aluplast®
Kunststoff-Fenstersysteme

**aluplast India Pvt. Ltd.**
**office and showroom**
aluplast House
C44, DDA Shed
Okhla Industrial Area
Phase 1
New Delhi - 110020

**works**
Plot No.730
GIDC Savli
Vadodara - 391775
Gujarat, India

Toll Free: 1800 233 4777
Info: +91 7042294330
Office: +91 7042294331
Tech: +91 9099599391
info.in@aluplast.net
www.aluplast.net

# System Certification Book

# Table of Contents

# Evidence of Performance
## Reaction to Fire of Construction Products

# Test Report
**Nr. 12-001896-PR02**
**(PB-K20-01-en-01)**

| | |
|---|---|
| Client | aluplast GmbH<br>Auf der Breit 2<br>76227 Karlsruhe<br>Germany |
| Manufacturer / Supplier | see client |
| Product / Building Material | PVC window profiles |
| Designation | "IDEAL 4000"<br>"IDEAL 2000" |
| Dimensions | 70 mm x 70 mm ("IDEAL 4000")<br>60 mm x 65 mm ("IDEAL 2000") |
| Application | as window profiles |
| Special features | - |
| Order | Testing the reaction to fire according to DIN EN ISO 11925-2 |
| Result |  Surface exposure: Flame height Fs ≤ 150 mm<br>Edge exposure: Flame height Fs ≤ 150 mm<br>No ignition of the filter paper |

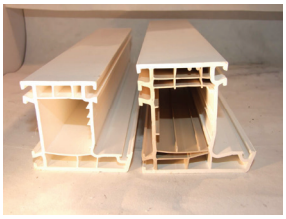
**ift** Rosenheim
18.12.2012

ift Rosenheim Notifizierte Prüf-, Überwachungs- und Zertifizierungsstelle PÜZ EG-Referenz-Nr. 0751

Dr. Gerhard Wackerbauer, Dipl. Phys.
Deputy Head of Testing Department
Fire safety

Dr. rer.nat. Mihaela Buschbeck
Operating Testing Officer
Fire safety

**Basis**
DIN EN ISO 11925-2:2011
Reaction to fire tests for building products
Part 2: Ignitability when subjected to direct impingement of flame

**Illustration**


**Instructions for use**
- This test report does not provide any evidence of specified use as set out by the relevant Building Supervisory Authorities
- This test report serves as basis for issuing a classification report

**Validity**
The given data and results refer solely to the tested and described test specimen. The reaction to fire test doesn't allow the issue of any statement regarding other properties, qualities or features than reaction to fire of the building product.

**Notes on publication**
The **ift**-Guidance Paper „Conditions and Guidance for the Use of ift Test Documents" applies.
The cover sheet can be used as abstract.

**Content**
The report comprises a total of 12 pages.






**ift** Rosenheim GmbH
Geschäftsführer:
Dr. Jochen Peichl
Prof. Ulrich Sieberath
Dr. Martin H. Spitzner

Theodor-Gietl-Str. 7 - 9
D-83026 Rosenheim
Tel.: +49 (0)8031/261-0
Fax: +49 (0)8031/261-290
www.ift-rosenheim.de

Sitz: 83026 Rosenheim
AG Traunstein, HRB 14763
Sparkasse Rosenheim
Kto. 3822
BLZ 711 500 00

Notified Body Nr.: 0757
Anerkannte PÜZ-Stelle: BAY 18
DAP-ZE-2288.00
DGA-IS-4285-00

DAkkS Deutsche Akkreditierungsstelle
D-PL-11349-01-00
D-ZM-11349-01-00

# 1 Object

## 1.1 Description of the test specimen

| | |
|---|---|
| Producer | See client |
| Date of production [1] | September 2012 |
| Dimensions (width x height x length) | 70 mm x 70 mm x 250 mm ("IDEAL 4000" - Sample No. 33249-001)<br>60 mm x 65 mm x 250 mm ("IDEAL 2000" - Sample No. 33249-002) |
| Item No.[1] | 140007 - "IDEAL 4000" - Sample No. 33249-001<br>120005 - "IDEAL 2000" - Sample No. 33249-002 |
| Product description | See drawings of cross-sections (Annex 1) |
| Main components[1] | Polyvinylchloride (PVC) |
| Linear mass density | 1324,4 g/m ("IDEAL 4000" - Sample No. 33249-001)<br>1010 g/m ("IDEAL 2000" - Sample No. 33249-002) |
| Colours | White und brown ("IDEAL 4000" - Sample No. 33249-001)<br>White ("IDEAL 2000" - Sample No. 33249-002) |

*The description is based on inspection of the test samples at the Center for Fire Testing of ift Rosenheim in Nuremberg. Item designations and numbers were given by the client. The details were examined solely on the basis of the characteristics to be classified.*

[1] according to the client

# 2 Procedure

## 2.1 Sampling

The samples have been produced and selected by the manufacturer, aluplast GmbH, Karlsruhe.

**Procedure for sample selection**

The client, aluplast GmbH, selected the samples for testing and prepared them according to the norm specifications.

**Table 1** List of test samples

| POS | Quantity | Sample-No. | Samples received on | Designation | Diemensions (mm) |
|---|---|---|---|---|---|
| 1 | 25[2] | 33249-001 | 01.10.12 | "IDEAL 4000" | see Annex 1 |
| 2 | 25[2] | 33249-002 | 01.10.12 | "IDEAL 2000" | |

## 2.2 Details on conditioning procedure

The samples were conditioned at standard atmosphere up to constant mass for longer than 3 days.

[2] in the dimensions according to the norm (less than 90 mm width)

## 2.3 Methods

**Table 2** Basic conditions

| | |
|---|---|
| **Basic conditions** | in accordance with the Norm demands:<br>Conditioning: 14 days standard conditions or up to constant mass as per EN 13238:2010 |
| **Deviation** | in accordance with the Norm demands:<br>No deviations from the test methods and test conditions |
| **Measuring and test equipment** | Small flame source device No. 22915 |

## 2.4 Testing

Notified body **ift** Rosenheim
Center for Fire Testing (Brandschutzzentrum Nürnberg)
Tillystraße 2, 90431 Nürnberg

**Table 3** Overview of test procedure

| POS | Sample No. | Operator | Date of the test |
|---|---|---|---|
| 1 | 33249-001 | M. Buschbeck | 05.11.12 |
| 2 | 33249-002 | M. Buschbeck | 05.11.12 |

# 3 Detailed results

## 3.1 Single flame test

**Table 4** Measured values / Observations for the Sample No.: 33249-001

| Exposure time 15 s | | Surface exposure | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| Sample orientation | | longitudinal / linear product | | | | | |
| Backing / Mounting | | None | | | | | |
| Point of exposure | | No. 1 (see - Annex 1) | | | | | |
| | | Front side | | | | | |
| Time of ignition | s | 1 | 1 | 1 | 1 | 1 | 1 |
| Extinguishment of flame | s | 15 | 15 | 15 | 15 | 15 | 15 |
| Maximal flame height | mm | 70 | 80 | 60 | 70 | 70 | 60 |
| Achievement of reference mark 150 mm | s | -- | -- | -- | -- | -- | -- |
| End of afterglow | s | -- | -- | -- | -- | -- | -- |
| Smoke emission | | strong | | | | | |
| Flaming droplets/particles | s | no | | | | | |
| Remarks: - | | | | | | | |

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**Table 5** Measured values / Observations for the Sample No.: 33249-002

| Exposure time 15 s | | Surface exposure | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| Sample orientation | | longitudinal / linear product | | | | | |
| Backing / Mounting | | None | | | | | |
| Point of exposure | | No. 1 (see Annex 1) | | | | | |
| | | Front side | | | | | |
| Time of ignition | s | 1 | 1 | 1 | 1 | 1 | 1 |
| Extinguishment of flame | s | 15 | 15 | 15 | 15 | 15 | 15 |
| Maximal flame height | mm | 70 | 60 | 60 | 60 | 60 | 60 |
| Achievement of reference mark 150 mm | s | -- | -- | -- | -- | -- | -- |
| End of afterglow | s | -- | -- | -- | -- | -- | -- |
| Smoke emission | | strong | | | strong | | |
| Flaming droplets/particles | s | no | | | | | |
| Remarks: - | | | | | | | |

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**Table 6** Measured values / Observations for the Sample No.: 33249-001

| Exposure time15 s | | Surface exposure | | Surface exposure | |
|---|---|---|---|---|---|
| | | 1 | 2 | 1 | 2 |
| Sample orientation | | longitudinal / linear product | | | |
| Backing / Mounting | | None | | | |
| Point of exposure | | No. 2 and No. 3 (see Annex 1) | | | |
| | | Front side (point of exposure No. 2) | | Front side (point of exposure No. 3) | |
| Time of ignition | s | 5 | 5 | 3 | 4 |
| Extinguishment of flame | s | 15 | 15 | 15 | 15 |
| Maximal flame height | mm | 50 | 40 | 60 | 50 |
| Achievement of reference mark 150 mm | s | -- | -- | -- | -- |
| End of afterglow | s | -- | -- | -- | -- |
| Smoke emission | | moderate | | moderate | |
| Flaming droplets/particles | s | no | | no | |
| Remarks: - | | | | | |

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**Table 7** Measured values / Observations for the Sample No.: 33249-002

| Exposure time 15 s | | Surface exposure | | Surface exposure | |
|---|---|---|---|---|---|
| | | 1 | 2 | 1 | 2 |
| Sample orientation | | longitudinal / linear product | | | |
| Backing / Mounting | | None | | | |
| Point of exposure | | Point of exposure No. 2 and No. 3 (see Annex 1) | | | |
| | | Front side (point of exposure No. 2) | | Front side (point of exposure no. 3) | |
| Time of ignition | s | 8 | 7 | 1 | 1 |
| Extinguishment of flame | s | 15 | 15 | 15 | 15 |
| Maximal flame height | mm | 40 | 40 | 50 | 50 |
| Achievement of reference mark 150 mm | s | -- | -- | -- | -- |
| End of afterglow | s | -- | -- | -- | -- |
| Smoke emission | | moderate | | strong | |
| Flaming droplets/particles | s | no | | no | |
| Remarks: - | | | | | |

## 3.2 Summary

**Table 8** Test results

| Test method | Parameter | Number of tests [a] | Results | |
|---|---|---|---|---|
| | | | Continuous parameter (m) | Discrete parameter |
| **DIN EN ISO 11925-2**<br>15 s<br>surface exposure* | $F_s \leq 150$ mm | 20 | ( - ) | yes |
| | Flaming droplets / particles | 20 | ( - ) | no |

Remarks:
[a]) not valid for extended field of application
*) as required to the end use application of the product
( - ) not applicable

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**Single-Flame Source Test**:

- The flame of all tested samples did not exceed the reference mark of 150 mm within the 20 seconds of the test
- Flaming droplets / particles have not been observed within the 20 seconds of the test.

**Aspect of the tested samples after the fire test:**

A local charring of the PVC-profiles has been observed at the point of exposure to flame (see Annex 2).

### 3.3 Instructions

The test results relate only to the reaction to fire of the tested samples under given test conditions; the test results should not be used as a single evaluation criteria for an estimation of the potential risk of fire of the construction product in the end use application.
This test report represents the basis for issuing a classification report. It does not replace a possibly needed building certification/evidence of specified use according to national building codes.

**ift** Rosenheim
18. Dezember 2012

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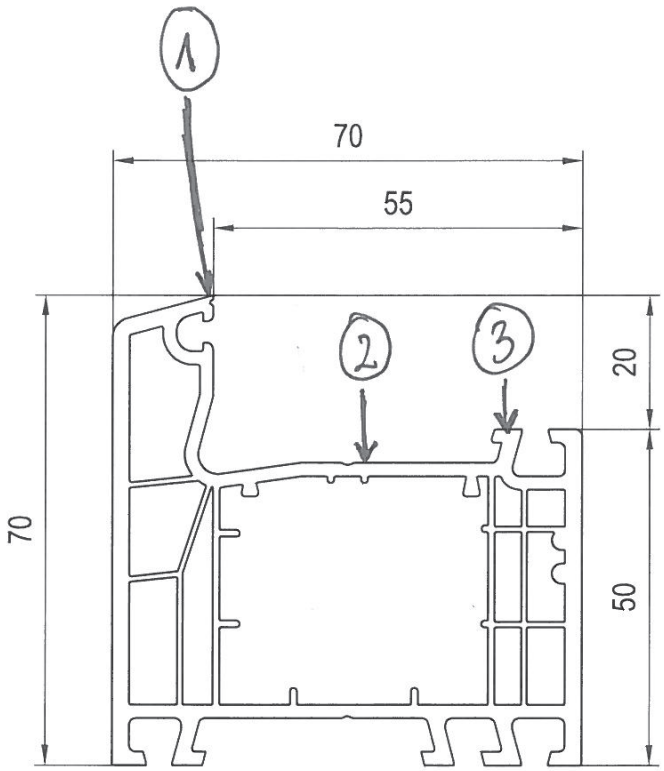
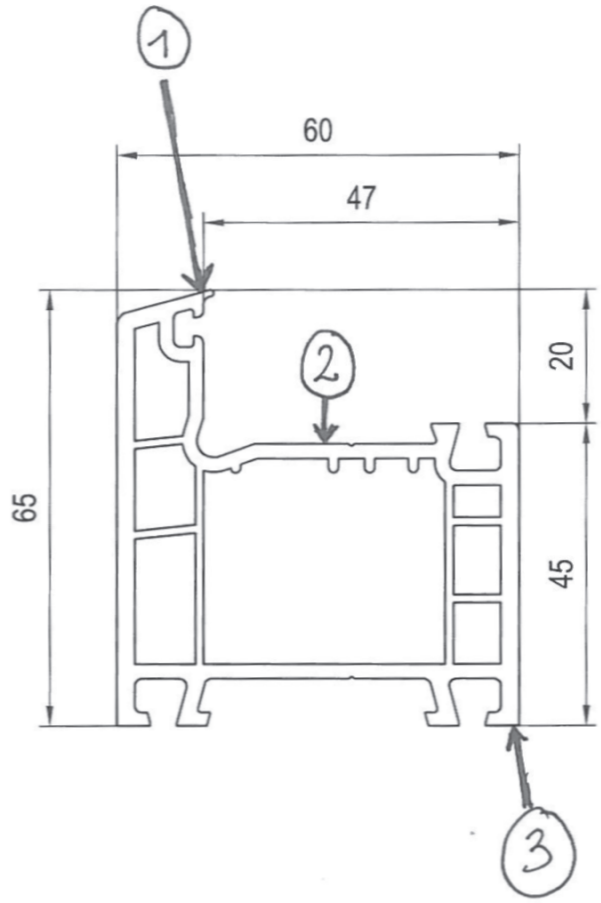
Annex 1: Cross-sectional view of the tested samples

a) Cross-sectional view of the sample No. 33249-001 ("IDEAL 4000") with the points of exposure to flame



b) Cross-sectional view of the sample No. 33249-002 ("IDEAL 2000") with the points of exposure to flame

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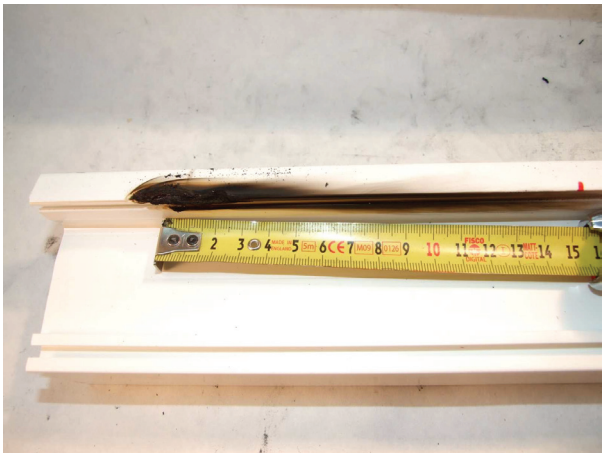
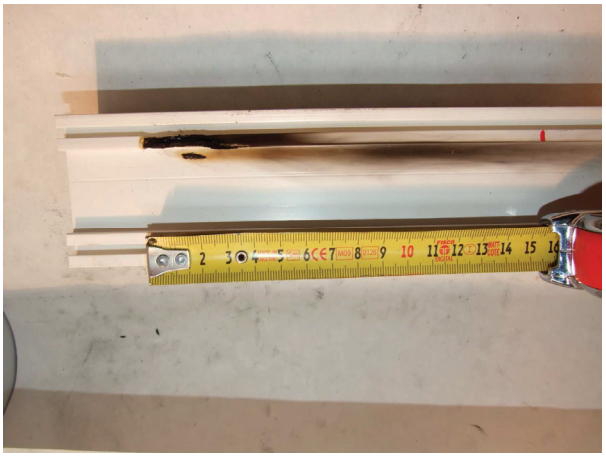
## Annex 2: View of the tested samples



Sample No.: 33249-001

Figure 1: Surface exposure



Sample No.: 33249-002

Figure 2: surface exposure

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# ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

| | |
|---|---|
| Owner of the Declaration | QKE Qualitätsverband Kunststofferzeugnisse e.V.<br>EPPA European PVC Window Profiles and related Building Products Association ivzw |
| Programme holder | Institut Bauen und Umwelt e.V. (IBU) |
| Publisher | Institut Bauen und Umwelt e.V. (IBU) |
| Declaration number | EPD-QKE-20130248-IBG2-EN |
| Issue date | 23.05.2014 |
| Valid to | 22.05.2019 |

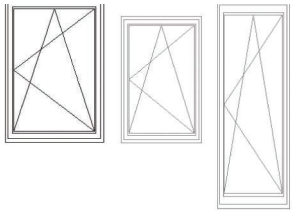
## PVC-U plastic windows

Tilt & turn window with dimensions 1.23 x 1.48 m
Insulated triple-glazing; depth > 80 mm

QKE e.V.
EPPA ivzw

**www.bau-umwelt.com / https://epd-online.com**

Institut Bauen und Umwelt e.V.



Presented by

aluplast
Kunststoff-Fenstersysteme

EPPA

GÜTEZEICHEN KUNSTSTOFF ERZEUGNISSE

## 1. General Information

### QKE / EPPA

**Programme holder**
IBU - Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

**Declaration number**
EPD-QKE-20130248-IBG2-EN

**This Declaration is based on the Product Category Rules:**
Windows and doors, 10-2012
(PCR tested and approved by the independent expert committee)

**Issue date**
23.05.2014

**Valid to**
22.05.2019

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Dr. Burkhart Lehmann
(Managing Director IBU)

### PVC-U window (1.23 x 1.48 m) with insulated triple-glazing

**Owner of the Declaration**
QKE - Qualitätsverband Kunststofferzeugnisse e.V.
Am Hofgarten 1-2; 53113 Bonn
Germany

EPPA - European PVC Window Profiles and related Building Products Association ivzw
Avenue de Cortenbergh 71; 1000 Brussels
Belgium

**Declared product / Declared unit**
PVC-U single-sash tilt & turn window, with the dimensions 1.23 m x 1.48 m, insulated triple-glazing and variable surface (white, painted, laminated with PVC film or coated with PMMA).

**Scope:**
This EPD is an association EPD. The arithmetical average from the manufacturer's specifications submitted by nine member companies was used as the data basis for the steel reinforced plastic window profiles. The companies supplying data represent a share of approximately 90% of the production of all systems traders affiliated with the QKE and EPPA associations and therefore nearly 90% of European production.
As a worst case approximation, the scope also contains profile types with a lower proportion of steel (glass fibre-reinforced PVC frame material / aluminium reinforcement).
As the various profile coatings and sealing materials are taken into account according to their market share, this EPD covers all designs for PVC windows that conform to the stated requirements.

The following companies were involved in the collection of data:

aluplast GmbH, D - Karlsruhe
Deceuninck nv, B - Hooglede-Gits
GEALAN Fenster-Systeme GmbH, D - Oberkotzau
Internorm Bauelemente GmbH, A - Traun
profine GmbH, D - Pirmasens
REHAU AG + Co., D - Erlangen
Salamander Industrie-Produkte GmbH, D - Türkheim
Schüco International KG, D - Weißenfels
VEKA AG, D - Sendenhorst

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

**Verification**

| |
|---|
| The CEN Norm EN 15804 serves as the core PCR |
| Independent verification of the declaration according to ISO 14025 |
| ☐ internally ☒ externally |

Dr. Eva Schmincke
(Independent tester appointed by SVA)

## 2. Product

### 2.1 Product description

The declared product is a single-sash tilt & turn window with the dimensions 1.23 x 1.48 m and insulated triple-glazing. It consists of a PVC frame profile (depth > 80 mm) with a transparent glass filling. The surface of the frame can vary in design: laminated with PVC film, coated with PMMA (polymethyl-methacrylate) or painted. This produces white or coated, structured or smooth surfaces. The seals are made from soft PVC, EPDM (ethylene propylene diene monomers) or TPE (thermoplastic elastomers), the fittings from steel.

The EPD does not relate to a specific product from a manufacturer, but confirms the average environmental quality for all PVC windows from member companies of the EPPA and QKE associations. The specifications for these products represent approximately 90% of the European market. Detailed data can be found in the respective manufacturer's product description.

A reference service life of 50 years was assumed. The respective useful lives of the individual components - glazing, seals and fittings - is shorter, however, which means that these will need replacing during the reference service life of the window unit. These planned replacements of individual components are also included in the declared unit.

### 2.2 Application

Windows are used in the outer shell of buildings for lighting, ventilation and protection from the elements.

### 2.3 Technical Data

**Technical construction data**

| Name | Value | Unit |
|---|---|---|
| Heat transfer coefficient glass according to /EN 674/, /EN 675/ | 0.7 | W/(m²K) |
| Heat transfer coefficient frame according to /EN 674/, /EN 675/ | 1.1 | W/(m²K) |
| Heat transfer coefficient window according to /EN 674/, /EN 675/ | 0.9 | W/(m²K) |
| Total enegry transmittance | 50 | % |
| Driving rain impermeability according to /EN 1027/, /EN 12208/ | 4A - 9A | Class |
| Airborne sound reduction Rw according to /EN ISO 717-1/ | 32 | dB |
| Installation depth | > 80 | mm |
| Possible opening types | Tilt & turn | - |

For further technical construction data, only the minimum requirements that apply to quality-assured windows according to /RAL-GZ 695/ are cited below.

Depending on the design of frame, seals and fittings, considerably higher performance classes can be achieved by the windows produced.

- Min. air permeability according to /EN 1026/, /EN 12207/: Class 2
- Min. resistance to wind load according to /EN 12211/, /EN 12210/: Class B1

Further specific data can be found in the relevant manufacturer's product description.

### 2.4 Placing on the market / Application rules

Placing on the market within EU/EFTA is subject to the /Construction Products Regulation/. The products must have a declaration of performance compliant with the harmonized product standard /EN 14351-1/ and the CE marking.

Usage is governed by the relevant national rules.

### 2.5 Delivery status

The EPD relates to plastic windows with the dimensions 1.23 x 1.48 m. The face area is 1.82 m².

### 2.6 Base materials / Ancillary materials

The base materials of the declared unit are:

| Name | Value | Unit |
|---|---|---|
| Frame material PVC | 22.7 | Mass % |
| Reinforcement steel | 15.6 | Mass % |
| Seals | 1.0 | Mass % |
| Fittings steel | 3.8 | Mass % |
| Glazing | 56.9 | Mass % |

The additives used to manufacture the PVC frame material can be found in the following overview:

PVC formulation

- 82.0 mass % PVC
- 6.5 mass % Filler (chalk)
- 4.9 mass % Impact-resistance modifiers
- 3.3 mass % Calcium/zinc stabilisers
- 3.3 mass % Titanium oxide ($TiO_2$) pigment

Recycled material obtained from used windows is used to manufacture proprietary profiles. These profiles can contain more than 0.1% lead compounds. These are treated as SVHC (Substances of Very High Concern) in accordance with /REACH/.

### 2.7 Manufacture

Plastic windows are made from a variety of individual components: each window consists of a PVC frame with seals, the glazing, the fittings and, where required, the steel reinforcement. The manufacture of the base materials glass, PVC and steel is described in the /WECOBIS/ database.

PVC profiles for window frames are manufactured in an extrusion process from a mixture of PVC powder and additives. These protect the PVC from damage during processing and give the profile the necessary properties (impact resistance, colour, weathering stability etc.). The PVC powder used to manufacture the frames is a widely used bulk plastic and is obtained through polymerisation. Due to its chemical structure,

PVC contains a high proportion of the halogen chlorine.

The majority of window frames are made from white hard PVC profiles. Some frames are manufactured from profiles that are also laminated with PVC film, coated with PMMA or painted.

Seals are generally attached to the window profiles in a coextrusion process and consist of soft PVC, EPDM or TPE.

The window profiles are then delivered in standard lengths to the window manufacturers, where they are sawn to the length actually required for the particular window. Where necessary, steel reinforcement is inserted and screwed in. The profiles are then welded, the fittings attached and the glass pane and glass retaining strips fitted. The window can now be supplied and fitted.

