The VdS approval process for a water mist system based on a practical example – VdS philosophy, standards and guidelines, practical example

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VdS Schadenverhütung

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Brief Overview

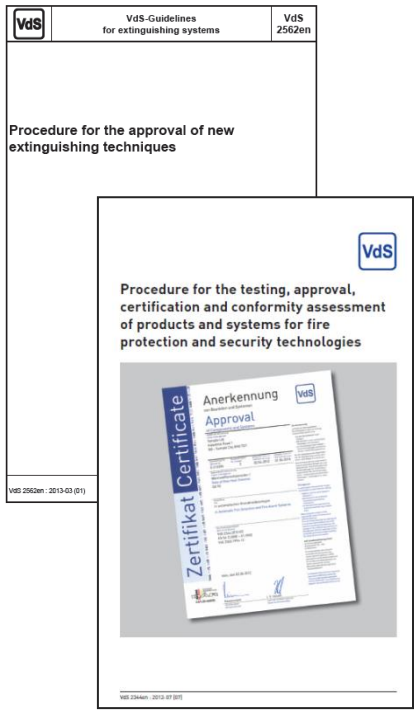
- VdS Schadenverhütung offers a range of approval procedures for water mist systems, e.g. for:
  - Machinery spaces, paint booths, etc.
  - Offices, hotels, multi-storey car parks, etc.

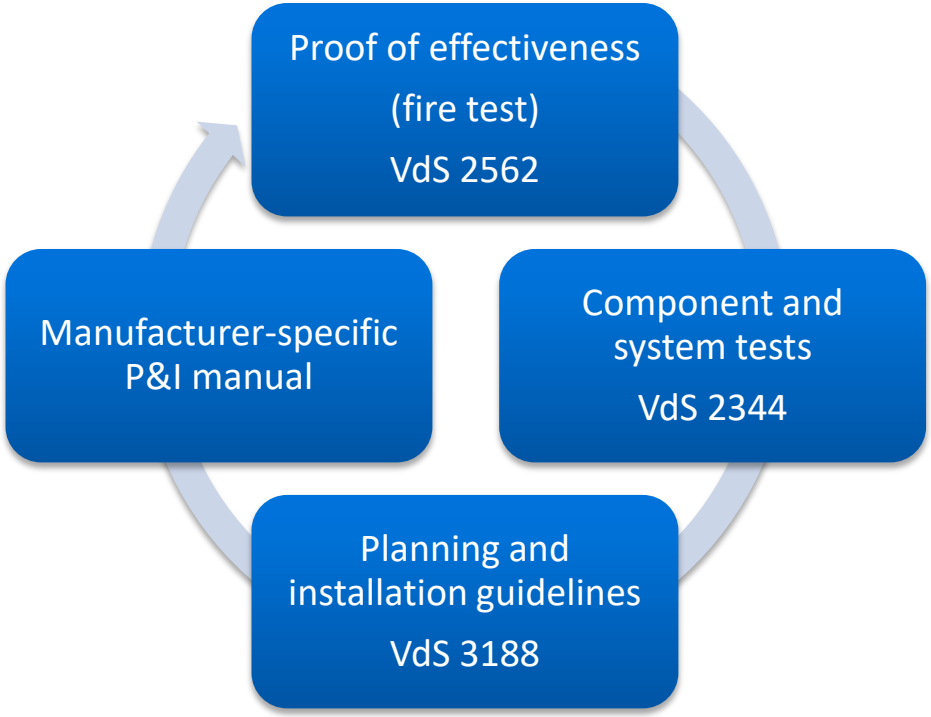
  } Always for a specific area of application

- High demand on the market on VdS approval procedure for water mist sidewall sprinklers for the protection of office and hotel areas
- Introduction of VdS 3188 (12/2015), Annex K → Information on and requirements for selected fields of application

