



# **Procedure for the Approval of New Fire Detection and Alarm Technologies**

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## VdS Guidelines for Automatic Fire Detection and Fire Alarm Systems

# Procedure for the Approval of New Fire Detection and Alarm Technologies

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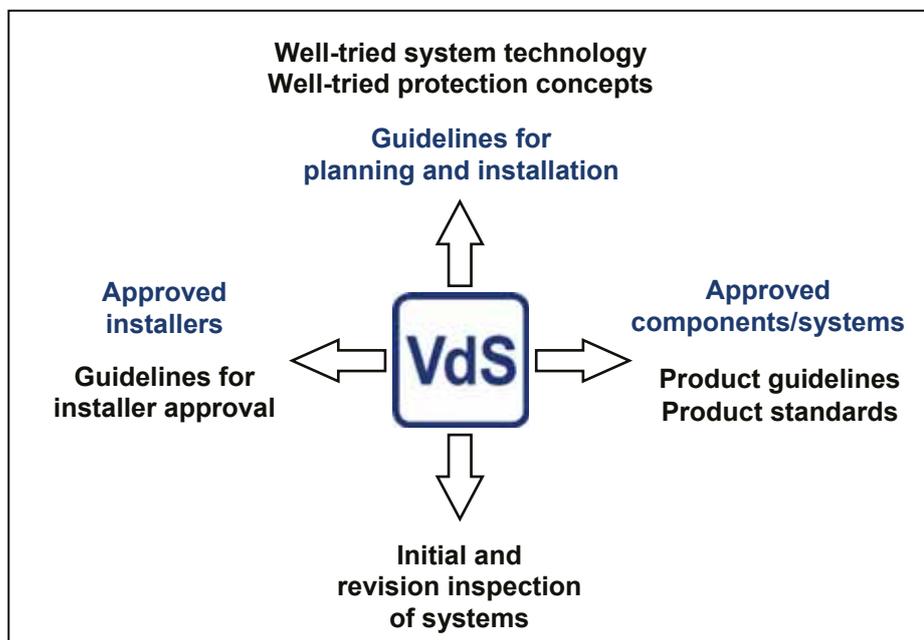
# 1 Declaration of non-binding status

These VdS-Guidelines for procedure for the approval of new fire detection and alarm technologies are binding only if their application has been agreed on an individual basis.

## 2 Foreword

The activities of VdS Schadenverhütung (VdS) in the field of fire protection are geared toward effectiveness and reliability of installed fire protection systems aiming at the protection of life and real values.

VdS has developed and implemented a concept of effective and reliable fire protection systems (see Fig. 1) for many systems (e.g. sprinkler systems, gas extinguishing systems, fire detection and fire alarm systems) - all on the basis of the experience VdS had gained throughout decades.



**Fig. 1:** VdS concept of effective and reliable fire protection systems

One indispensable component of this concept are the VdS-approved products, the reliable functionality of which during the expected lifetime is proven in extensive test procedures.

Today we have European or national standards and other guidelines for many products used in fire detection and fire alarm systems. These are taken as a basis for testing and certification. In addition, *VdS guidelines for planning and installation* describe the proper use of these fire detection and fire alarm products.

*Note: Alarm equipment and voice alarm systems belong to the group of fire detection and fire alarm systems and in the following are included when speaking of "fire detection and fire alarm systems" and "fire alarm technology" or the like.*

Occasionally, there are neither product standards applicable to new and innovative products in the field of fire alarm technology, which would specify requirements and test methods for a product qualification, nor do rules and regulations exist on how to effectively and reliably use them in the risks to be protected.

The present guidelines are intended to close this gap and in an innovation-friendly manner provide for a technical assessment and confirmation of the functionality and efficiency of new products long before any standard-setting body will have developed and published applicable standards.

On the occasion of the initial inspection of a fire detection and fire alarm system by VdS, effectiveness and reliability of this system can be confirmed provided that

- guidelines for planning and installation for this system technology and the corresponding products do exist, and
- the system has been installed in accordance with the guidelines for planning and installation by an installer approved for such system technology and with products (components, systems) approved for such system technology.

The VdS concept is applicable to a particular fire detection and fire alarm system without any further measure if all components of the VdS concept (see Fig. 1) are available for the system technology used.

However, this might not always be the case, especially with new fire alarm technology.

In such cases the missing components of the VdS concept shall be replaced with approvals of the new system technology or of the new products used. The corresponding approval procedures shall always include a proof of effectiveness and reliability. In case of fire alarm technology components this could e.g. refer to the reliable detection of fire characteristics, the effective indication of conditions, or the desired execution of control tasks.

