing effect (e.g. due to subsequent installations)
 - g) Function of installed flow detectors
- 4. Compressed air/water tanks including feed pump and compressor
 - a) Usability for the installation
 - b) Function tests (pump and compressor)
 - c) Check of fill level and container pressure
 - d) Checking proof of the necessary tests on pressure vessels
- 5. Valve station
 - a) Usability
 - b) Visual inspection of the condition
 - c) Functional test of the pressure switches and the alarm
 - d) Control of the transmission device

5.5.2.3 Automatic fire extinguishing systems (other extinguishing agents)

5.5.2.3.1 General test steps

- 1. Test step as defined in Section 5.5.2.1
- 2. Conformity of the installation with the measurements

5.5.2.3.2 Specific test steps

- 1. Fire extinguishing control panels
 - a) Adequate ventilation and temperature
 - b) Signage/labelling
 - c) Technical equipment with regard to intended use

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- d) Pressure relief, where necessary
- 2. Extinguishing agent tanks
 - a) Suitability of the containers
 - b) Labelling
 - c) Filling quantity/filling pressure
- 3. Section valve and manifold
 - a) Location
 - b) Functional testing of section valve
 - c) Flooding times for all extinguishing zones (only with low pressure)
- 4. Extinguishing zone
 - a) Warning and information signs
 - b) Gas tightness of the enclosing structure
 - c) Holding time
 - d) Prevention of impermissible interaction with the ventilation systems
- 5. Control and detection
 - a) Usability
 - b) Functional test of the fire detection
 - c) Functional test of the extinguishing system control and the required control function of the operating equipment
- 6. Pipe network including nozzles and pressure-reducing devices
 - a) Visual inspection of the equipotential bonding
 - b) Suitability of nozzles and pressure reducing devices
 - c) Arrangement, number and size of the nozzles
 - d) Impairment of the extinguishing effect (e.g. obstruction of the nozzle jet)
- 7. Delay device
 - a) Usability for the installation
 - b) Functional test
 - c) Early warning times of extinguishing areas
- 8. Alarm devices for the fire extinguishing system before triggering
 - a) Usability for the installation
 - b) Arrangement and functionality of the alarm equipment
 - c) Sufficient sound level of the alarm and signal transmitters
- 9. Pressure relief devices
 - a) Suitability for use
 - b) Execution of the assembly

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- c) Assignment to the extinguishing area
- d) Functional test and control

10. Monitoring

Functional test of the monitoring devices of the alarm and extinguishing areas

11. Additional requirements for personal protection

- a) Assessment of the measures taken for personal protection
- b) Functional test of the blocking mechanism
- c) Compliance with the advance warning period for evacuation
- d) Sufficient prevention of extinguishing agent carry-over

5.5.2.4 Non-automatic fire extinguishing systems

5.5.2.4.1 General test steps

Test step as defined in Section 5.5.2.1

5.5.2.4.2 Specific test steps

1. Installations with wet risers

- a) Pipe network
- b) Wall hydrants
 - Equipment, hose length (SW)
 - Accessibility
 - Check of the hose pressure test certificate (S) + (SW) water pressure, water quantity (if required for simultaneous operation)
 - Marking, operating instructions

2. Wet-dry installations

- a) Test steps as for no. 1
- b) Function of the filling and emptying stations (including warning device)
- c) Function of limit switch
- d) Flooding of the installation (filling time measurement)
- e) Emptying, drainage component (pipe gradient)

3. Outdoor hydrants (only if required under building law)

- a) Water pressure, quantity of water (if necessary for simultaneous use)
- b) Marking, operating instructions

5.5.3 Power supply

1. Visual inspection

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- a) Connection to the general power supply (GS)
- b) Connection to a safety power supply (SS) or to an alternative mandatory power supply (e.g. a fire brigade switch in accordance with DIN VDE 0100-560:2022-10 – section 560.3.19)
- c) Connection to a design-related power supply (e.g. compressed air water tank or pressure vessel)

2. functional test

Switching processes between the general power supply and the safety power supply (i.e. switching from GS to SS and back from SS to GS)

5.5.4 Measurement and control technology

- 1. Functional test of the control/regulation system with regard to requirements under building law (note: function-related sequence, e.g. programming), e.g. function and error simulation of the necessary sequences of:
 - a) Controls and control displays (including repair switches)
 - b) Protective devices
- 2. Control of the installation parts necessary for the function of the pressure booster system/pumps
- 3. Where safety-oriented controls and functions are present and linked to a building management system, the (possibly overarching) building management system is not to not override these controls and functions.