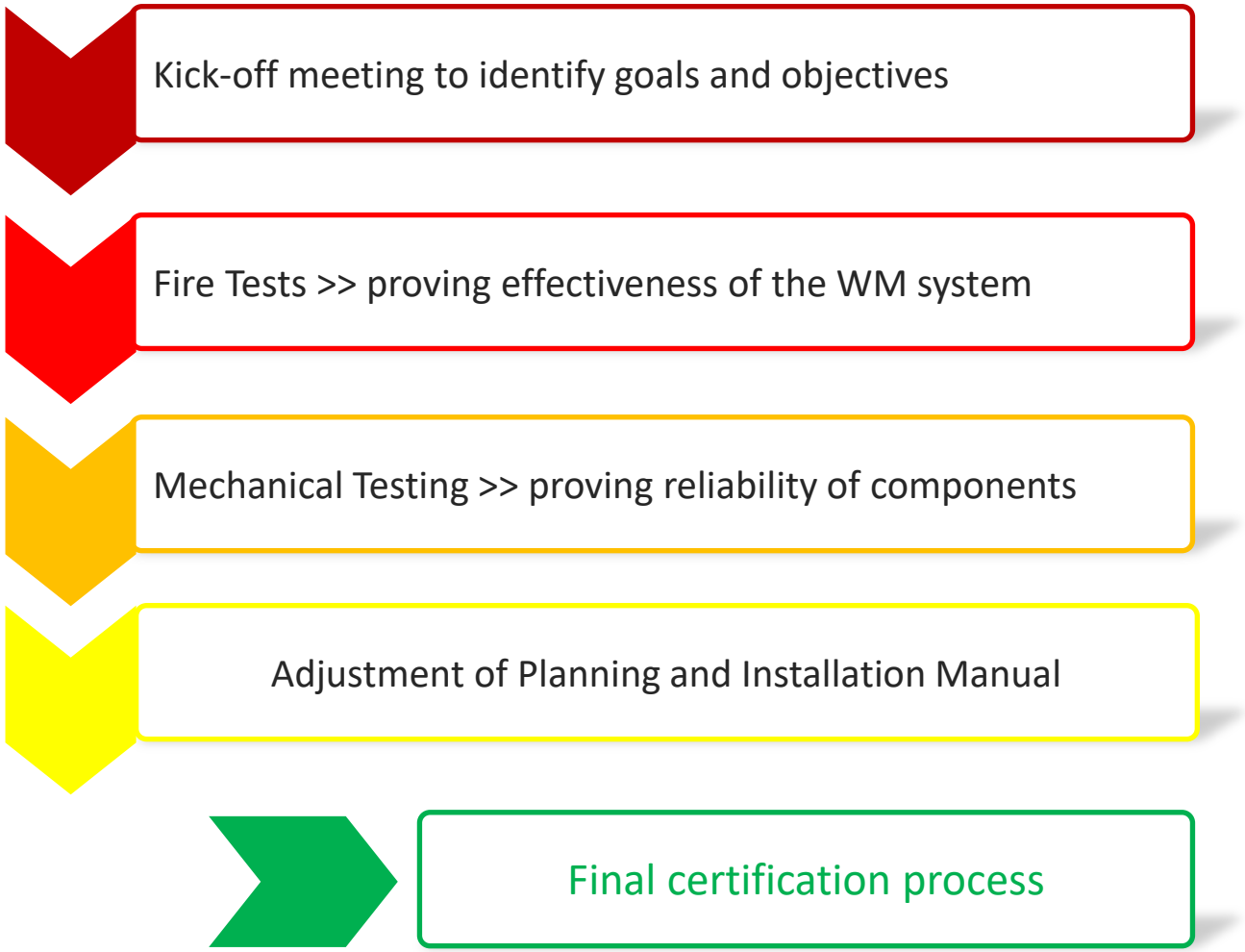
New approval procedure: protection of office and common areas with water mist sidewall sprinklers

Approval procedure (general)



