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TM 1011:2015

Determination of the Compression Strength of an OCF¹ Canister Foam

1. Scope

This test method describes how to determine the compressive strength of a cured foam. It gives an indication of the foams resistance against area distributed pressure. The maximum endurable stress is determined.

2. Short description of procedure

The test specimen is prepared by foaming between two wooden plates. After the full curing the specimen is compressed by a tensile testing machine to at least 10 % of its initial thickness. The compressive strength is obtained at 10 % compression.

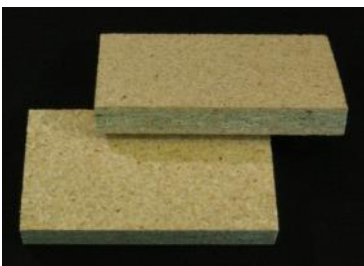
3. Background and purpose

One of the main application areas of OCF is the thermal insulation and sound damping in connection joints. The foam in those joints has to absorb the movement of the construction elements caused by temperature change, wind load etc. and therefore has to provide a certain strength and flexibility to withstand repetitive compression-tensile cycles. The strength can be measured by applying a compression force to a piece of the foam. The result is proportional to the extent of compression. A typical value is compression by 10 %.

4. Equipment

For each specimen (in total 6 specimens required):

- 2 wooden boards (chipboards) P3 or P5 (EN 312), size: 50 mm x 90 mm x 10 mm
- 2 spacers, thickness 30 mm x 20 mm x 50mm
- 2 screw clamps



¹ **OCF**: Generic term for moisture-curing or physically drying foam as well as self-curing activatable foam extruded as a froth from single pressurised containers.

Further equipment:

- Sharp cutter
- Tensile testing machine (e. g. Zwick or Instron)
- Controlled climate chamber or lab facilities

5. Procedure

5.1 Preparation

Bring the test canister to the test temperature for at least 24 hours.

5.2 Experimental procedure

- Attach the spacers between the panels and fix them with screw clamps. The cavity in the assembled joint should measure 50 mm × 50 mm × 30 mm (see Fig. 1).
- Prepare a minimum of 6 joints.
- The clamped boards are immersed in water for 20 sec, taken out and stored horizontally for two minutes, until excess water has dripped off. The foaming must have started within the next 30 sec.
- Shake the canister vigorously 20 times
- Discard the first 30 g - 50 g of foam
- Fill the joint in horizontal direction to allow foam expand freely on both sides (see Fig. 2).
- Fill approximately 60% of the joint if using straw or 100 % of the joint if using gun dispensing.
- Allow foam to cure for 24 hours at 23 °C/50 % r. h.
- Cut excessive foam after 24 hours (see Fig. 3).
- Remove screw clamps and spacers after 6 more days (the sample is to be stored at 23 °C/50% r. h.) and start the measurement within 5 minutes. The point where the compression distance of 10 % (and the relevant part of the record) starts is at 2 N above the ground level (Fig. 4).

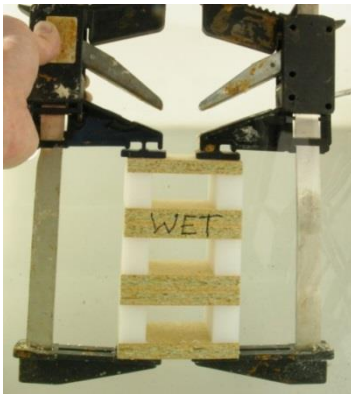


Fig. 1



Fig. 2



Fig. 3

Testing is performed according to ISO 844 / DIN 53421. The force is applied through a moving compressive plate perpendicular to the wooden board. The cross head velocity of the tensile machine is 3 mm/min. The compression strength is taken as stress at 10 % compression, in relation to the foam thickness (i.e. strain).



Fig. 4: Ready specimen before measurement

6. Evaluation

Take the mean value of the measurements, report whether the specimen was moisturized or not. The compression force, usually obtained in Newton (N), is divided by the foam area. Report the compression length in % (preferably 10 %, corresponds to 3 mm compression for the given foam thickness of 30 mm).

The reported unit is expressed in Pa, resp. in kPa. (1 N/cm² = 10 kPa).

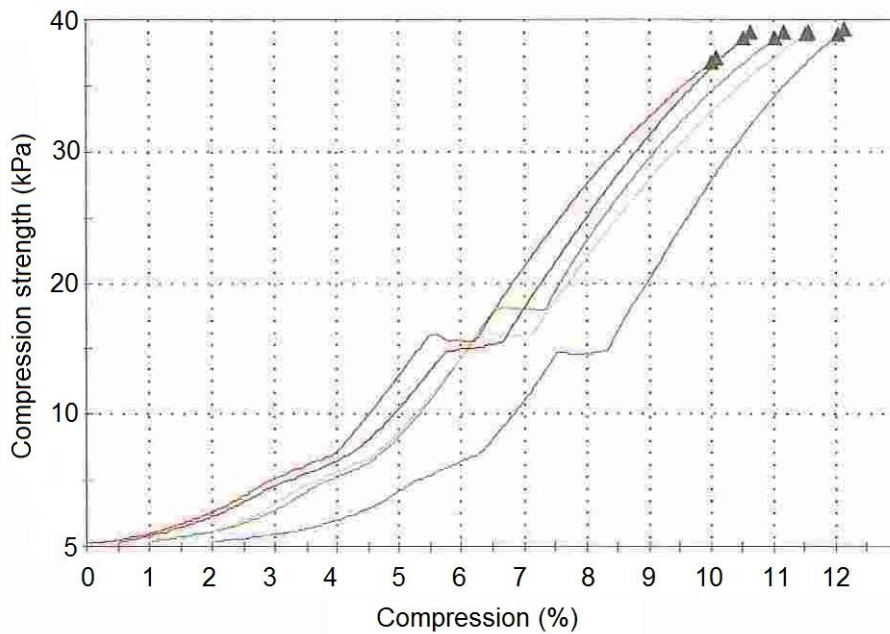


Fig. 5: Example with 5 measurements

7. Revision

Version	Date	Remarks
2	19/02/2013	Released at the OCF TTF meeting on 19/02/2013.
3	18/02/2015	Pictures are added, chipboard P3 or P5 (EN 312) allowed.

8. Contact

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