5.5.5 Interdependencies and links with other installations

- 1. Functionality of the fire extinguishing system with regard to conformity with the safety-related control concept of the installations
- 2. Usability of the installations and peripheral devices applied

5.5.6 Intended interaction (system interaction test, WPP)

- 1. Intended transmission and reception of control commands and/or information to and from safety-related installations, and testing of the corresponding control scenario (control-related sequence)
- 2. Control systems based on the approved building plans

5.6 Fire detection systems

5.6.1 General requirements

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1. Conformity of the technical execution with the testing principles (e.g. fire safety certification)
2. Selection of the installations and peripherals used (hardware and software)
3. Suitability for the intended application (e.g. availability of proof of applicability and/or usability or performance declarations)
4. Functionality of the fire extinguishing system with regard to conformity with the safety-related control concept of the installations

5.6.2 Components, construction products and types, installation-specific requirements

5.6.2.1 General test steps

1. Usability in relation to local environmental influences
2. Test of the individual components
 - a) For interaction with the other necessary controls and messages with the fire alarm system and determining that the links are free of interference
 - b) For the transfer of alarm and fault messages
 - c) For the avoidance of false alarms
 - d) Against the intended condition in the event of a failure of the general power supply

5.6.2.2 Specific test steps

1. Control centre
 - a) Technical equipment for the installation room with regard to intended use
 - b) Surge protection (protective and functional equipotential bonding)
 - c) Functionality of operating and fault messages
 - d) Control of peripheral devices (e.g. key depot, fire brigade panel, indicator light)
 - e) Forwarding the fire alarm to the fire brigade control centre or to a permanently staffed station
 - f) Functional tests of the control systems, possibly safety-related links with the building management system (e.g. control of smoke extraction systems or lifts, including fire control systems)
2. Transmission channels
 - a) Functional integrity of cable and wiring systems (e.g. MLAR*), (SW)
 - b) Exclusion of adverse electromagnetic interference and ensuring interference-free transmission (SW)
 - c) Use of primary and secondary lines (monitored and non-monitored transmission channels)

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- d) Simulation of faults leading to line interruption within the transmission paths (S) + (SW)
- 3. Fire detectors, detector groups and detector areas
 - a) Allocation to detector groups and detector areas (SW)
 - b) Suitability and arrangement of the automatic detectors according to fire characteristics and room layout (SW)
 - c) Arrangement of non-automatic detectors according to escape route (SW)
 - d) Measures to prevent false alarms (SW)
 - e) Arrangement of the separators (for ring lines) (SW)
 - f) Detector signage (SW)
 - g) Function of the detectors (S) + (SW)

5.6.3 Power supply

- 1. Type of design (including disconnected power supplies)
- 2. Usability
- 3. Where necessary, functional test of the switching processes between the general power supply and the safety power supply (i.e. switching from GS to SS and back from SS to GS)
- 4. Sufficient capacity
- 5. Fulfilment of further requirements (in accordance with the documentation to be provided) that are necessary for the installation to perform its intended function (e.g. functional integrity, selectivity, fault messages, fault analysis)

5.6.4 Measurement and control technology

- 1. Initial verification

Determine the version status of the installation parameterisation and the conformity of the set parameterisation with the documents to be provided

- 2. Recurring tests

Check of the version status for compliance with the intended functions in accordance with the documentation to be provided

5.6.5 Interdependencies and links with other installations

Check of the control of external systems, including any feedback (e.g. galvanic isolation, contact design, fail-safe consideration)

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5.6.6 Intended interaction (system interaction test)

1. Intended transmission and reception of control commands and/or information to and from safety-related installations, and testing of the corresponding control scenario (control-related sequence)
2. Control systems based on the approved building plans

5.7 Alarm systems

5.7.1 General requirements

1. Conformity of the technical execution with the documents to be provided (e.g. fire protection certificate)
2. Selection of the installations and peripherals used (hardware and software)
3. Suitability for the intended application (e.g. availability of proof of applicability and/or usability or performance declarations)
4. Functionality with regard to compliance with the safety-related control concept (speech and/or sound)

