Test report

Requested by	SabetoFLEX ApS	**Date**	21-10-2019
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Report no	ChimneyLab-330
Order no.....	0718

Product:	
Manufacturer	SabetoFLEX ApS
Function.....	Water vapour membrane
Type.....	SabetoFLEX water vapour membrane
Serial no.....	-

Received date.....	01-06-2019
Test date	10-06-2019 – 14-06-2019
Procedure	Test according to EN 1856-1:2009, EN 1859:2013
Type test	Non-accredited thermal test

Results	See Paragraph 5
Conclusion	See Paragraph 6
Terms	*This test report or extracts from it may not be reproduced without the written permission of ChimneyLab Europe ApS.* *The test results concern only the tested objects.*

Lyngaa, Denmark 21-10-2019

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1. Introduction

The purpose of this test is to determine the SabetoFLEX water vapour membrane behaviour during thermal test, when installed on chimney below floor penetration.

The tests were carried out at ChimneyLab Europe ApS in Lyngaa, Denmark, by Process Engineer Finn Petersen.

2. Description of test specimen

2.1. SabetoFLEX water vapour membrane

The test specimen is a black water vapour membrane, type SabetoFLEX.

On the topside is a layer of polyisobutylene, on the back side a layer of butyl polyisobutylene

The total thickness is 1.2 ± 0.2 mm

3. Test description

3.1. Thermal test ChimneyLab-330-A

Thermal test according to EN 1859:2013, Paragraph 4.5.

For thermal test of the membrane, it was tested on a double wall metal chimney with a nominal diameter of 200 mm. Inside, the chimney was insulated with ceramic insulation type Cerablanket from Morgan Thermal Ceramics, with a nominal density of 128 kg/m^3.

The chimney was mounted in thermal test rig with a first floor penetration height of 200 mm.

In first floor penetration, the chimney was insulated with 50 mm thickness of Paroc Extra building insulation and a total height of 200 mm.

Stainless black ceiling plates were mounted below and above first floor.

Below the first floor penetration, a one-meter start section with 25 mm insulation was mounted. The adapter from 25 mm to 50 mm insulation was just above the lower ceiling plate.

Between the lower ceiling plate and the insulation, the SabetoFLEX water vapour membrane, was installed by pulling it over the chimney, so that it was sitting tight around the chimney.

Temperature sensor for flue gas temperature was placed 50 mm before inlet of the tee.

Flue gas is generated by an LPG (Light Propane Gas) burner with a nominal thermal output of 100 kW.

The flue gas temperature is controlled via a programmable temperature controller.

Flue gas flow according to EN 1859:2013, Table 1, is controlled by the combustion airflow, which is delivered to the combustion chamber by a centrifugal ventilator.

For this chimney, with a nominal diameter of 200 mm and pressure class N1, the flue gas flow is set to 421 m^3/h at 500 °C flue gas temperature.

