1 SCOPE AND FIELD OF APPLICATION

This NORDTEST method is intended for providing a basis for testing of portable foam branches.

This test method includes both general requirements as well as performance tests.

The test method is applicable for portable foam branches intended for generating both low and medium expansion foams.

The test method can be used as a separate test of any specific foam branch for eg some basic approval. Preferably it should be used to provide information about the complete foam extinguishing system that will be used by the fire brigades. This is possible by combining tests and test results from the following NORDTEST methods.

- NT FIRE 023, Fire extinguishing foam concentrates: Performance.
- NT FIRE 042, Foam concentrates, proportioner: Performance test.

2 TESTING

2.1 Documentation

The client shall provide the testing institute with the following documents before the tests are started.

- Design drawings and general assembly drawing with dimensioned flow paths.
- Material description also including information about surface treatment and coating thickness.
- Technical data regarding minimum and maximum flow rates as well as minimum and maximum pressure for proper function.

2.2 Test specimen and extent of tests

The client shall provide the testing institute with two complete foam branches of each type. The foam branch shall then undergo tests specified in Table 1.

Table 1 Extent of tests

<table>
<thead>
<tr>
<th>Foam branch No.</th>
<th>Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pressure test, operation torque/force test, examination</td>
</tr>
<tr>
<td>2</td>
<td>Capacity test, examination</td>
</tr>
</tbody>
</table>

2.3 Test equipment

The test equipment should in principle be arranged as shown in Fig 1. The following equipment and performance is required.

Flow meter with an accuracy within ±2 % of the measured volume.

Pressure gauge with an accuracy within ±2 % of the measured value.

Foam proportioner with an accuracy according to NT FIRE 042, Foam concentrates, proportioner: performance test.

Tube for foam collection, approximately ø 600 mm, with two 90° bends, one at each end of the tube, see Fig 2.

Foam collection container with a minimum volume of 50 l. The bottom should be provided with an outlet, a transparent tube approximately 100 mm long and a valve. The flow capacity through the valve should exceed the rate of the drainage.

Vessel for collection of drained foam solution, see fig 2.
Scale for weighing of the drained foam. The amount of drained foam could also be determined by measuring the volume.

2.4 Foam concentrate
The foam concentrate that is used should preferably have been tested according to NT FIRE 023 and fulfill the requirements described in Annex E dated January 1, 1987.

As there are many different foam concentrates with various characteristics, the manufacturer or supplier of the foam branch may freely choose foam concentrate. However, used foam concentrates shall be reported.

2.5 Test procedure

2.5.1 General
The tests shall be performed at an air temperature of 10°C - 20°C, the water temperature shall be 5°C - 15°C and the foam concentrate shall have a temperature of 15°C - 20°C. The wind velocity may not be greater than 1 m/s.

2.5.2 Pressure test
The foam branch shall be subject to a hydrostatic pressure test of 1.6 MPa during 1 min. The test shall be carried out with the shut off device closed.

Any possible leakage shall be reported.

2.5.3 Operation torque/force test
The torque moment or the force required for operating the foam branch pipe subjected to a hydrostatic pressure of 0.5 MPa is measured with a dynamometer.

The force shall be applied at the outermost end of the operating device during the test. The value obtained in Nm or N is rounded off to the nearest integer.

2.5.4 Capacity test
All capacity tests (flow rate, throw length, expansion and drainage) are performed at 0.5 MPa water pressure. If other working pressures are specified by the manufacturer, the tests shall also be made at these pressures.

2.5.4.1 Determination of flow rate
The foam branch pipe shall be connected to a pump and the hydrostatic pressure is adjusted to 0.5 MPa. The flow rate is then registrated.

2.5.4.2 Determination of the throw length
The tests shall be carried out on flat ground under conditions specified in paragraph 2.5.1.

The angle of elevation may be chosen freely and maximum throw length is determined. The throw length is defined as shown in Fig 1.

![Diagram of foam branch test](image-url)
2.5.4.3 Measurement of the expansion ratio and drainage time

The foam branch shall be mounted at approximately the same level as the centre of the equipment for foam collecting as shown in Fig 2. The distance shall be approximately half the distance of the throw length. The foam collecting shall start when the foam spray is steady. Choice of foam concentrate should be made according to paragraph 2.4.