5.7.2 Components, construction products and types, installation-specific requirements

5.7.2.1 General test steps

Control by the fire alarm system (if required under building law)

5.7.2.2 Specific test steps

1. Control centre
 - a) Technical equipment with regard to intended use
 - b) Amplifier system (load, impedance, monitoring, etc.)
 - c) Functionality of operating and fault messages
 - d) Automatic error monitoring
 - e) Surge protection (protective and functional equipotential bonding)
 - f) Control of peripheral equipment (e.g. visual alarm, switch from loudspeaker to fire mode when shared for other purposes such as background music)
2. Transmission channels
 - a) Cable and ducting installations – Compliance with functional maintenance (e.g. MLAR*), (SW)
 - b) Elimination of harmful electro-magnetic interference and safeguarding of non-interference transmission (SW)
 - c) Transmission performance (e.g. simulation of faults within the transmission paths) (S) + (SW)

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3. Alarm and signal generators (S) + (SW)

- a) Adequate insonification and adequate speech intelligibility
- b) Arrangement and functionality of the alarm transmitters
- c) Shutdown function of the acoustic signal transmitters in close proximity to the first point of contact of the fire brigade or assisting unit

5.7.3 Power supply

- 1. Type of design (including disconnected power supplies)
- 2. Usability
- 3. Functional testing of the switching processes between the general power supply and the safety power supply (i.e. switching from GS to SS and back from SS to GS)
- 4. Sufficient capacity

5.7.4 Measurement and control technology

- 1. Initial verification

Determine the version status of the installation parameterisation and the conformity of the set parameterisation with the documents to be provided

- 2. Recurring tests

Check of the version status for compliance with the intended functions in accordance with the documentation to be provided

5.7.5 Interdependencies and links with other installations

Interference with the alarm signal from sources of disturbance, e.g. acoustic or electrical

5.7.6 Intended interaction (system interaction test)

- 1. Intended transmission and reception of control commands and/or information to and from safety-related installations, and testing of the corresponding control scenario (control-related sequence)
- 2. Control systems based on the approved building plans

5.8 Safety lighting

5.8.1 General requirements

- 1. Conformity of the technical execution with the documents to be provided (e.g. fire protection certificate)
- 2. Compliance of the execution with the technical documentation of the safety lighting, the documentation is to include in particular (SW)

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- a) Overview plan with the safety lighting components
 - b) Performance summary with specification of the nominal values,
 - c) A short-circuit current calculation and selectivity assessment of all operating conditions for all consumers connected to the emergency lighting
3. Usability of the installations and peripheral devices applied

5.8.2 Components, construction products and types, installation-specific requirements

- 1. Central/sub-central units
 - a) Network set-up
 - b) Protection against electric shock (S) + (SW)
 - c) Compliance with building regulations (e.g. MLAR [Model Line System Guideline]*, M-EltBauVO [Model Ordinance on the Construction of Operating Rooms for Electrical Installations]*)
- 2. Cable and duct systems
 - a) Function maintenance of the cable and duct systems (SW)
 - b) Interference-free transmission on exclusion of adverse electromagnetic influence (SW)
- 3. Lights
 - a) Suitability for the intended purpose
 - b) Marking (S) + (SW)
 - c) Arrangement (S) + (SW)
 - d) Professional connections (S) + (SW)
 - e) Minimum illumination and uniformity of illumination (S) + (SW)
- 4. Safety lighting distributor
 - a) Technical execution of the overload and short-circuit protection devices,
 - b) Protection against electric shock (S) + (SW)
 - c) Compliance with functional maintenance (SW)
- 5. General lighting distributors
 - a) Undervoltage monitors
 - b) Monitoring of the failure of general lighting circuits

These tests are limited to the necessary switching on of the safety lighting.

