



# **Procedure for the Approval of New Protection Concepts**

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## VdS Guidelines for Extinguishing Systems

# Procedure for the Approval of New Protection Concepts

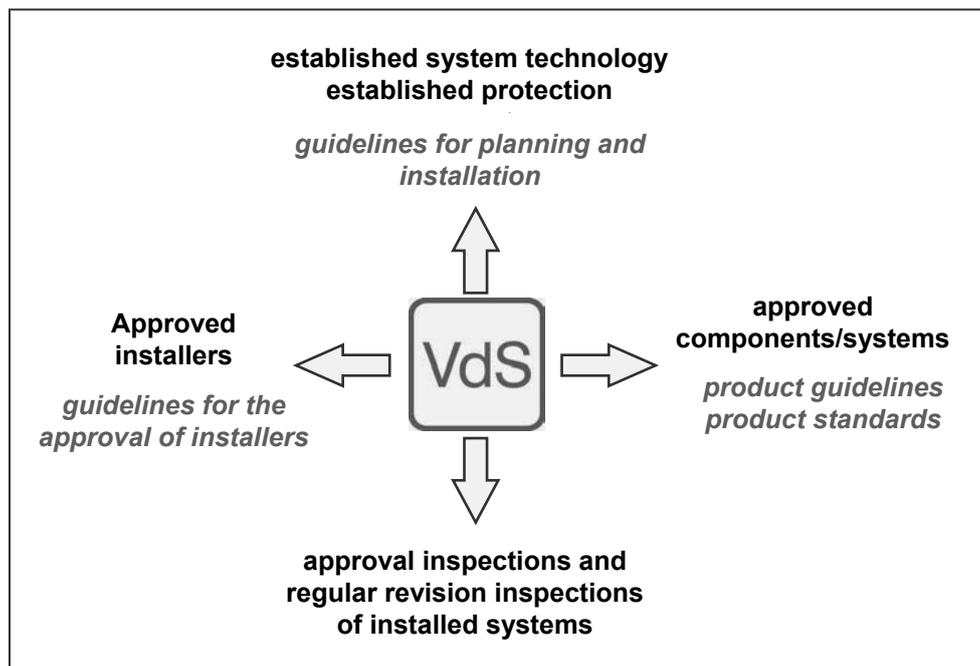
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# 1 Preface

The activities of VdS Schadenverhütung (VdS) in the field of fire protection are aimed at the effectiveness and reliability of installed fire protection systems. Approval inspections and regular revision inspections of installed fire protection systems are carried out to confirm their effectiveness and reliability.

The VdS concept for effective and reliable fire protection systems is shown in Figure 1. It is based on decades of experience and applicable to a variety of system technologies (e.g. sprinkler systems, gas extinguishing systems, fire detection and fire alarm systems).



**Figure 1:** VdS concept for effective and reliable fire protection systems

The effectiveness and reliability of an installed fire protection system can be attested by VdS in the course of an approval inspection, provided that

- guidelines for planning and installation of the system technology (e.g. sprinkler systems, gas extinguishing systems) are available, and
- these guidelines for planning and installation contain the applied protection concept, and
- the system has been installed in accordance with these guidelines for planning and installation by an installer approved for this system technology using products (components, systems) approved for this system technology.

The VdS concept is applicable to a certain fire protection system without any further measures, if all modules of the VdS concept (Figure 1) are available for the system technology and the applied protection concept.

However, this is not always the case, especially with new protection concepts or new system technologies.

In these cases the missing modules of the VdS concept need to be replaced by approvals for the new protection concept or the new system technology. In the procedures for these approvals the extinguishing effectiveness and the reliability shall always be evidenced.

## 2 Scope

These Guidelines specify a procedure for the approval of new protection concepts.

These Guidelines are applicable in the following cases:

- Case A: new protection concept without any product influence;
- Case B: new protection concept with product influence (product influence limited to special performance characteristics of the components discharging the extinguishing agent, especially performance characteristics of products in the protection zone, especially sprinklers or nozzles).

The following table shows the relevant criteria for these cases:

Criteria for the cases	Case	
	A	B
Guidelines for planning and installation of the system technology are available.	yes	yes
Guidelines for planning and installation already include a protection concept for the respective risk.	yes or no	yes or no
The new protection concept can be realised with available approved components and systems, additional performance characteristics are not required.	yes	yes, except for nozzle/ sprinkler
The new protection concept can be realised by approved installers, additional qualifications are not required.	yes	yes

As a general rule, VdS will include any new protection concepts for which the extinguishing effectiveness and reliability have been evidenced, in the respective VdS guidelines for planning and installation, if applicable, after the end of a blocking period (see Definitions).

These Guidelines are not applicable to new extinguishing technologies.

## 3 Definitions

Protection concept: comprehensive instructions for the planning and installation of an extinguishing system for a certain risk (application or individual case).

New protection concept: a protection concept **not** specified in the VdS guidelines for planning and installation.

Blocking period: period of time agreed between client and VdS, after which VdS may include the protection concept in the respective VdS guidelines for planning and installation and use any accompanying documents (specifications of the risk and the protection concept, inspection reports, etc.).

