

Test Report

Sliding Door Tests

This report presents the air permeability test, water penetration test and wind load resistance test conducted on sliding doors manufactured by Lyssand Treindustri AS.

Compiled by
Magnus Vågen





SINTEF Byggforsk

Address: PO Box 4760
Sluppen 7465 Trondheim

Phone: 73593000

Fax: 73593380

byggforsk@sintef.no
<http://www.sintef.no/Byggforsk/>

Enterprise Register Number:

NO 948007029 MVA

Test Report

Sliding Door Tests

This report presents the air permeability test, water penetration test and wind load resistance test conducted on sliding doors manufactured by Lyssand Treindustri AS.

Scope:

Sliding doors

Three tests:

Air permeability,

Water penetration,

Wind load resistance

REPORT VERSION

1

REPORT DATE

2013-05-31

COMPILED BY

Magnus Vågen

COMMISSIONED BY

Lyssand Treindustri AS

COMMISSIONER'S DETAILS

Magne Sæterstøl

PROJECT NUMBER

102004221

NUMBER OF PAGES AND ATTACHMENTS

8

SUMMARY:

Lyssand Treindustri AS commissioned SINTEF Byggforsk to conduct the following sliding door tests: air permeability test, water penetration test and wind load resistance test.

The air permeability test was in compliance with NS-EN 1026 standard. The average air permeability result was 3.5 m³/m²h and 2.4 m³/mh ±600 Pa. The water penetration test was in compliance with EN 1027 standard. The sliding doors are waterproof up to 900 Pa.

Air tightness for the sliding doors is defined in class 4 regulations of NS-EN 12207 standard, which is the highest level of air tightness, in accordance with SINTEF Byggforsks test recommendations.

The sliding doors conform to E900 class of water tightness (rain water) as defined in NS-EN 12208 standard, which is two classifications above the minimum requirements by SINTEF Byggforsks.

The sliding doors fall within C3 class of wind load resistance as defined in NS-EN 12210 standard, which is in compliance with SINTEF Byggforsks recommendations.

COMPILED BY

Magnus Vågen

QUALITY ASSURANCE MANAGER

Arve Bugten

APPROVED BY

Birgit Risholt

REPORT NUMBER

102004221

ISBN

GRADE

confidential

SIGNATURE

[illegible]

SIGNATURE

[illegible]

SIGNATURE

[illegible]

FINAL GRADE

confidential

1. Introduction

Lyssand Treindustri AS commissioned SINTEF Byggforsk to conduct the air permeability test, water penetration test and wind load resistance test on sliding doors.

2. Test results

Detailed information on the product tested is in the report on air tightness and water tightness (Attachments 1 and 2) and on wind load resistance (Attachment 3). The technical drawings are presented in Attachment 4.

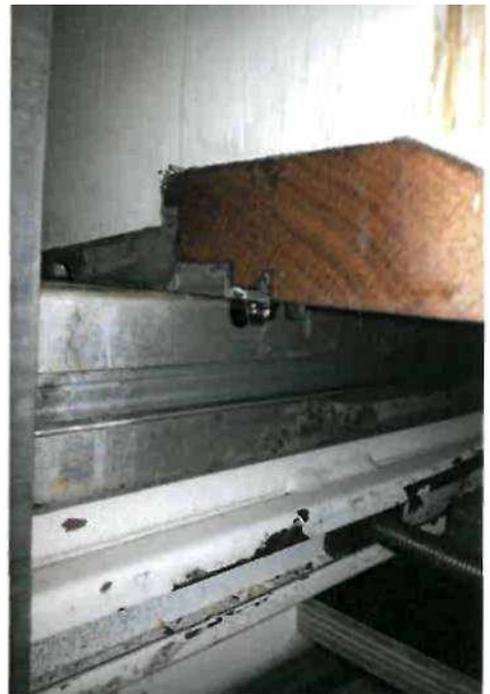
3. Notes

The air permeability test was in compliance with NS-EN 1026 standard.