The steel for manufacturing the fittings is largely obtained from iron ores in a blast furnace process by means of reduction with coke.

The basic raw material for manufacturing the glazing is quartz sand to which various fluxing agents and oxidants (soda ash, sodium sulphate, potash etc.) have been added. In a further processing step, the molten raw glass is added to molten tin, from which a flat strip of glass can be continuously extracted (float glass process). /European IPPC Bureau/

The member companies of QKE e.V. are subject to external quality monitoring within the framework of voluntary self-regulation. Plastic window systems that bear the RAL quality mark according to /RAL-GZ 716/ are listed on the website at gkfp.de.

### 2.8 Environment and health during manufacturing

Of all the constituents of PVC formulations, only the calcium/zinc stabilisers have to be classified and marked as follows in accordance with /GHS/:

H302: Harmful if swallowed
H318: Causes serious eye damage
H317: May cause an allergic skin reaction
Pictogram: corrosive and irritating

### 2.9 Product processing/Installation

The finished windows are transported to the construction site and installed. Screws made from zinc-plated steel and polyurethane foam are required for each window unit for assembly.

### 2.10 Packaging

Polyethylene foam pads, a cardboard edge protector, polypropylene load retaining straps, aluminium or steel clamps and PE stretch film are used as packaging materials for plastic windows.

### 2.11 Condition of use

No requirement for any specific declarations.

### 2.12 Environment and health during use

No requirement for any specific declarations.

### 2.13 Reference service life

The reference service life of the declared PVC-U plastic windows is 50 years.

The technical life of certain individual components is thus exceeded; as a result, there will be two replacements of seals and one replacement of fittings and glazing during this service life.

### 2.14 Extraordinary effects

**Fire**

Plastic windows are classified in classes B – E for fire behaviour (depending on the surface characteristics), s3 for smoke gas development and d0 for burning droplets in accordance with /EN 13501-1/. Individual proof shall be obtained project-oriented from the manufacturer.

**Fire protection**

| Name | Value |
|---|---|
| Building material class | B - E |
| Burning droplets | d0 |
| Smoke gas development | s3 |

Plastic windows therefore meet the requirements of B2 "normal combustibility" according /DIN 4102-1/ as a minimum.

**Water**

No requirement for any specific declarations.

**Mechanical destruction**

No requirement for any specific declarations.

### 2.15 Re-use phase

The most important processes in the reuse phase of PVC are the recycling of materials and dumping. In addition, PVC can also be thermally utilised.

A large amount of the steel used in the fittings and reinforcement is also recycled for materials.

Glazing is mostly dumped in landfill sites, but a small amount is recycled for materials or sent to waste incineration plants.

### 2.16 Disposal

The waste codes according to the European Waste Catalouge /EWC/ are as follows:

- 17 02 02 Glass
- 17 02 03 Plastic
- 17 04 05 Iron and steel

### 2.17 Further information

Possible sources of further information are available from the associations' websites

http://www.qke-bonn.de
http://www.eppa-profiles.org

and the websites of the manufacturers.

## 3. LCA: Calculation rules

### 3.1 Declared Unit

The declared unit is a window 1.23 x 1.48 m (reference window in accordance with /EN 14351-1/) with a depth of > 80 mm, a frame proportion of 22.7% and a mass of 70.1 kg and has a service life of 50 years including the incidental replacement of the glazing, fittings and seals.

### 3.2 System boundary

Type of EPD: "Cradle to grave"; the entire life cycle of the product is assessed.

Manufacture

The aggregate view in modules A1-A3 is used for manufacturing. This includes the supply of raw materials, the manufacture of the steel reinforcement, flat glass, fittings and PVC profile, all transportation to the window manufacturer, the energy requirements for constructing the windows, and any production waste generated.

The proportions of coated profiles and sealing materials are taken into account according to their market share.

Capital goods (machinery, buildings etc.) and the illumination and heating of buildings are not considered.

Transportation from the plant gate to the construction site is taken into account in module A4. All processes relating to the installation of the window in the building are considered in module A5.

Usage

The transmission heat losses occurring during the usage phase are taken into account in module B1. The measures described in 2.13 for replacing window components are taken into account in module B4.

Disposal

All processes relating to the removal, dismantling or demolition of the window from the building, including an initial sorting on the construction site, are factored into module C1.

Redistribution transportation from the construction site for recovering heat and recycling materials and for dumping fall under module C2. Module C3 covers the material/thermal recycling of the PVC, the steel from the fittings and reinforcement as well as the glazing.

Dumping of the relevant parts of the PVC, the steel from the fittings and reinforcement, and the glazing are assigned to module C4.

Credit

Finally, module D shows the potential for reuse, recovery and recycling derived from modules C3 and C4.

### 3.3 Estimates and assumptions

Apart from the assumptions and estimates described in section 4, no further assumptions or estimates are made that will impact on the outcome.

### 3.4 Cut-off criteria

The quantities of packaging used are below the cut-off criteria and are not factored into the life cycle assessment.

The disregarded input flows are all under 1% of both the total mass and the total flow of primary energy. Taken together they form less than 5% of the total mass or 5% of the total energy.

### 3.5 Background data

The primary data for window manufacturing was provided by the members of the declaring associations (see scope). In addition, life cycle assessments from the /GaBi/ database were used for modelling the manufacture of the PVC, glazing and fittings. The background data for steel and all other data originate from the /ecoinvent 2.2/ database. Life cycle assessment modelling was performed with the /SimaPro 7/ software.

### 3.6 Data quality

The data for the products examined was collected through analyses of internal production and environmental data, by collating LCA-related data within the supplier chain, and on the basis of average data submitted by the associations. The data collated was checked for plausibility and consistency.

Apart from one exception (disposal of glazing at the landfill site, 1995), the background data records used for the assessment do not go back more than 12 years.

### 3.7 Period under review

All primary data was collected in 2010/2011.

### 3.8 Allocation

No allocations are modelled.

### 3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

## 4. LCA: Scenarios and additional technical information

The following technical information forms the basis for the declared modules, or can be used to develop specific scenarios in the context of a building assessment if modules are not declared (MND).

**Transportation to construction site (A4)**

| Name | Value | Unit |
|---|---|---|
| Litres of fuel 40 t truck | 31 | l/100km |
| 7.5 t truck | 19 | l/100km |
| Transport distance 40 t truck | 150 | km |
| 7.5 t truck | 50 | km |
| Capacity utilisation (including empty runs) 40 t truck | 47 | % |
| 7.5 t truck | 73 | % |
| Gross density of products transported | 3276 | kg/m³ |

**Installation in building (A5)**

| Name | Value | Unit |
|---|---|---|
| Water consumption | 0 | m³ |
| Electricity consumption , current mix for Germany | 0.12 | kWh |
| Screws | 0.24 | kg |
| Polyurethane | 0.20 | kg |

**Usage (B1), see Chapter 2.12 Usage**

The net heat losses caused by the window are taken into account here. These consist of the transmission heat losses and the solar heat gains from the window. A degree-day factor of 66 kKh/a and solar irradiation of 155 kWh/(m²*a) are assumed.

| Name | Value | Unit |
|---|---|---|
| Net heat loss (usage phase 50 years) | 1521 | kWh |

The impacts in the usage phase depend to a very great extent on the actual climatic and technical circumstances of a specific building. The calculations for the heat losses and gains and the results of the impact assessment are based on parameters for average Central European conditions.

The energy demand during the usage phase at the reference location is calculated from the transmission heat losses Qtr and the solar heat gains Qirr in winter according to /DIN V 18599-2/:

Qges = Qtr - Qirr

Both the degree-day factor as a climatic KPI and measure of the general building insulation and the alignment of the window have a major effect on the net heat losses and gains. In this life cycle assessment, it is assumed that the windows are installed in a new building that meets the requirements of /EnEV 2013/. The transmission heat losses calculated with a degree-day factor of 66 kKh/a are therefore used.

The data for German heating requirements was used to model the provision of heating energy: 49% gas, 30% heating oil and 13% district heating. The remaining 8% is divided aliquot across the cited energy sources.

**Replacement (B4), conversion/renovation (B5)**

| Name | Value | Unit |
|---|---|---|
| Replacement cycle Glazing | 1 | Number/RSL |
| Seals | 2 | Number/RSL |
| Fittings | 1 | Number/RSL |
| Replacement of worn parts Glazing | 40.4 | kg |
| Seals | 1.6 | kg |
| Fittings | 2.7 | kg |

**Reference service life**

| Name | Value | Unit |
|---|---|---|
| Reference service life | 50 | a |

**End of life (C1-C4)**

| Name | Value | Unit |
|---|---|---|
| Collected separately Glass | 34.6 | kg |
| PVC | 14.5 | kg |
| Steel | 11.8 | kg |
| Recycling Glass | 5.2 | kg |
| PVC | 7.2 | kg |
| Steel | 9.5 | kg |
| Landfilling Glass | 27.7 | kg |
| PVC | 3.0 | kg |
| Steel | 1.0 | kg |

**Reuse, recovery and recycling potential (D), relevant scenario specifications**

The energy (thermal energy and current) resulting from heat recovery and recycling of waste and the recycled material thus created is credited here.

## 5. LCA: Results

In Table 1 "Description of the system boundary", all declared modules shall be indicated with an "X"; all modules that are not declared shall be indicated with "MND". In the following tables 2, 3 and 4, columns may be deleted for modules that are not declared. Indicator values should be declared with three valid digits (eventually exponential form (e.g. 1,23E-5 = 0,0000123). A uniform format should be used for all values of one indicator. If several modules are not declared and therefore have been deleted from the table, the abbreviations for the indicators can be replaced by the complete names, while the readability and clear arrangement should be preserved; the legends can then be deleted.
If no reference service life is declared (see chapter 2.13 "Reference Service Life"), the LCA results of the modules B1-B2 and B6-B7 must refer to a period of one year. This must be indicated as an explanatory text in Chapter 5, "LCA: Results". Also in this case, the calculation formula for the total life cycle results is to be specified.

**DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)**

| PRODUCT STAGE | | | CONSTRUCTION PROCESS STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARYS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Raw material supply | Transport | Manufacturing | Transport from the gate to the site | Assembly | Use | Maintenance | Repair | Replacement[1)] | Refurbishment[1)] | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse- Recovery- Recycling- potential |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| X | X | X | X | X | X | MND | MND | X | MND | MND | MND | X | X | X | X | X |

**RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: one piece / window (1.23 x 1.48 m)**

| Parameter | Unit | A1 - A3 | A4 | A5 | B1 | B4 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GWP | [kg $CO_2$-Eq.] | 1.46E+2 | 1.07E+0 | 1.34E+0 | 4.37E+2 | 8.07E+1 | 0.0E+0 | 3.13E+0 | 7.02E+0 | 2.47E-1 | -4.74E+1 |
| ODP | [kg CFC11-Eq.] | 6.33E-6 | 1.75E-7 | 3.18E-8 | 5.84E-5 | 3.9E-6 | 0.0E+0 | 4.94E-7 | 1.88E-7 | 7.4E-8 | -1.57E-6 |
| AP | [kg $SO_2$-Eq.] | 7.16E-1 | 3.34E-3 | 5.81E-3 | 6.14E-1 | 3.51E-1 | 0.0E+0 | 9.43E-3 | 1.5E-2 | 1.47E-3 | -1.98E-1 |
| EP | [kg $(PO_4)^{3-}$ - Eq.] | 1.42E-1 | 8.97E-4 | 2.05E-3 | 1.01E-1 | 5.13E-2 | 0.0E+0 | 2.49E-3 | 9.97E-4 | 3.59E-4 | -7.99E-2 |
| POCP | [kg Ethen Eq.] | 4.33E-2 | 1.38E-4 | 6.4E-4 | 4.77E-2 | 2.47E-2 | 0.0E+0 | 3.8E-4 | 3.16E-4 | 5.41E-5 | -1.4E-2 |
| ADPE | [kg Sb Eq.] | 4.27E-3 | 1.35E-5 | 5.22E-5 | 7.18E-4 | 2.19E-3 | 0.0E+0 | 3.61E-5 | 2.47E-6 | 1.73E-6 | -1.7E-3 |
| ADPF | [MJ] | 5.78E+3 | 8.09E+2 | 2.72E+1 | 7.17E+3 | 2.76E+3 | 0.0E+0 | 2.27E+3 | 5.48E+2 | 3.76E+2 | -2.44E+3 |

| Caption | GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources |
|---|---|

**RESULTS OF THE LCA - RESOURCE USE: one piece / window (1.23 x 1.48 m)**

| Parameter | Unit | A1 - A3 | A4 | A5 | B1 | B4 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PERE | [MJ] | 9.53E+1 | 2.3E-1 | 8.41E-1 | 2.67E+1 | 4.03E+1 | 0.0E+0 | 6.61E-1 | 4.68E-1 | 5.1E-2 | -2.73E+1 |
| PERM | [MJ] | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| PERT | [MJ] | 9.53E+1 | 2.3E-1 | 8.41E-1 | 2.67E+1 | 4.03E+1 | 0.0E+0 | 6.61E-1 | 4.68E-1 | 5.1E-2 | -2.73E+1 |
| PENRE | [MJ] | 2.35E+3 | 1.82E+1 | 2.78E+1 | 7.02E+3 | 1.09E+3 | 0.0E+0 | 5.16E+1 | 2.83E+1 | 6.86E+0 | -8.39E+2 |
| PENRM | [MJ] | 3.04E+2 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 2.81E+1 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | -4.8E+1 |
| PENRT | [MJ] | 2.66E+3 | 1.82E+1 | 2.78E+1 | 7.02E+3 | 1.12E+3 | 0.0E+0 | 5.16E+1 | 2.83E+1 | 6.86E+0 | -8.87E+2 |
| SM | [kg] | 3.06E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | - |
| RSF | [MJ] | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | - |
| NRSF | [MJ] | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | - |
| FW | [$m^3$] | 3.75E+1 | 4.6E-3 | 2.12E-2 | 3.16E-1 | 3.72E+1 | 0.0E+0 | 1.17E-2 | 3.28E-2 | 5.96E-3 | -3.01E-1 |

| Caption | PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Use of net fresh water |
|---|---|

**RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: one piece / window (1.23 x 1.48 m)**

| Parameter | Unit | A1 - A3 | A4 | A5 | B1 | B4 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HWD | [kg] | 1.94E-1 | 1.83E-5 | 3.53E-5 | 5.71E-3 | 2.05E-1 | 0.0E+0 | 4.82E-5 | 3.13E-6 | 2.53E-6 | -6.85E-2 |
| NHWD | [kg] | 2.13E+2 | 1.36E-1 | 9.27E-2 | 3.29E+0 | 1.34E+3 | 0.0E+0 | 3.02E-1 | 1.27E+1 | 3.48E+1 | -3.94E+0 |
| RWD | [kg] | 4.66E-2 | 1.38E-5 | 2.33E-5 | 1.57E-3 | 4.66E-2 | 0.0E+0 | 4.06E-5 | 2.05E-5 | 3.13E-6 | -1.16E-3 |
| CRU | [kg] | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 |
| MFR | [kg] | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 8.1E+0 | 0.0E+0 | 0.0E+0 | 2.3E+1 | 0.0E+0 | -2.57E+1 |
| MER | [kg] | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 9.94E+0 | 0.0E+0 | 0.0E+0 |
| EEE | [MJ] | 3.13E-1 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 1.53E+0 | 0.0E+0 | 0.0E+0 | 2.9E+0 | 0.0E+0 | -4.43E+0 |
| EET | [MJ] | 5.14E-1 | 0.0E+0 | 0.0E+0 | 0.0E+0 | 4.44E+0 | 0.0E+0 | 0.0E+0 | 8.41E+0 | 0.0E+0 | -1.28E+1 |

| Caption | HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy |
|---|---|

## 6. LCA: Interpretation

The environmental impacts are dominated by the provision of energy to compensate the transmission heat losses caused by installing the window (module B1), the manufacturing phase (module A1-A3) and the replacement of the glazing in module B4 (see figure).

In the categories of global warming potential (GWP), ozone depletion potential (ODP) and non-renewable primary energy (PENRE), the compensation of transmission heat losses accounts for more than 65-84% of the impacts or energy requirements.

The categories of acidification potential (AP), eutrophication potential (EP), photochemical ozone creation potential (POCP), abiotic resource depletion potential for elements (ADPe), renewable primary energy (PERE) and fresh water consumption (FW) are each dominated by the environmental impacts of manufacturing the main window components in A1-A3 (glazing, steel reinforcement, plastic window profile) and the replacement of the glazing in module B4 with a proportion of 52-74%.

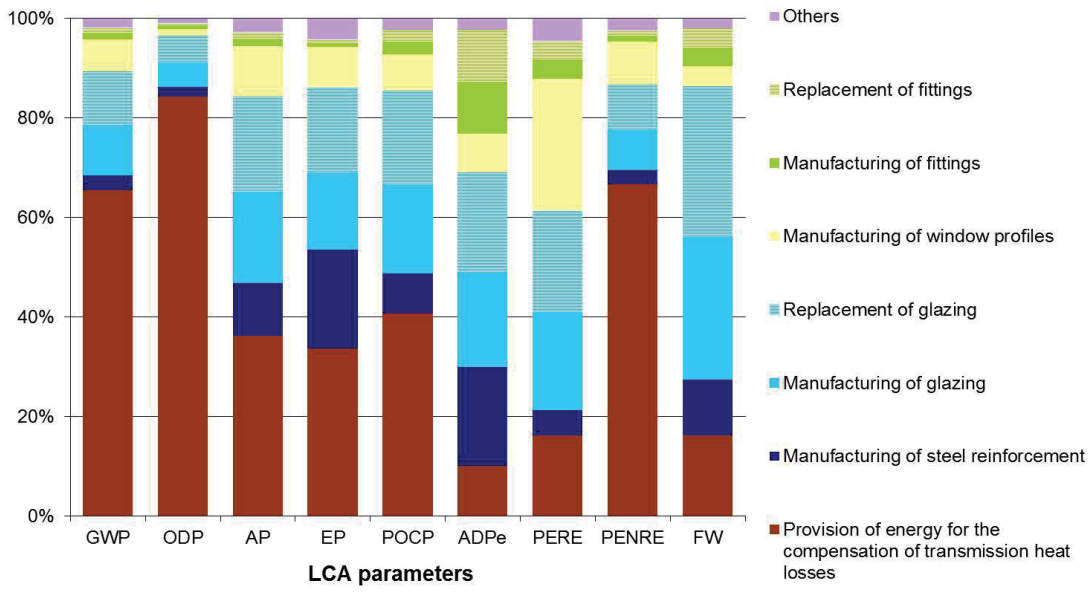
The manufacture of the fittings in modules A1-A3 and the replacement of fittings in module B4 contribute approx. 21% to the abiotic resource depletion potential for elements (ADPe).

It should be pointed out that the consideration of module B1 is optional. It shows that reducing transmission heat losses or unintentional heat gains is the key factor in optimising environmental quality in the building. If module B1 were taken out of the equation, virtually all environmental impacts would be caused by modules A1-A3 and B4.

The environmental impacts of the end-of-life phase are of less importance when considered over the entire service life.



**Relative Shares of Selected Processes in the Manufacturing and Use of the Declared Product for Selected LCA parameters**



## 7. Requisite evidence

Fire

Fire tests on several test elements from different manufacturers using the SBI test method according to /EN 13823/ by Efectis Nederland BV, project number 2012-Efectis-R0205
Result: In accordance with the average parameters identified, plastic windows meet the following classification criteria according to /EN 13501-1/:
Building material class: B - D
Smoke gas development: s3
Burning droplets: d0

VOC (volatile organic compounds)

Research project into VOC emissions from building products; German Federal Office for Building and Regional Planning as part of the Building the Future research initiative, file reference Z6-10.08.18.7-08.20/II2-F20-08-005; December 2010
Result: In terms of the indoor exposure, the VOC emissions fall largely below the requirements of the assessment by the German Committee for Health-related Evaluation of Building Products.

## 8. References


**Construction Products Regulation:** Regulation (EU) No 305/2011 of the European Parliament and of the council of March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC

**DIN 4102-1:** Fire behaviour of building materials and building components - Part 1: Building materials; concepts, requirements and tests;
DIN 4102-1:1998

**DIN V 18599-2:** Energy efficiency of buildings - Calculation of the net, final and primary energy demand for heating, cooling, ventilation, domestic hot water and lighting - Part 2: Net energy demand for heating and cooling of building zones;
DIN V 18599-2:2011

**EN 674**: Glass in building. Determination of thermal transmittance (U value). Guarded hot plate method;
EN 674:2011

**EN 675**: Glass in building. Determination of thermal transmittance (U value). Heat flow meter method;
EN 675:2011

**EN 1026**: Windows and doors - Air permeability - Test method; EN 1026:2000

**EN 1027**: Windows and doors - Watertightness - Test method; EN 1027:2000

**EN 12207**: Windows and doors - Air permeability - Classification; EN 12207:1999

**EN 12208**: Windows and doors - Watertightness - Classification; EN 12208:1999

**EN 12210**: Windows and doors - Resistance to wind load - Classification; EN 12210:1999+AC:2002

**EN 12211**: Windows and doors - Resistance to wind load - Test method; EN 12211:2000

**EN 13501-1**: Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests;
EN 13501-1:2007+A1:2009

**EN 13823**: Reaction to fire tests for building products - Building products excluding floorings exposed to the thermal attack by a single burning item;
EN 13823:2010

**EN 14351-1**: Windows and doors - Product standard, performance characteristics - Part 1: Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics;
EN 14351-1:2006+A1:2010

**EN ISO 717-1**: Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation; ISO 717-1:2013

**ecoinvent 2.2**: Ecoinvent database, v. 2.2, Swiss Centre for Life Cycle Inventories (pub.), Duebendorf, Switzerland, 2010

**EnEV 2013**: Regulations on the energy-saving thermal insulation and energy-saving installations in buildings (Energieeinsparverordnung – EnEV), latest version: November 18th, 2013

**European IPPC Bureau**: Draft Reference Document on Best Available Techniques in the Glass Manufacturing Industry, 2001

**EWC**: European Waste Catalogue, established by Decision 2000/532/EC of European Commission

**Fachverband Schloss- und Beschlagindustrie e.V.**: EPD on window fittings according to ISO 14025, declaration number EPD-FVS-2011311-D. Institut Bauen und Umwelt e.V. (pub.), Königswinter, 2011

**GaBi**: GaBi version 6.3: Software and Databases for Life Cycle Engineering, pub.: PE International, Leinfelden-Echterdingen, 2013

**GHS**: Globally Harmonized System of Classification and Labelling of Chemicals

**RAL-GZ 695**: Quality assurance of windows, doors, facades and winter gardens

**RAL-GZ 716**: General Quality and Test Requirements, System Description and Suitability Testing of Plastic Window and Door Profile Systems

**REACH**: Regulation (EC) No 1907/2006 of the European Parliment and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals

**SimaPro 7**: Software version 7.3.2, 2011; pub.: Pré Consultants bv, Amersford (NL)

**WECOBIS**: Information system on ecological aspects of building materials, Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (pub.) http://www.wecobis.de

**Institut Bauen und Umwelt**
Institut Bauen und Umwelt e.V., Berlin (pub.): Generation of Environmental Product Declarations (EPDs);

**General principles**
for the EPD range of Institut Bauen und Umwelt e.V. (IBU), 2013-04
www.bau-umwelt.de

**PCR Part A**
Institut Bauen und Umwelt e.V., Königswinter (pub.): Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report. April 2013
www.bau-umwelt.de

**ISO 14025**
DIN EN ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

**EN 15804**
EN 15804:2012-04+A1 2013: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

**Publisher**
Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Tel +49 (0)30 3087748- 0
Fax +49 (0)30 3087748- 29
Mail info@bau-umwelt.com
Web **www.bau-umwelt.com**

**Programme holder**
Institut Bauen und Umwelt e.V.
Panoramastr 1
10178 Berlin
Germany

Tel +49 (0)30 - 3087748- 0
Fax +49 (0)30 – 3087748 - 29
Mail info@bau-umwelt.com
Web **www.bau-umwelt.com**

**Author of the Life Cycle Assessment**
SKZ - Das Kunststoffzentrum
Friedrich-Bergius-Ring 22
97076 Würzburg
Germany

Tel +49 931 4104132
Fax +49 931 4104717
Mail kfe@skz.de
Web **skz.de**

**Owner of the Declaration**
EPPA European PVC Window Profiles and related Building Products Association
Avenue de Cortenbergh 71
1000 Brussels
Belgium

Tel +32 2 7324124
Fax +32 2 7324218
Mail info@eppa-profiles.org
Web **eppa-profiles.org**

QKE Qualitätsverband Kunststofferzeugnisse e.V.
Am Hofgarten 1-2
53113 Bonn
Germany

Tel +49 228 7667654
Fax +49 228 7667650
Mail info@qke-bonn.de
Web **qke-bonn.de**

# Expert Statement

**255 33208 Rev1 dated 4 March 2010**

**For evidence of performance of burglar resistance**

**Translation of Expert Statement 255 33280 Rev 1 dated 20 October 2008**

| | |
|---|---|
| Client | **aluplast GmbH**<br>**Kunststoffprofile**<br>Auf der Breit 2<br><br>D-76227 Karlsruhe |
| Product | Single and double windows |
| Designation | ALUPLAST IDEAL (see profiles) |
| Overall dimensions (W x H) | Varying |
| (Frame) Material and profiles | PVC-U, white; profiles from system aluplast Ideal 4000<br>PVC-U, white; profiles from system aluplast Ideal 5000<br>PVC-U, white; profiles from system aluplast Ideal 6000<br>PVC-U, white; profiles from system aluplast Ideal 7000<br>PVC-U, white; profiles from system aluplast Ideal 8000 |
| Attack side | Closing side / closing face as per DIN 107 |
| Type of opening | As specified in type list |
| Glazing | DIN 52290 Class A3 and/or EN 356 Class P4A |
| Hardware | Winkhaus activPilot with at least 6 burglar resistant locking mechanisms and lockable window handle - company: Hoppe. |

Burglar resistance

Resistance Class 2*)

*) based on referenced test reports and additional specifications due to modifications

**ift** Rosenheim
04 March 2010

Christian Kehrer, Dipl.-Ing. (FH)
Head of Testing Department
ift Centre for Doors, Safety/Security t

Gerhard Fellermeier, Dipl.-Ing. (FH)
Test Engineer
ift Centre for Doors, Safety/Security

**Basis**

DIN V ENV 1627 : 1999
Windows, doors, shutters ¬ - Burglar resistance - Requirements and classification
DIN V ENV 1628 : 1999
DIN V ENV 1629 : 1999
DIN V ENV 1630 : 1999

Test report 211 33202 dated 13 February 2007
Test report 211 33203 dated 13 February 2007
Test report 211 33204 dated 13 February 2007
Test report 211 33205 dated 13 February 2007
Test report 211 33206 dated 13 February 2007
Test report 211 33207 dated 13 February 2007
Expert statement No. 255 33208 dated 13 Februar 2007
Design sheets
Annex 1, pp. 1 to 92

**Validity**

Testing for burglar resistance does not allow any statement to be made on any further characteristics regarding performance and quality of the construction submitted.

