



# **Wet alarm valve stations**

## **Requirements and test methods**

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## VdS Guidelines for water extinguishing systems

# Wet alarm valve stations

## Requirements and test methods

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# 1 Scope

These guidelines specify requirements, test methods and performance characteristics for wet alarm valve stations for the use in sprinkler systems according to VdS CEA 4001.

*Note: The smallest sprinkler in VdS CEA 4001 is currently K 57. As a rule, the range of the alarm threshold permitted in EN 12259-2 (10 l/min to 80 l/min) is not sufficient when using smaller sprinklers.*

*Note: A **wet alarm valve** is installed in the vertical water supply riser of a sprinkler system. The entire sprinkler piping network is filled with water. When one or more sprinkler open, water flows through the wet alarm valve into the sprinkler piping network. Alarm equipment is operated simultaneously by a branch stream.*

*Note: A **wet alarm valve station** is based on a wet alarm valve. A water drain valve, pressure gauges for the water supply pressure and the piping network pressure, an alarm test valve, an alarm shut-off valve, an alarm pressure switch and, if applicable, an alarm retard device complete the wet alarm valve to a wet alarm valve station, together with the necessary connection piping.*

*Note: Wet alarm valves are not a complete functional unit. With regard to the functional reliability and the durability of sprinkler systems, the VdS guidelines for sprinkler systems – design and installation – require the use of wet alarm valve stations that have been tested and approved as a complete unit. Thus, a VdS Approval is issued only for a complete wet alarm valve station as an unit.*

# 2 Normative references

These Guidelines incorporate, by dated or undated references, provisions from other publications (e.g. European Standards EN or International Standards IEC), which are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to these Guidelines only when incorporated in them by amendment or revision. For undated references the latest edition of the publication referred to applies.

VdS CEA 4001	VdS Guidelines for sprinkler systems – Planning and installation
EN 12259-2	Fixed firefighting systems – Components for sprinkler and water spray systems – Part 2: Wet alarm valve assemblies
ISO 7-1	Pipe threads where pressure-tight joints are made on the threads – Part 1: Dimensions, tolerances and designation
EN ISO 228	Pipe threads where pressure-tight joints are not made on the threads – Part 1: Dimensions, tolerances and designation
EN 1092-2 und -3	Flanges and their joints – Circular flanges for pipes, valves, fittings and accessories, PN designated
EN 764-1	Pressure equipment – Part 1: Terminology – Pressure, temperature, volume, nominal size

### 3 Definitions

For the purpose of these guidelines the definitions of EN 12259-2 apply.

**Maximum allowable pressure:** maximum pressure for which the device is designed according to the manufacturer specifications (EN 764-1).

*Note: The maximum allowable pressure corresponds to the pressure specified as rated working pressure in EN 12259-2.*

### 4 Requirements

#### 4.1 General

**4.1.1** The requirements of the standard EN 12259-2 do apply and, in addition, the requirements determined in the following sections.

**4.1.2** The manufacturer shall specify the upper limit value of the alarm threshold. The value shall be valid for the whole operating range and shall not exceed 80 l/min.

*Note: The permitted range of the alarm threshold is 10 l/min to 80 l/min according to EN 12259-2.*

The specified alarm threshold is checked during all corresponding tests and stated in the Approval (e.g. alarm threshold 40 l/min).

**4.1.3** The wet alarm valve and its moving parts shall not show any deformation, cracks, delamination, detachments, displacements or other failures during the flow test according to 5.2.2.

*Note: The flow test according to 5.2.2 completely covers the test according to EN 12259-2, Annex E.1.*

**4.1.4** The manufacturer shall specify the upper limit value of the retard time. The value shall be valid for the whole operating range and shall not exceed 90 s.

*Note: The permitted range of the retard time is 5 s to 90 s according to EN 12259-2.*

The specified retard time is checked during all corresponding tests and stated in the Approval (e.g. tested retard time < 60 s).

#### 4.2 Marking

Wet alarm valve stations shall be marked with following details:

- Name of manufacturer or supplier or his trademark
- Type designation
- Year of manufacture
- Nominal size of valve
- Maximum allowable pressure of the alarm valve station
- Flow direction of valve

The marking shall be non-detachable, non-flammable and permanent. It shall be well legible.

### 4.3 Connections

The piping within the station shall consist of galvanized steel pipe or equivalent material and shall have a minimum nominal size of DN 15. With superior material, e.g. copper pipe, DN 10 is sufficient.

Wet alarm valve stations shall be equipped with following connection points:

- Pressure gauge connections Rp 1/2 (ISO 7-1) or G 1/2 (ISO 228) for the pressure indication at the supply side and at the outlet side.
- Connection for alarm devices DN 20.
- Connection for the drainage of the alarm valve at least DN 20 (see EN 12259-2).