![Fig 2](image.png)

Equipment for foam collection when measuring the expansion ratio and drainage time.

Two tests shall be performed and the expansion ratio and drainage time are determined as follows.

Expansion ratio = \( \frac{\text{foam volume}}{\text{foam weight}} \)

The time to achieve to 25 % and 50 % drainage are determined by measuring the weight of the drained liquid from the foam collecting container shown in Fig 2. Readings are made at short intervals until at least half of the liquid content of the foam has been separated. The drainage at the different points of time is converted into percent of the original foam weight. The density of the separated liquid is assumed to be 1.0.

The mean value from the two tests shall be recorded.

3 TEST REPORT

The test report shall include the following information.

a) Name and address of the testing laboratory.
b) Date and identification number of the report on each page of the report.
c) Name and address of the client.
d) Purpose of the test.
e) Method of sampling.
f) Name of manufacturer or supplier of the product.
g) Name or other identification marks and description of the product.
h) Identification of drawings, material description and labels.
i) Date of supply of the product.
j) Description of the specimens.
k) Date of test.
l) Test method.
m) Signature and title of person(s) accepting technical responsibility for the test report and date of issue.
n) Statement that the report shall not be reproduced except in full without the approval of the testing laboratory.
o) Test results.

o:1 General conditions during the tests (temperatures, wind, induction rate etc.).
o:2 Results of general requirements.
o:3 Results of pressure test.
o:4 Results of torque/force test.
o:5 Results of flow rate test.
o:6 Results of throw length test.
o:7 Results of expansion ratio and drainage time.
Foam branches, portable: Requirements (PROPOSAL)

A.1 GENERAL REQUIREMENTS

The foam branch shall be constructed of non-corrosive material or a combination of materials, which do not give galvanic corrosion. The material shall resist any influence of the foam concentrate that would influence the results.

The last requirements are considered as fulfilled also with protective painting.

The foam branch pipe shall consist of the following.
- A fixed connection.
- A manometer (accuracy maximum ±5 % of rate).
- A shut-off device.
- A nozzle with openings for air/foam mixing (aspirating nozzle).
- A tube mantle (the manufacturer’s choice).

A.2 PRESSURE TEST

When tested foam branch pipes shall withstand an inner water pressure of 1.6 MPa without any leakage or any visible damage occurring.

A.3 OPERATING TORQUE/FORCE TEST

The operating torque force at 0.5 MPa water pressure may amount to
- maximum 35 Nm for lever,
- maximum 50 N for squeeze grip during the opening phase,
- maximum 20 N for squeeze grip during operation.

A.4 CAPACITY TESTS

After the capacity tests the various requirements given in Table 1 shall be fulfilled.

Table 1 Requirements (according to DIN 14366)

<table>
<thead>
<tr>
<th>Type of foam concentrate</th>
<th>Type of foam branch pipe 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L2</td>
</tr>
<tr>
<td>Flow rate ±5 % (1 min⁻¹)</td>
<td>200</td>
</tr>
<tr>
<td>Detergent</td>
<td></td>
</tr>
<tr>
<td>Throw length (m)</td>
<td>12</td>
</tr>
<tr>
<td>Expansion ratio</td>
<td>10</td>
</tr>
<tr>
<td>Drainage time, 50 % (min)</td>
<td>15</td>
</tr>
<tr>
<td>AFFF</td>
<td></td>
</tr>
<tr>
<td>Throw length (m)</td>
<td>12</td>
</tr>
<tr>
<td>Expansion ratio</td>
<td>5</td>
</tr>
<tr>
<td>Drainage time, 50 % (min)</td>
<td>3</td>
</tr>
<tr>
<td>FP (protein and fluoro protein)</td>
<td></td>
</tr>
<tr>
<td>Throw length (m)</td>
<td>12</td>
</tr>
<tr>
<td>Expansion ratio</td>
<td>5</td>
</tr>
<tr>
<td>Drainage time, 50 % (min)</td>
<td>5</td>
</tr>
</tbody>
</table>

1) L = low expansion foam  
   M = medium expansion foam