Validity of the expert statement expires with expiry of any one of the above items referred to as basis (standards or test reports).

**Notes on publication**

The **ift** Guidance Sheet "Conditions and Guidance for the Use of **ift** test reports" applies.

The cover sheet including the type list can be used as an abstract.

**Contents**

The expert statement comprises a total of 96 pages



05-08 / 539


PTE Rosenheim GmbH
**ift** Zentrum – Türen Tore Sicherheit
Geschäftsführer:
Dr. Jochen Peichl

Theodor-Gietl-Str. 7 – 9
D-83026 Rosenheim
Tel.: +49 (0)8031/261-0
Fax: +49 (0)8031/261-290
www.pte-rosenheim.de

Sitz: 83026 Rosenheim
AG Traunstein, HRB 14822
Sparkasse Rosenheim
Kto. 500 435 805
BLZ 711 500 00

Notified Body Nr.: 0757
Anerkannte PÜZ-Stelle: BAY 18
Deutscher Akkreditierungs Rat DAP-PL0808.99

## Type list

| No. | Tested type | Design variants approved by expert statement | Evidence / reports - Requirements |
|---|---|---|---|
| 1. | Single window with fixed sidelight, overall dimensions 1,600 mm x 800 mm (W x H), with 6 burglar resistant locking mechanisms<br><br>Single window with fixed sidelight, overall dimensions 2,000 mm x 1,400 mm (WxH), with 8 burglar resistant locking mechanisms<br><br>Single window, overall dimensions 1,000 mm x 1,000 mm (W x H), with 8 burglar resistant locking mechanisms<br><br>Double window with fixed sidelight, overall dimensions 2,400 mm x 800 mm (WxH), with 11 burglar resistant locking mechanisms<br><br>Double window of overlapping design, overall dimensions 2,000 mm x 1,400 mm (WxH), with 16 burglar resistant locking mechanisms | Design of burglar resistant single and double windows, optionally with fixed sidelights and dimensions as per Annex 1, hardware system Winkhaus activPilot.<br><br>Different profiles from the system:<br><br>PVC-U, white; aluplast Ideal 4000<br>PVC-U, white; aluplast Ideal 5000<br>PVC-U, white; aluplast Ideal 6000<br>PVC-U, white; aluplast Ideal 7000<br>PVC-U, white; aluplast Ideal 8000 | Expert statement 255 33208 Rev1 dated 20 October 2008 |

End of type list.

# Expert Statement

## No. 175 41510 e

Translation of Expert Statement No. 175 41510 dated 6 August 2009

| | |
|---|---|
| **Date of report** | 17 August 2009 |
| **Client** | **aluplast GmbH**<br>**Kunststoffprofile**<br>Auf der Breit 2<br><br>76227 Karlsruhe<br>Germany |
| **Order** | Expert statement on<br>the sound insulation of a window unit |
| **Object** | Single tilt-and-turn window composed of PVC profile sections |

**Contents**




LSW - Labor für Schall- und Wärmemesstechnik GmbH
– das Schallschutzprüfzentrum des **ift** Rosenheim

Geschäftsführer:
Dr. Jochen Peichl
Ulrich Sieberath

Lackermannweg 26
D-83071 Stephanskirchen

Tel. +49 (0)8031/261-2250
Fax: +49 (0)8031/261-2508
www.lsw-gmbh.de

Sitz: 83026 Rosenheim
AG Traunstein, HRB 14822

Sparkasse Rosenheim
Kto. 500 434 626
BLZ 711 500 00

Notified Body Nr.: 0757
Anerkannte PÜZ-Stelle: BAY 18
DAP-PL-0808.99
Sachverständige Prüfstelle Gruppe I
für Eignungs- und Güteprüfung DIN 4109

## 1 Object

With letter dated 2 June 2008, the company aluplast GmbH, 76227 Karlsruhe, commissioned **ift** Schallschutzzentrum (Centre for Acoustics) to prepare an expert statement on the following:

Determination of the weighted laboratory sound reduction index $R_w$ as well as the spectrum adaptation terms C and $C_{tr}$ of an alternative glazing for the window unit described in test report No. 950208. P8 dated 09 February 1995, on the basis of product standard DIN EN 14351-1 .

## 2 Basis

The expert statement is based on:

### 2.1 Documents provided by the client

[1] Test report No. 950208.P8 from Labor für Schallmesstechnik (Acoustics Laboratory) and further tests from this test series conducted on 09 February 1995

### 2.2 Standards and literature/references

[3] DIN 4109 : 1989-11 "Sound insulation in buildings; requirements and testing"

[4] DIN EN 12758 : 2002-10, "Glass in Building – Glazing and airborne sound insulation - Definitions and determination of properties; German version EN 12758: 2002"

[5] DIN EN 14351-1 : 2006-03, "Windows and doors - Product standard, performance characteristics - Part 1: Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics" 2006"

[6] DIN EN 20,140-2 : 1993-05, "Acoustics - Measurement of sound insulation in buildings and of building elements - Part 2: Determination, verification and application of precision data (ISO 140-2: 1991); German version EN 20 140-2: 1993"

[7] DIN EN ISO 140-3 : 2005-05, "Acoustics - Measurement of sound insulation in buildings and of building elements - Part 3: Laboratory measurements of impact sound insulation of floors (ISO 140-3: 1995+AM1:2004); German version EN 20 140-3: 1995+A1:2004"

[8] Research report “Revision of DIN 4109, Addendum 1, Table 40“, **ift** Rosenheim, 1999

## 3 Description

The description of the test specimen with reference to the relevant acoustic properties originates from the test report No. 950208.P8 dated 09 February 1995.

| | |
|---|---|
| Product | single tilt-and-turn window |
| Overall frame dimensions (W x ×H) | 1,230 mm × 1,480 mm |
| Overall casement dimensions (W x ×H) | 1,145 mm × 1,395 mm |
| Frame member | |
| Profiles | reinforced plastic profiles (PVC-U/white) |
| System | aluplast ideal 2000 |
| Casement member | |
| Profiles | reinforced plastic profiles (PVC-U/white) |
| System | aluplast ideal 2000 |
| Rebate seals | |
| external | one gasket (type 429320 / EPDM / company: aluplast) - in frame member |
| internal | one gasket (type 429320 / EPDM / company: aluplast) - in casement member |
| Glazing | |
| Configuration | 4 mm float – 16 mm cavity – 4 mm float |
| Gas filling | argon |
| Hardware | |
| Hinges / bearings | 1 stay arm bearing / 1 pivot bearing |
| Number of locking points | 1 at top, 3 on lock side, 1 at bottom, 1 on hinge side |
| Air permeability | no data available on air permeability |

For further details refer to test report No. 950208.P8

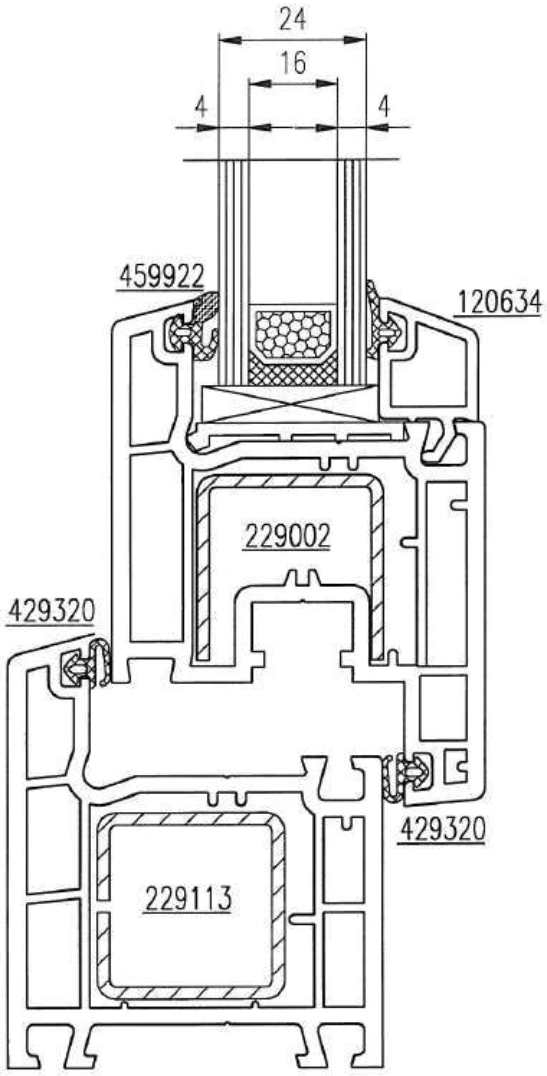



**Fig. 1** Drawing of section

## 4 Evaluation

Evaluation of sound insulation is based on Annex B, Clause B.3 of product standard DIN EN 14351-1.

The verified basis for applying this method is as follows:

| | |
|---|---|
| Type of window | single window |
| Type of opening | tilt-and-turn |
| Gas filling of insulating glass unit | optionally argon, air or any mixing ratio of the two gas types. |
| Rebate seal | 2 rebate seals continuous around perimeter, (the criteria “smooth, weather-resistant and easy to replace" were not verified). |
| Air permeability | No data was available on the air permeability of the window, therefore in analogical conclusion, the measurements from test series No. 950208.P[1)] were analysed. From this it resulted that the rebate seals of the window unit are sufficiently tight to ensure sufficient joint-related sound reduction for the attested sound reduction values. |

Sound reduction of insulating glass unit $R_w$ (C; $C_{tr}$) = 29 (-1;-4) dB[2)]
Overall frame dimensions 1,230 mm × 1,480 mm (area S = 1.82 $m^2$)
Correction for extrapolation rule related to window size
= 0 dB (because S ≤ 2.7 $m^2$)

[1)] Acoustic test no. 950208.P8 of a window element built of profiles system ideal 2000 and a glazing configuration 4 – 16 cavity (gas mixture) – 4 in a test stand according to ISO 140-3, test result $R_w$ = 35 dB.

[2)] Due to its design characteristics, the sound reduction of the insulating glass unit was determined on the basis of DIN EN 12758, Table 1,
For the configuration 4 – 16 cavity (argon) – 4 the above value was obtained:

## 5 Results and statement

As set out by Annex B of product standard DIN EN 14351-1:2006-07 using the specified tables B.1, B.2 and B.3, the sound insulation of the window unit described above was determined as follows:

$$R_w\ (C;\ C_{tr}) = 32\ (-1;-5)\ dB$$

Evidence of sound insulation may require conformity with additional rules and regulations. As set out by DIN 4109: 1989-11 for Germany the calculated value of the weighted sound reduction index $R_{w,R}$ is based on the value $R_w$ obtained from testing with deduction of the 2 dB tolerance.

This expert statement was prepared according to the principles of objectivity and to the best of our knowledge. Evidence of the sound insulation performance of the evaluated test elements can be supplied only by measurement of sound insulation as per DIN EN ISO 140-3.

The specified sound reduction indices do not take into consideration any acoustic inaccuracies in buildings and of building elements as per DIN EN 20140-2. Evaluation is based on comparative measurements. Prerequisite for conformity with the values is consistency in the quality of the material used as well as in the manufacture, assembly and adjustment/setting as tested. It is furthermore subject to the condition that the gaskets used for the rebate seal are smooth, resistant to weathering and easy to replace.

## 6 Notes on publication

The **ift** Guidance Sheet "Conditions and Guidance for the Use of **ift**Test Documents" applies.

**ift** Rosenheim
17 August 2009

Prüfstelle für Schall- und Wärmeschutz ROSENHEIM

Dr. Joachim Hessinger, Dipl.-Phys.
Head of Testing Department
ift Centre for Acoustics

Johann Baume, Dipl.-Ing. (FH)
Test engineer
ift Centre for Acoustics

# Test Report Summary and Expert Statement

## Airborne Sound Insulation of Building Elements

**11-000845-PR02**
**(PB-A01-04-en-01)**

| | |
|---|---|
| Client | **aluplast GmbH**<br>**Kunststoffprofile**<br>Auf der Breit 2<br><br>D-76227 Karlsruhe |
| Product | Single window, single leaf |
| Designation | ideal 2000 |
| Overall dimensions (W x H) | 1,230 mm × 1,480 mm |
| Frame material | PVC profiles with steel reinforcement |
| Type of opening | Tilt and turn |
| Glazing | Insulating glass unit (IGU) |
| Frame - structural depth | Frame member: 60 mm |
| Additional design variants | See type list |

Weighted sound reduction index $R_w$
Spectrum adaptation terms C and $C_{tr}$


$R_w$ (C;$C_{tr}$) in dB

*) based on sound insulation tests

ift Rosenheim
Bauaufsichtlich anerkannte Prüf-, Überwachungs- und Zertifizierungsstelle
PÜZ
BAY 18

ift Rosenheim
04 October 2011

Dr. Joachim Hessinger, Dipl.-Phys.
Head of Testing Department
Building Physics

Andreas Preuss, Dipl.-Ing. (FH)
Head of Laboratory
Building Acoustics

**Basis**

EN ISO 140-1:1997+A1:2004
EN ISO 140-3 :1995+A1:2004
EN ISO 717-1: 1996+A1:2006

EN 14351-1 : 2006

Test reports referring to windows from System aluplast ideal 2000.

This Test Report Summary and Expert Statement is a translation of Test Report Summary and Expert Statement no. 11-000845-PR02 (PB-A01-04-de-01) dated 31 August 2011.

**Instructions for use**

This expert statement together with the above basis serve to demonstrate the airborne sound insulation of a building element.

As per DIN 4109:1989-11, the following is applicable in Germany:

- $R_w$ corresponds to $R_{w,P}$, $R_{w,R} = R_{w,P} - 2$ dB
- $R_{w,R}$ for Construction Products List (Bauregelliste)

**Validity**

Testing the airborne sound insulation of a window does not allow any statement to be made on any additional properties relating to performance and quality of the present construction.

**Notes on publication**

The **ift** Guidance Sheet "Conditions and Guidance for the Use of **ift** Test Reports" applies.

**Contents**

The report comprises a total of 6 pages.



03-01/031

ift ROSENHEIM

ift Rosenheim GmbH
Geschäftsführer:
Dipl.-Ing. (FH) Ulrich Sieberath
Dr. Jochen Peichl

Theodor-Gie
D-83026 Rosenheim
Tel.: +49 (0)8031/261-0
Fax: +49 (0)8031/261-290
www.ift-rosenheim.de

83026 Rosenheim
AG Traunstein, HRB 14763
Sparkasse Rosenheim
Kto. 3822
BLZ 711 500 00

Notified Body Nr.: 0757
Anerkannte PÜZ-Stelle: BAY 18
Deutscher Akkreditierungs Rat
DAP-PL-0808.99
DAP-ZE-2288.00
TGA-ZM-16-93-00
TGA-ZM-16-93-60

## 1 Contents



## 2 Basis

The evaluation is based on:

- DIN EN 20140-2:1993-05, "Acoustics; measurement of sound insulation in buildings and of building elements - Part 2: Determination, verification and application of precision data“
- DIN EN 140-3:2005, "Acoustics; measurement of sound insulation in buildings and of building elements - Part 3: Laboratory measurements of airborne sound insulation of building elements“
- DIN EN ISO 10140-2:2010-12, "Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation "
- DIN EN ISO 717-1:1997, "Acoustics; measurement of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation“
- DIN 4109 Addendum 1 / A1 Table 40: 2003:09
- DIN EN 12758:2002, "Glass in Building – Glazing and airborne sound insulation - Definitions and determination of properties "
- DIN EN 14351-01:2006, "Windows and doors - Product standard, performance characteristics - Part 1: Windows and external pedestrian doors without resistance to fire and/or smoke leakage characteristics"
- Test of airborne sound insulation of windows from Systems ideal 2000 of company aluplast according to list of test reports/test evidence given in Section 3, i.e.:

  Test reports No. 161 29751 / Z14 R1, Z16 R1 and Z18 R1 dated 1 September 2005 referring to sound insulation measurements of System IDEAL 2000 by ift Rosenheim, as commissioned by company aluplast GmbH

- Expert statements No. 175 41510 dated 6 August 2009 referring to sound insulation of window units from System IDEAL 2000 by ift Rosenheim, commissioned by company aluplast GmbH

## 3 List of test reports

List of test reports

| No. | Type | Design, Dimensions, Type of opening | Glazing Gas filling: Argon | $R_w$ of glass in dB | Test result in dB $R_w$ (C;$C_{tr}$) | Evidence of Performance |
|---|---|---|---|---|---|---|
| 1. | ideal 2000 with steel reinforce-ment | Single window, single leaf, 1.23 × 1.48, tilt and turn, 1 external gasket 1 internal gasket | 4/16/4 | 29 | 32 (-1;-4) | 17541510 |
| 2. | | | 9 LSG SI/16/6 | 41 | 41 (-2;-5) | 161 29751/Z14 R1 |
| 3. | | | 10 LSG SI/16/6 | 42 | 42 (-2;-5) | 161 29751/Z16 R1 |
| 4. | | | 9 LSG SI/16/10 | 45 | 43 (-1;-2) | 161 29751/Z18 R1 |

Note: $R_w$ of glass specified by client

# 4 List of variants

## 4.1 Design - window unit ideal 2000

The design covers windows with casement and frame of 60 mm structural depth each.

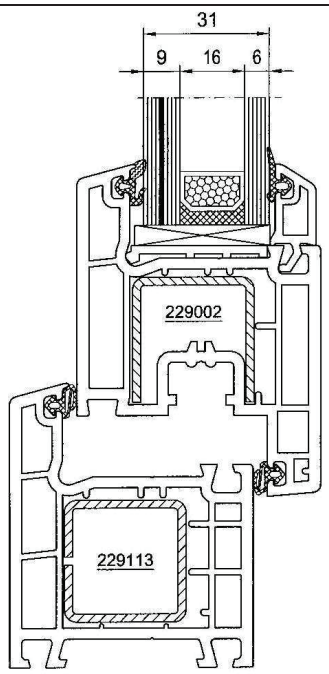
Further characteristics of the windows listed in this Section

| | |
|---|---|
| Product | single window, single leaf |
| Opening direction | opening inwards |
| Type of opening | tilt and turn |
| Rebate seals | 1 external gasket, 1 internal gasket |

The below variants were tested:
Window composed of PVC profiles with steel reinforcement

The table below gives an overview of the design.

Design - single window

| Type | Variant | Drawing | Maximum glass thickness |
|---|---|---|---|
| ideal 2000 | PVC profiles with steel reinforcement, structural depth of casement member: 60 mm |  | 35 mm |

### 4.2 Tested variants

The following lists the weighted sound reduction indices and spectrum adaptation terms for single windows sized 1.23 x 1.48 obtained from sound insulation testing.

| | | | | | |
|---|---|---|---|---|---|
| | Glass configuration | 4 / 16 Ar / 4 | 9 LSG SI / 16 Ar / 6 | 10 LSG SI / 16 Ar / 6 | 10 / 16 Ar / 9 LSG SI |
| | Nominal glass thickness | 24 mm | 30mm | 32 mm | 34 mm |
| | $R_w$, glass | 29 dB | 41 / 42 dB | 42 dB | 45 dB |
| System | | $R_w$ (C;$C_{tr}$) in dB | | | |
| ideal 2000 | with steel reinforcement, structural depth of casement member: 60 mm | 32 (-1;-5) | 41 (-2;-5) | 42 (-2;-5) | 43 (-1;-2) |

## 5 Expert evaluation

### 5.1 Evaluation

In addition to the test results listed in Section 4.2, the sound insulation of these windows was to be verified for additional insulating glass units on the basis of the tabulated values given in DIN EN 14351-1. The glass configurations used had been specified by the client. The sound reduction indices $R_{w,P,Glas}$ of these glass configurations were determined on the basis of the tabulated values given in DIN EN 12758. These data were used to determine the sound reduction of the window units as set out by Annex B of product standard DIN EN 14351-1.
Apart from glazing, it is prerequisite for application/extrapolation of these findings that the evaluated window units are the same as those tested; this applies in particular to the dimensions of frame/casement members, the profile cross sections, rebate seals and hardware/fittings.

### 5.2 Result of expert evaluation

| | | | | | |
|---|---|---|---|---|---|
| | Glass configuration | 6/16/4 | 8/16/4 | 10/16/4 | 10/16/6 |
| | Gas filling | Argon each | | | |
| | Glass $R_w$ (C;$C_{tr}$) | 32 (-2;-4) dB | 33 (-1;-4) dB | 35 (-2;-5) dB | 35 (-1;-3) dB |
| System | | $R_w$ (C;$C_{tr}$) in dB | | | |
| ideal 2000 | with steel reinforcement, structural depth of casement member: 60 mm | 34 (-1;-4) | 34 (-1;-4) | 35 (-1;-4) | 35 (-1;-3) |

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## 6 Result and statement

Based on the test results listed in Section 3 and the expert evaluation contained in Section 5.1, conformity with the characteristics listed in Section 4.2 and 5.2 is achieved.

For the specified sound reduction indices the acoustic inaccuracies as set out by DIN EN 20140-2, must be taken into account. Prerequisite for conformity with the values is that the quality of the material used as well as the manufacture and assembly/installation of the units are the same as tested.

# Test Report Summary and Expert Statement

## Airborne Sound Insulation of Building Elements

**11-000845-PR01**
**(GAS-PB01-A01-04-en-02)**

Client

**aluplast GmbH**
**Kunststoffprofile**
Auf der Breit 2

76227 Karlsruhe
Gemany

| | |
|---|---|
| Product | Single window, single leaf |
| Designation | IDEAL 4000 |
| Overall dimensions (W x H) | 1,230 mm × 1,480 mm |
| Frame material | PVC profiles with and without steel reinforcement |
| Type of opening | Tilt and turn |
| Glazing | Insulating glass unit (IGU) |
| Frame - structural depth | Frame member: 70 mm |
| Additional design variants | - |

Weighted sound reduction index $R_w$
Spectrum adaptation terms C and $C_{tr}$


$R_w$ (C;$C_{tr}$) in dB

*) based on sound insulation tests

**ift** Rosenheim
09 May 2012

Dr. Joachim Hessinger, Dipl.-Phys.
Head of Testing Department
Building Physics

Andreas Preuss, Dipl.-Ing. (FH)
Head of Laboratory
Building Acoustics

### Basis

EN ISO 140-3 :1995+A1:2004
EN ISO 717-1 : 1996+A1:2006
EN 14351-1: 2006

Test reports referring to windows from System aluplast IDEAL 4000.

This Test Report Summary and Expert Statement is a translation of Test Report Summary and Expert Statement no. 11-000845-PR01 (GAS-PB-01-A01-04-de-02) dated 09 May 2012.

### Instructions for use

This expert statement together with the above basis serve to demonstrate the airborne sound insulation of a building element.

