Foam concentrates

Requirements and test methods

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VdS-Guidelines for fire extinguishing media

Foam concentrates

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Declaration of non-binding status

These VdS-Guidelines for fire extinguishing media, Foam concentrates, VdS 3124en, are binding only if their application has been agreed on an individual basis.

1 Scope

These guidelines specify requirements and test methods for foam concentrates.

Moreover, these guidelines define regulations for the approval procedure of foam concentrates applicable in addition to the procedure guidelines VdS 2344 and VdS 2841.

2 Normative References

These guidelines incorporate, by dated or undated references, provisions from other publications. These normative references are cited in the respective positions in the text and the publications 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 CEA-Guidelines for Sprinkler Systems – Planning and Installation

VdS 2109 VdS-Guidelines for water spray systems – Planning and installation

VdS 2344 Procedure for the testing, approval, certification and conformity assessment of products and systems for fire protection and security technologies

VdS 2841 Performance of product surveillances

EN 1568-1 Fire extinguishing media – Foam concentrates – Part 1: Specification for medium expansion foam concentrates for surface application to water-immiscible liquids

EN 1568-2 Fire extinguishing media – Foam concentrates – Part 2: Specification for high expansion foam concentrates for surface application to water-immiscible liquids

EN 1568-3 Fire extinguishing media – Foam concentrates – Part 3: Specification for low expansion foam concentrates for surface application to water-immiscible liquids

EN 1568-4 Fire extinguishing media – Foam concentrates – Part 4: Specification for low expansion foam concentrates for surface application to water-miscible liquids

3 Definitions

For the use of these guidelines the definitions of EN 1568 and of VdS 2344 (e. g. ‘manufacturing plant’) apply.

4 Requirements and test methods

4.1 Technical documentation and specifications

The manufacturer shall provide the following documents:

a) product data sheet,

b) material safety data sheet (MSDS) for the foam concentrate,

c) exact composition of the foam concentrate (formulation), see also note 1,

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d) material safety data sheets (MSDS) for all raw materials, see also note 2,
e) description of the marking,
f) quality plan (scheme of regular testing done by the manufacturer during production or on final product),
g) indication of materials (metallic and non-metallic) that are **not** recommended to be used with the foam concentrate (storage and distribution),
h) indication of materials (metallic and non-metallic) that are recommended to be used with the foam concentrate (storage and distribution).

VdS reserves the right to require proof regarding h) in individual cases.

The technical documentation is checked for completeness and sufficient information.

Note 1: In the formulation, raw materials for which the manufacturer does not want to identify type/brand name and source of supply may be specified coded/anonymised.

Note 2: For raw materials which are specified coded/anonymised in the formulation, the information in the material data sheets on type/brand name and source of supply may be blackened. In this case, the compliance with the raw materials used is verified by the auditor during the inspection of the manufacturing quality in the manufacturing plant.

4.2 Characteristics according to EN 1568

4.2.1 The extinguishing efficiency as well as the chemical and physical characteristics of the foam concentrate shall be determined according to the appropriate part(s) of EN 1568. All applicable requirements shall be fulfilled.

For the proof, Annex A applies.

4.2.2 Foam concentrates which shall be additionally approved for the use in sprinkler systems according to VdS CEA 4001 or water spray systems according to VdS 2109 shall be synthetic foam concentrates and fulfil − depending on the application in question − the following requirements:

Application: Protection of flammable water-immiscible liquids

- spreading coefficient with reference to Cyclohexan: > 0
- classification of extinguishing performance according to EN 1568-3:2008 (table 1):
  - extinguishing class I; and
  - burnback resistance level A or B.

Note: If the foam concentrate does not fulfil the requirements regarding the spreading coefficient, an alternative method of proof, that takes into account the special conditions in sprinkler and water spray systems, may be agreed and assessed upon the manufacturer's suggestion.

Application: Protection of flammable water-miscible liquids

Note: Currently, an approval for this application is not possible. The use of foam concentrate has to be agreed with VdS Technische Prüfstelle (VdS Inspection Services) in each single case. Minimum requirement is an approval based on EN 1568-4.

Application: Risks with involvement of plastics (storage container, stored goods) with potential to generate a pool.

- spreading coefficient with reference to Cyclohexan: > 0
- classification of extinguishing performance according to EN 1568-3:2008 (table 1):
  - extinguishing class I; and
  - burnback resistance level A or B.

Note: If the foam concentrate does not fulfil the requirements regarding the spreading coefficient and/or the extinguishing performance, an alternative method of proof, that

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takes into account the special conditions in sprinkler and water spray systems, may be agreed and assessed upon the manufacturer's suggestion.

Application: Risks with involvement of plastics (storage container, stored goods) without potential to generate a pool.