5.8.3 Power supply

- 1. Execution in accordance with the specifications in the building permit (safety power supply, including batteries if necessary)

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2. Usability
3. Capacity of the power source to achieve the operating time required under building law (e.g. from special building regulations or documents to be provided)
4. Functional testing of the switching processes between the general power supply and the safety power supply (i.e. switching from GS to SS and back from SS to GS)

5.8.4 Measurement and control technology

Fault messages and display at a suitable location

5.8.5 Interdependencies and links with other installations

Test for absence of interference with other installations, e.g. lighting control for general lighting

5.8.6 Intended interaction (system interaction test)

1. Intended transmission and reception of control commands and/or information to and from safety-related installations, and testing of the corresponding control scenario (control-related sequence)
2. Control systems based on the approved building plans

5.9 Safety power supply systems

5.9.1 General testing requirements

1. Compliance of the technical execution with the documents to be provided (e.g. compliance with the requirements of the fire safety certificate)
2. Compliance of the execution with the technical documentation of the safety power supply
The documentation is to include, in particular (SW):
 - a) Overview plan with components of the safety power supply,
 - b) Performance summary with specification of the nominal values
 - c) A short-circuit current calculation and selectivity assessment of all operating conditions for all consumers connected to the safety power supply system
3. Usability of the installations and components used (e.g. thermal and dynamic design of the components)

5.9.2 Components, construction products and types, installation-specific requirements

1. Backup power source (power unit with generator, static or dynamic systems)
 - a) Suitability for the intended purpose

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- b) Network set-up
 - c) Protection against electric shock (S) + (SW)
 - d) Compliance of the technical equipment execution for the installation room with regard to intended use
 - e) Execution, arrangement and function of the protection, monitoring and alarm detection equipment
 - f) Installation of electrical overload and short-circuit protection devices, (S) + (SW)
 - g) Operating displays
 - h) During the initial test and in the event of significant changes to the installation, proof of acceptance of the operating load, including all connected consumers and power units, taking into account the
 - Voltage as well as the static and dynamic voltage deviations including voltage regulation time in case of load changes
 - Frequency as well as static and dynamic frequency deviation including frequency oscillation width during load changes
 - Harmonic oscillations in the voltage
 - Load including possible unbalanced load
 - i) Management of supply and exhaust air as well as combustion gases (only for power units)
 - j) Suitability of the starting device (only for power units)
2. Cable and duct systems
- a) Function maintenance of the cable and duct systems (SW)
 - b) Exclusion of adverse electromagnetic interference and ensuring interference-free transmission (SW)
 - c) Selected cable cross-sections (e.g. voltage case under exposure to fire [SW])
3. Distribution of the safety power supply
- a) Execution of the overload and short-circuit protection devices and the switching device
 - b) Synchronisation with possible parallel operation
 - c) Resynchronization with uninterrupted switchback to GS network
 - d) Protection against electric shock (S) + (SW)
 - e) Compliance with functional maintenance (SW)

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5.9.3 Power supply

1. Type of design, taking into account the dimensions specified in the documents to be provided
2. Usability
3. Capacity of the power source to achieve the operating time required under building law (e.g. from special building regulations or documents to be provided)
4. Measurement and verification of the fuel supply, taking into account the duration of operation under building law at the initial test and after substantial modification (only for power units)

5.9.4 Measurement and control technology

Test of fault messages and display at a suitable location

5.9.5 Interdependencies and links with other installations

Free from interference from other installations and equipment for the safety power supply

5.9.6 Intended interaction (system interaction test)

1. Intended transmission and reception of control commands and/or information to and from safety-related installations, and testing of the corresponding control scenario (control-related sequence)
2. Control systems based on the approved building plans

5.10 Electrical installations

5.10.1 General requirements

1. Conformity of the technical execution with the documents to be provided (e.g. fire protection certificate)
2. Compliance of the execution with the technical documentation of the electrical installation (SW), the documentation shall include in particular
 - a) Overview plan with the components of the electrical system
 - b) Performance summary with specification of the nominal values,
 - c) A short-circuit current calculation and selectivity assessment for all operating states
 - d) Installation certificates for inaccessible penetration seals (SW)
 - e) Assembly instructions for the penetration seals used (SW)
 - f) Verification of short-circuit and dielectric strength (thermal and dynamic)

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3. Usability of the installations and components used (e.g. thermal and dynamic design of the components)

5.10.2 Components, construction products and types, installation-specific requirements

1. Distribution and consumer systems

- a) Switching systems and transformers over 1 000 V
- b) Main and sub-distributors for the general power supply
- c) Main and sub-distributors of the safety devices according to the testing of technical installations¹ (with the exception of the safety power supply, see Section 5.5)
- d) Control centres for technical systems required under building law, in particular ventilation and smoke and heat extraction systems, including all control cabinets, insofar as they are functionally assigned or relevant to fire protection.