As per DIN 4109:1989-11, the following is applicable in Germany:

- $R_w$ corresponds to $R_{w,P}$, $R_{w,R} = R_{w,P} - 2$ dB
- $R_{w,R}$ for Construction Products List (Bauregelliste)

### Validity

Testing the airborne sound insulation of a window does not allow any statement to be made on any additional properties relating to performance and quality of the present construction.

### Notes on publication

The **ift** Guidance Sheet "Conditions and Guidance for the Use of **ift** Test Reports" applies.

### Contents

The report comprises a total of 9 pages.



-01/031

**ift** Rosenheim GmbH
Geschäftsführer:
Dipl.-Ing. (FH) Ulrich Sieberath
Dr. Jochen Peichl

Theodor-Gietl-Str. 7 - 9
D-83026 Rosenheim
Tel.: +49 (0)8031/261-0
Fax: +49 (0)8031/261-290
www.ift-rosenheim.de

Sitz: 83026 Rosenheim
AG Traunstein, HRB 14763
Sparkasse Rosenheim
Kto. 3822
BLZ 711 500 00

Notified Body Nr.: 0757
Anerkannte PÜZ-Stelle: BAY 18
DAP-PL-0808.99
DAP-ZE-2288.00
TGA-ZM-16-93-00
TGA-ZM-16-93-60

## 1 Contents



## 2 Basis

The evaluation is based on:

- DIN EN 20140-2:1993-05, "Acoustics; measurement of sound insulation in buildings and of building elements - Part 2: Determination, verification and application of precision data“
- DIN EN ISO 140-3:2005, "Acoustics; measurement of sound insulation in buildings and of building elements - Part 3: Laboratory measurements of airborne sound insulation of building elements“
- DIN EN ISO 10140-2:2010-12, "Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation "
- DIN EN ISO 717-1:1997, "Acoustics; measurement of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation“
- DIN 4109 Addendum 1 / A1 Table 40: 2003:09
- DIN EN 14351-01:2006, "Windows and doors - Product standard, performance characteristics - Part 1: Windows and external pedestrian doors without resistance to fire and/or smoke leakage characteristics"
- Test of airborne sound insulation of windows from Systems IDEAL 4000 of company aluplast according to list of test reports/test evidence given in Section 3, i.e.:

  Test report No. 001127.P14 dated 22 March 2001 referring to sound insulation measurements of System IDEAL 4000 by Labor für Schall- und Wärmemesstechnik commissioned by company aluplast GmbH
  Test reports No. 161 29751 / Z1 R1, Z2 R1, Z3 R1 and / Z5 R1 dated 1 September 2005 referring to sound insulation measurements of System IDEAL 4000 by ift Rosenheim commissioned by company aluplast GmbH
  Test reports No. 161 32941 / Z6-Z7 and Z1-Z10 dated 8 March 2007 referring to sound insulation measurements of System IDEAL 4000 by ift Rosenheim commissioned by company aluplast GmbH
  Test reports No. 161 37413 / Z2, Z3, Z4 and / Z7 dated 16 December 2008 referring to sound insulation measurements of System IDEAL 4000 by ift Rosenheim commissioned by company aluplast GmbH

- Expert statements No. 010424.S21 and S24 dated 29 June 2001 referring to sound insulation measurements of window elements of Systems IDEAL 4000 by Labor für Schall- und Wärmemesstechnik commissioned by company aluplast GmbH
- Bernd Saß "Sound Insulation of triple insulating glass units", Fortschritte der Akustik (Progress in acoustics), NAG/DAGA 2009
- Sound insulation tests of triple insulating glass units, unpublished analyses from the archive of the ift Centre for Acoustics

Notes: The tests used as basis for this test report were conducted in accordance with EN ISO 140-3:1995+A1:2004. Therefore, this test report refers to these test standards. These test standards have now been superseded by the standard series DIN EN ISO 10140 (Parts 1 to 5). According to the two standard series, the test methods are identical.

## 3 List of test reports

List of test reports

| No. | Type | Design, Dimensions, Type of opening | Glazing Gas filling: Argon | $R_w$ of glass in dB | Test result in dB $R_w$ ($C;C_{tr}$) | Evidence of Performance |
|---|---|---|---|---|---|---|
| 1. | IDEAL 4000 with steel reinforcement structural depth: 82 mm casement hfv | Single window, single leaf, 1.23 × 1.48, Tilt and turn, 1 external gasket 1 internal gasket | 4/16/4 | - | 33 (-;-)[1] | 010424.S24 |
| 2. | | | 6/16/4 | - | 37 (-;-)[1] | 010424.S21 |
| 3. | | | 10/16/4 | - | 39 (-2;-5) | 001127.P14 |
| 4. | IDEAL 4000 with steel reinforcement structural depth: 70 mm casement fv | Single window, single leaf, 1.23 × 1.48, Tilt and turn, 1 external gasket 1 internal gasket | 9 LSG SI/16/6 | 41 | 42 (-2;-5) | 161 29751/Z01 R1 |
| 5. | | | 8 LSG TF/16/6 | 42 | 42 (-2;-6) | 161 29751/Z02 R1 |
| 6. | | | 9 LSG SI/16/10 | 45 | 44 (-1;-2) | 161 29751/Z03 R1 |
| 7. | | | 9 LSG SI/16/13 LSG SI | 48 | 45 (-1;-3) | 161 29751/Z05 R1 |
| 8. | energeto IDEAL 4000 with reinforcement of PBT strips structural depth: 79 mm casement hfv | Single window, single leaf, 1,23 × 1,48, Tilt and turn, 1 external gasket 1 internal gasket | 4/16/4 | 29 | 33 (-2;-6) | 161 37413/Z02 |
| 9. | | | 6/16/4 | 35 | 38 (-3;-7) | 161 37413/Z03 |
| 10. | | | 8 LSG SI/16/6 | 42 | 41 (-3;-7) | 161 37413/Z04 |
| 11. | | | 12 LSG SI/20/8 LSG SI | 48 | 45 (-1;-3) | 161 37413/Z07 |

Note: $R_w$ of glass specified by client

[1] For this expert statement only the weighted sound reduction index was specified and not the spectrum adaptation terms.

# 4 List of variants

## 4.1 Design - window unit IDEAL 4000

The design covers windows with frame of 70 mm structural depth. The structural depth of the casement member varies with the shape of the profile between 70 mm and 82 mm.

Further characteristics of the windows listed in this Section:

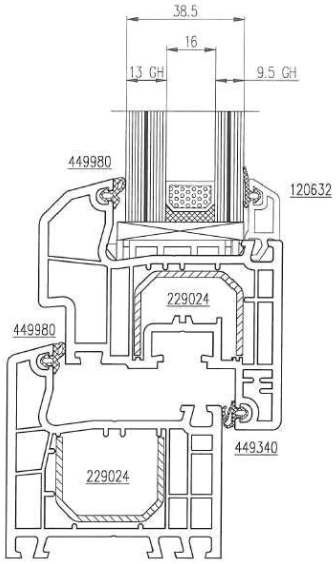
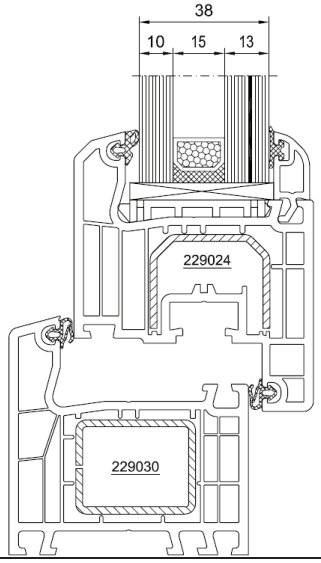
| | |
|---|---|
| Product | single window, single leaf |
| Opening direction | opening inwards |
| Type of opening | tilt and turn |
| Rebate seals | 1 external gasket, 1 internal gasket |

The below variants were tested:
Window composed of PVC profiles with steel reinforcement, structural depth of casement member: 70 mm and 82 mm
Window composed of PVC profiles with PBT-reinforcement, structural depth of casement member: 79 mm

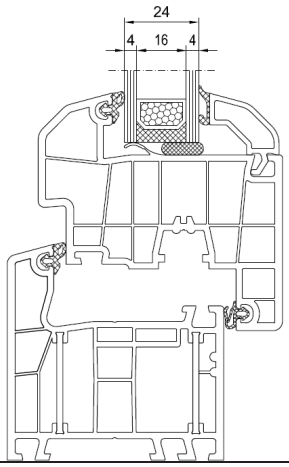
Windows having the IGU glued to the casement member shall be evaluated with respect to the sealant not filling the complete spacing up to the lip. The configuration evaluated in this statement is shown in the table below.

The table below gives an overview of the design.

Design - single window

| Type | Variant | Drawing | Maximum glass thickness |
|---|---|---|---|
| IDEAL 4000 | PVC profiles with steel reinforcement, structural depth of casement member 82 mm |  | |
| IDEAL 4000 | PVC profiles with steel reinforcement, structural depth of casement member 70 mm |  | |

Design - single window

| Type | Variant | Drawing | Maximum glass thickness |
|---|---|---|---|
| energeto IDEAL 4000 | PVC profiles with PBT-reinforcement, structural depth of casement member 79 mm |  | |

## 4.2 Tested variants

The following lists the weighted sound reduction indices and spectrum adaptation terms for single windows sized 1.23 x 1.48 obtained from sound insulation testing.

| | | | | | |
|---|---|---|---|---|---|
| | Glass configuration | 4/16 Ar/4 | 6/16 Ar/4 | 10/16 Ar/4 | 8 LSG SI/16 Ar/6 |
| | Nominal glass thickness | 24 mm | 26 mm | 34 mm | 30 mm |
| | $R_{w,P,Glas}$ | - | 35 / 36 dB | 39 dB | 41 / 42 dB |
| System | | $R_w$ (C;$C_{tr}$) in dB | | | |
| IDEAL 4000 | with steel reinforcement, structural depth of casement member 82 mm | 33 (-;-) | 37 (-;-) | 39 (-2;-5) | - |
| IDEAL 4000 | with steel reinforcement, structural depth of casement member 70 mm | - | - | - | 42 (-2;-5) |
| energeto IDEAL 4000 | with PBT-reinforcement, structural depth of casement member 79 mm | 33 (-2;-6) | 38 (-3;-7) | - | 41 (-3;-7) |

| | | | | |
|---|---|---|---|---|
| | Glass configuration | 10/16 Ar/ 9 LSG SI | 13 LSG SI/16 Ar/ 9 LSG SI | 12 LSG SI/20 Ar/ 8 LSG SI |
| | Nominal glass thickness | 30 mm | 38 mm | 42 mm |
| | $R_{w,P,Glas}$ | 45 dB | 48 dB | 48 dB |
| System | | $R_w$ (C;$C_{tr}$) in dB | | |
| IDEAL 4000 | with steel reinforcement, structural depth of casement member 70 mm | 44 (-1;-2) | 45 (-1;-3) | - |
| energeto IDEAL 4000 | with PBT-reinforcement, structural depth of casement member 79 mm | - | - | 45 (-1;-3) |

# 5 Expert evaluation

## 5.1 Evaluation

The test results listed in Section 4.2 are to be extrapolated for windows with triple insulating glass units. For ensuring correctness of this extrapolation, the sound reduction index $R_{w,P,Glas}$ of the triple insulating glass units must be at least the same as that of the tested double insulating glass units. Evaluation of triple insulating glass units has shown that sound insulation of glazing $R_{w,P,Glas}$ is the same as or better than that of double insulating glass units, provided that the external panes are the same. Therefore the test results listed in Section 4.2 can be applied without any deduction to the window combinations listed below.
The result of the expert evaluation for the window configuration having the IGU glued to the casement member with the sealant not filling the complete spacing up to the lip, was that no change in sound insulation is expected to occur within the general uncertainties of measurement.
Apart from glazing, it is prerequisite for application/extrapolation of these findings that the evaluated window units are the same as those tested; this applies in particular to the dimensions of frame/casement members, profile cross sections, rebate seals and hardware/fittings. For triple insulation glass units the configurations of the external panes must be identical with the variants tested (glass thickness, type and thickness of interlayer/film).

## 5.2 Result of expert evaluation

| | Glass configuration | 4/12/4/12/4 | 6/12/4/12/4 | 10/12/4/12/4 | 8 LSG SI /12/4/12/6 |
|---|---|---|---|---|---|
| | Gas filling | Argon each | | | |
| | Nominal glass thickness | 36 mm | 38 mm | 42 mm | 42 mm |
| System | | $R_w$ (C;$C_{tr}$) in dB | | | |
| IDEAL 4000 | with steel reinforcement, structural depth of casement member 82 mm | 33 (-;-) | 37 (-;-) | 39 (-2;-5) | - |
| IDEAL 4000 | with steel reinforcement, structural depth of casement member 70 mm | - | - | - | 42 (-2;-5) |
| energeto IDEAL 4000 | with PBT-reinforcement, structural depth of casement member 79 mm | 33 (-2;-6) | 38 (-3;-7) | - | 41 (-3;-7) |

| | Glass configuration | 10/12/4/12/ 9 LSG SI | 13 LSG SI/12/4/ 12/9 LSG SI | 12 LSG SI/12/4/12/ 8 LSG SI |
|---|---|---|---|---|
| | Gas filling | Argon each | | |
| | Nominal glass thickness | 47 mm | 50 mm | 48 mm |
| System | | $R_w$ (C;$C_{tr}$) in dB | | |
| IDEAL 4000 | with steel reinforcement, structural depth of casement member: 70 mm | 44 (-1;-2) | 45 (-1;-3) | - |
| energeto IDEAL 4000 | with PBT-reinforcement, structural depth of casement member 79 mm | - | - | 45 (-1;-3) |

## 6 Result and statement

Based on the test results listed in Section 3 and the expert evaluation contained in Section 5.1, conformity with the characteristics listed in Section 4.2 and 5.2 is achieved.

For the specified sound reduction indices the acoustic inaccuracies as set out by DIN EN 20140-2, must be taken into account. Prerequisite for conformity with the values is that the quality of the material used as well as the manufacture and assembly/installation of the units are the same as tested.

PfB Prüfzentrum für Bauelemente
Dipl.-Ing. (FH) Rüdiger Müller

Fenster · windows
Rollläden · shutters
Türen + Tore · doors
Fassaden · curtain walling
Baubeschläge · building hardware

# KURZBERICHT NR. 14/03-A092-K3

Version 1.de

Messung der Luftschalldämmung nach DIN EN ISO 10140-2 : 2010 von Bauteilen im Prüfstand und Bewertung der Messergebnisse nach DIN EN ISO 717-1 : 2013-06

| | | |
|---|---|---|
| **Antragsteller** | aluplast GmbH<br>Auf der Breit 2<br>76227 Karlsruhe | |
| **Bauart** | Hebeschiebetür aus armierten PVC Profilen | |
| **Produktbezeichnung** | **System Hebeschiebetür 85 mm – Schema A** | |
| **Maße** | Blendrahmen (B x H):<br>Blendrahmen-Profilquerschnitt (B x H):<br>Funktionsflügel-Profilquerschnitt (B x H):<br>Verglasung 8/12/4/12/6 | bis 3600 mm x 2300 mm<br>197 mm x 63 mm<br>85 mm x 100 mm |
| **Prüfbericht** | Prüfbericht Nr. 14/03-A092-B1 vom 16.04.2014 | |
| **Messung** | Nr. 14/03-A092-P3-M1 | |
| **Ergebnis** | Bewertetes Schalldämm-Maß $R_w$ (= $R_{w,P}$)<br>**$R_w$ (C; $C_{tr}$) = 39 (-1; -4) dB** | |
| **Gültigkeit** | Laufzeit der o.g. Prüf- und Klassifizierungsnormen | |

Dipl.-Ing. Matthias Demmel
Prüfstellenleiter

Stephanskirchen
29.04.2014

M.Eng. Dipl.-Ing.(FH) Andreas Wastlhuber
Sachbearbeiter

PfB GmbH & Co. Prüfzentrum für Bauelemente KG
AG Traunstein HRA 8871
Lackermannweg 24, 83071 Stephanskirchen
phG PfB Verwaltungs GmbH
Geschäftsführer: Matthias Demmel, Rüdiger Müller
AG Traunstein HRB 16490

Telefon +49 (0) 80 36 / 674947 0
Telefax +49 (0) 80 36 / 674947 28
www.pfb-rosenheim.de
info@pfb-rosenheim.de

Sparkasse Rosenheim-Bad Aibling
IBAN: DE88 7115 0000 0500 5567 41
SWIFT-BIC: BYLADEM1ROS
Steuer-Nr.: 156/172/13009
USt-IdNr.: DE245353602

Anerkannte Prüfstelle Landesbauordnung BAY 33
Notified Body No. 1644

AZUMA Design

# Laboratory Report

**Date** 26-August-2011

**Customer** ALUPLAST GmbH
Kunststoffprofile, Auf der Breit 2, D-76227 Karlsruhe

**Test No :** AZT0146.11.xls

NATA
WORLD RECOGNISED ACCREDITATION

**NATA Accredited Laboratory No : 15147**

Azuma Design Pty Limited
160 Newton Rd Wetherill Park. NSW 2164 Ph 02 9604 0255 E-Mail info@azumadesign.com.au

# AZUMA DESIGN

## TESTING LABORATORY REPORT

NATA
WORLD RECOGNISED ACCREDITATION

| SIGNATORIES | |
|---|---|
| Reported by : | Nathan Olsen |
| Checked by : | Robert Irwin |

| Date : | 26-Aug-11 |
|---|---|
| | Test No: |
| | AZT0146.11.xls |

NATA Accredited Laboratory No : 15147

## Wind and Water Penetration Testing

**Testing to AS 2047.1 as per test method 4420.0 to .6**

**Manufacturer / Customer** ALUPLAST GmbH

**Test Sample Data**

**Deflection Ratio** 1/180

| | | |
|---|---|---|
| Unit type | Sliding/Fixed Window | |
| Unit code | 60mm Sliding Window | |
| Size | H (mm) | 1200 |
| | W (mm) | 2500 |
| Design Pa: | 1500 | |

| Tested For | Y / N | Rating | Units |
|---|---|---|---|
| Structural Deflection ? | Yes | 1500 | Pa |
| Air Infiltration ? | Yes | 75/150 | Pa |
| Operating Force Initial / constant ? | Yes | 90/110 | N |
| Water Penetration ? | Yes | 150 | Pa |
| Ultimate Strength ? | Yes | 3300 | Pa |

**Test Unit Specifications** **Results**

| Sizes | | | H | W | Area sq m | Glass Type |
|---|---|---|---|---|---|---|
| Frame | | | 1200 | 2500 | 3.00 | |
| Sash | Sliding | | 1085 | 1225 | 1.33 | |
| | Fixed | | 1085 | 1225 | 1.33 | |
| | | | | | | |
| Glass | Thickness (mm) | | H | W | | |
| | Sliding | 4,12,4 | 970 | 1113 | 1.08 | Clear Float |
| | Fixed | 4,12,4 | 970 | 1113 | 1.08 | Clear Float |
| | | | | | | |
| | | | | | | |

| Structural Framing Member | Span (mm) | Allowable Deflection | Deflection Result | Actual Ratio | Test Press (Pa) | Results |
|---|---|---|---|---|---|---|
| Interlock P | 1025 | 5.69 | 2.14 | 479 | 1500 | P |
| Interlock N | 1025 | 5.69 | 2.69 | 381 | 1500 | P |
| Mullion P | | | | | | |
| Mullion N | | | | | | |
| Transom P | | | | | | |
| Transom N | | | | | | |
| H/L Trans P | | | | | | |
| H/L Trans N | | | | | | |
| H/L Mullion P | | | | | | |
| H/L Mullion N | | | | | | |
| Meet Style P | | | | | | |
| Meet Style N | | | | | | |
| Spare | | | | | | |
| Spare | | | | | | |

# AZUMA DESIGN

## TESTING LABORATORY REPORT

**Test equipments**

The test equipment and methods used in the above test comply with the requirements of AS 4420.1-6.

**Test Specimen**

See drawings at the end of this report.

**Test Methods**

The test unit was fixed into the rig as outlined in AS 4420.1.

**Deflection Test**

The unit was subjected to both positive and Negative pressure as prescribed in AS 4420.2. After the initial settling in of the unit at the 50% of the required test pressure, the differential pressure was then applied slowly until the nominated design pressure was reached in Positive. This process was then repeated for the Negative.

**Results of Test**

**The test unit satisfied the requirements of AS 2047.1 in both the positive and negative deflection at the nominated design pressure.**

**Observations**

**NIL**

---

**Air Infiltration Test**

The test was first completely sealed against air leakage as per AS 4420.4 to determine the air leakage of the test rig. It was then subjected to 75 Pa of both positive and negative pressure, and 150 Pa of both negative and positive pressure. Differential pressures were recorded. The test unit was then unsealed and subjected to 75 Pa of both positive and negative pressure. Differential pressures were recorded and air leakage then calculated. The actual leakage of the test unit was then determined.

| Barometric pressure *(Pbar)*: | 1018 | Air temperature *(° C)* | 20 |
|---|---|---|---|

| Max Pressure *(Pa)* | SEALED | | UNSEALED | |
|---|---|---|---|---|
| | Positive *(Pa)* | Negative *(Pa)* | Positive *(Pa)* | Negative *(Pa)* |
| 75 | 13 | 10 | 21 | 21 |
| 150 | 32 | 28 | 56 | 63 |

| Test Pressure | Pressure Direction | Building / Window Type | Allowable leakage flow $l/s\,m^2$ | Test results | | | |
|---|---|---|---|---|---|---|---|
| | | | | $ls^{-1}m^{-2}$ Positive | $ls^{-1}m^{-2}$ Negative | Pos + | Neg - |
| 75 Pa | +/- | Air conditioned | 1.0 | 0.30 | 0.44 | *Passed* | *Passed* |
| 75 Pa | + | Non air conditioned | 5.0 | 0.30 | 0.44 | *Passed* | |
| 150 Pa | +/- | Air conditioned | 1.6 | 0.56 | 0.81 | *Passed* | *Passed* |
| 150 Pa | + | Non air conditioned | 8.0 | 0.56 | 0.81 | *Passed* | |

**Results of test**

The test unit satisfied the requirement of AS 2047. The test unit was tested to AS 4420.4. The net flow readings are as follows:

**Observation**

**NIL**

---

**Operating Force**

**OPERATING FORCE (N)**

| | | Opening Force | Closing Force |
|---|---|---|---|
| Initiating Movement | Sash 1 | 55 | 26 |
| Sustaining Movement | Sash 1 | 15 | 16 |
| Initiating Movement | Sash 2 | | |
| Sustaining Movement | Sash 2 | | |
| Initiating Movement | Sash 3 | | |
| Sustaining Movement | Sash 3 | | |

**A force gauge was attached to the operating handle of the sash to determine the force required to set the sash in motion and thereafter to maintain motion as per AS 4420.3.**

**Results of test**

**The test unit satisfied the requirement of AS 2047.**

**Observations**

**NIL**

# AZUMA DESIGN

## TESTING LABORATORY REPORT

**WATER PENETRATION**

**Water was applied to the exterior of the test unit with no less than 0.05 ls-1m-2 for a period of five minutes at zero pressure. After five minutes, a nominated pressure was applied for fifteen minutes as per AS 4420.5.**

**Maximum pressure *(Pa)* applied for 15 minutes (Nominated pressure)**

| 150 |
|---|

**Results of test**

**The test unit satisfied the requirement of AS 2047 in positive pressure at the nominated design pressure.**

**Observations**

NIL

---

**ULTIMATE STRENGTH TEST**

A pressure nominated on part 1 of this report and determined by AS 2047, table 2.5 was applied to the test unit for a period of 10 seconds as per AS 4420.6.

| Max. pressure reached for 10 seconds | |
|---|---|
| **Positive** | **Negative** |
| **3300** | **3300** |

| Results of test : | Y or N |
|---|---|
| Dislodgement of any glass? | No |
| Dislodgement of a frame or any part of a frame? | No |
| Removal of alignment with or without its framing sash from a frame? | No |
| Loss of support of a frame such as when it is unstable in its opening in the building structure? | No |
| Failure of any sash, locking device, fasteners or supporting stay which would allow an opening light to come open? | No |

