



Brussels, 18 February 2015

TM 1018:2015

Determination of the Tensile Strength of an OCF¹ Canister Foam

1. Scope

This test method describes how to determine the maximum stress a cured foam can withstand while being stretched before breaking. The result gives an indication of the elasticity of the cured foam.

2. Short description of procedure

All test specimens are prepared by foaming between two wooden plates. After one day, two additional wooden plates are adhered as a tearing device. After fully curing, the specimen is stretched by a tensile testing machine, gradually increasing the distance at a set speed until the sample fractures. The tensile strength is the maximum force withstood by the specimen.

3. Background and purpose

The tensile strength is an important property of a foam. It is used to evaluate its fixing power, particularly for the fixation of doorframes. It allows the calculation of the necessary area of fixation for a given door wing weight and vice versa. This test also indicates the breaking point of the fixation, which can be either within the foam (cohesion failure) or between the foam and the bonded surface (adhesion failure).

4. Equipment

For each specimen (in total six specimens are required):

- 2 wooden boards (chipboards) P5 (EN 312), size: 50 mm x 200 mm x 10 mm
- 2 wooden boards (chipboards) P5 (EN 312), size: 80 mm x 200 mm x 10 mm
- 2 spacers, size: 50 mm x 20 mm x 20 mm
- 2 screw clamps

Other equipment:

- PU adhesive
- Sharp cutter
- Tensile testing machine (e.g. Zwick or Instron)
- 2 C-profiles for fixing the specimen to the tensile testing machine
- Controlled climate chamber

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.

5. Procedure

5.1 Preparation

Bring the test canister and the chipboards to the test temperature (23°C/50% r.h.) for at least 24 hours.

5.2 Experimental procedure

- a) Attach the spacers between the two smaller panels and fix them with screw clamps. The cavity in the assembled joint should measure 50 mm x 160 mm x 20 mm.
- b) Prepare a minimum of six joints.
- c) Moisten three of the six 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 start within the next 30 sec.
- d) Shake the canister vigorously 20 times.
- e) Discard the first 30 g – 50 g of foam.
- f) Fill the joint in a horizontal direction to allow the foam to expand freely on both sides.
- g) Fill approximately 60% of the joint if using straw dispensing or 100% of the joint if using gun dispensing.
- h) Allow the foam to cure for 24 hours at 23°C/50% r.h.
- i) Cut off excess foam after 24 hours.
- j) Remove the screw clamps and adhere the two larger wooden boards to the specimen protruding 1.5 cm per side.
- k) Immediately fix the screw clamps again.
- l) After six days remove the screw clamps and spacers (samples are to be stored at 23°C/50%r.h.) and start the measurement. The machine gets the starting point as soon as it gets contact with the material.



5.3 Testing

The specimen is fitted into the C-profiles of the tensile testing machine. Apply an initial tension (preload) of 5N. The velocity of the tensile machine is 5 mm/min. Stretch the specimen until it breaks.

6. Evaluation

Take the mean value of the measurements; report whether the specimen was moisturised or not.

Report the maximum tensile force in kPa.

Report the elongation at break in %, taking into account the starting value.

7. Revision

Version	Date	Remarks
1	18/02/2015	Released at the OCF TTF meeting on 28 February 2015.

8. Contact

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Publication ref.: TM-1018:2015 v1

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