The water penetration (rain water tightness) test was in compliance with NS-EN 1027 standard. During the test water penetration was observed in the area of the screw hole in the right side door frame. The Commissioner explained that these holes resulted from tests performed by the manufacturer. The explanation was deemed plausible; therefore, it was concluded that the fact of water penetration in that area would not be taken into account. With the air pressure at 1050Pa air permeability was recorded in the area of the door lock (Picture 1) and at the junction of the bottom and lateral side of the door frame (Picture 2). In all likelihood, the air permeability in the latter case was consequent upon the insufficient amount of glue/sealant used, or it may have appeared upon inadequate adjustment of the three elements which are conjoined in the left bottom corner of the door frame. The threshold (doorsill) is made of aluminium (element 1, exterior) and hard wood (element 2, bottom part). The door frame (sides) is made of laminated pine wood (element 3).



Picture 1
Air permeability in the area of the door lock $\pm 1050\text{Pa}$



Picture 2
Air permeability at the junction of aluminium and wood in the left bottom corner $\pm 1050\text{Pa}$



The wind load resistance test was in compliance with EN 12211 standard and the categorization to C3 class was pursuant to NS-EN 12210 standard. No signs of damage or lower qualities of usage were recorded during the safety tests.

A slight deformation (deflection) of the front part was detected by the right door frame, i.e. where the load concentrates when the sliding doors are in the position for closed.

4. Conclusions

Air tightness for the sliding doors is defined in class 4 regulations of NS-EN 12207 standard, which is the highest level of air tightness, in accordance with SINTEF Byggforsks test recommendations.

The sliding doors conform to E900 class of water tightness (rain water) as defined in NS-EN 12208 standard, which is two classifications above the minimum requirements by SINTEF Byggforsks.

The sliding doors fall within C3 class of wind load resistance as defined in NS-EN 12210 standard, which is in compliance with SINTEF Byggforsks recommendations.

Test report – water penetration

<i>Commissioner</i> Lyssand Treindustri AS	<i>Project number</i> 102004221
---	------------------------------------

Product tested

<i>Product name</i> Sliding doors		<i>Registry number/registry date</i> 69-13,29.4.2013	
<i>Product type</i> Sliding doors		<i>Sampling</i>	
<i>Manufacturer</i> Lyssand Treindustri AS		<i>Product identification number/ technical drawing</i> Attachment 4	
<i>Door construction/frame [mm], external measurement</i>		<i>Dimensions width x height [mm]</i>	
	<i>Minimum</i>	<i>Maximum</i>	1988x2088
<i>Top</i>			<i>Testing method</i> Measurement
<i>Bottom</i>			<i>Test result</i> good
<i>At the hinges</i>			
<i>At the lock</i>			

Testing

<i>Tests conducted by:</i> OEH, Laboratoriet in Trondheim	<i>Conditioning:</i> T=20 °C and RF=50 %
<i>Testing method</i> NS-EN 1027 Method A: x Method B:	<i>Conditions throughout testing</i> Room relative humidity: 28.3 % Room temperature: 22.2 °C Room air pressure: kPa
<i>Test date</i> 6.5.2013	<i>Irregularities</i> No

Results

Pressure [Pa]	Time [min]	Visible leakages recorded
0	15	none
50	5	none
100	5	Water observed in the screw hole in the vertical door frame
150	5	ditto
200	5	ditto
250	5	ditto
300	5	ditto
450	5	ditto
600	5	ditto
750	5	ditto
900	5	ditto
1050	5	Air permeability in the area of the door lock and at the junction of the wooden and aluminium elements in the left bottom corner of the door frame

Whenever the term 'right' or 'left' is used herein, it refers to the position in the interior part of the door construction.

Trondheim, 6.5.2013

[illegible]

Øystein Holmberget

Test report – wind load resistance

Standard: NS-EN 12211

Classification standard: NS-EN 12210

Test conducted by:			OEH	Project number	3278
Product	Sliding doors			Test date	2013-05-06
Manufacturer	Lyssand Treindustri AS			Ext.door frame width [m]	1,988
Registry number/date	69/13, 29.04.2013			Ext. door frame height [m]	2,088
Temperature [°C]	kPa		20	Door frame width [m]	1
Air pressure [kPa],			101	Door frame height [m]	2,02
Humidity, RF, [%]			10	Number of door frames	1
	Area, m ²		4,15	Junction length in total [m]	6,04