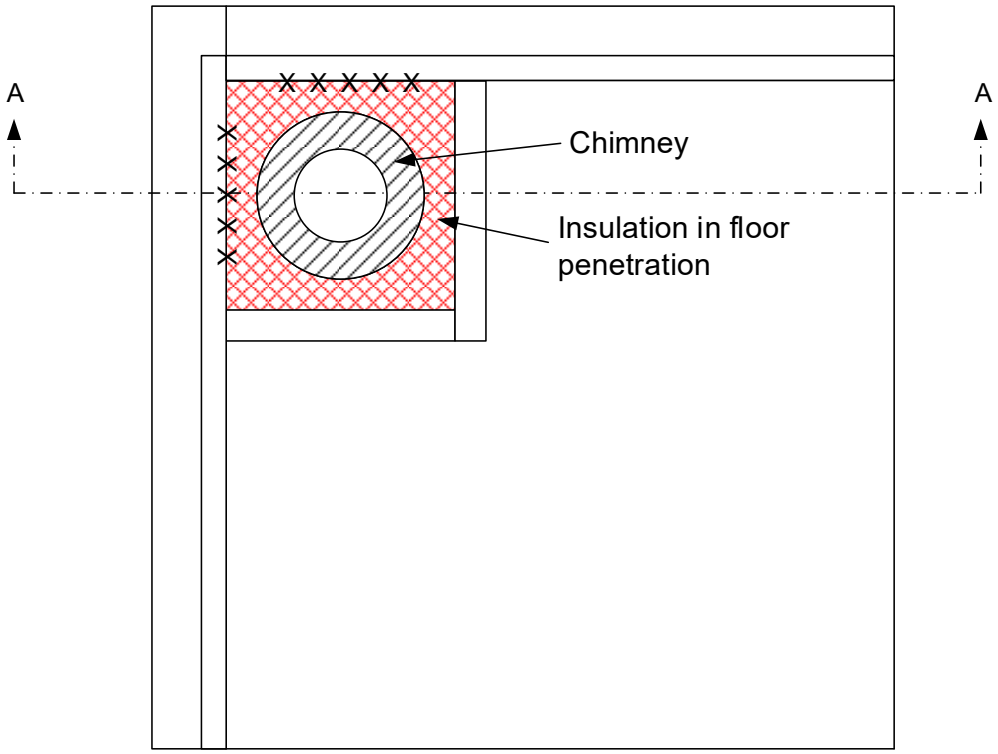
Photo 1: Chimney installed in thermal test rig

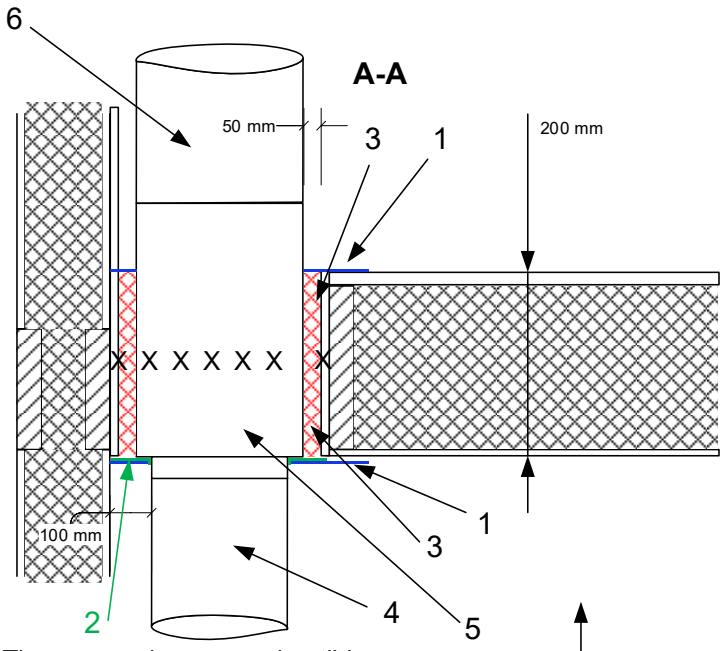
Photo 2: Insulation in first floor before it is closed by upper ceiling plate

Photo 3: SabetoFLEX water vapour membrane below penetration, during installation

Photo 4: SabetoFLEX water vapour membrane after thermal tests. The black color on the joists is trace from the membrane.

1st floor penetration





X = Thermocouples on combustibles
1 = Ceiling plate
2 = Water vapour membrane
3 = Insulation in floor penetration
4 = Flue pipe with 25 mm insulation
5 = Adapter 25 -> 50 mm insulation
6 = Chimney with 50 mm insulation

Figure 1: First floor penetration

The chimney was mounted and tested under the following conditions:

