



Pipe fasteners for metal roof

Requirements and test methods

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VdS Guidelines for water extinguishing systems

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1 Scope

These guidelines specify requirements and test methods for pipe fasteners for metal roof (trapezoidal sheet metal) for the installation in stationary water extinguishing systems according to VdS CEA 4001 and VdS 2109 that can be used to affix pipe hangers for pipes up to DN 50 to trapezoidal sheet metal roofs.

Note 1: The requirements and test methods relate only to the fastener itself (sufficient load capacity and reliable fixation to trapezoidal sheet metal according to DIN 18807). The requirements and test methods are not related to the load capacity of trapezoidal sheet metal/trapezoidal sheet metal roofs.

Note 2: The minimum requirements for pipe hangers (especially rated load, e.g. 2000 N for DN 50) cover the use according to VdS CEA 4001 with the maximum distance between two pipe supports specified there as 4 m. These minimum requirements apply also to pipe fasteners for metal roof.

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.

DIN 18807-1	Trapezoidal sheeting in buildings – Steel trapezoidal sheeting – General requirements, determination of the bearing strength by calculation
VdS CEA 4001	Guidelines for sprinkler systems – Planning and installation
VdS 2109	Guidelines for water spray systems – Planning and installation

3 Definitions

For the use of these guidelines the following definitions apply:

not applicable

4 Requirements

4.1 Technical documentation

The following documents are required:

- a) Manufacturing documents:
 - Assembly drawing;
 - All detail parts drawings;

The marking according to 4.2 shall be documented in the drawings.

- b) User documentation:
- Data sheet; and
 - installation instructions.
- c) List of documents:
- A list (with own designation, drawing no., revision state, date) containing all above mentioned documents (each with designation, drawing number, revision state and date).

4.2 Marking

Pipe fasteners for metal roof shall be marked with following details:

- Name or trade mark of the manufacturer/supplier;
- Model designation;
- „VdS“.

This marking shall be non-detachable, non-flammable, permanent and well legible in mounting position. Marking by means of adhesive foil or similar measures is not acceptable.

4.3 Design

4.3.1 Pipe fasteners for metal roof shall be made of corrosion resistant or galvanised steel.

4.3.2 Pipe fasteners for metal roof shall provide at least the performance characteristics shown in Figure 4/01.

Nominal pipe size (pipe hanger)	Minimum thickness [mm]	Minimum cross section [mm ²]	Rated load [N]	Minimum load at yield [N]	Minimum thread size for tensile load
≤ DN 50	2,5	25	2000	4000	M8

Figure 4/01: Performance characteristics

4.3.3 Normal forces and shear forces shall be transferred by positively secured connection. Purely non-positive connection is not acceptable.

4.3.4 Threaded rods in toggle fixings shall be secured against getting unscrewed in the direction of the load

4.3.5 When mounting systems include threaded rods screwed into blind holes, the other end of the threaded rods shall provide an adjustment option which makes it possible for the threaded rod to protrude at least 2 cm through the female thread.

4.3.6 The length of thread engagement in female threads of fasteners shall be in case of steel 1 times the nominal diameter of the thread and in case of cast material parts 1.25 times the nominal diameter of the thread.

4.3.7 Pipe fasteners for metal roof shall be able to withstand any oscillations and vibrations which may be encountered.

4.4 Strength and fixation to trapezoidal sheet metal

When tested in accordance with 5.3 pipe fasteners for metal roof shall meet the requirements specified there.

4.5 Vibration

It is checked on the basis of the drawings, the parts lists and the test samples, whether or not vibrations or agitation may have a detrimental effect on the performance characteristics of the pipe fastener. In case of doubt, corresponding tests will be agreed with the manufacturer and conducted.

5 Tests

5.1 Test conditions and test samples

The tests are conducted at a temperature of $(25 \pm 10) ^\circ\text{C}$ unless otherwise specified for a specific test.

The tolerance of all test parameters is $\pm 5\%$ unless specified otherwise.

For the testing of pipe fasteners for metal roof 6 samples are needed (including 3 reference samples).

5.2 Compliance test

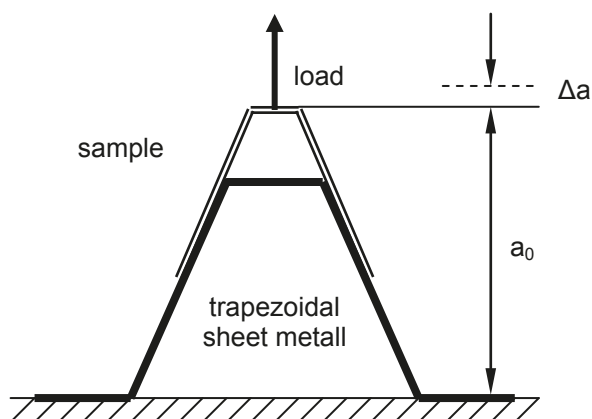
The test samples are checked visually and dimensionally for compliance with the description given in the technical documentation (drawings, parts lists and installation instructions) and for compliance with the auditable requirements of these guidelines.

5.3 Test of strength and fixation to trapezoidal sheet metal

The test is conducted with 3 samples.

The sample is mounted in accordance with the manufacturer's installation instructions to trapezoidal sheet metal according to DIN 18807 – nominal sheet thickness 0.75 mm, profile height 158 mm, profile width 250 mm. The trapezoidal sheet metal is fixed to a rigid support.

A load of 200 N (pre-load) is applied to the sample and the distance (a_0) between the load bearing point and the rigid support of the trapezoidal sheet metal is determined.



Subsequently, the load is increased to the rated load according to figure 4.01 and the elongation (Δa) of the distance between the load bearing point and the rigid support of the trapezoidal sheet metal is measured.

Requirement: The plastic and elastic elongation (Δa) of the distance between the load bearing point and the rigid support of the trapezoidal sheet shall not exceed 5 mm and there shall be no visible damage at the connection points of the trapezoidal sheet metal (e.g. cracks, widenings).

Subsequently, the load is increased to the minimum load at yield according to figure 4.01.

Requirement: The sample shall not crack/break. The sample shall not be yanked out of the trapezoidal sheet metal.

Subsequently, for information only, the load is increased within the limits of the facility – if possible until the sample breaks.

5.4 Other tests

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