**The test unit satisfied the requirement of AS 2047.**

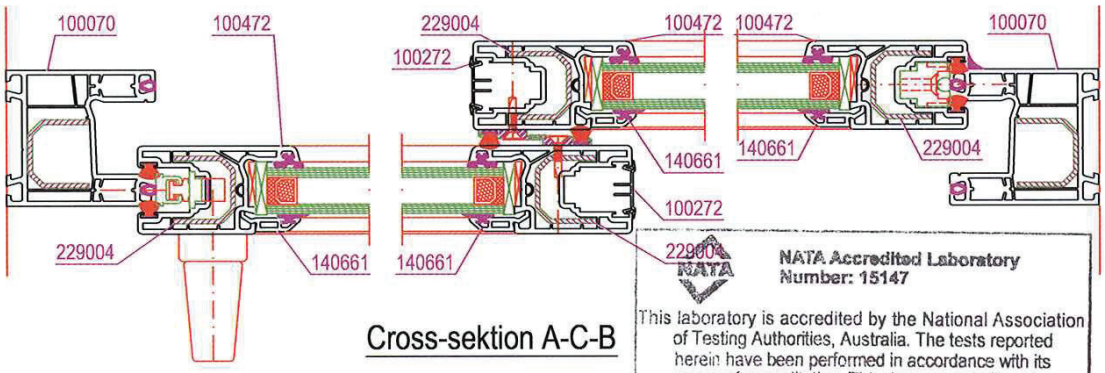
**Observations**

NIL

aluplast® GmbH
Kunststoffprofile, Auf der Breit 2, D-76227 Karlsruhe
Telefon: +49 (721) 4 71 71 - 0; Telefax: +49 (721) 4 71 71 - 999
E-Mail: info@aluplast.de / www.aluplast.de

# Slinding-Window SF60
# Schema A

Position 4
Maßstab: ~
Datum: 2011-08




Cross-sektion A-C-B

NATA Accredited Laboratory
Number: 15147

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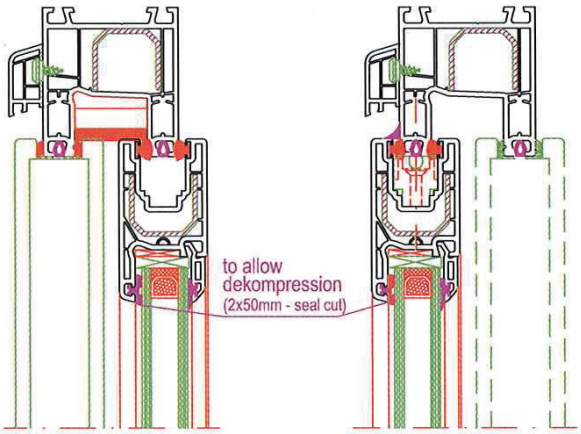
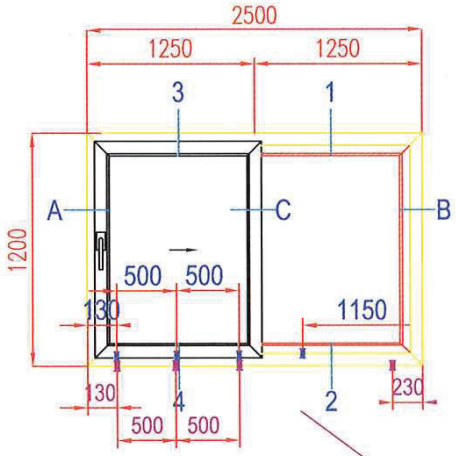
Checked by:

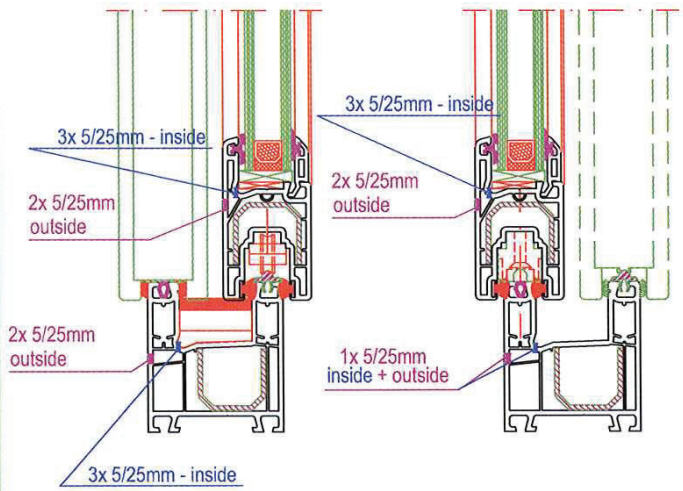
Hardware: Roto



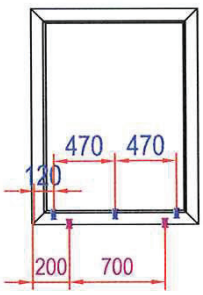

Drainage

Frame
Sliding+ Fix Sash




Sliding-Sash
Cross-sektion 3-4

Sliding-Sash
Cross-sektion 1-2




PKSI60_110523_SchemeA*
Technische Änderungen vorbehalten!

Page 6 of 6

AZUMA
Design

# Laboratory Report

**Date** 30-August-2011

**Customer** ALUPLAST GmbH
Kunststoffprofile, Auf der Breit 2, D-76227 Karlsruhe

**Test No :** AZT0148.11.xls

NATA
WORLD RECOGNISED
ACCREDITATION

**NATA Accredited Laboratory No : 15147**

Azuma Design Pty Limited
160 Newton Rd Wetherill Park. NSW 2164 Ph 02 9604 0255 E-Mail info@azumadesign.com.au

# AZUMA DESIGN

## TESTING LABORATORY REPORT

NATA
WORLD RECOGNISED ACCREDITATION

| SIGNATORIES | | |
|---|---|---|
| Reported by : | Nathan Olsen | |
| Checked by : | Robert Irwin | |

| Date : | 30-Aug-11 |
|---|---|
| Test No: | AZT0148.11.xls |

NATA Accredited Laboratory No : 15147

## Wind and Water Penetration Testing

**Testing to AS 2047.1 as per test method 4420.0 to .6**

**Manufacturer / Customer** **ALUPLAST GmbH**

**Test Sample Data**

| | | |
|---|---|---|
| **Unit type** | TILT & TURN | |
| **Unit code** | Id 4000 | |
| **Size** | H (mm) | 2200 |
| | W (mm) | 2150 |
| **Design Pa:** | 1500 | |

**Deflection Ratio** 1/180

| Tested For | Y / N | Rating | Units |
|---|---|---|---|
| Structural Deflection ? | Yes | 1500 | Pa |
| Air Infiltration ? | Yes | 75/150 | Pa |
| Operating Force Initial / constant ? | No | N/A | N |
| Water Penetration ? | Yes | 600 | Pa |
| Ultimate Strength ? | Yes | 3300 | Pa |

**Test Unit Specifications**

| Sizes | | | H | W | Area sq m | Glass Type |
|---|---|---|---|---|---|---|
| Frame | | | 2200 | 2150 | 4.73 | |
| Sash | Sash 1 & 2 | | 2116 | 1019 | 2.16 | |
| | | | | | | |
| | | | | | | |
| Glass | Thickness (mm) | | H | W | | |
| | Sash 1 & 2 | 4,16,4 | 1992 | 895 | 1.78 | Clear Float |
| | | | | | | |
| | | | | | | |
| | | | | | | |

**Results**

| Structural Framing Member | Span (mm) | Allowable Deflection | Deflection Result | Actual Ratio | Test Press (Pa) |
|---|---|---|---|---|---|
| Interlock P | | | | | |
| Interlock N | | | | | |
| Mullion P | 2050 | 11.39 | 10.49 | 195 | 1500 |
| Mullion N | 2050 | 11.39 | 10.41 | 195 | 1500 |
| Transom P | | | | | |
| Transom N | | | | | |
| H/L Trans P | | | | | |
| H/L Trans N | | | | | |
| H/L Mullion P | | | | | |
| H/L Mullion N | | | | | |
| Meet Style P | | | | | |
| Meet Style N | | | | | |
| Spare | | | | | |
| Spare | | | | | |

# AZUMA DESIGN

## TESTING LABORATORY REPORT

**Test equipments**

The test equipment and methods used in the above test comply with the requirements of AS 4420.1-6.

**Test Specimen**

See drawings at the end of this report.

**Test Methods**

The test unit was fixed into the rig as outlined in AS 4420.1.

**Deflection Test**

The unit was subjected to both positive and Negative pressure as prescribed in AS 4420.2. After the initial settling in of the unit at the 50% of the required test pressure, the differential pressure was then applied slowly until the nominated design pressure was reached in Positive. This process was then repeated for the Negative.

**Results of Test**

**The test unit satisfied the requirements of AS 2047.1 in both the positive and negative deflection at the nominated design pressure.**

**Observations**

**NIL**

---

**Air Infiltration Test**

The test was first completely sealed against air leakage as per AS 4420.4 to determine the air leakage of the test rig. It was then subjected to 75 Pa of both positive and negative pressure, and 150 Pa of both negative and positive pressure. Differential pressures were recorded. The test unit was then unsealed and subjected to 75 Pa of both positive and negative pressure. Differential pressures were recorded and air leakage then calculated. The actual leakage of the test unit was then determined.

| Barometric pressure *(Pbar)*: | 1018 | Air temperature *(° C)* | 17 |
|---|---|---|---|

| Max Pressure *(Pa)* | SEALED | | UNSEALED | |
|---|---|---|---|---|
| | Positive *(Pa)* | Negative *(Pa)* | Positive *(Pa)* | Negative *(Pa)* |
| 75 | 5 | 4 | 5 | 5 |
| 150 | 10 | 11 | 11 | 15 |

| Test Pressure | Pressure Direction | Building / Window Type | Allowable leakage flow L/s $m^2$ | Test results | | | |
|---|---|---|---|---|---|---|---|
| | | | | $ls^{-1}m^{-2}$ Positive | $ls^{-1}m^{-2}$ Negative | Pos + | Neg - |
| 75 Pa | +/- | Air conditioned | 1.0 | 0.00 | 0.05 | *Passed* | *Passed* |
| 75 Pa | + | Non air conditioned | 5.0 | 0.00 | 0.05 | *Passed* | |
| 150 Pa | +/- | Air conditioned | 1.6 | 0.03 | 0.11 | *Passed* | *Passed* |
| 150 Pa | + | Non air conditioned | 8.0 | 0.03 | 0.11 | *Passed* | |

**Results of test**

The test unit satisfied the requirement of AS 2047. The test unit was tested to AS 4420.4. The net flow readings are as follows:

**Observation**

NIL

---

**Operating Force**

**OPERATING FORCE (N)**

| | | Opening Force | Closing Force |
|---|---|---|---|
| Initiating Movement | Sash 1 | | |
| Sustaining Movement | Sash 1 | | |
| Initiating Movement | Sash 2 | | |
| Sustaining Movement | Sash 2 | | |
| Initiating Movement | Sash 3 | | |
| Sustaining Movement | Sash 3 | | |

A force gauge was attached to the operating handle of the sash to determine the force required to set the sash in motion and thereafter to maintain motion as per AS 4420.3.

**Results of test**

**The Standard does not require operating force testing for this type of window design.**

**Observations**

NIL

# AZUMA DESIGN

## TESTING LABORATORY REPORT

### WATER PENETRATION

Water was applied to the exterior of the test unit with no less than 0.05 ls-1m-2 for a period of five minutes at zero pressure. After five minutes, a nominated pressure was applied for fifteen minutes as per AS 4420.5.

**Maximum pressure *(Pa)* applied for 15 minutes (Nominated pressure)**

600

**Results of test**

The test unit satisfied the requirement of AS 2047 in positive pressure at the nominated design pressure.

**Observations**

NIL

---

### ULTIMATE STRENGTH TEST

A pressure nominated on part 1 of this report and determined by AS 2047, table 2.5 was applied to the test unit for a period of 10 seconds as per AS 4420.6.

| Max. pressure reached for 10 seconds | |
|---|---|
| Positive | Negative |
| 3300 | 3300 |

| Results of test : | Y or N |
|---|---|
| Dislodgement of any glass? | No |
| Dislodgement of a frame or any part of a frame? | No |
| Removal of alignment with or without its framing sash from a frame? | No |
| Loss of support of a frame such as when it is unstable in its opening in the building structure? | No |
| Failure of any sash, locking device, fasteners or supporting stay which would allow an opening light to come open? | No |

**The test unit satisfied the requirement of AS 2047.**

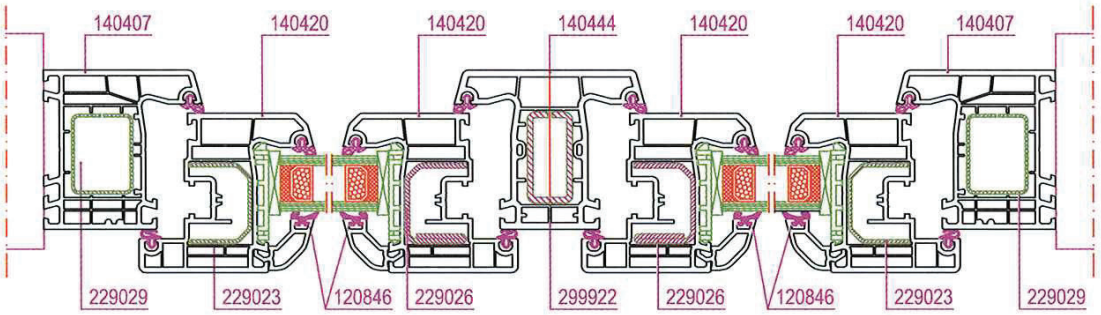
**Observations**

NIL

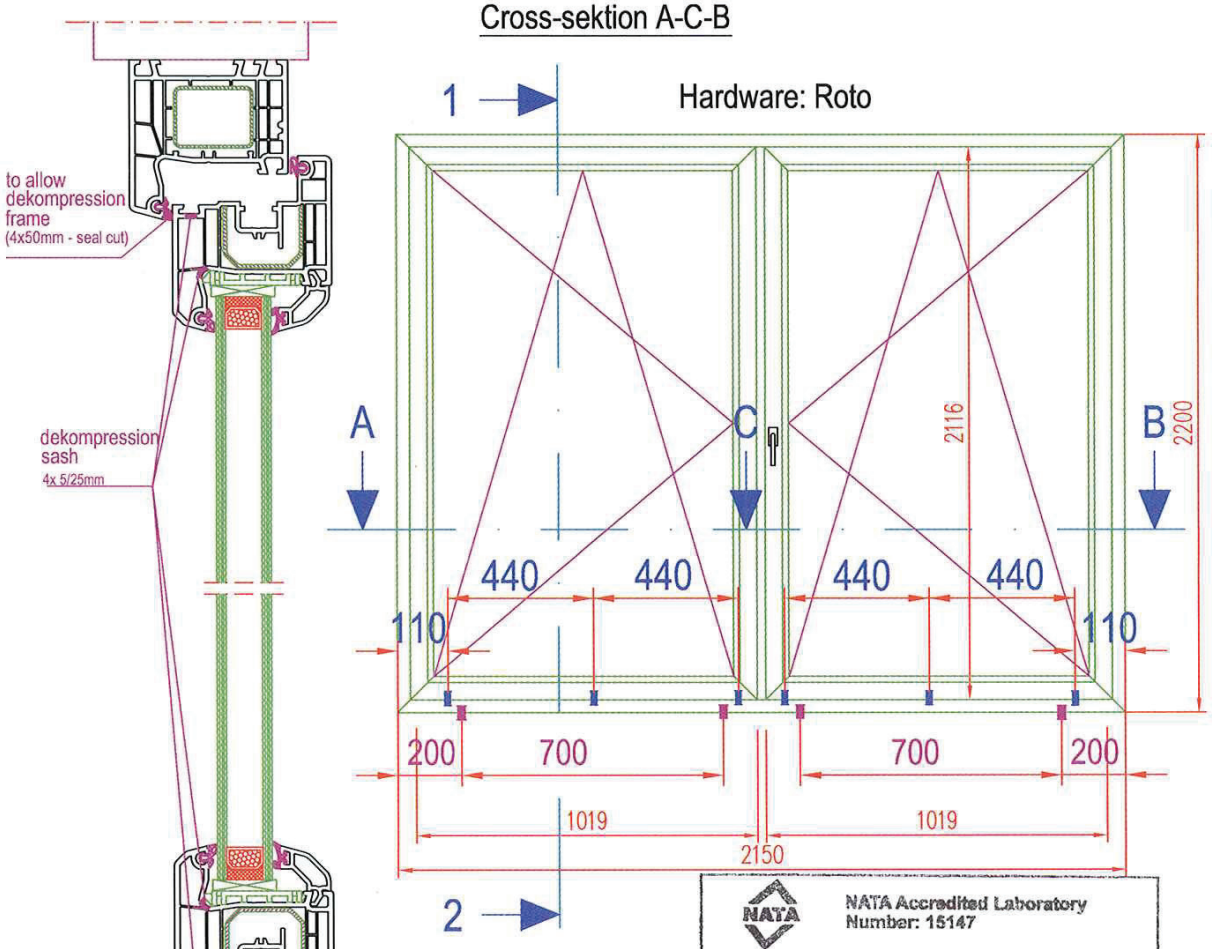
aluplast® GmbH
Kunststoffprofile, Auf der Breit 2, D-76227 Karlsruhe
Telefon: +49 (721) 4 71 71 - 0; Telefax: +49 (721) 4 71 71 - 999
E-Mail: info@aluplast.de / www.aluplast.de

# Tilt and turn Window - ID4000

Position 1
Maßstab: ~
Datum: 2011-08




Cross-sektion A-C-B




Cross-sektion 1-2

NATA Accredited Laboratory Number: 15147

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PK4id_110523_Balkontür*
Technische Änderungen vorbehalten!

Page 6 of 6

# Nachweis

## Widerstandsfähigkeit bei Windlast
## Schlagregendichtheit
## Luftdurchlässigkeit
## Mechanische Beanspruchung
## Dauerfunktion

### Prüfbericht 101 29257/1

Auftraggeber

aluplast GmbH
Kunststoffprofile
Auf der Breit 2

76227 Karlsruhe

| | |
|---|---|
| Produkt | Fensterelement bestehend aus einem Drehkippfenster mit glasteilender Kreuzsprosse und darunterliegender Festverglasung |
| Bezeichnung | Ideal 2000 |
| Außenmaß (B x H) | 1524 mm x 2300 mm |
| Rahmenmaterial | PVC-U/weiß |
| Besonderheiten | Anschlagdichtungssystem |

Widerstandsfähigkeit bei Windlast – EN 12210

**Klasse C2/B3**

Schlagregendichtheit – EN 12208

**Klasse 9A**

Luftdurchlässigkeit – EN 12207

**Klasse 4**

Bedienkräfte – EN 13115

**Klasse 1**

Mechanische Beanspruchung – EN 13115

**Klasse 4**

Dauerfunktion – EN 12400

**Klasse 2**

**ift** Rosenheim
22. Februar 2006

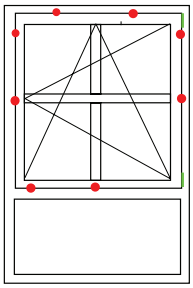
Jörn Peter Lass, Dipl.-Ing. (FH)
Prüfstellenleiter
ift Zentrum Fenster & Fassaden

Dirk Köberle, Dipl.-Ing. (FH)
Prüfingenieur
ift Zentrum Fenster & Fassaden

**Grundlagen**

prEN 14351-1 : 2005-09, Fenster und Außentüren – Produktnorm
Prüfnormen:
EN 1026 : 2000-06
EN 1027 : 2000-06
EN 12211 : 2000-06
EN 12046–1 : 2003-11
EN 14608 : 2004-03
EN 14609 : 2004-3
EN 1191 : 2000-02

**Darstellung**



**Verwendungshinweise**

Dieser Prüfbericht dient zum Nachweis der oben genannten Eigenschaften für Fenster nach prEN 14351-1 : 2005-09.

**Gültigkeit**

Die Daten und Ergebnisse beziehen sich ausschließlich auf den geprüften und beschriebenen Probekörper.

Die Prüfergebnisse können auf gleiche oder kleinere Abmessungen bei gleicher Konstruktion, Anschlagart und ähnlichem Format unter Einhaltung des Flügelgewichts übertragen werden.

Diese Prüfung ermöglicht keine Aussage über weitere leistungs- und qualitätsbestimmenden Eigenschaften der vorliegenden Konstruktion, insbesondere Witterungs- und Alterungserscheinungen wurden nicht berücksichtigt.

**Veröffentlichungshinweise**

Es gilt das **ift**-Merkblatt „Bedingungen und Hinweise zur Benutzung von **ift**-Prüfdokumentationen“. Das Deckblatt kann als Kurzfassung verwendet werden.

**Inhalt**

Der Nachweis umfasst insgesamt 12 Seiten



04-03 / 562


**ift** Rosenheim GmbH
Geschäftsführer:
Dipl.-Ing. (FH) Ulrich Sieberath
Dr. Jochen Peichl

Theodor-Gietl-Str. 7 - 9
D-83026 Rosenheim
Tel.: +49 (0)8031/261-0
Fax: +49 (0)8031/261-290
www.ift-rosenheim.de

Sitz: 83026 Rosenheim
AG Traunstein, HRB 14763
Sparkasse Rosenheim
Kto. 3822
BLZ 711 500 00



Notified Body Nr.: 0757
Anerkannte PÜZ-Stelle: BAY 18
DAP-PL-0808.01
DAP-ZE-2288.00
TGA-ZM-16-93-00
TGA-ZM-16-93-60

# Certificate

Resistance to wind load
Watertightness
Air permeability
Mechanical impact
Durability

Test report No. 101 29257/1

| | |
|---|---|
| Client | aluplast GmbH<br>Kunstoffprofile<br>Auf der Breit 2<br><br>DE - 76227 Karlsruhe |
| Product | Window element comprising of one tilt-and-turn sash with glass-dividing cross transoms and a fixedly glazed element below |
| Designation | Ideal 2000 |
| Exterior dimensions (W x H) | 1524mm x 2300mm |
| Frame material | PVC-U/white |
| Characteristics | Backstop gasket system |

Resistance to wind load - EN 12210

**Class C2/B3**

Watertightness - EN 12208

**Class 9A**

Air permeability - EN 12207

**Class 4**

Operating forces - EN 13115

**Class 1**

Mechanical impact - EN 13115

**Class 4**

Durability - EN 12400

**Class 2**

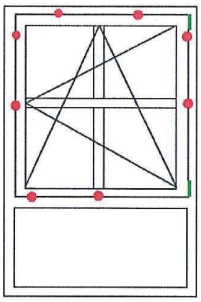
*[Translator's note: ift Rosenheim Logo in the original]*

**Basis:**

prEN 14351-1 : 2005-09, Windows and Exterior Doors, Product standard

Test standards:
EN 1026 : 2000-06
EN 1027 : 2000-06
EN 12211 : 2000-06
EN 12046 -1 : 2003-11
EN 14608 : 2004-03
EN 14609 : 2004-3
EN 1191 : 2000-02

**Drawing**



**Instructions for use**

This certificate serves to proof the above mentioned window characteristics according to prEN 14351-1 : 2005-09 standard.

**Validity**

The data and results refer solely to the tested and described specimen.

The test results may be transferred to other specimens of the same size or smaller as long as the construction, the stop type and the format remain the same and the maximum sash weight is not exceeded.

This test does not allow any statement to be made on any further characteristics regarding performance and quality of the construction presented, in particular the effects of weathering and ageing were not taken into account.

**Notes on publication**

The **ift**-Guidance Sheet "Advertising with ift test documents" applies.
The cover sheet can be used as an abstract.

**Contents:**
The report comprises of a total of 12 pages:
- Subject
- Procedure
- Individual results

**ift** Rosenheim
22 February 2006

*[Translator's note: Signature in the original]*

Jörn Peter Lass, Dipl.-Ing. (FH)
Head of Testing Department
ift Zentrum Fenster & Fassaden

*[Translator's note: Signature in the original]*

Dirk Köberle, Dipl.-Ing. (FH)
Test engineer
ift Zentrum Fenster & Fassaden

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Karlsruhe, 20/05/2015


Sonja Schramm
Publicly Appointed and Sworn Translator
of the Federal State of Baden-Württemberg, Germany

# Nachweis

## Widerstandsfähigkeit bei Windlast
## Schlagregendichtheit
## Luftdurchlässigkeit
## Mechanische Beanspruchung
## Dauerfunktion

### Prüfbericht 101 29257/2

| | |
|---|---|
| Auftraggeber | aluplast GmbH<br>Kunststoffprofile<br>Auf der Breit 2<br><br>76227 Karlsruhe |
| Produkt | zweiflügeliges Dreh-/Drehkipptür mit aufgehendem Mittelstück |
| Bezeichnung | Ideal 2000 |
| Außenmaß (B x H) | 1770 mm x 2324 mm |
| Rahmenmaterial | PVC-U/weiß |
| Besonderheiten | Anschlagdichtungssystem |

Widerstandsfähigkeit bei Windlast – EN 12210

**Klasse C2/B2**

Schlagregendichtheit – EN 12208

**Klasse 8A**

Luftdurchlässigkeit – EN 12207

**Klasse 4**

Bedienkräfte – EN 13115

**Klasse 1**

Mechanische Beanspruchung – EN 13115

**Klasse 4**

Dauerfunktion – EN 12400

**Klasse 2**

**ift** Rosenheim
22. Februar 2006

Jörn Peter Lass, Dipl.-Ing. (FH)
Prüfstellenleiter
ift Zentrum Fenster & Fassaden

Dirk Köberle, Dipl.-Ing. (FH)
Prüfingenieur
ift Zentrum Fenster & Fassaden

**Grundlagen**

prEN 14351-1 : 2005-09, Fenster und Außentüren – Produktnorm
Prüfnormen:
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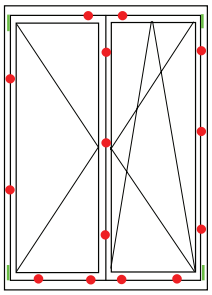
**Darstellung**



**Verwendungshinweise**

Dieser Prüfbericht dient zum Nachweis der oben genannten Eigenschaften für Fenster nach prEN 14351-1 : 2005-09.