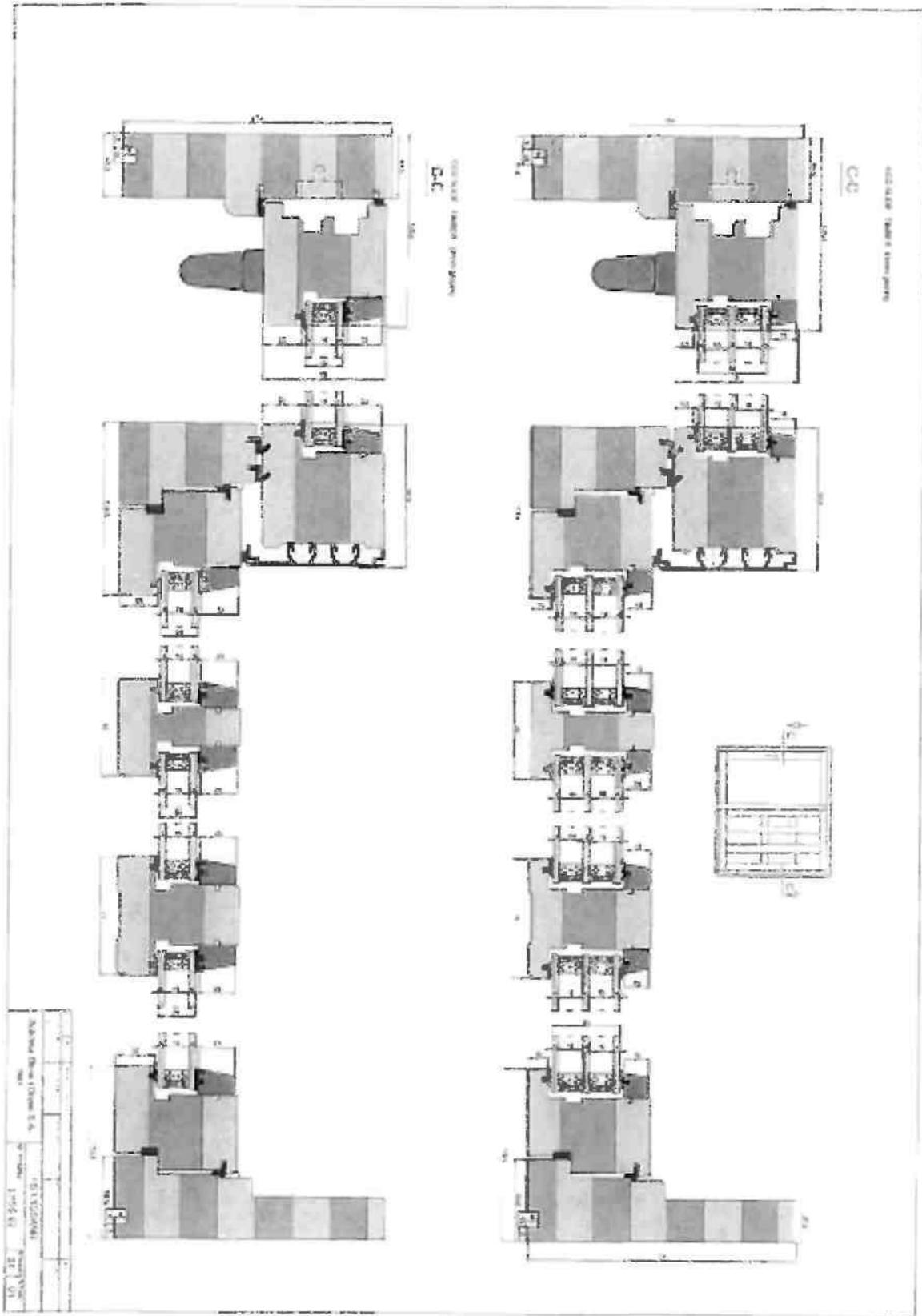
	Measurement unit	Overpressure	Negative pressure
Measurement of frontal deformation (deflation)	mm	1,81	3,09
Requirements of NS-EN 12210 standard	mm	6,73	6,73

Measurement of deformation [mm] in compliance with NS-EN 12211 standard

	Reading 1	Reading 2	Reading 3	Air	
Overpressure					
Before	-0,001	-0,114	-0,004	23	Pa
At pressure	1,999	2,689	-0,018	1200	Pa
After	0,000	0,002	-0,007	39	Pa
Negative pressure					
Before	-0,009	-0,001	-0,001	23,067	Pa
At pressure	-2,233	-4,233	-0,051	-1187,369	Pa
After	-0,243	-0,694	-0,006	5,611	Pa

Trondheim, 6.5.2013
[illegible]
Øystein Holmberget

Drawing





Technology for a better society

www.sintef.no