New extinguishing technology: system technology for which VdS guidelines for planning and installation do not yet exist.

## 4 Normative references

These Guidelines incorporate references to other publications. For undated references the latest edition of the publication referred to applies.

**VdS 2344** Procedures for testing, approval and evaluation of conformity of equipment, components and systems of fire protection and security technologies

## 5 General

New protection concepts are products in the sense of the Guidelines VdS 2344 (Procedures for testing, approval and evaluation of conformity of equipment, components and systems of fire protection and security technologies). For the procedures the Guidelines VdS 2344 apply.

Explanations on the use:

- Case A: The procedure only covers the testing and approval of a protection concept.
- Case B: The procedure covers the testing and approval of a protection concept and the testing and approval of nozzles/sprinklers for this protection concept.
- For the testing and approval of the protection concept (Case A and Case B) the provisions for systems of VdS 2344 apply together with these Guidelines.
- For the testing and approval of nozzles/sprinklers the provisions for components of VdS 2344 apply.

## 6 Order, order confirmation, pre-inspection

*Note: Prior to the procedure a meeting should take place to clarify whether and, if so, in what way these Guidelines are applicable under the specific circumstances. The client presents his protection concept and VdS informs the client on the basics of the procedure specified in these Guidelines. In particular, in this meeting it should also be clarified whether and, if so, in what way a blocking period (see Definitions) is to be agreed.*

The procedure is considered as ordered, if an order has been submitted to VdS in accordance with VdS 2344, Annex D, for the testing and approval of a protection concept, and in Case B an additional order in accordance with VdS 2344, Annex D for the testing and approval of nozzles/sprinklers.

*Note: In the following these Guidelines refer to the testing and approval of nozzles/sprinklers only where necessary for clarifying the correlation with the protection concept. The order is processed in accordance with VdS 2344.*

The order for the testing and approval of the protection concept shall be accompanied by the following documents:

- a) a declaration that VdS may include the protection concept in the respective VdS guidelines for planning and installation and may use any accompanying documents (specifications of the risk and the protection concept, inspection reports, etc.), possibly stating a blocking period;
- b) a comprehensive and also detailed specification of the risk to be protected;
- c) possibly required authorisations by other authorities, such as authorisations for extinguishants, measures for the prevention of health risks (employers' liability insurance association);
- d) a comprehensive and also detailed specification of the protection concept.

VdS will confirm the order receipt in writing.

In a pre-inspection the documents submitted by the client will be checked for completeness.

In addition, the information content of documents a) to c) will be checked.

The client will be informed of the pre-inspection result in writing.

The evaluation of the protection concept in accordance with clause 7 can start as soon as a) to c) are fulfilled.

## **7 Evaluation of the protection concept**

### **7.1 Inspection of the specification of the protection concept**

The specification of the protection concept submitted by the client is inspected and evaluated in terms of the following:

- instructions for planning and installation;
- safety philosophy;
- necessity to carry out fire tests;
- necessity to carry out component tests (Case B only).

The specification of the protection concept shall cover and clarify all issues relevant for the planning and installation of the extinguishing systems. Generally, these are only the issues regulated differently in the protection concept than in the VdS guidelines for planning and installation. In such cases the protection concept shall be specified as an amendment to the VdS guidelines for planning and installation, e.g. "The protection concept is to be realised in accordance with VdS CEA 4001 with the following exceptions: ... *[please list the exceptions here]*".

The safety philosophy incorporated in the protection concept (safety factors, redundancies, availability) is evaluated. Required is at least equivalence to the safety philosophy which is incorporated in the protection concepts specified in the relevant VdS guidelines for planning and installation.

The result of the inspection is communicated to the client in writing.

If VdS requires modifications or amendments of the specification of the protection concept, appropriate agreements will be made between the client and VdS. Generally, at this stage any such values are not yet taken into account, which are relevant for the extinguishing effectiveness and which can be fixed only after carrying out the fire and extinguishing tests (e.g. figures for design density or required extinguishing gas concentration). However, safety factors for the normal design of extinguishing systems compared to the design in fire and extinguishing tests should be fixed at this stage already.

If VdS requires fire and extinguishing tests to evidence the extinguishing effectiveness, the appropriate tests will be agreed and carried out as specified in 7.2.

If in Case B VdS requires component tests, the appropriate tests will be agreed and carried out as specified in 7.3 in the procedure for the testing and approval of the nozzles/sprinklers.

## **7.2 Fire and extinguishing tests**

### **7.2.1 General**

Evidence of the extinguishing effectiveness is generally given by means of practice-related fire and extinguishing tests. The significance of a positive test result is checked by at least one repeat test. The number of necessary repeat tests is agreed in advance. The results of all repeat tests shall be positive.

### **7.2.2 Planning**

The fire and extinguishing tests are agreed with the client. They shall

- take into account the normal operating conditions of the extinguishing system(s);
- take into account any operating conditions unfavourable for the extinguishing system(s); and
- verify a safety factor to the normal design of the extinguishing system(s).

These requirements may make necessary several tests under different operating conditions.