**Gültigkeit**

Die Daten und Ergebnisse beziehen sich ausschließlich auf den geprüften und beschriebenen Probekörper.

Die Prüfergebnisse können auf gleiche oder kleinere Abmessungen bei gleicher Konstruktion, Anschlagart und ähnlichem Format unter Einhaltung des Flügelgewichts übertragen werden.

Diese Prüfung ermöglicht keine Aussage über weitere leistungs- und qualitätsbestimmenden Eigenschaften der vorliegenden Konstruktion, insbesondere Witterungs- und Alterungserscheinungen wurden nicht berücksichtigt.

**Veröffentlichungshinweise**

Es gilt das **ift**-Merkblatt „Bedingungen und Hinweise zur Benutzung von **ift**-Prüfdokumentationen“. Das Deckblatt kann als Kurzfassung verwendet werden.

**Inhalt**

Der Nachweis umfasst insgesamt 12 Seiten



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**ift** Rosenheim GmbH
Geschäftsführer:
Dipl.-Ing. (FH) Ulrich Sieberath
Dr. Jochen Peichl

Theodor-Gietl-Str. 7 - 9
D-83026 Rosenheim
Tel.: +49 (0)8031/261-0
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www.ift-rosenheim.de

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AG Traunstein, HRB 14763
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DAP-ZE-2288.00
TGA-ZM-16-93-00
TGA-ZM-16-93-60

# Certificate

Resistance to wind load
Watertightness
Air permeability
Mechanical impact
Durability

Test report No. 101 29257/2

| | |
|---|---|
| Client | aluplast GmbH<br>Kunstoffprofile<br>Auf der Breit 2<br><br>DE - 76227 Karlsruhe |
| Product | Double-sash tilt-and-turn door with openable false mullion |
| Designation | Ideal 2000 |
| Exterior dimensions (W x H) | 1770 mm x 2324 mm |
| Frame material | PVC-U/white |
| Characteristics | Backstop gasket system |

Resistance to wind load - EN 12210

**Class C2/B2**

Watertightness - EN 12208

**Class 8A**

Air permeability - EN 12207

**Class 4**

Operating forces - EN 13115

**Class 1**

Mechanical impact - EN 13115

**Class 4**

Durability - EN 12400

**Class 2**

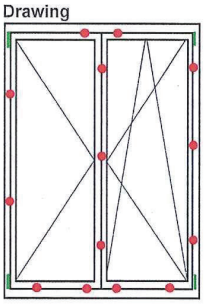
*[Translator's note: ift Rosenheim Logo in the original]*

**Basis:**

prEN 14351-1 : 2005-09, Windows and Exterior Doors, Product standard

Test standards:
EN 1026 : 2000-06
EN 1027 : 2000-06
EN 12211 : 2000-06
EN 12046 -1 : 2003-11
EN 14608 : 2004-03
EN 14609 : 2004-3
EN 1191 : 2000-02

**Drawing**



**Instructions for use**

This certificate serves to proof the above mentioned window characteristics according to prEN 14351-1 : 2005-09 standard.

**Validity**

The data and results refer solely to the tested and described specimen.

The test results may be transferred to other specimens of the same size or smaller as long as the construction, the stop type and the format remain the same and the maximum sash weight is not exceeded.

This test does not allow any statement to be made on any further characteristics regarding performance and quality of the construction presented, in particular the effects of weathering and ageing were not taken into account.

**Notes on publication**

The **ift**-Guidance Sheet "Advertising with ift test documents" applies.
The cover sheet can be used as an abstract.

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The report comprises of a total of 12 pages:
- Subject
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- Individual results

**ift** Rosenheim
22 February 2006

*[Translator's note: Signature in the original]*

Jörn Peter Lass, Dipl.-Ing. (FH)
Head of Testing Department
ift Zentrum Fenster & Fassaden

*[Translator's note: Signature in the original]*

Dirk Köberle, Dipl.-Ing. (FH)
Test engineer
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Karlsruhe, 20/05/2015


Sonja Schramm
Publicly Appointed and Sworn Translator
of the Federal State of Baden-Württemberg, Germany

# Nachweis

## Widerstandsfähigkeit bei Windlast
## Schlagregendichtheit
## Luftdurchlässigkeit
## Mechanische Beanspruchung
## Dauerfunktion

### Prüfbericht 101 29257/3

| | |
|---|---|
| Auftraggeber | aluplast GmbH<br>Kunststoffprofile<br>Auf der Breit 2<br><br>76227 Karlsruhe |
| Produkt | zweiflügeliges Dreh-/Drehkippfenster mit aufgehendem Mittelstück |
| Bezeichnung | Ideal 2000 |
| Außenmaß (B x H) | 2550 mm x 1524 mm |
| Rahmenmaterial | PVC-U/weiß |
| Besonderheiten | Anschlagdichtungssystem |

Widerstandsfähigkeit bei Windlast – EN 12210

**Klasse C3/B3**

Schlagregendichtheit – EN 12208

**Klasse 9A**

Luftdurchlässigkeit – EN 12207

**Klasse 4**

Bedienkräfte – EN 13115

**Klasse 1**

Mechanische Beanspruchung – EN 13115

**Klasse 4**

Dauerfunktion – EN 12400

**Klasse 2**

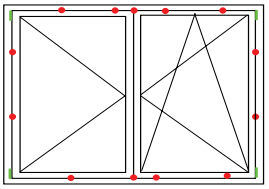
**ift** Rosenheim
22. Februar 2006

Jörn Peter Lass, Dipl.-Ing. (FH)
Prüfstellenleiter
ift Zentrum Fenster & Fassaden

Dirk Köberle, Dipl.-Ing. (FH)
Prüfingenieur
ift Zentrum Fenster & Fassaden

**Grundlagen**
prEN 14351-1 : 2005-09, Fenster und Außentüren – Produktnorm
Prüfnormen:
EN 1026 : 2000-06
EN 1027 : 2000-06
EN 12211 : 2000-06
EN 12046–1 : 2003-11
EN 14608 : 2004-03
EN 14609 : 2004-3
EN 1191 : 2000-02

**Darstellung**



**Verwendungshinweise**
Dieser Prüfbericht dient zum Nachweis der oben genannten Eigenschaften für Fenster nach prEN 14351-1 : 2005-09.

**Gültigkeit**
Die Daten und Ergebnisse beziehen sich ausschließlich auf den geprüften und beschriebenen Probekörper.

Die Prüfergebnisse können auf gleiche oder kleinere Abmessungen bei gleicher Konstruktion, Anschlagart und ähnlichem Format unter Einhaltung des Flügelgewichts übertragen werden.

Diese Prüfung ermöglicht keine Aussage über weitere leistungs- und qualitätsbestimmenden Eigenschaften der vorliegenden Konstruktion, insbesondere Witterungs- und Alterungserscheinungen wurden nicht berücksichtigt.

**Veröffentlichungshinweise**
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**Inhalt**
Der Nachweis umfasst insgesamt 12 Seiten


**ift** Rosenheim GmbH
Geschäftsführer:
Dipl.-Ing. (FH) Ulrich Sieberath
Dr. Jochen Peichl

Theodor-Gietl-Str. 7 - 9
D-83026 Rosenheim
Tel.: +49 (0)8031/261-0
Fax: +49 (0)8031/261-290
www.ift-rosenheim.de

Sitz: 83026 Rosenheim
AG Traunstein, HRB 14763
Sparkasse Rosenheim
Kto. 3822
BLZ 711 500 00

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DAP-ZE-2288.00
TGA-ZM-16-93-00
TGA-ZM-16-93-60

# Certificate

Resistance to wind load
Watertightness
Air permeability
Mechanical impact
Durability

Test report No. 101 29257/3

| | |
|---|---|
| Client | aluplast GmbH<br>Kunstoffprofile<br>Auf der Breit 2<br><br>DE - 76227 Karlsruhe |
| Product | Double-sash turn / tilt-and-turn window with openable false mullion |
| Designation | Ideal 2000 |
| Exterior dimensions (W x H) | 2550 mm x 1524 mm |
| Frame material | PVC-U/white |
| Characteristics | Backstop gasket system |

Resistance to wind load - EN 12210
**Class C3/B3**

Watertightness - EN 12208
**Class 9A**

Air permeability - EN 12207
**Class 4**

Operating forces - EN 13115
**Class 1**

Mechanical impact - EN 13115
**Class 4**

Durability - EN 12400
**Class 2**

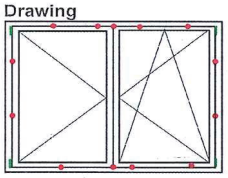
*[Translator's note: ift Rosenheim Logo in the original]*

**Basis:**

prEN 14351-1 : 2005-09, Windows and Exterior Doors, Product standard

Test standards:
EN 1026 : 2000-06
EN 1027 : 2000-06
EN 12211 : 2000-06
EN 12046 -1 : 2003-11
EN 14608 : 2004-03
EN 14609 : 2004-3
EN 1191 : 2000-02

**Drawing**



**Instructions for use**

This certificate serves to proof the above mentioned window characteristics according to prEN 14351-1 : 2005-09 standard.

**Validity**

The data and results refer solely to the tested and described specimen.

The test results may be transferred to other specimens of the same size or smaller as long as the construction, the stop type and the format remain the same and the maximum sash weight is not exceeded.

This test does not allow any statement to be made on any further characteristics regarding performance and quality of the construction presented, in particular the effects of weathering and ageing were not taken into account.

**Notes on publication**

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**ift** Rosenheim
22 February 2006

*[Translator's note: Signature in the original]*

Jörn Peter Lass, Dipl.-Ing. (FH)
Head of Testing Department
ift Zentrum Fenster & Fassaden

*[Translator's note: Signature in the original]*

Dirk Köberle, Dipl.-Ing. (FH)
Test engineer
ift Zentrum Fenster & Fassaden

Öffentl. bestellte u. beeidigte Urkundenübersetzerin der spanischen und englischen Sprache
Sonja Schramm
Dipl. Übersetzerin
für Baden-Württemberg

This is to certify that the foregoing English translation is a true, accurate and complete translation of the original German document, made upon presentation of a copy of the original German document, which is attached hereto.

Karlsruhe, 20/05/2015


Sonja Schramm
Publicly Appointed and Sworn Translator
of the Federal State of Baden-Württemberg, Germany

# Nachweis

## Widerstandsfähigkeit bei Windlast
## Schlagregendichtheit
## Luftdurchlässigkeit
## Mechanische Beanspruchung
## Dauerfunktion und Stoßfestigkeit

### Prüfbericht 101 29257/4

| | |
|---|---|
| Auftraggeber | aluplast GmbH<br>Kunststoffprofile<br>Auf der Breit 2<br><br>76227 Karlsruhe |
| Produkt | einflügelige Drehkipptür |
| Bezeichnung | Ideal 2000 |
| Außenmaß (B x H) | 1024 mm x 2424 mm |
| Rahmenmaterial | PVC-U/weiß |
| Besonderheiten | Anschlagdichtungssystem |

Widerstandsfähigkeit bei Windlast – EN 12210

**Klasse C5/B5**

Schlagregendichtheit – EN 12208

**Klasse 9A**

Luftdurchlässigkeit – EN 12207

**Klasse 4**

Bedienkräfte – EN 13115

**Klasse 1**

Mechanische Beanspruchung – EN 13115

**Klasse 4**

Dauerfunktion – EN 12400

**Klasse 2**

Stoßfestigkeit – EN 13049

**Klasse 3**

**ift** Rosenheim
22. Februar 2006

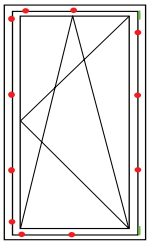
Jörn Peter Lass, Dipl.-Ing. (FH)
Prüfstellenleiter
ift Zentrum Fenster & Fassaden

Dirk Köberle, Dipl.-Ing. (FH)
Prüfingenieur
ift Zentrum Fenster & Fassaden

**Grundlagen**

prEN 14351-1 : 2005-03, Fenster und Außentüren – Produktnorm
Prüfnormen:
EN 1026 : 2000-06
EN 1027 : 2000-06
EN 12211 : 2000-06
EN 12046–1 : 2003-11
EN 14608 : 2004-03
EN 14609 : 2004-3
EN 1191 : 2000-02
EN 13049 : 2003-04

**Darstellung**



**Verwendungshinweise**

Dieser Prüfbericht dient zum Nachweis der oben genannten Eigenschaften für Fenster nach prEN 14351-1 : 2005-03.

**Gültigkeit**

Die Daten und Ergebnisse beziehen sich ausschließlich auf den geprüften und beschriebenen Probekörper.

Die Prüfergebnisse können auf gleiche oder kleinere Abmessungen bei gleicher Konstruktion, Anschlagart und ähnlichem Format unter Einhaltung des Flügelgewichts übertragen werden.

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TGA-ZM-16-93-00
TGA-ZM-16-93-60

# Certificate

Resistance to wind load
Watertightness
Air permeability
Mechanical impact
Durability and impact resistance

Test report No. 101 29257/4

| | |
|---|---|
| Client | aluplast GmbH<br>Kunstoffprofile<br>Auf der Breit 2<br><br>DE - 76227 Karlsruhe |
| Product | Single-sash tilt-and-turn door |
| Designation | Ideal 2000 |
| Exterior dimensions (W x H) | 1024 mm x 2424 mm |
| Frame material | PVC-U/white |
| Characteristics | Backstop gasket system |

Resistance to wind load - EN 12210

**Class C5/B5**

Watertightness - EN 12208

**Class 9A**

Air permeability - EN 12207

**Class 4**

Operating forces - EN 13115

**Class 1**

Mechanical impact - EN 13115

**Class 4**

Durability - EN 12400

**Class 2**

Impact resistance - EN 13049

**Class 3**

**ift** Rosenheim
22 February 2006

*[Translator's note: Signature in the original]*

Jörn Peter Lass, Dipl.-Ing. (FH)
Head of Testing Department
ift Zentrum Fenster & Fassaden

*[Translator's note: Signature in the original]*

Dirk Köberle, Dipl.-Ing. (FH)
Test engineer
ift Zentrum Fenster & Fassaden

*[Translator's note: ift Rosenheim Logo in the original]*

**Basis:**

prEN 14351-1 : 2005-03, Windows and Exterior Doors, Product standard

Test standards:
EN 1026 : 2000-06
EN 1027 : 2000-06
EN 12211 : 2000-06
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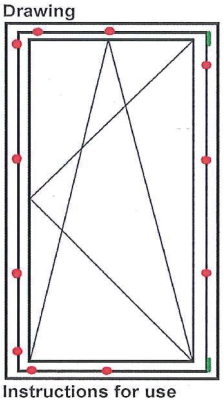
EN 14608 : 2004-03
EN 14609 : 2004-3
EN 1191 : 2000-02
EN 13049 : 2003-04

**Drawing**



**Instructions for use**

This certificate serves to proof the above mentioned window characteristics according to prEN 14351-1 : 2005-03 standard.

**Validity**

The data and results refer solely to the tested and described specimen.

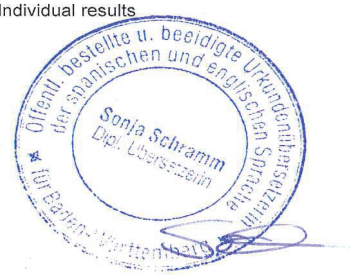
The test results may be transferred to other specimens of the same size or smaller as long as the construction, the stop type and the format remain the same and the maximum sash weight is not exceeded.

This test does not allow any statement to be made on any further characteristics regarding performance and quality of the construction presented, in particular the effects of weathering and ageing were not taken into account.

**Notes on publication**

The **ift**-Guidance Sheet "Advertising with ift test documents" applies.
The cover sheet can be used as an abstract.

**Contents:**
The report comprises of a total of 11 pages:
- Subject
- Procedure
- Individual results



This is to certify that the foregoing English translation is a true, accurate and complete translation of the original German document, made upon presentation of a copy of the original German document, which is attached hereto.

Karlsruhe, 20/05/2015


Sonja Schramm
Publicly Appointed and Sworn Translator
of the Federal State of Baden-Württemberg, Germany

# Nachweis

## Widerstandsfähigkeit bei Windlast
## Schlagregendichtheit
## Luftdurchlässigkeit
## Mechanische Beanspruchung
## Dauerfunktion

### Prüfbericht 101 29257/5

Auftraggeber
aluplast GmbH
Kunststoffprofile
Auf der Breit 2

76227 Karlsruhe

| | |
|---|---|
| Produkt | einflügelige Parallel - Schiebe - Kipptür (PSK) |
| Bezeichnung | Ideal 2000 |
| Außenmaß (B x H) | 3000 mm x 2424 mm |
| Rahmenmaterial | PVC-U/weiß |
| Besonderheiten | Anschlagdichtungssystem |

Widerstandsfähigkeit bei Windlast – EN 12210

**Klasse C1/B2**

Schlagregendichtheit – EN 12208

**Klasse 9A**

Luftdurchlässigkeit – EN 12207

**Klasse 4**

Bedienkräfte – EN 13115

**Klasse 1**

Mechanische Beanspruchung – EN 13115

**Klasse 4**

Dauerfunktion – EN 12400

**Klasse 2**

**ift** Rosenheim
22. Februar 2006

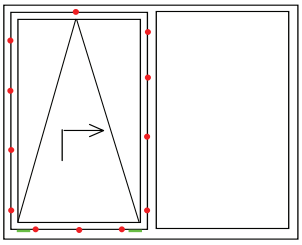
Jörn Peter Lass, Dipl.-Ing. (FH)
Prüfstellenleiter
ift Zentrum Fenster & Fassaden

Dirk Köberle, Dipl.-Ing. (FH)
Prüfingenieur
ift Zentrum Fenster & Fassaden

**Grundlagen**

prEN 14351-1 : 2005-09, Fenster und Außentüren – Produktnorm
Prüfnormen:
EN 1026 : 2000-06
EN 1027 : 2000-06
EN 12211 : 2000-06
EN 12046–1 : 2003-11
EN 14608 : 2004-03
EN 14609 : 2004-3
EN 1191 : 2000-02

**Darstellung**



**Verwendungshinweise**

Dieser Prüfbericht dient zum Nachweis der oben genannten Eigenschaften für Fenster nach prEN 14351-1 : 2005-09.

**Gültigkeit**

Die Daten und Ergebnisse beziehen sich ausschließlich auf den geprüften und beschriebenen Probekörper.

Die Prüfergebnisse können auf gleiche oder kleinere Abmessungen bei gleicher Konstruktion, Anschlagart und ähnlichem Format unter Einhaltung des Flügelgewichts übertragen werden.

Diese Prüfung ermöglicht keine Aussage über weitere leistungs- und qualitätsbestimmenden Eigenschaften der vorliegenden Konstruktion, insbesondere Witterungs- und Alterungserscheinungen wurden nicht berücksichtigt.

**Veröffentlichungshinweise**

Es gilt das **ift**-Merkblatt „Bedingungen und Hinweise zur Benutzung von **ift**-Prüfdokumentationen“. Das Deckblatt kann als Kurzfassung verwendet werden.

**Inhalt**

Der Nachweis umfasst insgesamt 16 Seiten




**ift** Rosenheim GmbH
Geschäftsführer:
Dipl.-Ing. (FH) Ulrich Sieberath
Dr. Jochen Peichl

Theodor-Gietl-Str. 7 - 9
D-83026 Rosenheim
Tel.: +49 (0)8031/261-0
Fax: +49 (0)8031/261-290
www.ift-rosenheim.de

Sitz: 83026 Rosenheim
AG Traunstein, HRB 14763
Sparkasse Rosenheim
Kto. 3822
BLZ 711 500 00



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DAP-PL-0808.01
DAP-ZE-2288.00
TGA-ZM-16-93-00
TGA-ZM-16-93-60

# Certificate

Resistance to wind load
Watertightness
Air permeability
Mechanical impact
Durability

Test report No. 101 29257/5

| | |
|---|---|
| Client | aluplast GmbH<br>Kunstoffprofile<br>Auf der Breit 2<br><br>DE - 76227 Karlsruhe |
| Product | Single-sash parallel slide-and-tilt door (PSK) |
| Designation | Ideal 2000 |
| Exterior dimensions (W x H) | 3000 mm x 2424 mm |
| Frame material | PVC-U/white |
| Characteristics | Backstop gasket system |

Resistance to wind load - EN 12210

**Class C1/B2**

Watertightness - EN 12208

**Class 9A**

Air permeability - EN 12207

**Class 4**

Operating forces - EN 13115

**Class 1**

Mechanical impact - EN 13115

**Class 4**

Durability - EN 12400

**Class 2**

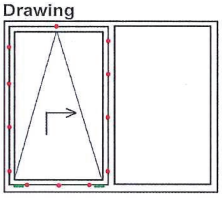
*[Translator's note: ift Rosenheim Logo in the original]*

**Basis:**

prEN 14351-1 : 2005-09, Windows and Exterior Doors, Product standard

Test standards:
EN 1026 : 2000-06
EN 1027 : 2000-06
EN 12211 : 2000-06
EN 12046 -1 : 2003-11
EN 14608 : 2004-03
EN 14609 : 2004-3
EN 1191 : 2000-02

**Drawing**



**Instructions for use**

This certificate serves to proof the above mentioned window characteristics according to prEN 14351-1 : 2005-09 standard.

**Validity**

The data and results refer solely to the tested and described specimen.

The test results may be transferred to other specimens of the same size or smaller as long as the construction, the stop type and the format remain the same and the maximum sash weight is not exceeded.

This test does not allow any statement to be made on any further characteristics regarding performance and quality of the construction presented; in particular the effects of weathering and ageing were not taken into account.

**Notes on publication**

The **ift**-Guidance Sheet "Advertising with ift test documents" applies.
The cover sheet can be used as an abstract.

**Contents:**
The report comprises of a total of 16 pages:
- Subject
- Procedure
- Individual results
- Attachment 1

**ift** Rosenheim
22 February 2006

*[Translator's note: Signature in the original]*

Jörn Peter Lass, Dipl.-Ing. (FH)
Head of Testing Department
ift Zentrum Fenster & Fassaden

*[Translator's note: Signature in the original]*

Dirk Köberle, Dipl.-Ing. (FH)
Test engineer
ift Zentrum Fenster & Fassaden

This is to certify that the foregoing English translation is a true, accurate and complete translation of the original German document, made upon presentation of a copy of the original German document, which is attached hereto.

Karlsruhe, 20/05/2015

Sonja Schramm
Publicly Appointed and Sworn Translator
of the Federal State of Baden-Württemberg, Germany

PfB Prüfzentrum für Bauelemente
Dipl.-Ing. (FH) Rüdiger Müller

Fenster · windows
Rollläden · shutters
Türen + Tore · doors
Fassaden · curtain walling
Baubeschläge · building hardware

April 02, 2014 CG Version 1.en

# TEST REPORT No. 14/03-A094-B1

Initial type testing (ITT) according to DIN EN 14351-1 : 2010 "Windows and doors – Product standard, performance characteristics – Part 1: Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics – German version EN 14351-1:2010"

| | |
|---|---|
| Order No. | 14/02-A094 |
| Applicant | aluplast GmbH<br>Auf der Breit 2<br>76227 Karlsruhe<br>Germany |
| Conducted Tests | Proof of mandated characteristics<br>- Air permeability<br>- Watertightness<br>- Resistance to wind load |
| Type | Single-casement inward opening tilt-and-turn window made of plastic profiles, with insulated glazing |
| Product Designation | **System IDEAL 4000**<br>**energeto 4000** |
| Test Certificate | No. 14/03-A094-Z1<br>issued by **PfB** |
| Tested by | A. Nerz |

This Test Report comprises 8 pages and the following attachments:

- Attachment 1: Data Sheets (3 pages)
- Attachment 2: Photos (3 pages)
- Attachment 3: Technical Documentation according to Section 2.2 (1 page)

PfB GmbH & Co. Prüfzentrum für Bauelemente KG
AG Traunstein HRA 8871
Lackermannweg 24, 83071 Stephanskirchen
phG PfB Verwaltungs GmbH
Geschäftsführer: Matthias Demmel, Rüdiger Müller
AG Traunstein HRB 16490

Telefon +49 (0) 80 36 / 674947 0
Telefax +49 (0) 80 36 / 674947 28
www.pfb-rosenheim.de
info@pfb-rosenheim.de

Sparkasse Rosenheim-Bad Aibling
IBAN: DE88 7115 0000 0500 5567 41
SWIFT-BIC: BYLADEM1ROS
Steuer-Nr.: 156/172/13009
USt-IdNr.: DE245353602

Anerkannte Prüfstelle
Landesbauordnung
BAY 33

Notified Body
No. 1644

# CONTENTS

# 1 Scope

With the delivery of the test sample, the applicant commissioned **PfB** Prüfzentrum für Bauelemente to test the applicant's sample for the characteristics listed on page 1 under "Conducted Tests".