2. Switchgear and transformers up to 1 000 V and over 1 000 V

Visual inspection of the condition of the electrical installations without opening housings: e.g. for externally identifiable damage and defects as well as subsequent and new installations and changes in the use of space

Compliance with special requirements in stowage rooms and installations of a particular type or use, where required under building law

- a) Presence of protection against direct contact (SW)
- b) Adequate covers and penetration seals for cable ducts and openings for pipe and wiring systems (SW)
- c) Required distances and storage areas to or from combustible materials, as well as impermissible storage
- d) Compliant positioning, signage, labelling
- e) Identifiable deficiencies in structural fire protection
- f) Available overload and short-circuit protection (allocation and setting) (SW)
- g) Protection against electric shock (SW)

Functional test of the continuity of the protective conductor on permanently installed devices and sockets in networks with protective conductors and of the protection against indirect contact by measurement (SW).

If the installer can submit an installation protocol for the initial tests according to DIN VDE, the protective measurements against electric shock during the initial test can be limited to spot checks (S).

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3. Additional tests on main and sub-distributors, control cabinets up to 1 000 V
Condition testing of distributors and cabinets by opening housings or covers using, if necessary, tools and test equipment
 - a) Visual inspection
 - Dirt, corrosion, damage inside connecting spaces and distributors (SW)
 - Proper labelling and wiring (SW)
 - Correct allocation and adjustment of overcurrent protection devices to the line cross-sections and the assigned operating equipment (SW)
 - b) Functional test on
 - ba) Residual current devices (RCDs) (SW)
 - bb) Insulation monitoring devices (IMD)
 - bc) End-of-life circuits
 - to verify the shut-down conditions (S)₂ + (SW)₃
 - to verify the shut-down conditions (S)₄ + (SW)
 - For the detection of unauthorised heating of equipment (SW)
4. Cable and duct systems
Visual inspection of:
 - a) Assignments
 - b) Type of installation
 - c) Degree of protection
 - d) Bending radii
 - e) Mountings
 - f) Joint installation of different voltage ranges of voltage level I (voltage range for protective purposes or for signalling, telecommunications, bells, control and reporting systems) and voltage level II (voltage range for application in the technical installation and for production installations)
 - g) Exclusion of adverse electromagnetic interference and ensuring interference-free transmission (SW)

² If any faults are found, insulation measurements must be carried out in full. These are generally to be carried out if a defective installation is suspected, as well as with lighting circuits with chokes and in rooms with a fire hazard. As a guideline, a scope of 10 per cent of the circuits can be considered appropriate.

³ A measurement of the trip current or the contact voltage is necessary for all cases in which the residual current operated circuit breaker protection is required for reasons of personal protection. The RCD breaker must be tripped with the nominal residual current. For cases in which, for operational reasons, it is not possible to check the effectiveness of the residual current operated circuit breaker, this must be done during non-operational periods, or it is possible to rely on operator protocols. For cases in which the RCD breaker provides additional protection in the event of direct contact or protection against fire hazards, then measurement of the tripping current can be omitted.

⁴ If the installer can submit an installation protocol for the initial tests according to DIN VDE, the measurements during the initial test can be limited to spot checks (S).

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- h) Mechanical protection for damage prevention
 - i) Suitability of the wiring types for non-stationary devices
- 5. Penetration seals for cable and duct penetrations
 - Visual inspection of:
 - a) Presence of the installation label
 - b) Correctness of subsequent installations
 - c) Correctness of penetration seals (S).
- 6. Operating equipment
 - Visual inspection of:
 - a) Selection according to ambient conditions and room classification, especially with regard to max. surface temperatures at the assembly point and IP protection class
 - b) External integrity
 - c) Dust deposits (contamination)
 - d) Heat build-up (installation details, distances, assembly)
 - e) Cable and duct penetrations
 - Functional test with regard to:
 - a) Measuring the continuity of the protective conductor (S) + (SW)
 - b) Testing the protective devices (S) + (SW)

5.10.3 Power supply from photovoltaic systems

1. Tests in accordance with Sections 5.10.1 and 5.10.2
2. Tests of accumulators in accordance with Section 5.9.3