### **3 Scope**

The present guidelines present a procedure for the approval of new fire detection and alarm technologies.

For the client, this procedure provides for:

- a clear and documented course of events;
- a VdS test report regarding the tests carried out with the client's product;
- if the product passes the test, a VdS approval certificate stating conformity of the product with the stipulated defaults as well as its suitability as fire alarm component for a particular case or for a defined field of application.

Moreover, the procedure normally also includes defaults agreed upon regarding installation and servicing of the new fire alarm technology. VdS reserves the right not to accept an order if the client refuses to agree upon such defaults.

This procedure can be offered only if a comparable testing level can be obtained; such testing level results from the requirements stated in other EN 54 standards published already.

This procedure does not apply to products or parts thereof already governed by other EN 54 standards.

## 4 Definitions

In addition to the specifications of VdS 2129 and VdS 2095 the definitions below shall apply:

**New fire alarm technology:** Fire alarm technology for which no product standards accepted by VdS, no other guideline, and no VdS guidelines for planning and installation do exist.

**Blocking period:** Period of time to be agreed upon by the client and VdS, after which VdS will be allowed to use all documents belonging to the approval procedure (e.g. descriptions of the new fire alarm technology, descriptions of the risks, test reports, etc.) for its work on VdS guidelines.

## 5 Normative references

These Guidelines incorporate references to other publications. In case of undated publications, the latest edition shall apply.

<b>VdS 2344</b>	Procedure for the testing, approval and certification of products and systems for fire protection and security technologies
<b>VdS 2129</b>	Guidelines dealing with the approval of installers for fire detection and fire alarm systems (FDAS)
<b>VdS 2095</b>	Automatic Fire Detection and Fire Alarm Systems, Planning and Installation
<b>DIN VDE 0833-4</b>	Alarm systems for fire, intrusion and hold-up – Part 4: Requirements for voice alarm systems in case of fire

## 6 Order

*Note: Before starting the procedure it should be discussed whether and, if so, how these Guidelines shall be applicable in the particular case. On the occasion of this discussion, the client presents its new fire alarm technology and VdS informs the client of the characteristic features of the procedure described in these Guidelines. This discussion should especially be used to agree upon the issue whether and, if so, how a blocking period (see Definitions) shall be stipulated.*

The order (application) is considered to be placed if application follows VdS 2344, Annex D, if it orders the testing and approval procedure of the new fire alarm technology (components and the system if applicable), and when VdS has received this.

The application for testing and approval shall include the enclosures below to be kept by VdS:

- Instructions on planning and installation of the new fire alarm technology. Here, the client shall align to existing VdS guidelines as much as possible and make reference to them. Explanations on how to instruct for planning and installations are given in Annex 1.
- Any deviation from VdS 2095 or other published guidelines for planning and installation (e.g. DIN VDE 0833-4) with description.
- The designated use with detailed description.

- Perhaps required approvals by other bodies, e.g. ATEX certificates, personal protection measures (Employers' Liability Insurance Association "BG").
- A description of the product / system and the corresponding components stating their application limits and how they interact.
- A list of single components with the corresponding documentations of hardware and software.
- Defaults regarding the installation and servicing of the new fire alarm technology, e.g.
  - requirements on the installer of the fire detection and fire alarm system interacting with the new fire alarm technology;
  - minimum intervals and extent of servicing to be effected by the installer;
  - requirements on the installer regarding servicing.

Where required, current versions of these documents shall be enclosed with applications for an extension or a modification of the approval.

## 7 Order of events

The procedure is carried out in the order specified below:

- a) Acceptance of order..... (see 6.1)
- b) Basic stipulations ..... (see 6.2)
  - Stipulated rules and regulations on planning and installation
  - Stipulation to carry out effectiveness tests
  - Stipulation to carry out component tests and system tests if applicable
  - Stipulation on any use of the test results by VdS
- c) Planning of effectiveness tests and their execution..... (see 6.3)
- d) Execution of component tests..... (see 6.4)
- e) Certification..... (see 6.5)

The individual steps of the procedure will be explained in the following.

### 7.1 Acceptance of order

VdS confirms in writing receipt of the order.

Within the scope of a preliminary test, the documents delivered by the client are checked for completeness and sufficient information content. Perhaps required other approvals, such as an ATEX certificate or a proof of conformity for radio components should also be submitted at this time. The client will get written response with the result of the preliminary test.