# 2 Test Sample

## 2.1 Sampling

The required test sample was delivered to **PfB** by the applicant on March 11, 2014. The exact date of manufacture is unknown. Sample selection and sample fabrication were performed by the applicant according to the sampling report of February 24, 2014.

| | |
|---|---|
| Applicant: | aluplast GmbH, Kunststoff-Fenstersysteme<br>Auf der Breit 2, 76227 Karlsruhe, Germany |
| Place and date of sampling: | Karlsruhe, 2014-01-27 |
| Type / description of sample: | System energeto 4000 – Single-casement tilt-and-turn window – Casement dimensions: 1500 x 1500 mm |
| Tests to be conducted: | Air permeability, watertightness, resistance to wind load |
| No. of test samples: | 1 |
| Designation of test sample: | System energeto 4000 |
| Marking of test sample by the applicant: | aluplast<br>System energeto 4000 – 1 flg. DK-Fenster-Elementabmessung: 1500 x 1500 mm |
| Sample taken by: | Mr J. Hauns |

The sample was delivered mounted in a four-sided sub-frame.

## 2.2 Technical Documentation

The following technical documents of the test sample were submitted to **PfB**. They have been provided with a **PfB** endorsement and attached to this Test Report. The applicant is responsible for the correctness and accuracy of the statements. These statements were reviewed only at random by **PfB**.

- Fensterelement: einflg. Drehkipp-Fenster - PK4id_131205_Systemteilprüfung

## 2.3 Technical Data of the Test Sample

Sample No. 14/02-A094-P1

Single-casement inward opening tilt-and-turn window made of plastic profiles, with insulated glazing.

**Test sample**

| | |
|---|---|
| Product name | System IDEAL 4000 -> energeto 4000 |
| Type | Tilt-and-turn window |
| Material | Plastic – PVC / white |
| Opening direction | Inward opening |
| Mounting and care / maintenance instructions | According to aluplast processing guidelines |

**Design drawings**

| | |
|---|---|
| Quantity | 1 |
| Names | PK4id_131205_Systemteilprüfung_LWW_1-flg_Abm_1500x1500_Prüfkörperzeichnung |

**Dimensions**

| | |
|---|---|
| Casement dim. (WxH) | 1416 mm x 1416 mm |
| Dim. of outer frame (WxH) | 1500 mm x 1500 mm |
| Dim. of clear opening (WxH) | 1360 mm x 1360 mm |

**Outer frame**

| | |
|---|---|
| Manufacturer | aluplast GmbH Kunststoffprofile, Karlsruhe |
| Material | Plastic – PVC / white |
| Profile system | energeto 4000 – Frame with Powerdur strips |
| Profile cross section | 70 mm x 70 mm |
| Profile number | 040407 |
| Joints of outer frame | Mitred and welded |

**Casement frame**

| | |
|---|---|
| Manufacturer | aluplast GmbH Kunststoffprofile, Karlsruhe |
| Material | Plastic – PVC / white |
| Profile system | energeto 4000 – Casement with bonding inside |
| Profile cross section | 70 mm x 65 mm |
| Profile number | 140486 |
| Height of lever handle | Centre 708 mm |
| Joints of casement frame | Mitred and welded |

**Rebate**

| | |
|---|---|
| Clearances | |
| top | 12 mm |
| bottom | 12 mm |
| sides | 12 mm |
| Rebate drainage | 3x internal / 3x external -> each 5mm x 25mm |

**Glazing / Infill**

| | |
|---|---|
| Type/Name/Manufacturer | UNITOP B 3A E+ / Sinsheimer Glas |
| Configuration | 4/12/4/12/4 |
| Overall dimensions (WxH) | 1318 mm x 1318 mm |
| Visible dimensions (WxH) | 1285 mm x 1285 mm |
| Insertion depth | 16 mm |
| Thickness | 36 mm |
| Ug value | 0.7 W/m2 K |

**Mounting of infill**

| | |
|---|---|
| Type/Name/Manufacturer | Partial bonding to rebate bottom / aluplast GmbH, Karlsruhe |
| Bond | ap bond |
| Internal / Manufacturer | With glazing bead / aluplast GmbH, Karlsruhe |
| External | Extruded |
| Type/Name/Manufacturer | TPE / aluplast GmbH Kunststoffprofile, Karlsruhe |
| Vapour pressure equalisation | 3x internal - 5mm x 25mm /2x external gasket cutout |

**Glazing/panel beads**

| | |
|---|---|
| Type/Name/Manufacturer | aluplast GmbH Kunststoffprofile, Karlsruhe |
| Material | Plastic – PVC / white |
| Profile number | 120879 |
| Type of fastening | Clip-on, mitre joints at corners |

**Hardware**

| | |
|---|---|
| Type/Name/Manufacturer | activPilot / Winkhaus |
| Hinges/bearings | 2 |
| Type of opening | Tilt-and-turn |
| No. of locking points | 8 |
| Distance betw. locking points | max. 700 mm |
| Fastening/screw type | According to specifications of hardware supplier |
| Screw dimensions | 4.1 mm x 30 mm |

**Closing piece**

| | |
|---|---|
| Type/Name/Manufacturer | Winkhaus |
| Fastening/screw type | According to specifications of hardware supplier |
| Screw dimensions | 4.1 mm x 30 mm |
| No. of screws | 1 / 2 each |

Design according to Section 2.2, Technical Documentation.

### 2.3.1 Documentation of the Test Sample

For documentation of the sample digital photos were taken, which will be archived together with the sample pieces of the gaskets for 10 years by **PfB**.

## 3 Test and Measurement Equipment

Test and measurement equipment used for testing:

| | |
|---|---|
| – Digital dial gauge | 03 02 42 01-03 |
| – Dial gauge holders | 03 02 45 10-12 |
| – Digital caliper gauge, Mitutoyo | 01 00 50 01 |
| – Window test rig | 03 02 05 04 |
| – Transportable air permeability/watertightness/wind load unit | 03 02 15 01 |
| – Digital photo camera | 00 01 96 02 |

The test and measurement equipment tolerances required by the test standards listed in section 1 "Scope" are complied with due to the accuracy of the test and measurement equipment. The test equipment is subject to the calibration cycle.

# 4 Test

## 4.1 Test Period

The tests were carried out at **PfB**'s laboratories on March 11 and 12, 2014.

## 4.2 Test Procedure and Test Results

### 4.2.1 Applicable Standards

**Requirements and classification standards**

– DIN EN 12207 : 2000-06 "Windows and doors – Air permeability – Classification"
– DIN EN 12208 : 2000-06 "Windows and doors – Watertightness – Classification"
– DIN EN 12210 : 2000-08 "Windows and doors – Resistance to wind load – Classification"

**Test and calculation standards**

– DIN EN 1026 : 2000-09 "Windows and doors – Air permeability – Test method"
– DIN EN 1027 : 2000-09 "Windows and doors – Watertightness – Test method"
– DIN EN 12211 : 2000-12 "Windows and doors – Resistance to wind load – Test method"

### 4.2.2 Air Permeability Test According to DIN EN 1026

The air permeability test was performed in accordance with the requirements of DIN EN 1026.

The air permeability of the sample was tested according to the above standard up to a pressure of 600 Pa, first at a positive pressure in the test chamber (exfiltration) and then at a negative pressure in the test chamber (infiltration). The air volumes measured at the different pressure levels are documented in the attached "Air permeability according to DIN EN 1026" data sheet. All changes that occurred and all measures taken are indicated in the a.m. data sheet.

For the table given in the a.m. data sheet, the air permeability values measured for the positive and negative pressures in accordance with DIN EN 1026 have been converted to standard conditions (293 K / 101.3 kPa) for each pressure level required by the standard.

The averages determined in the tests at positive and negative pressures were calculated relating to the joint length and relating to the surface area of the test sample. They are given as numeric values in the table of the data sheet and in the corresponding diagrams.

### 4.2.3 Watertightness Test According to DIN EN 1027

The watertightness test was performed in accordance with the requirements of DIN EN 1027.

Watertightness testing was performed up to the test pressure at which repeated or continuous water leakage to the area to be protected was observed. The position and time of water leakage were recorded.

The test results for the sample are documented in the attached "Watertightness according to DIN EN 1027" data sheet. All changes that occurred and all measures taken are also indicated in the a.m. data sheet.

### 4.2.4 Test of Resistance to Wind Load According to DIN EN 12211

The test of resistance to wind load was performed in accordance with the requirements of DIN EN 12211. The test results are documented in the attached "Resistance to wind load according to DIN EN 12211" data sheet. All changes that occurred and all measures taken are indicated in the a.m. data sheet.

No damage to the sample was observed when subjected to the repeated pressure test. The final safety test (= 1.5 x test pressure P1) was performed on the sample. The test pressures applied were documented in the aforementioned data sheet.

## 5 Classification of the Test Results

| | | |
|---|---|---|
| Air permeability acc. to DIN EN 1026 | Class **4** | acc. to DIN EN 12207 |
| Watertightness acc. to DIN EN 1027 | Class **9A** | acc. to DIN EN 12208 |
| Resistance to wind load acc. to DIN EN 12211 | Class **C5** | acc. to DIN EN 12210 |

## 6 Scope of Application

In accordance with Annex E (normative) of DIN EN 14351-1 "Determination of characteristics", the test results determined for the tested samples can be applied directly to building products of similar design (see also section 3.4 of the standard in conjunction with Annex A) and of equal or smaller size (e.g. resistance to wind load).

The air permeability and watertightness characteristics are exceptions to the above general rule. In this case, the classes achieved also apply to window assemblies of the same type of opening with smaller sizes and larger sizes up to + 50% compared to the size tested.

However, this only applies if neither the distances of the locking points to the corners nor the distances between the locking points are substantially changed.

This extension in size does not apply to the characteristic of resistance to wind load, however.

## 7 General Information

This Test Report is intended for the applicant only and must not be published, wholly or in part, without the prior permission of both the applicant and **PfB**.

The Test Certificate No. 14/03-A094-Z1 has been issued for publication purposes.

The original of this Test Report is given to the applicant and one copy remains with **PfB** for documentation. This Test Report was digitised and supplied to the applicant as a PDF file.

The test results apply only to the tested sample. A transfer of the test results of this Test Report to other products from the applicant's tested product family is only permitted if their design and materials correspond to the tested sample and comply with the specifications of this Test Report.

PfB Prüfzentrum für Bauelemente
Dipl.-Ing. (FH) Rüdiger Müller

Test Report No. 14/03-A094-B1 of April 02, 2014, Version 1.en
aluplast GmbH, 76227 Karlsruhe, Germany

This Test Report is issued without prejudice to any rights of third parties, in particular intellectual property rights. **PfB** shall not be liable for any recourse claims arising from or in connection with the issuance of this Test Report.

The Test Report is issued in two language versions. In case of discrepancies between the two language versions, the German version shall prevail.

Validity of the a.m. test certificate: Valid for the validity period of EN 14351-1 : 2006 + A1 : 2010

Prüfzentrum für Bauelemente PfB Landesbauordnung BAY 33 / Notified Body No. 1644

Dipl.-Ing. Matthias Demmel
Head of Notified Test Body

Stephanskirchen
April 02, 2014

Dipl.-Ing. (FH) Christoph Geiger
Responsible Official

PfB Prüfzentrum für Bauelemente
Dipl.-Ing. (FH) Rüdiger Müller

Test Report No. 14/03-A094-B1 of April 02, 2014, Version 1.en
aluplast GmbH, 76227 Karlsruhe, Germany

Data Sheet 1: Air permeability according to DIN EN 1026

Test Sample: Single-casement window

Test date: March 12, 2014

Sample No.: 14/03-A094-P1 As-received condition

Overall Dim. [mm] :

| | | |
|---|---|---|
| Frame width: | 1500 | |
| Frame height: | 1500 | |
| Casement width: | 1415 | |
| Casement height: | 1415 | |

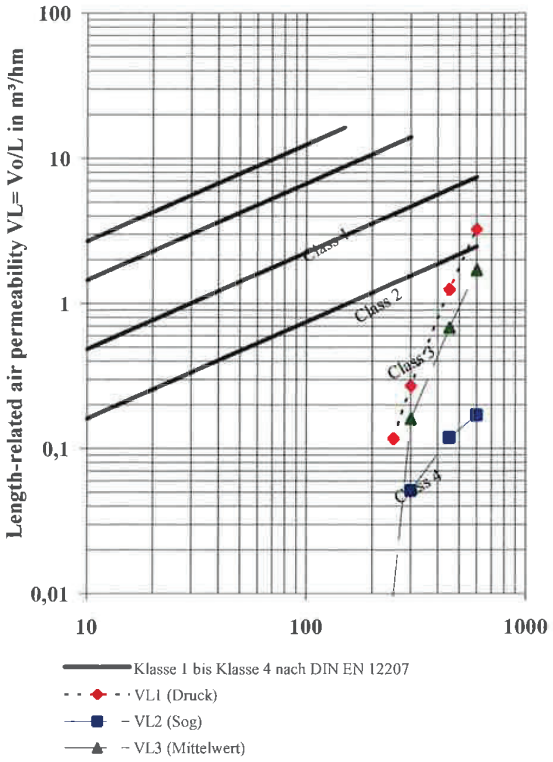
Atmospheric pressure: 962 hPa
Temperature: 18 °C

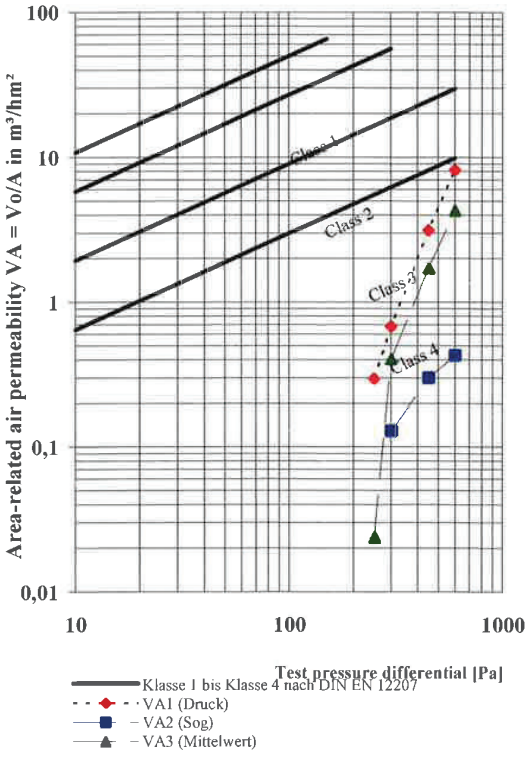
Joint length L: 5,66 m
Surface area A: 2,25 m²

**Table: Air permeability $V_0$** (corrected to standard conditions: 293 K, 101,3 kPa)

| **Test pressure differential (Pa)** | | **10** | **50** | **100** | **150** | **200** | **250** | **300** | **450** | **600** |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 (positive) | (m³/h) | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,7 | 1,5 | 7,1 | 18,4 |
| V2 (negative) | (m³/h) | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | -0,6 | 0,3 | 0,7 | 1,0 |
| V3 (average) | (m³/h) | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,1 | 0,9 | 3,9 | 9,7 |
| Air permeability relating to joint length L of the element | | | | | | | | | | |
| $V_L1$ (positive) | (m³/hm) | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,12 | 0,27 | 1,25 | 3,24 |
| $V_L2$ (negative) | (m³/hm) | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | -0,10 | 0,05 | 0,12 | 0,17 |
| $V_L3$ (average) | (m³/hm) | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,01 | 0,16 | 0,68 | 1,71 |
| Air permeability relating to surface area A of the complete element | | | | | | | | | | |
| $V_A1$ (positive) | (m³/hm²) | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,30 | 0,68 | 3,14 | 8,16 |
| $V_A2$ (negative) | (m³/hm²) | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | -0,25 | 0,13 | 0,30 | 0,43 |
| $V_A3$ (average) | (m³/hm²) | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,02 | 0,40 | 1,72 | 4,29 |

Remarks: Values for 10 Pa test pressure were extrapolated



Prüfzentrum für Bauelemente
Dipl.-Ing. (FH) Rüdiger Müller

Test Report No. 14/03-A094-B1 of April 02, 2014, Version 1.en
aluplast GmbH, 76227 Karlsruhe, Germany

Data Sheet 3: Resistance to wind load according to DIN EN 12211

Test Sample: Single-casement window

Test date: March 12, 2014

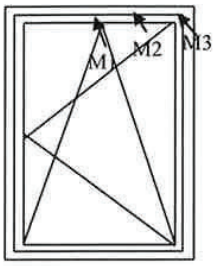
Sample No.: 14/03-A094-P1

Overall Dim. [mm]:

| | |
|---|---|
| Frame width: | 1500 |
| Frame height: | 1500 |
| Casement width: | 1415 |
| Casement height: | 1415 |

| | |
|---|---|
| Atmospheric pressure: | 962 hPa |
| Temperature: | 18 °C |
| Rel. air humidity: | 0 % |
| Joint length L: | 5,66 m |
| Surface area A: | 2,25 m² |

View Drawing:




Span L
710 mm

→ = Position of the meas. point
1 = Serial no. of the meas. point

Table 1: Test of frontal deflection

| | Frontal displacement of meas. points in [mm] under pos. pressure | | | | Frontal displacement of meas. points in [mm] under neg. pressure | | | |
|---|---|---|---|---|---|---|---|---|
| Pos. or neg. press. [Pa] | Meas.pt. 1 | Meas.pt. 2 | Meas.pt. 3 | f | Meas.pt. 1 | Meas.pt. 2 | Meas.pt. 3 | f |
| 400 | 0,82 | 0,66 | 0,12 | 0,19 | 0,63 | 0,50 | 0,14 | 0,12 |
| 800 | 1,56 | 1,39 | 0,35 | 0,44 | 1,26 | 1,02 | 0,31 | 0,24 |
| 1200 | 2,45 | 2,28 | 0,69 | 0,71 | 1,89 | 1,55 | 0,50 | 0,36 |
| 1600 | 3,42 | 3,29 | 1,16 | 1,00 | 2,58 | 2,13 | 0,71 | 0,49 |
| 2000 | 4,30 | 4,25 | 1,65 | 1,28 | 3,22 | 2,68 | 0,93 | 0,61 |
| Limit values | A (L/150) | B (L/200) | C (L/300) | | A (L/150) | B (L/200) | C (L/300) | |
| DIN EN 12210 | 4,7 | 3,6 | 2,4 | | 4,7 | 3,6 | 2,4 | |

Alternating load P2 = P1 * 0,5
P2 = 1000 Pa
50 cycles ± 1000 Pa without damage

Safety load P3 = P1 x 1,5
P3 = 3000 Pa
± 3000 Pa without damage

PfB Prüfzentrum für Bauelemente
Dipl.-Ing. (FH) Rüdiger Müller

Test Report No. 14/03-A094-B1 of April 02, 2014, Version 1.en
aluplast GmbH, 76227 Karlsruhe, Germany

Photo 1:
Sample No. 14/03-A094-P1

Photo 2:
Sample No. 14/03-A094-P1

Test Report No. 14/03-A094-B1 of April 02, 2014, Version 1.en
aluplast GmbH, 76227 Karlsruhe, Germany

Photo 3:
Sample No. 14/03-A094-P1

Photo 4:
Sample No. 14/03-A094-P1

Test Report No. 14/03-A094-B1 of April 02, 2014, Version 1.en
aluplast GmbH, 76227 Karlsruhe, Germany

Photo 5:
Sample No. 14/03-A094-P1

Photo 6:
Sample No. 14/03-A094-P1

PfB Prüfzentrum für Bauelemente
Dipl.-Ing. (FH) Rüdiger Müller

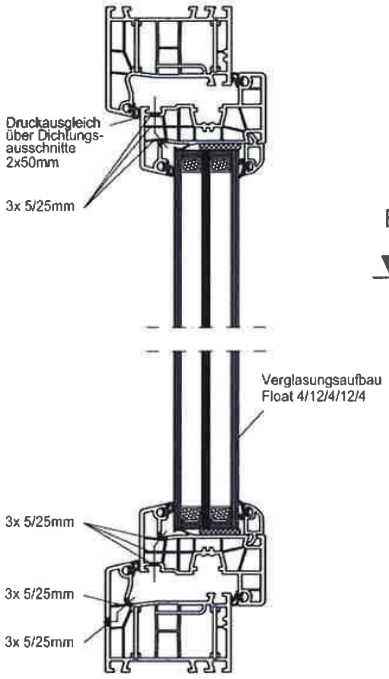
Test Report No. 14/03-A094-B1 of April 02, 2014, Version 1.en
aluplast GmbH, 76227 Karlsruhe, Germany

aluplast® GmbH
Kunststoffprofile, Auf der Breit 2, D-76227 Karlsruhe
Telefon: +49 (721) 4 71 71 - 0; Telefax: +49 (721) 4 71 71 - 999
E-Mail: info@aluplast.de / www.aluplast.de

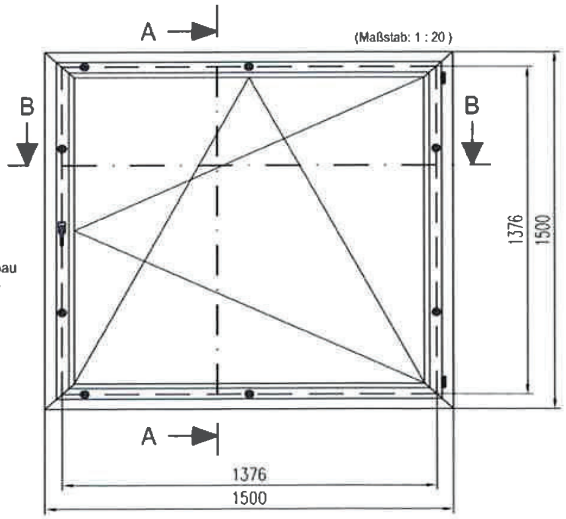
Fensterelement:
einflg. Drehkipp-Fenster

Anlage: 01
Maßstab: ~
Datum: 2014-03


Schnitt B-B
(Maßstab 1 : 3)




Schnitt A-A
(Maßstab 1 : 3)




Beschlag: Winkhaus

PK4id_140306_Systemteilprüfung*
Technische Änderungen vorbehalten!

Prüfzentrum für Bauelemente
Dipl.-Ing. (FH) Rüdiger Müller

Fenster · windows
Rollläden · shutters
Türen + Tore · doors
Fassaden · curtain walling
Baubeschläge · building hardware

# TEST CERTIFICATE No. 14/03-A094-Z1

Version 1.en

Initial type testing (ITT) according to DIN EN 14351-1 : 2010 "Windows and doors – Product standard, performance characteristics – Part 1: Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics – German version EN 14351-1:2010"

| | |
|---|---|
| **Applicant** | aluplast GmbH<br>Auf der Breit 2<br>76227 Karlsruhe<br>Germany |
| **Type** | Single-casement inward opening tilt-and-turn window made of plastic profiles, with insulated glazing |
| **Product Designation** | **System IDEAL 4000**<br>**energeto 4000** |
| **Dimensions** | Frame (W x H): up to 1500 mm x 1500 mm |
| **Hardware** | 2 hinges, tilt-and-turn window furniture |
| **Gaskets** | Two circumferential sealing levels on 4 sides |
| **Classification** | According to Test Report No. 14/03-A094-B1 |

| | | | |
|---|---|---|---|
|  | EN 1026 Air permeability | EN 12207 | Class **4** |
|  | EN 1027 Watertightness | EN 12208 | Class **9A** |
|  | EN 12211 Resistance to wind load | EN 12210 | Class **C5** |

**Validity** Valid for the validity period of EN 14351-1 : 2006 + A1 : 2010

Dipl.-Ing. Matthias Demmel
Head of Notified Test Body

Stephanskirchen
April 02, 2014

Dipl.-Ing. (FH) Christoph Geiger
Responsible Official

PfB GmbH & Co. Prüfzentrum für Bauelemente KG
AG Traunstein HRA 8871
Lackermannweg 24, 83071 Stephanskirchen
phG PfB Verwaltungs GmbH
Geschäftsführer: Matthias Demmel, Rüdiger Müller
AG Traunstein HRB 16490

Telefon +49 (0) 80 36 / 674947 0
Telefax +49 (0) 80 36 / 674947 28
www.pfb-rosenheim.de
info@pfb-rosenheim.de

Sparkasse Rosenheim-Bad Aibling
IBAN: DE88 7115 0000 0500 5567 41
SWIFT-BIC: BYLADEM1ROS
Steuer-Nr.: 156/172/13009
USt-IdNr.: DE245353602

Anerkannte Prüfstelle
Landesbauordnung
BAY 33

Notified Body
No. 1644

A·L·I

(Validator / Operations Administrator)

# AAMA
# CERTIFICATION PROGRAM

## AUTHORIZATION FOR PRODUCT CERTIFICATION

**aluplast US Corp**
**445 N 700 W Unit 105**
**North Salt Lake, UT 84054**

**Attn: Frank LaSusa**

This authorization is based on the successful completion of tests, and the reporting to the AAMA Validator of the results of the tests by an AAMA Accredited Laboratory. The listing below will be added to the next update to the AAMA Certified Products Directory.

| SPECIFICATION | RECORD OF PRODUCT TESTED | | | |
|---|---|---|---|---|
| AAMA/WDMA/CSA 101/I.S.2/A440-11<br>CW-PG40*-2134x1676 (84x66)-DAW | | | | |
| COMPANY AND CODE | CPD NO. | SERIES MODEL & PRODUCT DESCRIPTION | MAXIMUM SIZE TESTED | |
| aluplast US Corp<br>Code: ALU | 15528 | 80 mm TNT SERIES DUAL ACTION WINDOW<br>(PVC) (OX) (IG)<br>(INS LAM GL) (REINF)<br>(ASTM) (CMBSO) | FRAME<br>2134 mm x 1676 mm<br>(7'0" x 5'6") | VENT<br>1002 mm x 1572 mm<br>(3'3" x 5'2") |

1. This Certification will expire **July 17, 2019** and requires validation until then by continued listing in the current AAMA Certified Products Directory.

