



# **K 160 Sprinklers**

## **Requirements and test methods**

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## VdS Guidelines for water extinguishing systems

# K 160 Sprinklers

## Requirements and Test Methods

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## Declaration of non-binding status

These VdS Guidelines for Water Extinguishing Systems, K 160 sprinklers, Requirements and test methods, VdS 2100-35en, are binding only if their application has been agreed on an individual basis.

### 1 Scope

These guidelines specify requirements and test methods for spray pattern sprinklers with K-Factor 160 for the use in sprinkler systems according to VdS CEA 4001.

These guidelines specify requirements and test methods for these sprinklers

- by reference to the European Standard for Sprinklers (EN 12259-1) or
- by description of requirements and test methods in these guidelines.

### 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.

<b>VdS CEA 4001</b>	VdS Guidelines for sprinkler systems – Planning and installation
<b>EN 12259-1:2006 (EN 12259-1:1999 + A1:2001 + A2:2004 + A3:2006)</b>	Fixed firefighting systems – Components for sprinkler and water spray systems – Part 1: Sprinklers

### 3 Definitions

For the purpose of these guidelines the definitions of EN 12259-1:2006 and the following definitions apply:

**K 160 sprinkler:** Spray sprinkler with a flow constant nominal K-factor value of 160.

## 4 Requirements and test methods

### 4.1 General

K 160 Sprinklers shall fulfil the requirements for spray sprinklers of EN 12259-1:2006, except when otherwise stated in the subsequent clauses.

K 160 Sprinklers shall be tested in accordance with the test methods for spray sprinklers of EN 12259-1:2006, except when otherwise stated in the subsequent clauses.

## 4.2 Dimensions

Note: This clause applies instead of EN 12259-1:2006, clause 4.2.1.

The nominal diameter of the orifice and the corresponding thread size of K 160 sprinklers shall be suitable for use with pipe threads given in table 1. Nominal thread sizes shall be suitable for fittings threaded in accordance with ISO 7-1.

Nominal diameter of orifice [mm]	K-factor [l min <sup>-1</sup> bar <sup>-1/2</sup> ]	Nominal pipe thread size [in]
25	160	1/2 or 3/4

**Table 1:** Orifice and Thread Dimensions of K 160 sprinklers

## 4.3 K-Factor

Note: This clause applies instead of EN 12259-1:2006, clause 4.5.1.

The discharge coefficient (K-factor) shall be within the range given in table 2, when determined in accordance with EN 12259-1:2006, Annex C.

Nominal diameter of orifice [mm]	K-factor [l min <sup>-1</sup> bar <sup>-1/2</sup> ]	
	Sprinklers other than dry types	Dry sprinklers
25	160 ± 8	160 ± 13

**Table 2:** K-factor of K 160 sprinklers

## 4.4 Water distribution

Note: This clause applies instead of EN 12259-1:2006, clause 4.5.2.1.

4.4.1 When K 160 sprinklers are tested in accordance with 4.4.2 (of these guidelines), using the parameters given in columns 3, 4 and 5 of Table 3, the number of containers in which the quantity of water corresponds to less than 50 % of the water coverage specified in column 6 of Table 3 shall not be more than the appropriate maximum specified in column 7 of Table 3.

1	2	3	4	5	6	7
Nominal diameter of orifice [mm]	K-factor [l min <sup>-1</sup> bar <sup>-1/2</sup> ]	Flow rate per sprinkler [l/min]	Measurement area [m <sup>2</sup> ]	Sprinkler spacing [m]	Water coverage [mm/min]	Maximum number of containers with a lower content of water
25	160	112,5	9,00	3,0	12,5	3
25	160	270,0	9,00	3,0	30,0	3

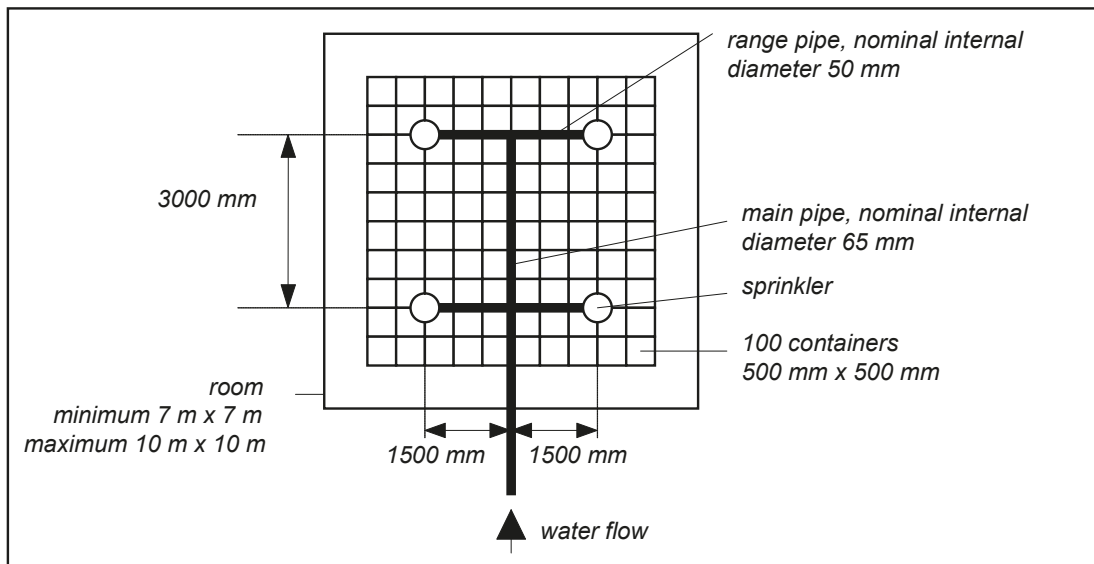
**Table 3:** Water distribution parameters of K 160 sprinklers

**4.4.2** Install, in a test chamber of minimum dimensions 7 m x 7 m and maximum dimensions 10 m x 10 m, four K 160 sprinklers of the same type, arranged in a square, on piping prepared for this purpose. Use the arrangement of the piping, sprinklers and containers shown in figure 1. Ensure the yoke arms of the sprinklers are parallel to the range pipes.

Position upright sprinklers with a distance of  $(50 \pm 5)$  mm and pendent sprinklers with a distance of  $(275 \pm 5)$  mm between the ceiling and the deflector.

Collect the water for a period of at least 120 s or until a measurement has been recorded. Measure the water distributed over the measurement area between the four sprinklers by means of square measuring containers with sides of  $(500 \pm 10)$  mm, positioned with a distance of  $(2,7 \pm 0,025)$  m between the ceiling and the upper edge of the measuring containers. Position the measuring containers centrally in the room, beneath the four sprinklers as shown in figure 1.

Determine the number of containers in which the quantity of water corresponds to less than 50 % of the water coverage given in table 3, column 6.



**Figure 1:** Layout of water distribution test chamber (measurement area 9 m<sup>2</sup>)

## 4.5 Water distribution below the deflector

*Note: This clause applies instead of EN 12259-1:2006, clause 4.5.2.3.*

**4.5.1** When K 160 sprinklers are tested in accordance with 4.5.2 the proportion of the water discharge below the deflector shall be within the range of 80 % to 100 %.

**4.5.2** The test shall be done according to EN 12259-1:2006, Annex D.3 with the following exception:

- the flow rate shall be 120 l/min.