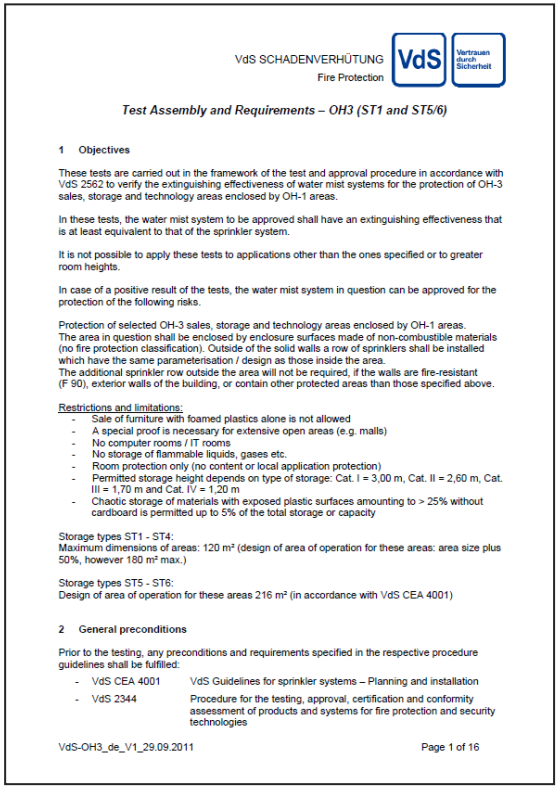


Definition of core tasks



Approval Procedure - Fire Test Protocols

- Fire test protocols for standard applications
- In most cases comparison of water mist system to be approved and sprinkler system acc. to VdS CEA 4001
- Fixed pass/fail criteria, e.g. damage/temperatures
- Design parameters evaluated by tests:
  - Spacing
  - Pressure
  - Ceiling height
  - If applicable:
    - max. room volume (deluge systems)
    - type of storage and containers (flammable liquids)
  - Special concepts or new test protocols where required



VdS SCHADENVERHÜTUNG
Fire Protection

Test Assembly and Requirements – OH3 (ST1 and ST5/6)

1 Objectives

These tests are carried out in the framework of the test and approval procedure in accordance with VdS 2562 to verify the extinguishing effectiveness of water mist systems for the protection of OH-3 sales, storage and technology areas enclosed by OH-1 areas.

In these tests, the water mist system to be approved shall have an extinguishing effectiveness that is at least equivalent to that of the sprinkler system.

It is not possible to apply these tests to applications other than the ones specified or to greater room heights.

In case of a positive result of the tests, the water mist system in question can be approved for the protection of the following risks.

Protection of selected OH-3 sales, storage and technology areas enclosed by OH-1 areas.
The area in question shall be enclosed by enclosure surfaces made of non-combustible materials (no fire protection classification). Outside of the solid walls a row of sprinklers shall be installed which have the same parameterisation / design as those inside the area.
The additional sprinkler row outside the area will not be required, if the walls are fire-resistant (F 90), exterior walls of the building, or contain other protected areas than those specified above.

Restrictions and limitations:
- Sale of furniture with foamed plastics alone is not allowed
- A special proof is necessary for extensive open areas (e.g. malls)
- No computer rooms / IT rooms
- No storage of flammable liquids, gases etc.
- Room protection only (no content or local application protection)
- Permitted storage height depends on type of storage: Cat. I = 3,00 m, Cat. II = 2,60 m, Cat. III = 1,70 m and Cat. IV = 1,20 m
- Chaotic storage of materials with exposed plastic surfaces amounting to > 25% without cardboard is permitted up to 5% of the total storage or capacity

Storage types ST1 - ST4:
Maximum dimensions of areas: 120 m² (design of area of operation for these areas: area size plus 50%, however 180 m² max.)

Storage types ST5 - ST8:
Design of area of operation for these areas 216 m² (in accordance with VdS CEA 4001)

2 General preconditions

Prior to the testing, any preconditions and requirements specified in the respective procedure guidelines shall be fulfilled:

- VdS CEA 4001	VdS Guidelines for sprinkler systems – Planning and installation
- VdS 2344	Procedure for the testing, approval, certification and conformity assessment of products and systems for fire protection and security technologies

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Fire Test Protocols - Impressions








Fire Test Protocol - Scope

Source: https://www.buero100.de/img/buero-1-l.jpg

https://www.zenolicht.de/de/projekte/hotelzimmer.html#&gid=1&pid=1

The test concept applies to the following areas:

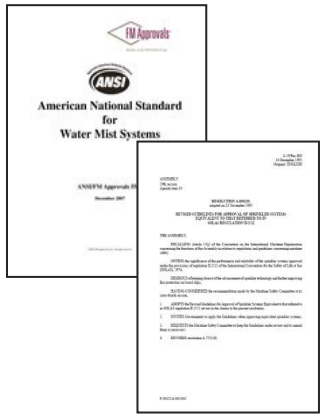
- Offices
- Public areas with low fire loads
- Hotel rooms
- Rooms in hospitals, care homes, retirement homes, nursing homes
- Housing
- Common areas

Fire Test Protocols-Choice of fire loads

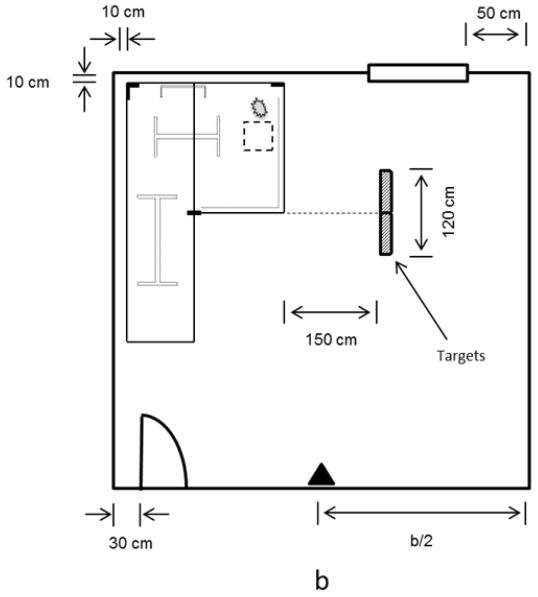
- Standardised office workplace consisting of:
  - Two desks at right angles to each other
  - A padded wooden chair
  - A drawer unit below the desk
  - Folders, stacks of paper, books, newspapers, monitor and keyboard on the desks
  - Plywood partitions around the desks
- Ignition source: gas burner and a pile of wood

Fire Test Protocols-Choice of fire loads

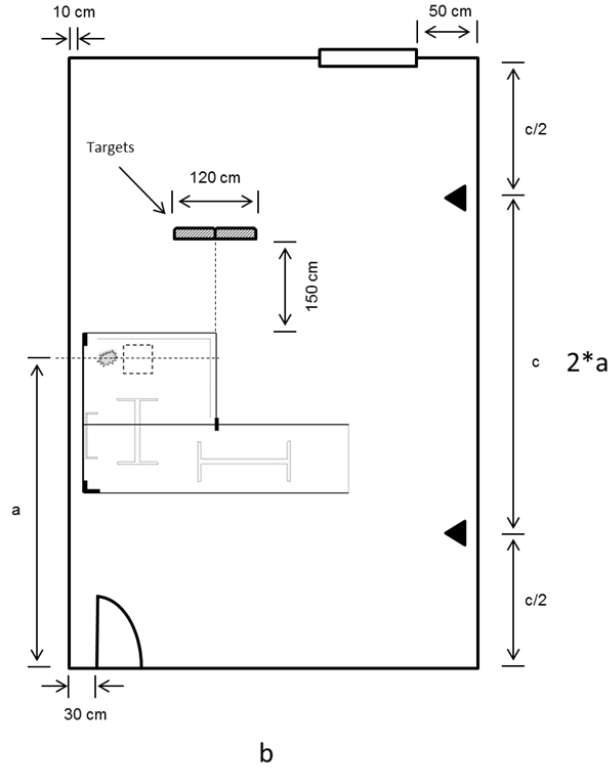
- Standardised test setup consisting of:
  - Metal frames
  - Mattresses
- Ignition source: standardised ignitor