Clause 9.1 gives a survey of the issues to be taken into account in the agreement.

### **7.2.3 Preparation**

The fire and extinguishing tests shall be carried out in a fire test room appropriate for these tests. Among others, the following aspects shall be taken into account when choosing the fire test room:

- size of the fire test room – in relation to the fire scenario and the expected smoke gas quantity;
- ventilation – as regards possibilities for supply air and exhaust air before and during the fire and extinguishing test;
- availability of or possibility to install the necessary fire detection and fire alarm technology and extinguishing technology in the fire test room;

- availability of or possibility to install the required system capacity (e.g. pump capacity) and/or extinguishant quantity (e.g. extinguishing water supply);
- possibilities of retention and disposal of extinguishing water for the tests to be carried out.

VdS decides whether the fire test room is appropriate for the tests.

The fire and extinguishing tests shall be organised and carried out by an appropriately qualified body. This body submits a comprehensive documentation of the test setup.

The measurements are generally carried out by VdS. By agreement with VdS the measurements (or subtasks) may be carried out by another body appropriately qualified and equipped (e.g. an independent laboratory accredited in accordance with DIN EN ISO/IEC 17025). This body submits a comprehensive documentation of the measuring technology including calibration verifications.

The documentation of the test setup is checked by VdS for compliance with the agreements made.

In order to ensure that the test results will be and remain valid, already before the tests the client provides evidence that the components to be used in the tests fulfil possible existing formal criteria. Furthermore he orders the VdS laboratories to check and determine those characteristics of the components, which are necessary to know for the validity of the tests.

#### **7.2.4 Procedure**

The fire and extinguishing tests including repeat test(s) are carried out by order of the client and are witnessed by VdS.

After the repeat test(s), all components whose modifications would imply new fire tests are removed from the test setup and handed over to VdS.

#### **7.2.5 Documentation**

The fire and extinguishing tests are generally documented by VdS. If the measurements are carried out and the documentation is done by another independent body accepted by VdS, the test report shall include the documentation of all fire and extinguishing tests and comply with DIN EN ISO/IEC 17025. The test report shall be submitted to VdS.

#### **7.2.6 Evaluation**

If the fire and extinguishing tests evidence the criteria agreed for a positive evaluation, the client – by agreement with VdS – takes into account those design parameters in the protection concept which depend on the result of the tests.

### 7.3 Component tests

*Note: not applicable in Case A.*

*Note: Irrespective of this, the performance characteristics of the components used in the fire test shall be verified at any rate (at least the components discharging the extinguishing agent). Also in this case tests may be necessary, depending on the particular case (see also 7.2.3).*

A procedure-specific test schedule is set up.

The test schedule for the component tests is agreed based on a proposal submitted by VdS.

The test schedule always includes the following modules:

- check of the documentation for the components in consideration of any required authorisations;
- check of the components for compliance with the documentation;
- testing for proof of function and safety of the components (e.g. pressure resistance, functional test at normal temperature);
- testing for proof of reliability of the components (endurance tests, environmental tests, wear resistance tests).

## 8 Certification

With positive evaluation of the fire and extinguishing tests and positive evaluation of the specification of the protection concept and, if applicable, positive results of the component tests a certificate can be issued in accordance with the client's order.

Certificate	Case	
	A	B
Certificate on the approval of a protection concept	yes	yes
Certificate on the approval of a component for a protection concept specified in the certificate	no	yes

The validity of certificates on the approval of a protection concept ends with the end of the blocking period (see Definitions).

## 9 Additional information

### 9.1 Planning of fire and extinguishing tests

Already in the planning stage, agreements for the performance and evaluation of fire and extinguishing tests should be made to avoid, as far as possible, subsequent questions or even the devaluation of tests carried out.

Therefore, the planning of the tests should

- take into account the normal operating conditions of the extinguishing system(s); and
- take into account any operating conditions unfavourable for the extinguishing system(s); and
- verify a safety factor to the normal design of the extinguishing system(s).

Examples for safety factors that can be derived from the fire and extinguishing tests for the subsequent design of the extinguishing system(s) are:

- guarantee for a shorter pre-burn time than that applied in the extinguishing test;
- higher design density than that applied in the extinguishing test;
- longer operating time than extinguishing time in the extinguishing test; and
- larger design quantity than in the extinguishing test.

Under these aspects the agreement for the tests should include the following items:

- a list of all parameters specifying the areas to be protected:
  - aspired values agreed on for these parameters (for the tests);
  - maximum and minimum values agreed on for these parameters (for the extinguishing systems to be installed);
- a list of all parameters relevant for the design of the extinguishing system(s):
  - aspired values agreed on for these parameters (for the tests);
  - maximum and minimum values agreed on for these parameters (for the extinguishing systems to be installed);
- a list of the values to be measured during the tests, each one with all measurement-relevant parameters such as measuring uncertainty, measuring time, etc.;
- all criteria to be fulfilled for a positive evaluation of the tests;
- all criteria to be fulfilled formally by the components to be used in the tests;
- the characteristics of the components to be verified prior to the tests;
- a list of the components to be removed from the test setup after the extinguishing tests and handed over to VdS.