### 7.2 Basic stipulations

The stipulations of 6.2.1 through 6.2.4 form a common basis for the procedure. In the interest of the client, any measures to be taken later and effects are agreed upon already at the beginning of the procedure or prior to any expensive effectiveness test.

### **7.2.1 Stipulated rules and regulations on planning and installation**

The instructions on planning and installation of the new fire alarm technology, which delivers the client, are examined as to sufficient defaults while taking the designated use into account. Please see Annex 1 for explanations.

The client will get written response with the result of the examination.

If VdS requires modifications or supplements, VdS and the client will stipulate this. As a rule the values of relevance to effectiveness, which can be specified only after the effectiveness tests, are not considered then (e.g. sensitivity, output power).

If the procedure is also intended to define defaults for installation and servicing, examination covers this as well.

### **7.2.2 Stipulation to carry out effectiveness tests**

If VdS requires, e.g. fire tests, to prove effectiveness, the procedure can be continued only upon permission by the client to carry out effectiveness tests as described in Cl. 6.3.

The client agrees with VdS upon extent and types of effectiveness test.

### **7.2.3 Stipulation to carry out component and system tests**

If VdS requires component and system tests to prove functionality, safety, and reliability, the procedure can be continued only upon permission by the client to carry out component and system tests following the steps described in Cl. 6.4.

If not stipulated otherwise, the component and system tests are carried out according to VdS 2344 (Procedure for the testing, approval and certification of products and systems for fire protection and security technologies).

VdS defines the extent and types of component and system tests taking already existing test procedures for comparable or similar devices as a basis.

Specific tests of the technology may become necessary.

### **7.2.4 Stipulation on any use of the test results by VdS**

The procedure can be continued only upon the client's declaration that VdS will be allowed to use all documents belonging to the approval procedure (e.g. descriptions of the new fire alarm technology, descriptions of the risks and protection objectives, test reports, etc., except for the hardware and software documentation) for its work on VdS guidelines and upon having stipulated a blocking period if the client requires this.

## **7.3 Planning of effectiveness tests and their execution**

### **7.3.1 General**

Proof of effectiveness is normally established with practice-oriented fire and function tests. The validity of a positive test result is verified by at least one repeat test. The number of required repeat tests is stipulated in advance. The results of all repeat tests shall be positive.

### **7.3.2 Planning of effectiveness tests**

The client agrees with VdS upon the effectiveness tests. They shall

- allow for the normal conditions of use of the new fire alarm technology and
- allow for the most unfavourable conditions of use.

These requirements can call for multiple tests under different conditions of use.

### **7.3.3 Preparation and execution of effectiveness tests**

Prior to execution, normally the VdS draws up a test concept. This includes the main aspects of the test set-up, the test scenarios, and the sequence. Furthermore, it formulates the criteria for a positive test result.

The effectiveness tests shall be carried out in an environment suitable for the tests (e.g. fire test room).

VdS decides whether the environment is suitable for the planned tests.

As a rule, VdS organises and carries out the effectiveness tests. VdS draws up a complete documentation of the test set-up, all in compliance with the stipulations made.

VdS carries out the tests and takes the readings. By agreement with VdS, the readings can be taken (in whole or in part) by a second office proving corresponding qualification and with appropriate equipment (e.g. an independent laboratory accredited for this purpose acc. to DIN EN ISO/IEC 17025). This office shall provide complete documentation of the measuring equipment, incl. calibration verifications.

To guarantee applicability of the test results, the client shall prove already before starting the tests that the components used in the test comply with perhaps required formal criteria. Moreover, the client shall have those components characteristics verified or determined in the VdS laboratories, the knowledge of which is required to validate the tests.

VdS shall document the effectiveness tests. If an independent body accepted by VdS takes the readings and prepares the documentation, the test report shall include all tests and comply with DIN EN ISO/IEC 17025. Normally, VdS gets the test report in German and/or English.

### **7.3.4 Analysis of the effectiveness tests**

If the criteria stipulated for a positive assessment are proven to be met in tests, the client in cooperation with the VdS shall consider those design parameters, which are dependent on the test result, in the instructions on planning and installation.

## **7.4 Component and system tests**

The test plan for the component and system tests (the "product test" in the following) is agreed upon using a proposal of VdS as the basis. The product test shall be divided as follows:

- Examination of the documentation of products in consideration of perhaps required approvals by authorities or other bodies.
- Examination for compliance of the products with the documentation.
- Tests to prove function and safety of the products (e.g. response behaviour of a detector, function test at operating temperature).
- Tests to prove the reliability of products (long duration tests, environmental tests, wear resistance tests).
- If required tests of the connectivity or compatibility within a fire detection system.