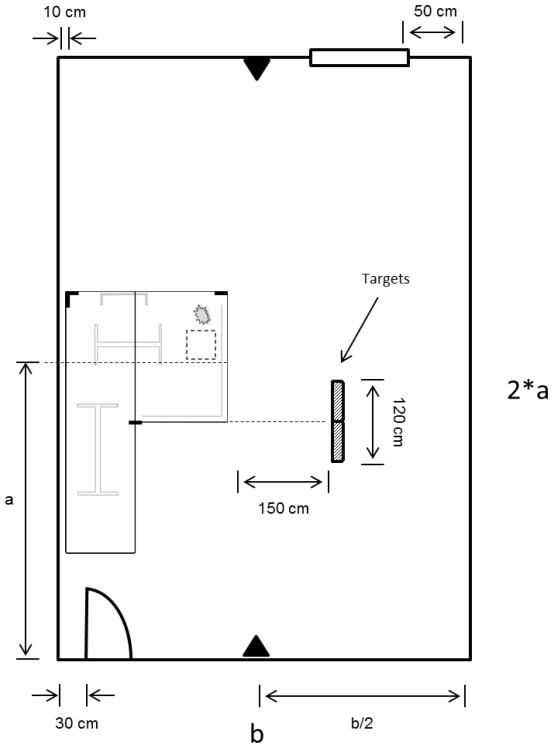
Test room specifications (Office Spaces)



Small test room with one sidewall sprinkler (office setup)



Large test room with two sidewall sprinklers on the long side (office setup)

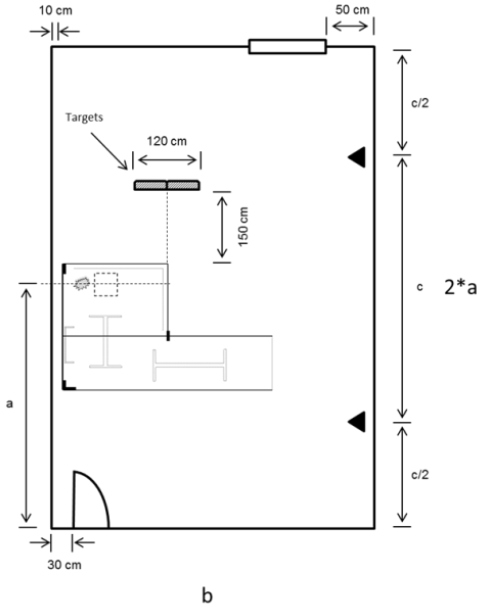


Large test room with two sidewall sprinklers on opposite sides (office setup)

Fire Test Protocols - Safety Factors

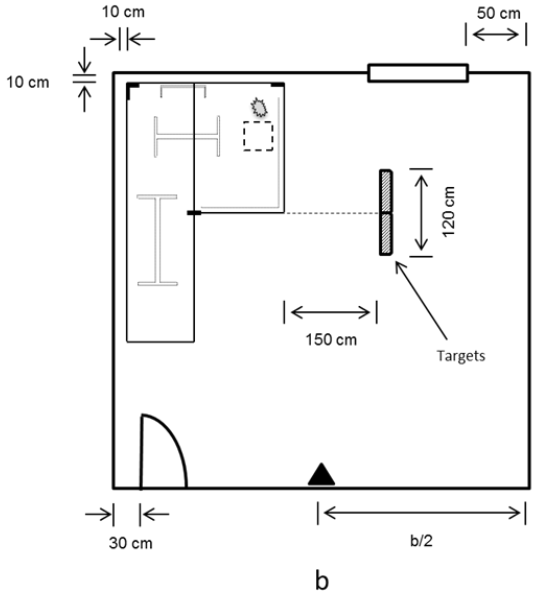
- **In general** fire test concepts take into account
  - the normal operating conditions of the water mist system
  - any operating conditions unfavorable for the water mist system
  - a safety factor to the normal design.
- **Regarding sidewall sprinkler concept**:
  - An open door and an open window represent the worst-case conditions
  - The length of the sides of the room are reduced by 15% for the approval

