




# Test report: Fire testing of moss according to NS-EN ISO 11925-2:2010

SP Fire Research AS



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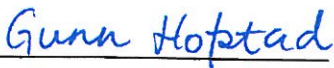

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<b>PROJECT NO.</b> 102010.35/14.005	<b>NUMBER OF PAGES/APPENDICES:</b> 6 incl. appendices	
<b>TEST OBJECT</b> Moss of quality Cladonia stellaris	<b>TEST OBJECT RECEIVED</b> 2014-02-10	
<b>TEST PROGRAM</b> NS-EN ISO 11925-2	<b>TEST LOCATION</b> SP Fire Research AS	<b>DATE OF TEST</b> 2014-05-08

## ABSTRACT

Test specimen of the moss, quality Cladonia stellaris, was tested according to NS-EN ISO 11925-2:2010 (E). The product was tested with 30 seconds exposure.

Test results are given in section 4.

The test results relate only to the items tested

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# Document history

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VERSION	DATE	VERSION DESCRIPTION
1	12.05.2014	This version

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# 1 Product description

## 1.1 Type of product

The product consists of moss, the latin name is *Cladonia stellaris*. Chemicals, different salts and colour pigments are added to the moss to keep it soft.

## 1.2 Manufacturer / place of production

Norske Moseprodukter AS, Akrestrømmen, 2485 Rendalen, Norway

## 1.3 Sampling

The tested material was selected by the client. The material subjected for testing arrived at SP Fire Research 2014-02-10. It is not known to SP Fire Research if the fire characteristics of the product received are representative of the fire characteristics of the average product.

## 1.4 Test specimens

The product was tested in a specimen holder for loose fill materials with dimensions 250 mm x 40 mm 90 mm.

It was filled up with moss, and the density of the product was measured to approximately 74 kg/m<sup>3</sup>.

Colour: green



# 2 Testing

*Operator:*

Erling Stenhaug, engineer

*Conditioning of the test material:*

The specimens were conditioned at a temperature of  $(23 \pm 2)^\circ\text{C}$  and a relative humidity of  $(50 \pm 5)\%$  until constant mass was obtained.

*Number of single tests:*

6

*Duration of the tests:*

30 seconds exposure – total test duration of 60 seconds

# 3 Remarks / deviations

According to NS-EN ISO 11925-2:2002 (E), the following statement shall be given in the test report: *The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.*

This test report is a translation from the original Norwegian version. If any dispute or uncertainty occur due to interpretation, the text in the original test report is valid.

## 4 Test results

**Table 1** Results from testing of moss, quality *Cladonia stellaris*, according to NS-EN ISO 11925-2:2010(E).

**Surface exposure** – 30 seconds duration.

Test no.	Ignition <sup>1</sup> Yes/No	Flames reach 150 mm-mark		Length of damaged area [mm]	Ignition of filter paper <sup>2</sup> [Yes/No]
		Yes/No	[seconds]		
1	No	No	-	65	No
2	No	No	-	50	No
3	No	No	-	60	No
4	No	No	-	40	No
5	No	No	-	50	No
6	No	No	-	55	No

Note 1 Ignition is according to NS-EN ISO 11925-2 defined as the presence of sustained flaming – i.e. persistence of flame for a period greater than 3 s.

Note 2 Ignition of the filter paper is according to NS-EN ISO 11925-2 defined as the presence of sustained flaming – i.e. persistence of flame for a period greater than 3 s.

## A Appendix - Criteria for classification according to NS-EN 13501-1

**Table 2** Classes of reaction to fire performance for construction products excluding floorings and linear pipe thermal insulation products according to NS-EN 13501-1:2007.

