

SIA "Stali"  
 Kingas, Priekulu pagasts,  
 Priekulu novads  
 LV-4126  
 Latvia

## Determination of air permeability, watertightness, resistance to wind load and operating forces

(2 appendices)

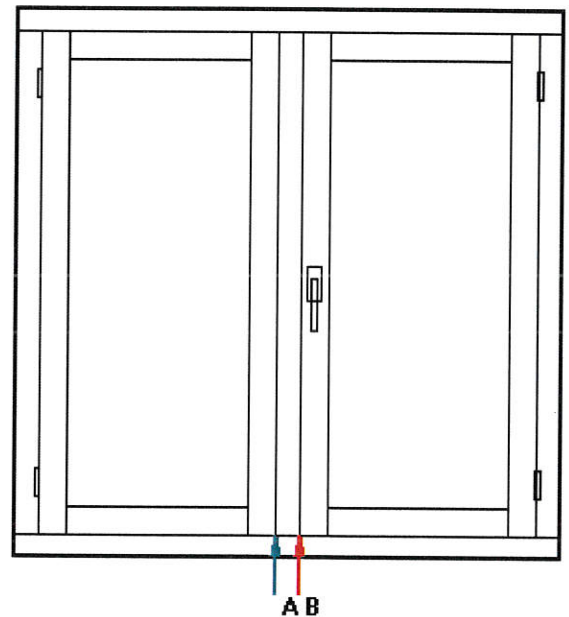
### Test object

(See attached figures, description and drawings in appendices)

Manufacturer: SIA "Stali".  
 Type: IV 105 double outwards opening side hung window with middle post.  
 Left hand window has two old style locking hardware IPA hooks, see figure 3 in appendix 1  
 Size: 1180 x 1180 mm.  
 Condition at arrival: No visible damage.  
 Date of arrival: 2015-06-17 / 2015-08-28  
 Date of testing: 2015-06-26 / 2015-09-03  
 SP's serial number: 1883.

The test object was chosen and supplied by the client and mounted in the test rig by SP.

The watertightness re-test was carried out in accordance with NVDK requirements, with air tightening on the outside face only of the test object see figures 5-6 in appendix 1.



### Watertightness according to SS-EN 1027 method A up to 600 Pa

Point A: Leakage between frame and sash

Leakage degree 1 after three minutes at 200 Pa

#### Leakage grading

0 No leakage	3 Minor run
1 One or a few drops	4 Minor flow
2 Several drops	5 Considerable flow

The window meets the requirements for class 9A according to SS-EN 12208.

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**Watertightness re-test (2015-09-03) according to SS-EN 1027 method A up to 600 Pa, with air tightening on outside face according to NVDK requirement**

Point B: Leakage between frame and sash

**Leakage grading**

Leakage degree 1 after four minutes at 450 Pa

- 0 No leakage
- 1 One or a few drops
- 2 Several drops
- 3 Minor run
- 4 Minor flow
- 5 Considerable flow

(see figures 5-6 in appendix 1)

The window meets the requirements for class 9A according to SS-EN 12208.

**Resistance to wind load according to SS-EN 12211 class 3**

**Deflection test up to 1200 Pa**

Pressure, Pa	Deflection, mm	
	Upper horizontal casement member, (measuring length = 1035 mm)	Hinge side vertical casement member, right hand window, as seen from inside (measuring length = 1035 mm)
0	0.1	0.1
1200 positive pressure	0.3	0.2
1200 negative pressure	-0.1	0.0

The maximum relative frontal deflection was 0.19 per mille (requirement: <3.3 per mille according to SS-EN 12210 class C)