The connection for the drainage of the alarm valve may be specified for the drainage of the piping network as well if it is designed with DN 50.

### 4.4 Function

When a sprinkler opens, water begins to flow through the wet alarm valve station. The result is that the alarm connection is supplied with water via the valve clapper and further equipment such as annular gap or auxiliary valve.

The alarm threshold shall at least fulfill the requirements according to EN 12259-2 (lower limit value 10 l/min; upper limit value 80 l/min). As an option, the manufacturer can restrict the upper limit value of the response threshold by own specifications (see also 5.1). In this case the response threshold shall also fulfil the specifications of the manufacturer.

The alarm shall stop automatically when the water flow is terminated and the alarm line shall drain automatically.

It shall not be possible for any water to flow from the sprinkler pipework through the wet alarm valve station towards the water supply. The operation of the wet alarm valve station shall be guaranteed within a pressure range from 1.5 bar to the maximum allowable working pressure.

### 4.5 Pressure resistance

The maximum allowable pressure of the wet alarm valve station shall be at least 12 bar. The body shall be made of metal with a melting point > 800°C. For pressures > 12,5 bar, the body shall be made of ductile material e.g. ductile cast iron or at least equivalent material.

### 4.6 Equipment

The wet alarm valve station shall consist of following components which shall meet the requirements specified:

- Drain valve

The drain valve shall be capable of removing all water from the alarm valve station. The dimension of the drain valve derives from section 4.3.

- Pressure gauge

For the indication of pressure at the supply side and at the outlet side pressure gauges shall be provided with R 1/2 or G 1/2 connection, housing diameter of at least 100 mm, accuracy class 1.6, scale intervals of at least 0.5 bar and an adequate display range (starting at 0 bar). Shut-off valves with pressure relief feature shall be provided.

- Alarm test valve

The alarm test valve shall have a K-factor  $\leq 57$  and allow to take water from the outlet side.

- Alarm pressure switch

Alarm pressure switches shall be VdS approved.

- Drain valve for the alarm line

The drain valves shall be designed such that the line between the alarm valve and the water motor alarm is always kept free from water except in case of alarm. For this reason there shall be permanent a visible outlet opening for drainage with a K-factor between 2 and 5. If the alarm valve station requires drainage of larger volumes of leakage water, it is allowed to install a device which at a water discharge rate of maximum 25 l/min reduces the opening in the drain valve to a K-factor between 2 and 5, so that the alarm will be triggered. To allow a quick draining after an alarm test, the drain valve may incorporate a manual actuator which enlarges the drain opening. If the manual actuator is not operated, the drain opening shall automatically reduce its size to a K-factor between 2 and 5. The drain valve shall have a visible outlet. The required alarm actuation volume shall not be affected by the drain valve.

- Retard device

see EN 12259-2

- Alarm shut-off valve

The alarm shut-off valve is used to interrupt the alarm sound during operation.

In addition, the wet alarm valve station may be equipped with a main shut-off valve. This main shut-off valve shall be VdS approved.

Alarm valve stations shall be either completely assembled in the factory or delivered as kit of not more than five pre-assembled subunits (gauges, pressure switch, monitoring switches etc are exempted) that can be easily assembled on site.

#### 4.7 Labelling and operating instructions

The alarm test valve and the alarm shut-off valve shall be marked appropriately as well as their operating positions.

An operation manual shall be issued for each wet alarm valve station. It shall be durable and permanent and shall contain the following details:

- a graphic representation of the wet alarm valve station which makes it possible to identify the functional components of the station and their operational condition.
- a key identifying the functional components in the station.
- a description of the functional sequence.
- an instruction for the operating sequence until operational readiness.
- an instruction for restoring the operational readiness after a fire.
- an instruction for conducting trial alarms and functional tests.
- an instruction for periodic maintenance.

*Note: The instruction for periodic maintenance may also be a separate document.*

## **5 Test methods**

### **5.1 Compliance test**

A visual and dimensional check is made to determine whether the test samples correspond to the description in the technical documentation (drawings, parts list, functional descriptions, instructions for operation, maintenance and installation) and comply with the verifiable requirements of these guidelines.

### **5.2 Test of the performance characteristics**

**5.2.1** The test of the performance characteristics of wet alarm valve stations is carried out in tests according to EN 12259-2.

The additional requirements of these guidelines are included in these tests.

**5.2.2** A flow test is conducted according to EN 12259-2, Annex E.1, however with a higher flow velocity of 7.5 m/s and a longer flow time of 90 min.

### **5.3 Other tests**

Where special designs or new manufacturing methods make it necessary, additional tests will be conducted in agreement with the manufacturer.