Test no.	ChimneyLab-330-A
Chimney nominal diameter, mm	200
Start section outer diameter, mm	250
Chimney outer diameter, mm	300
Temperature class	T400
Pressure class	N1
Soot fire test (1000 °C)	Yes
1st floor penetration:	
Distance to combustibles, mm	50
Ceiling plate below floor penetration	Yes
Air gap between lower ceiling plate and chimney, mm	0
Rubber gasket on lower ceiling plate	SabetoFLEX water vapour membrane
Ceiling plate above floor penetration	Yes
Air gap between upper ceiling plate and chimney, mm	0
Rubber gasket on upper ceiling plate	No
Floor penetration height, mm	200
Insulation height in floor penetration, mm	200
Insulation type in floor penetration	Paroc Extra building insulation

Table 1: Test conditions

Chimney elements used for the test were:

Element No.	Description	Insulation thickness mm	Colour
1	Tee 50 mm insulation	50	Black
2	Adapter 50->25 mm insulation	50/25	Black
3	1 m 25 mm insulation	25	Black
4	Adapter 25->50 mm insulation	25/50	Black
5	1 m 50 mm insulation	50	Black
6	1 m 50 mm insulation	50	Black
7	1 m 50 mm insulation	50	Black

Table 2: Chimney elements used in the test

The chimney was thermal tested in the following order:

Test order	Description	EN 1859:2013 Paragraph
1	Installation of chimney in thermal test rig	4.5.3
2	Heat stress test T400 1st time 500 °C until steady state	4.5.3.1
3	Thermal shock test (sootfire test), at 1000 °C. Heating to 1000 °C in 10 minutes and hereafter 1000 °C in 30 minutes	4.5.3.2

Table 3: Thermal test order

4. Instrumentation

Instrument	Type	Reference	Accuracy
Vibration table	ChimneyLab	CLE-014	-
Thermal test rig	ChimneyLab	CLE-001	-
Data acquisition unit	HP 34972A	CLE-135-137	-
Data acquisition software	TIDop	DTI	-
Gas burner	ChimneyLab	CLE-003	-
Flow combustion air	Orifice, ChimneyLab	CLE-003-01-32mm	± 0.1 Nm^3/h
Flow combustion air	Orifice, ChimneyLab	CLE-003-01-45mm	± 0.3 Nm^3/h
Flow combustion air	Orifice, ChimneyLab	CLE-003-01-60mm	± 0.5 Nm^3/h
Flow combustion air	Orifice, ChimneyLab	CLE-003-02-85mm	± 1.5 Nm^3/h
Flow combustion air	Micro manometer Dwyer 607-8	CLE-003-005	± 1 Pa
Temperature controller	Eurotherm 2408	CLE-003-003	± 0.5 °C
Thermocouple, flue gas inlet	Type N	CLE-001-105	± 1.0 °C
Thermocouples, surface temperatures	Type K	CLE-001-101 to 920	± 0.5 °C

Table 4: Test equipment

5. Test results

5.1. Thermal test results ChimneyLab-330-A

During the 6.7 hours T400 heat stress test (flue gas temperature 500 °C), the SabetoFLEX water vapour membrane did not emit any visible smoke and no flames were observed.

During the 30 minutes soot fire test (flue gas temperature 1000 °C), the SabetoFLEX water vapour membrane did not emit any visible smoke and no flames were observed.

After the thermal tests, the SabetoFLEX water vapour membrane was visually intact before dismantling. The 10 mm lip, which was in contact with the chimney, had lost some of its flexibility during the soot fire test.

6. Conclusion

See 5.1. Thermal test results ChimneyLab-330-A.

7. Remarks

In Denmark, rubber gasket or water vapour membrane on lower ceiling plate, is commonly used. However, this is not covered by EN 1856-1:2009 nor the Danish building regulations.

All test objects used in the tests were sampled by the manufacturer.

All information from the manufacturer regarding materials used for the product has been assumed by ChimneyLab Europe ApS. The materials have not been subject to any qualitative tests, except from an immediate visual evaluation.

This report is not an approval, but the result of a test. Producer/importing company are obligated to ensure that all relevant regulations during sale and installation of the product are fulfilled.

Temperatures during thermal test