VdS carries out the component and system tests.

## **7.5 Certification**

Based on the positive assessment of the effectiveness tests, the submission of the stipulated instructions on planning and installation, and the positive product test result, VdS may issue an approval certificate as applied for in the order including a description of the purpose.

## Annex A                      Examples of instructions on planning and installation of the new fire alarm technology in the fire detection and fire alarm system

The instructions aim at the provision of all information required for planning and installation of the new fire alarm technology.

It should include definite information as follows:

- State the risks which can be protected / reduced.
- State the protection objective achieved in those risks.
- How do you achieve the protection objective?
- Describe the design and installation of the new fire alarm technology in the monitoring area.
- State the required personal protection measures.
- How can faults and false alarms be prevented or minimised?

The tables below list exemplary keywords and defines the information required.

### State the risks which can be protected / reduced.

Keywords	Documents
<ul style="list-style-type: none"> <li>– Description of the monitoring area               <ul style="list-style-type: none"> <li>– Length</li> <li>– Width</li> <li>– Height</li> <li>– surface area</li> <li>– volume</li> <li>– angles</li> <li>– temperature ranges</li> <li>– inside / outside use</li> </ul> </li> <li>– Fire load / stored goods in monitoring area</li> <li>– Use of the monitoring area</li> </ul>	<p>Characteristic description of the risks to be protected/minimised, including a list of all parameters with maximum and minimum values</p> <p>Characteristic description of the number of devices (fire load density), including a list of all parameters with maximum and minimum values</p>

**State the protection objective achieved in those risks.**

Keywords	Documents
Room protection Protection of single objects	Description of the protection objective aimed at

**How do you achieve the protection objective?**

Keywords	Documents
Sensitivities Climatic suitability Environmental influences (e.g. dust, steam) Power supply	Description of the design in this regard

**Describe the design and installation of the new fire alarm technology in the monitoring area.**

Keywords	Documents
Installation heights Monitoring areas Signalling areas Lines and pipes Settings	Characteristic configuration of the new fire alarm technology, including a list of all parameters that are important to the configuration with maximum and minimum values (relating to the risk information)

**State the required personal protection measures.**

Keywords	Documents
Protection against optical radiation Protection against noise	If required description of the corresponding defaults

## **Annex B            Technical documentation**

The extent of technical documentation is determined by the following:

- Data collection for all components used
- Documentation of the features guaranteed by the manufacturer (component features and characteristics when the component interact in the fire detection and fire alarm system), including the application limits
- Component tests
- Test of the functional interaction of components (system test)
- Check of constant quality of the components (product-specific external quality check)

To take these measures, normally the following documents are required and, consequently, to be enclosed with the order:

- List of all components used
- Data sheets, manufacturing documents, functional descriptions, as well as instructions on installation and maintenance for all components
- Schematic drawing of all links between the components (system layout)
- Description of the functional interaction of components (functional description of the system)

## Annex C Exemplary test plan for a component test

No.	Requirement / test	Conditions
1	Function tests	acc. to manufacturer's specifications
2	Requirements for software controlled devices	VdS 2203
3	Power supply equipment	EN 54-4
4	Cold (operational)	-25 °C / 16 h
5	Damp heat, steady state (operational)	40 °C, 93 %, 4 d
6	Damp heat, steady state (endurance)	40 °C, 93 % 21 d
7	Damp heat, cyclic (operational)	25 °C, > 95 %, 55 °C, 93 %, 2 cycles
8	Damp heat, cyclic (endurance)	25 °C, > 95 %, 55 °C, 93 %, 6 cycles
9	Sulphur dioxide corrosion (endurance)	25 °C, 93 %, 25 ppm SO <sub>2</sub>
10	Impact test (operational)	0.5 J, 3 hits per point
11	Shock test (operational)	e.g. 800 m/s <sup>2</sup> (for devices <4.75 kg)
12	Vibration, sinusoidal (operational)	10...150 Hz, 5 m/s <sup>2</sup> 1 cycle
13	Vibration, sinusoidal (endurance)	10...150 Hz, 10 m/s <sup>2</sup> 20 cycles
14	Electromagnetic compatibility (EMC)	EN 50130-4: 2011
15	Variation in supply parameters (operational)	acc. to manufacturer's specifications