- spreading coefficient with reference to Cyclohexan: > 0
- classification of extinguishing performance according to EN 1568-3:2008 (table 1):
  - extinguishing class I; and
  - burnback resistance level A or B.

Note: If the foam concentrate does not fulfil the requirements regarding the spreading coefficient and/or the extinguishing performance, an alternative method of proof, that takes into account the special conditions in sprinkler and water spray systems, may be agreed and assessed upon the manufacturer's suggestion.

4.3 Environmental and human compatibility

Note: The requirements and tests specified herein shall cover – regarding the application of the product in the specified limits of use – basic aspects of the health and environmental protection on the latest level of knowledge.

According to the present level of knowledge it is assumed that the product does not represent a danger for humans and the environment – if the requirements specified herein are fulfilled and when the product is used in the specified limits.

Furthermore, the fulfilment of the requirements specified herein does not imply that all legal requirements valid in the place of use (Germany, Europe, worldwide) are fulfilled when the product is used in the specified limits.

These guidelines do not include any requirements and tests as to possible impact on soil and soil life (e. g. in areas that are used agriculturally or horticulturally or in forests).

4.3.1 Raw materials

Only REACH-registered and REACH-conform documented raw materials may be used in the production of foam concentrates.

For all raw materials, material safety data sheets according to the REACH regulation shall be available (see also notes in 4.1).

Basically, no raw material may be toxic (T), very toxic (T+), carcinogen (CMR) or bioaccumulating in terms of the directive 67/548/EWG or the REACH regulation respectively. For each exception, a case-specific assessment is necessary. In this assessment it shall be verified that the negative classification of the material does not conflict with the use of the raw material in the foam concentrate (preparation) (e. g. for reason of negligible low concentration).

VdS reserves the right to require proof as to details in the material safety data sheet and to check them or have them checked respectively.

4.3.2 Foam concentration (preparation)

A material safety data sheet according to the REACH regulation shall be available for the foam concentrate.

The foam concentrate may not be toxic (T), very toxic (T+), carcinogen (CMR) or bioaccumulating in terms of the directive 67/548/EWG or the REACH regulation respectively.

VdS reserves the right to require proof as to details in the safety data sheet and to check them or have them checked respectively.

The foam concentrate shall be tested according to Annex B and fulfil the requirements of Annex B.

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For the proof, Annex A applies.

In addition, it is evaluated by the formulation of the foam concentrate if additional tests are necessary due to special ingredients. As far as tests are necessary they are agreed with the manufacturer and conducted.

4.4 Identification of the foam concentrate

4.4.1 Formulation

In a part or full chemical analysis it is tested whether the foam concentrate complies with the formulation of the manufacturer.

The manufacturer provides VdS with a sample (amount to be agreed; minimum 20 liters). The sample remains at VdS.

4.4.2 „Finger Print“

The manufacturer shall describe a test method in which the composition of the foam concentrate can be determined and documented in such a way that changes in the composition are identifiable when the procedure is applied again (“finger print”).

The test method shall be available publicly and easy to apply.

The requirement may be fulfilled in combination with 4.5.

4.5 Identification of manufacturing plant

The foam concentrate should be clearly identifiable as a product of the indicated manufacturing site. In case of several manufacturing sites each manufacturing site should be identifiable.

In this case, the manufacturer shall describe a test method with which each respective manufacturing site can be identified.

The test method shall be available publicly and easy to apply.

The requirement may be fulfilled in combination with 4.4.

4.6 Marking

For the marking, the applicable part(s) of EN 1568 applies/apply).

5 Regulations for the approval procedure

5.1 Manufacturing quality and product surveillance

The following regulations apply in addition to VdS 2344 and VdS 2481:

- The manufacturer shall document his distribution channel(s) and on request inform VdS of the distribution channel(s).
- In each manufacturing plant a product audit is conducted once a year.
- In each product audit a sample is taken for subsequent tests on marking, „finger print“, identification of manufacturing plant.

Note: As the case may be, additional special samplings may take place in the manufacturing plant or at other sampling places (see VdS 2841, 3.2).

5.2 Confidentiality

With his application for approval according to VdS 2344, Annex D, the manufacturer shall limit the confidentiality obligation of VdS. He shall allow VdS to pass information which is relevant for the assessment of the environmental and human compatibility of the foam

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concentrate (amongst others formulation, test reports on environmental and human compatibility) to

- Hygiene-Institut des Ruhrgebiets, Gelsenkirchen, Deutschland.

5.3 Product modification

In each approval procedure, it is agreed with the manufacturer if and in case which modifications of the product or of the purchase or of the production are permitted without prior consent of VdS.

Especially the following cases are also included in the agreement:

- Change of supplier of a raw material;
- Substitution of a raw material by another raw material with the same specification.