Configuration of fire loads - Scenarios

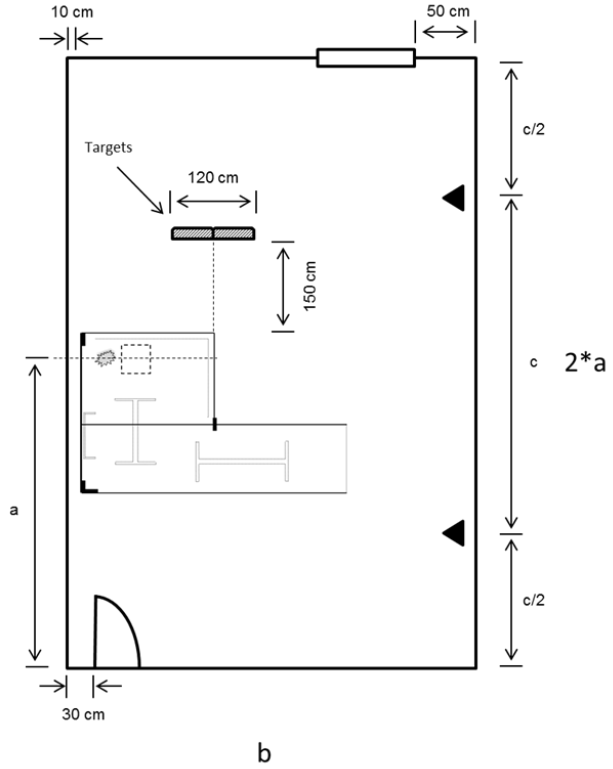


- Tests with **one sidewall** sprinkler:
  - In the corner of the room furthest away from the sidewall sprinkler
  - In the corner of the room next to the wall with the sidewall sprinkler
- Tests with **two sidewall** sprinklers:
  - Where sidewall sprinklers are installed on one of the long walls, halfway between them on the opposite side of the room
  - Where sidewall sprinklers are installed on opposite walls, halfway between them on one of the long sides

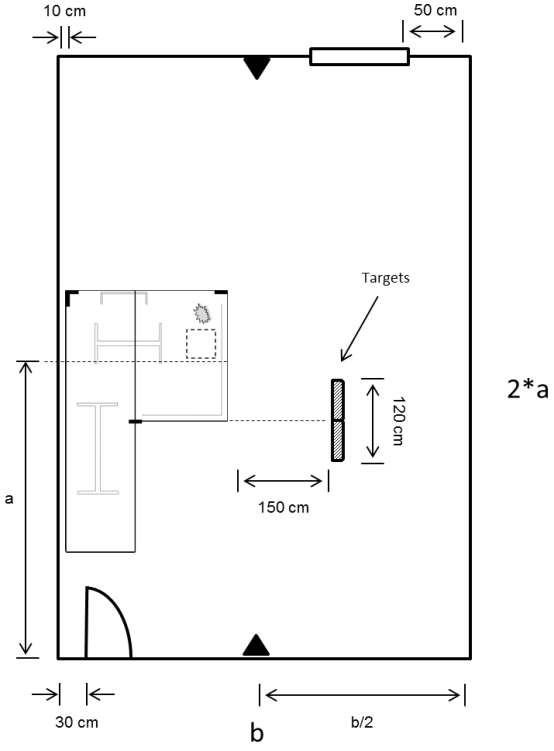
Test room specifications (Office Spaces)



Small test room with one sidewall sprinkler (office setup)



Large test room with two sidewall sprinklers on the long side (office setup)



Large test room with two sidewall sprinklers on opposite sides (office setup)

Fire Test Protocols - Pass/fail Criteria

- **Pass/fail criteria:**
  - The total fire damage of all flammable objects must not exceed 30% (office) or 40% (hotel) [1)]
  - All temperatures must remain below 100°C three minutes after activation of the first water mist sprinkler
  - The targets must not be damaged

[1)] Fixed pass/fail criteria are a new approach for the sidewall sprinkler concept. Usually comparative testing.

Outlook

- For many applications standardised VdS fire test protocols are available
- Fire test concepts covering new applications or project specific requirements may be developed if required
- It is intended to publish all VdS fire test protocols officially soon (VdS XXXX)
- Existing VdS fire test protocols will be revised soon

Thank you for your attention

If You have further questions do not hesitate to contact us

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