Class	Test method(s)	Classification criteria	Additional classification
<b>A1</b>	EN ISO 1182 <sup>(1)</sup> ; and	$\Delta T \leq 30^\circ\text{C}$ ; and $\Delta m \leq 50\%$ ; and $t_f = 0$ (i.e. no sustained flaming)	-
	EN ISO 1716	$\text{PCS} \leq 2.0 \text{ MJ/kg}$ <sup>(1)</sup> ; and $\text{PCS} \leq 2.0 \text{ MJ/kg}$ <sup>(2)</sup> <sup>(2a)</sup> ; and $\text{PCS} \leq 1.4 \text{ MJ/m}^2$ <sup>(3)</sup> ; and $\text{PCS} \leq 2.0 \text{ MJ/kg}$ <sup>(4)</sup>	-
<b>A2</b>	EN ISO 1182 <sup>(1)</sup> ; or	$\Delta T \leq 50^\circ\text{C}$ ; and $\Delta m \leq 50\%$ ; and $t_f \leq 20\text{s}$	-
	EN ISO 1716; and	$\text{PCS} \leq 3.0 \text{ MJ/kg}$ <sup>(1)</sup> ; and $\text{PCS} \leq 4.0 \text{ MJ/m}^2$ <sup>(2)</sup> ; and $\text{PCS} \leq 4.0 \text{ MJ/m}^2$ <sup>(3)</sup> ; and $\text{PCS} \leq 3.0 \text{ MJ/kg}$ <sup>(4)</sup>	-
	EN 13823 (SBI)	$\text{FIGRA} \leq 120 \text{ W/s}$ ; and $\text{LFS} < \text{edge of specimen}$ ; and $\text{THR}_{600\text{s}} \leq 7.5 \text{ MJ}$	Smoke production <sup>(5)</sup> ; and Flaming droplets/particles <sup>(6)</sup>
<b>B</b>	EN 13823 (SBI); and	$\text{FIGRA} \leq 120 \text{ W/s}$ ; and $\text{LFS} < \text{edge of specimen}$ ; and $\text{THR}_{600\text{s}} \leq 7.5 \text{ MJ}$	Smoke production <sup>(5)</sup> ; and Flaming droplets/particles <sup>(6)</sup>
	EN ISO 11925-2 <sup>(8)</sup> ; Exposure = 30s	$F_s \leq 150 \text{ mm}$ within 60 s	
<b>C</b>	EN 13823 (SBI); and	$\text{FIGRA} \leq 250 \text{ W/s}$ ; and $\text{LFS} < \text{edge of specimen}$ ; and $\text{THR}_{600\text{s}} \leq 15 \text{ MJ}$	Smoke production <sup>(5)</sup> ; and Flaming droplets/particles <sup>(6)</sup>
	EN ISO 11925-2 <sup>(8)</sup> ; Exposure = 30s	$F_s \leq 150\text{mm}$ within 60 s	
<b>D</b>	EN 13823 (SBI); and	$\text{FIGRA} \leq 750 \text{ W/s}$	Smoke production <sup>(5)</sup> ; and Flaming droplets/particles <sup>(6)</sup>
	EN ISO 11925-2 <sup>(8)</sup> ; Exposure = 30s	$F_s \leq 150\text{mm}$ within 60 s	
<b>E</b>	EN ISO 11925-2 <sup>(8)</sup> ; Exposure = 15s	$F_s \leq 150\text{mm}$ within 20 s	Flaming droplets/particles <sup>(7)</sup>
<b>F</b>	No performance determined		



The indices in the table are described on the next page.

**Explanation of indices in the table on the previous page:**

- (1) For homogeneous products and substantial components of non-homogeneous products.
- (2) For any external non-substantial component of non-homogeneous products.
- (2a) Alternatively, any external non-substantial component having a  $PCS \leq 2,0 \text{ MJ/m}^2$ , provided that the product satisfies the following criteria or EN 13823:  $FIGRA \leq 20 \text{ W/s}$ , and  $LFS < \text{edge of specimen}$ , and  $THR_{600s} \leq 4,0 \text{ MJ}$ , and  $s1$ , and  $d0$
- (3) For any internal non-substantial component of non-homogeneous products
- (4) For the product as a whole
- (5) In the last phase of the development of the test procedure, modifications of the smoke measurement system have been introduced, the effect of which needs further investigation. This may result in a modification of the limit values and/or parameters for the evaluation of the smoke production.

$s1 = SMOGRA \leq 30 \text{ m}^2/\text{s}^2$  and  $TSP_{600s} \leq 50 \text{ m}^2$ ;

$s2 = SMOGRA \leq 180 \text{ m}^2/\text{s}^2$  and  $TSP_{600s} \leq 200 \text{ m}^2$ ;

$s3 = \text{not } s1 \text{ or } s2$

(6) **d0** = No flaming droplets/particles in EN 13823:2010 within 600 s;

**d1** = No flaming droplets/particles persisting longer than 10 s in EN 13823 within 600 s;

**d2** = not **d0** or **d1**

Ignition of the paper in EN ISO 11925-2 results in a **d2** classification

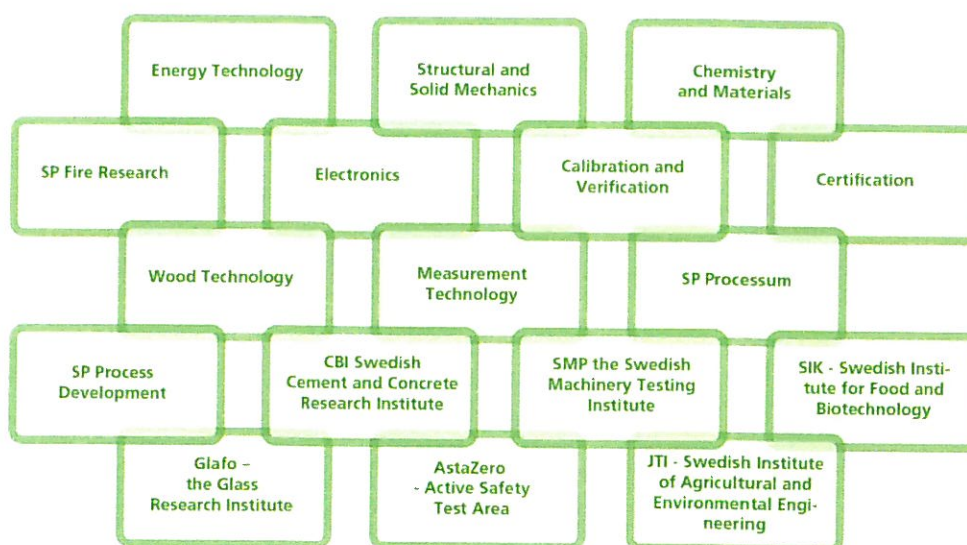
(7) Pass = no ignition of the paper (no classification)

Fail = ignition of the paper (**d2** classification)

Under conditions of surface flame attack and, if appropriate to the end-use application of the product, edge flame attack.

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