**Repeated pressure test up to 600 Pa and storm safety test up to 1800 Pa**

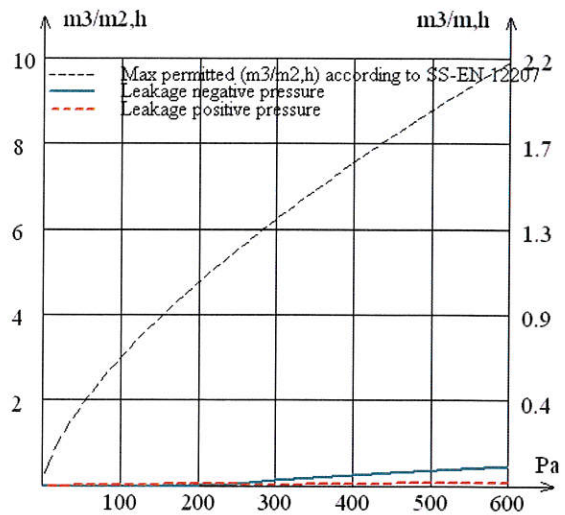
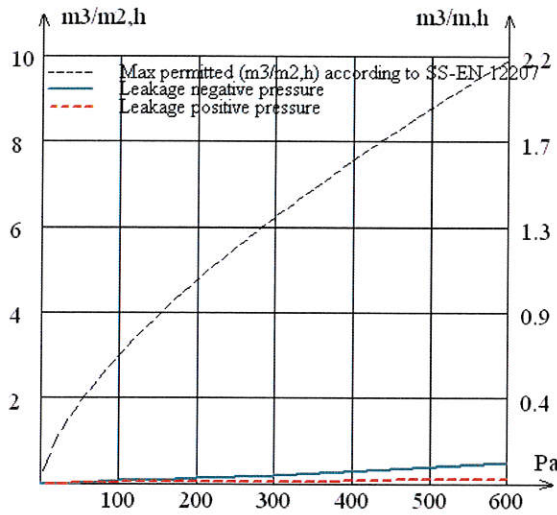
No damage noted.

The window meets the requirements for class C3 according to SS-EN 12210.

### Air permeability according to SS-EN 1026 up to 600 Pa

Before wind load:

After wind load:



The window meets the requirements for class 4 according to SS-EN 12207 both before and after wind load

### Operating forces according to SS-EN 12046-1

Right hand window with handle, as seen from inside face:

Opening torque (mean value of three measurements) = 1.5 Nm

Closing torque (mean value of three measurements) = 3.2 Nm

The window meets the requirements for class 1 according to SS-EN 13115

(opening and closing torques shall be maximum 10 Nm).

## Conditions of test

The test results refer only to the tested object.

Equipment used:	Test rig invnr 202206 and measuring equipment invnr 200746
Air tightening against the test rig:	On the test objects inside face.
Estimated error margin:	Air pressure difference $\pm 2$ Pa and air flow $\pm 5$ %
Test climate:	
(2015-06-26)	Air temperature 20,5 °C, RH 42 %, air pressure 994 hPa
(2015-09-03)	Air temperature 20,5 °C, RH 42 %, air pressure 994 hPa
Water temperature:	According to the standard
Conditioning:	Laboratory climate after arrival to SP

## SP Technical Research Institute of Sweden Sustainable Built Environment - Building Physics and Indoor Environment

Performed by

Examined by



Richard Dawson



Hans Brodin

## Appendices

Appendix 1: Figures of the test object.

Appendix 2: Description, drawings and material technical information of the test object.

Appendix 2

**Description of test window\***

<b>Manufacturer:</b>	Sia "Stali"
<b>Type designation:</b>	IV105 side hung
<b>Drawing No:</b>	105_SH_1,105_SH_2,105_SH_3,105_SH_4,105_SH_5,105_SH_6
<b>Type of opening:</b>	Side hung- outward opening
<b>Outer dimensions of frame (wxh):</b>	1180 x 1180
<b>Joint length between sash and frame:</b>	mm
<b>Material in sash/panel:</b>	Pine
<b>Material in door sill:</b>	-
<b>Material in frame:</b>	Pine
<b>Surface treatment:</b>	Paint-automatic paint spraying booth
<b>Corner joints</b>	
Frame (type and tightening):	Tenoning
Sash (type and tightening):	Tenoning
<b>Tightening strip</b>	
Make and type:	QL3004
Material:	Combinated
<b>Glazing</b>	
Single glass. Make and type:	4mm
Sealed glazing unit. Make and type:	3k4LowE+4+4LowE CHR 36 mm
Jointing material:	ParasilicoAM851T
Glazing bead:	Polybase
<b>Hardware</b>	
Hinges:	Kurzemes atslega 1
Closing device:	Fix espagnolete, IPA hooks
Striking plate:	FIX
<b>Supply air device:</b>	-
<b>Mounting instructions:</b>	Stali , Ltd Instructions for instalation an use of wooden windows and doors.
<b>Other comments:</b>	Spilka Safety catch for side hung windows

\* Description made by: ULDIS BABRIS / STALI. LTD/ TECHNICAL MANAGER