Note: With this agreement it is intended to allow those modifications from which changes of the performance characteristics are not expected without involvement of VdS.

In case of modifications which deserve prior consent of VdS it is agreed which proof/testing is necessary in advance.

5.4 Changes related to environmental and human compatibility

5.4.1 The manufacturer shall immediately notify to VdS when new findings or changes of legal requirements impact on classification or use of a raw material or of the foam concentrate. In this case, it is checked whether the requirements on environmental and human compatibility according to 4.3 are still fulfilled and whether the approval may be maintained.

5.4.2 Prior to each prolongation of the approval, VdS gets checked whether there are new findings or changes of legal requirements. In this case, it is checked whether the requirements on environmental and human compatibility according to 4.3 are still fulfilled.

5.5 Retention sample

A retention sample from the type testing sample is stored at VdS. The retention sample is replaced regularly – according to the manufacturer's specification on the durability of the foam concentrate. At each replacement, the compliance of the two retention samples (i. e. the old and the new retention sample) shall be proven by analysis of both samples.

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Annex A
Test procedure, test laboratories and test reports

A.1 Test procedure

A.1.1 The manufacturer provides VdS with a sample of the foam concentrate. The quantity of the sample is agreed in each single case and shall be sufficient to conduct all tests and to serve as retention for later comparative analyses.

A.1.2 Normally, VdS orders all tests on characteristics according to EN 1568 as well as on environmental and human compatibility and provides the test laboratories with the respective test samples.

A.1.3 In exceptional cases, results of tests conducted already prior to the approval procedure can be accepted. For this, the following conditions shall be fulfilled:

- Proof (test reports) for characteristics according to EN 1568 or environmental and human compatibility respectively shall be provided by a test laboratory which is accepted by VdS (see A.2).
- In each single case it shall be proven that the tests have been done with the foam concentrate in question.

Even if the conditions are fulfilled VdS reserves the right for retesting.

A.2 Test laboratories

A.2.1 General

The test laboratories and any subcontractors should be accredited for the tests according to EN ISO/IEC 17025. As an alternative, the competence can be checked by VdS.

Prior to the first acceptance of a test report, VdS checks the competence of the test laboratory during an assessment of the test laboratory. If subcontractors are appointed, VdS reserves the right to check the competence of any subcontractor during a separate assessment of the subcontractor.

Assessments may include all aspects of competence (e. g. professional know-how, technical equipment, practised procedures, quality assuring measures).

A.2.2 Test laboratories for EN 1568

The test laboratory shall have all test facilities for the tests with foam generation (e. g. spreading, foam expansion, water drainage time, extinguishing performance) and shall conduct these tests itself.

For the other tests, subcontractors may be appointed.

A.2.3 Test laboratories for environmental and human compatibility

The test laboratory shall have all test facilities and shall conduct all tests itself.

A.3 Test reports

Test reports shall comply with EN ISO/IEC 17025.

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Annex B
Environmental and human compatibility

B.1 Tests with foam concentrate

The tests according to table B.1 or equivalent in vitro tests* are conducted with the foam concentrate.

* The equivalence has to be proved in each single case.

Test	Requirement
OECD Guidelines for the Testing of Chemicals Test No. 404 : 24.04.2002 Acute Dermal Irritation/Corrosion	No serious dermal corrosion
OECD Guidelines for the Testing of Chemicals Test No. 405 : 24.04.2002 Acute Eye Irritation/Corrosion	No eye corrosion
OECD Guidelines for the Testing of Chemicals Test No. 420 : 17.12.2001 Acute oral toxicity	LD50 > 2.000 mg/kg
Table B.1: Acute Toxicity	

B.2 Tests with foam concentrate in application concentration

The tests according to table B.2 or equivalent in vitro tests* are conducted with the **foam concentrate in the highest specified application concentration** (i. e. not with the pure foam concentrate).

* The equivalence has to be proved in each single case.

Test	Requirement
OECD Guidelines for the Testing of Chemicals Test No. 301 : 17.07.1992 Ready Biodegradability, Test 301-C: MITI	28 days > 70%
OECD Guidelines for the Testing of Chemicals Test No. 201 : 23.03.2006 Freshwater Alga and Cyanobacteria, Growth Inhibition Test	> 100 mg/l
OECD Guidelines for the Testing of Chemicals Test No. 202 : 13.04.2004 Daphnia sp. Acute Immobilisation Test	> 100 mg/l
OECD Guidelines for the Testing of Chemicals Test No. 203 : 17.07.1992 Fish, Acute Toxicity Test	> 100 mg/l
TTC-Test (bacteria, sewage plants)	Compliance with manufacturer specification for the dilution factor with no negative effects arising
Table B.2: Environment (water, sewage, mud)	

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