2. Product Tested and Reported by: **National Certified Testing Laboratories**

   Report No.: **NCTL-310-4363; Ref. NCTL-310-4331**

   Date of Report: **March 22, 2016; March 22, 2016**

Evaluated for Certification: **July 12, 2016**

Brad Schultz

Associated Laboratories, Inc.

Authorized for Certification: **July 12, 2016**

SBS/JTS

American Architectural Manufacturers Association

*ACP-04 (Rev. 6/16)*

NATIONAL CERTIFIED TESTING LABORATORIES

3310 HILL AVENUE • EVERETT, WASHINGTON 98201 • TELEPHONE (425) 259-6799
FAX (425) 259-4936
www.nctlinc.com

**AAMA/WDMA/CSA 101/I.S.2/A440-11**

**TEST REPORT SUMMARY**

**Rendered to:**

**ALUPLAST USA**
P.O. Box 496
Layton, UT 84041

**PRODUCT TYPE: OX – Horizontal Sliding Window**

**SERIES/ MODEL: Sliding 60**

| Title | Summary of Results |
|---|---|
| Primary Product Designator | Class LC-PG25:Size tested 1803 x 1524 mm (71 x 60 in)-Type HS |
| Design Pressure | ± 1920 Pa (40.10 psf) |
| Operating Force (in motion $_{max}$) | 4 N (1 lbf) |
| Air Infiltration/Exfiltration | 1.1 L/s/m$^2$ (0.21 cfm/ft$^2$) – Infiltration<br>1.2 L/s/m$^2$ (0.23 cfm/ft$^2$) – Exfiltration |
| Water Penetration Resistance Test Pressure | 180 Pa (3.76 psf) |
| Uniform Load Structural Test Pressure | ± 2880 Pa (60.15 psf) |
| Forced Entry Resistance | ASTM F588-07 - Grade 20 - Pass<br>CAWM 1-79, CMBSO 301 - Pass |

Test Completed: 07/15/14

Reference must be made to Report No. NCTL-310-4328 dated 08/05/14 for complete test specimen description and data.

**For National Certified Testing Laboratories**

Jim Clarke
Structural Performance Technician

*Professionals In The Science of Testing*

NATIONAL CERTIFIED TESTING LABORATORIES

3310 HILL AVENUE • EVERETT, WASHINGTON 98201 • TELEPHONE (425) 259-6799
FAX (425) 259-4936
www.nctlinc.com

# AAMA/WDMA/CSA 101/I.S.2/A440-11

# STRUCTURAL TEST REPORT

# NCTL-310-4328

REPORT TO:
ALUPLAST USA
P.O. BOX 496
LAYTON, UT 84041

REPORT NUMBER: NCTL-310-4328
REPORT DATE: 08/05/14

PRODUCT:
**OX – 1803 mm x 1524 mm (71” x 60”)**
**Sliding 60 Series Horizontal Sliding Window**

*Professionals In The Science of Testing*

| | |
|---|---|
| **Report Number** | NCTL-310-4328 |
| **Report Date** | 08/05/14 |
| **Report To** | ALUPLAST USA<br>P.O. Box 496<br>Layton, UT 84041 |
| **Test Start Date**<br>**Test End Date** | 07/15/14<br>07/15/14 |
| **Specification** | AAMA/WDMA/CSA 101/I.S.2/A440-11<br>NAFS 2011 - North American Fenestration Standard/Specification for windows, doors and skylights |
| **Performance Results** | Class LC-PG25:Size tested 1803 x 1524 mm (71 x 60 in)-Type HS |

## *Description of Specimen Tested*

Note: All dimensions are in the order (Width x Height x Thickness) unless otherwise noted.

| | |
|---|---|
| **Model/ Series** | Sliding 60 Series Horizontal Sliding Window |
| **Configuration** | OX |
| **Overall Frame Size** | 1803 mm x 1524 mm (71” x 60”) |
| **Sash Size** | One (1) operable sash 881 mm x 1408 mm (34.6875” x 55.4375”)<br>One (1) fixed sash 881 mm x 1408 mm (34.6875” x 55.4375”) |
| **Fixed Daylight Opening** | 730 mm x 1260 mm (28.75” x 49.625”) |
| **Frame & Sash Type** | Extruded polyvinyl chloride (PVC) |
| **Joint Construction** | All corners were mitered and welded. The interlocks were separate aluminum extrusions, sealed and multiple screw-connected to each meeting rail interior/exterior face. An extruded vinyl drip cap was sealed and multiple screw-connected full width to the exterior face of the head. |
| **Fixed Sash Installation** | Rigid nylon glides were double screw-connected into integral grooves on the fixed top and bottom rails and jamb stile. The fixed sash was then set on the exterior frame leg and multiple screw-connected through the glazing pocket and the rigid nylon glides into the main frame. Each end of the fixed meeting rail was sealed to the main frame with silicone. |
| **Glazing Components** | |
| Overall | 19.05 mm (0.75”) nominal |
| Glass Thickness | One (1) exterior pane of 6.35 mm (0.25”) nominal laminated and one (1) interior pane of 3.97 mm (0.15625”) nominal annealed |
| Spacer Type/Size | 8.73 mm (0.34375”) stainless steel (SSU-D) |
| Glazing System | Interior glazed with a soft black vinyl gasket back-bedding and a snap-in extruded vinyl glazing bead with a co-extruded dual fin soft black vinyl gasket. Each gasket/snap bead corner joint was sealed with silicone. |

**Weatherstrip**

| | | |
|---|---|---|
| Type | | Woolpile with integral center fin(s) |
| Size | | 9.65 mm (0.380”) high |
| Location | 1. | Along the interior face of the fixed interlock |
| | 2. | Along the exterior face of the active interlock |
| | 3. | Along the exterior face of the interior leg of each sash top and bottom rail and jamb stile |
| | 4. | Along the interior face of the exterior leg of each sash top and bottom rail and jamb stile |
| | 5. | Two (2) rows on on a riser block, which was double screw-connected into the interior frame channel of the head and sill at the meeting rails. |

**Filler Bars**

| | |
|---|---|
| Type | Extruded vinyl channel cover |
| Location | Snap-fit onto the edge face of each meeting rail |

**Operating Hardware**

Locks

| | |
|---|---|
| Type | Multi-point lock with interior mounted swing latch |
| Location | The swing latch was double screw-connected over bored holes on the interior face of the active lock stile at the midpoint. The swing latch actuated two (2) lock points, located at 287.34 mm (11.3125”) from each end. |

Keeper

| | |
|---|---|
| Type | Cast metal strikes |
| Location | Double screw-connected to the edge face of the interior jamb leg at the corresponding locations |

Rollers

| | |
|---|---|
| Type | Metal dual wheel roller assemblies |
| Location | Double screw-connected into the integral channel on the bottom face of the active bottom sash rail at 133.35 mm (5.50”) from each end; Two (2) roller assemblies total. The rollers rested on an extruded aluminum roller track, snap-fit into a groove on the top face of the interior sill leg. |

**Reinforcement**

| | | |
|---|---|---|
| Type | | Shaped galvanized steel |
| Thickness | | 14 gauge |
| Location | 1. | Internal hollow of each main frame member |
| | 2. | Internal hollow of each sash member |

**Pressure Equalization**

| | |
|---|---|
| Size | 6.35 mm (0.25”) diameter hole |
| Location | From the main frame head channel, through to the exterior-most internal hollow at 88.90 mm (3.50”) from each end; Two (2) total. |

**Weep Description**

| | | |
|---|---|---|
| Size | | 34.13 mm x 6.35 mm (1.34375” x 0.25”) slots |
| Location | 1. | From each glazing pocket, through the interior wall of the exterior sash leg draining into the exterior-most internal hollow at 88.90 mm (3.50”) from each end; Two (2) per sash, four (4) weeps total. |
| | 2. | From the sill channel, through the interior wall of the exterior frame leg draining into the exterior-most sill hollow at 63.50 mm (2.50”) from each end and from the fixed interlock within the active sash opening; Three (3) weeps total. |

**Weep Description (cont.)**

| | | |
|---|---|---|
| Size | | 34.13 mm x 5.08 mm (1.34375” x 0.20”) slots |
| Location | 1. | From the exterior-most internal sash hollow, draining to the exterior at 219.08 mm (8.625”) from each end; Two (2) per sash, four (4) weeps total. |
| | 2. | From the exterior-most internal sill hollow, draining out the exterior sill face at 209.55 mm (8.25”) from each end and at 238.13 mm (9.375”) from the fixed interlock within the fixed sash opening; Three (3) weeps total. |

**Weep Covers** None

**Interior/ Exterior Surface Finish** White vinyl (PVC)

**Sealant**

| | |
|---|---|
| Location | Glazing corners, meeting rail riser blocks and interlocks |
| Material | Silicone |

**Insect Screen** No screen was provided with the test sample

**Installation Method** The window was installed in a 60.3 mm x 139.7 mm (2.375” x 5.50”) engineered wood buck and the window was fastened through the main frame via #9 x 139.70 mm (5.50”) coarse thread screws at approximately 457.20 mm (18”) on center around the perimeter. The main frame exterior was sealed with silicone to the test buck.

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## *Test Results - AAMA/WDMA/CSA 101/I.S.2/A440-2011*

| Paragraph | Test |
|---|---|
| 9.3.1 | Operating Force and Force to Latch - Method B (Force Gauge)<br>ASTM E2068-00(08) |

| | | | |
|---|---|---|---|
| Initiate Motion | = | 16 N | (3.5 lbf) |
| Allowed (Normal Use) | = | Report Only | |
| Maintain Motion - Opening | = | 4 N | (1 lbf) |
| Maintain Motion - Closing | = | 4 N | (1 lbf) |
| Allowed (Normal Use) | = | 115 N | (25.85 lbf) |
| Latches | = | 4 N | (1 lbf) |
| Allowed | = | 100 N | (22.5 lbf) |

**NOTE**: The results above represent the maximum force among all sash tested.

---

| Paragraph | Test |
|---|---|
| 9.3.2 | Air Leakage Resistance<br>ASTM E283-04(12) |

The tested specimen meets or exceeds the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440-2011 for air infiltration at 75 Pa (1.57 psf).

| | | | |
|---|---|---|---|
| Maximum Allowable | = | 1.5 L/s/m$^2$ | (0.3 cfm/ft$^2$) |
| Infiltration | | | |
| Extraneous Air Leakage | = | 2.28 L/s | (4.82 cfm) |
| Total Air Leakage | = | 2.93 L/s | (6.22 cfm) |
| Air Infiltration Rate | = | 1.1 L/s/m$^2$ | (0.21 cfm/ft$^2$) |
| Exfiltration | | | |
| Extraneous Air Leakage | = | 2.04 L/s | (4.31 cfm) |
| Total Air Leakage | = | 3.23 L/s | (6.85 cfm) |
| Air Infiltration Rate | = | 1.2 L/s/m$^2$ | (0.23 cfm/ft$^2$) |

---

| Paragraph | Test |
|---|---|
| 9.3.3 | Water Penetration Resistance<br>ASTM E547-00(09) and ASTM E331-00(09) |

No Leakage after 4 cycles of 5 minutes at 180 Pa (3.76 psf)

**NOTE:** Tested with and without insect screen

---

| Paragraph | Test |
|---|---|
| 5.3.4.2 | Uniform Load Deflection at Design Pressure<br>ASTM E330-02(14) |

| | |
|---|---|
| No damage after positive | 1920 Pa (40.10 psf) held for 10 seconds |
| No damage after negative | 1920 Pa (40.10 psf) held for 10 seconds |

| | | |
|---|---|---|
| Measured Deflection $_{\text{Positive}}$ | = | 6.96 mm (0.274 inches) |
| Measured Deflection $_{\text{Negative}}$ | = | 6.91 mm (0.272 inches) |

---

| Paragraph | Test |
|---|---|
| 5.3.4.3 | Uniform Load Structural Test<br>ASTM E330-02(14) |

| | |
|---|---|
| No damage after positive | 2880 Pa (60.15 psf) held for 10 seconds |
| No damage after negative | 2880 Pa (60.15 psf) held for 10 seconds |

| | | |
|---|---|---|
| Measured Permanent Set $_{Positive}$ | = | 0.53 mm (0.021 inches) |
| Measured Permanent Set $_{Negative}$ | = | 0.53 mm (0.021 inches) |
| Maximum Allowed (0.4%) | = | 5.64 mm (0.222 inches) |

**NOTE:** Deflection and Permanent Set measurements taken on the active interlock over a 1408 mm (55.4375”) span.

---

| Paragraph | Test |
|---|---|
| 5.3.5 | Forced Entry Resistance<br>ASTM F588-07 |

Type A Window Assembly/ Grade 20: Pass

| Test | Results | Allowed |
|---|---|---|
| Disassembly | No Entry | No Entry |
| Test A1 | No Entry | No Entry |
| Test A2 | No Entry | No Entry |
| Test A3 | No Entry | No Entry |
| Test A4 | No Entry | No Entry |
| Test A5 | No Entry | No Entry |
| Test A7 | No Entry | No Entry |
| Hardware Manipulation Test | No Entry | No Entry |
| Sash Manipulation Test | No Entry | No Entry |

**NOTE:** 1. T1 = 5 minutes, L1 = 200 lbf, L2 = 100 lbf, L3 = 35 lbf
2. Loads were held for 60 seconds.

---

| Paragraph | Test |
|---|---|
| 5.3.5 | Forced Entry Resistance<br>CMBSO 1-79, CAWM 301 |

Type I Window Assembly Pass

| Test | Results | Allowed |
|---|---|---|
| Disassembly | No Entry | No Entry |
| Hand/Tool Manipulation | No Entry | No Entry |
| Test A | No Entry | No Entry |
| Test B | No Entry | No Entry |
| Test C | No Entry | No Entry |
| Hand/Tool Manipulation | No Entry | No Entry |
| Test D | No Entry | No Entry |
| Hand/Tool Manipulation | No Entry | No Entry |

**Note:** Each Concentrated Load was maintained from the exterior side whenever possible and maintained for a period of one (1) Minute.
The disassembly sequence and the hand and tool manipulation tests were each conducted continuously for a period of five (5) minutes.

---

| Paragraph | Test |
|---|---|
| 5.3.6.2 | Thermoplastic Corner Weld Test (PVC products only) - Pass |

| Paragraph | Test |
|---|---|
| 5.3.6.3 | Deglazing Test<br>ASTM E987-88(09) |

| Rails – 230 N (51.71 lbf) | Results | Allowed |
|---|---|---|
| Top Rail | 12.0% | <90% (<100%) |
| Bottom Rail | 11.5% | <90% (<100%) |
| Stiles – 320 N (71.94 lbf) | Results | Allowed |
| Jamb Stile | 14.5% | <90% (<100%) |
| Meeting Stile | 13.0% | <90% (<100%) |

**NOTE:** The glass bite was approximately 12.7 mm (0.5”)

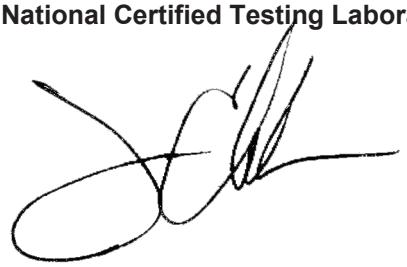
This space left intentionally blank

All testing was performed at NCTL NW Inc, 3310 Hill Avenue, Everett, WA 98201.

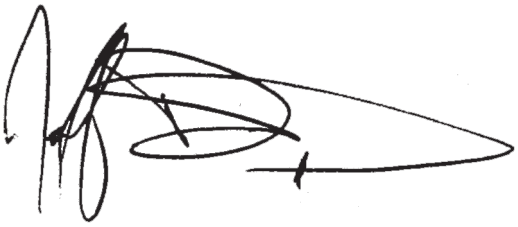
This test report was prepared by National Certified Testing Laboratory NW Inc. (NCTL), for the exclusive use of the above named client and it does not constitute certification of this product. The results are for the particular specimen tested and do not imply the quality of similar or identical products manufactured or installed from specifications identical to the tested product. The test specimen was supplied to NCTL NW by the above named client. No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen are to be drawn from the ASTM E330 test. Forced entry resistance test equipment used is in compliance with Section 7 of the ASTM F588-07 test method. NCTL NW is a testing lab and assumes that all information provided by the client is accurate and does not guarantee or warranty any product tested or installed. The results in this report are actual tested values and are applicable to the specimen tested only, using the components and construction methods described herein.

Detailed drawings were available for laboratory records and compared to the test specimen at the time of this report. Component drawings were reviewed for product verification. The bill of materials contains details with any deviations noted. Ambient conditions during the referenced testing are available upon request. A copy of this report along with representative sections of the test specimen will be retained by NCTL NW. This report does not constitute certification or approval of the product, which may only be granted by a certification program validator or recognized approval entity. All tests were conducted in full compliance with the referenced specifications and/or test methods. This report is the joint property of National Certified Testing Laboratories North West Inc. and the Client to whom it is issued. Permission to reproduce this report by anyone other than National Certified Testing Laboratories North West Inc and the Client must be granted in writing by both of the above parties. This report may not be reproduced, except in its entirety, without the written consent of NCTL NW.

**National Certified Testing Laboratories**



Jim Clarke
Structural Performance Technician



Jeffrey M. Douglas
Lab Manager

Attachments
- Appendix A – Revision Summary
- Appendix B – Drawings

## Appendix A

**Section 1:**

Component Drawings, with Applicable Part Numbers, Manufacturing and Modeling Details, were Reviewed (as submitted) for Product Verification
(Reference: NCTL-310-4328)

See Attached Documentation;
any deviations noted.

Note: The above referenced component drawings (if applicable) along with representative sections of the test specimen will be retained per procedure by NCTL. This testing facility assumes that all information provided by the client is accurate.

**Section 2:**

| Identification | Date | Page & Revision |
|---|---|---|
| Original Issue | 8/26/2014 | Not Applicable |

## Appendix B

## Drawings

NATIONAL CERTIFIED TESTING LABORATORIES

3310 HILL AVENUE • EVERETT, WASHINGTON 98201 • TELEPHONE (425) 259-6799
FAX (425) 259-4936
www.nctlinc.com

**AAMA/WDMA/CSA 101/I.S.2/A440-11**

**TEST REPORT SUMMARY**

**Rendered to:**

**ALUPLAST USA**
P.O. Box 496
Layton, UT 84041

**PRODUCT TYPE: OX – Sliding Glass Door**

**SERIES/ MODEL: 80 mm Multislide**

| Title | Summary of Results |
|---|---|
| Primary Product Designator | Class LC-PG25:Size tested 2413 x 2108 mm (95 x 83 in)-Type SD |
| Design Pressure | ± 1200 Pa (25.06 psf) |
| Operating Force | 93 N (21 lbf) – initiate motion<br>67 N (15 lbf) - in motion $_{max}$ |
| Air Infiltration/Exfiltration | 0.8 L/s/m$^2$ (0.16 cfm/ft$^2$) – Infiltration<br>0.8 L/s/m$^2$ (0.16 cfm/ft$^2$) – Exfiltration |
| Water Penetration Resistance Test Pressure | 180 Pa (3.76 psf) |
| Uniform Load Structural Test Pressure | ± 1800 Pa (37.59 psf) |
| Forced Entry Resistance | ASTM F842-04 - Grade 25 - Pass<br>CAWM 1-79, CMBSO 301 - Pass |

Test Completed: 07/21/14

Reference must be made to Report No. NCTL-310-4337 dated 08/15/14 for complete test specimen description and data.

**For National Certified Testing Laboratories**

Jim Clarke
Structural Performance Technician

*Professionals In The Science of Testing*

| | |
|---|---|
| **Report Number** | NCTL-310-4337 |
| **Report Date** | 08/15/14 |
| **Report To** | ALUPLAST USA<br>P.O. Box 496<br>Layton, UT 84041 |
| **Test Start Date**<br>**Test End Date** | 07/18/14<br>07/21/14 |
| **Specification** | AAMA/WDMA/CSA 101/I.S.2/A440-11<br>NAFS 2011 - North American Fenestration Standard/Specification for windows, doors and skylights |
| **Performance Results** | Class LC-PG25:Size tested 2413 x 2108 mm (95 x 83 in)-Type HS |

### *Description of Specimen Tested*

Note: All dimensions are in the order (Width x Height x Thickness) unless otherwise noted.

| | |
|---|---|
| **Model/ Series** | 80 mm Multislide Series Sliding Glass Door |
| **Configuration** | OX |
| **Overall Frame Size** | 2413 mm x 2108 mm (95” x 83”) |
| **Sash Size** | One (1) operable sash 1208 mm x 2029 mm (47.5625” x 79.875”)<br>One (1) fixed sash 1208 mm x 2029 mm (47.5625” x 79.875”) |
| **Fixed Daylight Opening** | 1041 mm x 1861 mm (41” x 73.25”) |
| **Frame & Sash Type** | Extruded polyvinyl chloride (PVC) |
| **Joint Construction** | All corners were mitered and welded. The interlocks were separate vinyl extrusions, multiple screw-connected to each respective meeting rail face. An extruded vinyl drip cap was sealed and multiple screw-connected full width to the exterior face of the head. |
| **Fixed Sash Installation** | Rigid nylon glides were double screw-connected into integral grooves on the fixed top and bottom rails and jamb stile. The fixed sash was then set on the exterior frame leg and multiple screw-connected through the glazing pocket and the rigid nylon glides into the main frame. |
| **Glazing Components** | |
| Overall | 19.05 mm (0.75”) nominal |
| Glass Thickness | One (1) exterior pane of 6.35 mm (0.25”) nominal laminated and one (1) interior pane of 3.97 mm (0.15625”) nominal annealed |
| Spacer Type/Size | 8.73 mm (0.34375”) stainless steel (SSU-D) |
| Glazing System | Interior glazed with a soft black vinyl gasket back-bedding and a snap-in extruded vinyl glazing bead with a co-extruded dual fin soft black vinyl gasket. Each gasket/snap bead corner joint was sealed with silicone. |

**Weatherstrip**

| | |
|---|---|
| Type | Woolpile with integral center fin(s) |
| Size | 10.16 mm (0.400”) high |
| Location | 1. Along the interior face of the fixed interlock<br>2. Along the exterior face of the active interlock<br>3. Along the exterior face of the interior leg of each sash top and bottom rail and jamb stile<br>4. Along the interior face of the exterior leg of each sash top and bottom rail and jamb stile<br>5. Two (2) rows on on a riser block, which was multiple screw-connected into the interior frame channel of the head and sill at the meeting rails. |

**Filler Bars**

| | |
|---|---|
| Type | Extruded vinyl channel cover |
| Location | Snap-fit onto the edge face of each meeting rail |

**Operating Hardware**

Locks

| | |
|---|---|
| Type | Multi-point lock with interior mounted swing latch |
| Location | The swing latch was double screw-connected over bored holes on the interior face of the active lock stile at 1009.65 mm (39.75”). The swing latch actuated two (2) lock points. |

Keeper

| | |
|---|---|
| Type | Cast metal strikes |
| Location | Double screw-connected to the edge face of the interior jamb leg at 317.50 mm (12.50”) from the sill and 269.88 mm (10.625”) from the head. |

Rollers

| | |
|---|---|
| Type | Dual nylon wheel roller assemblies |
| Location | Double screw-connected into the integral channel on the bottom face of the active bottom rail at 171.45 mm (6.25”) from each end; Two (2) roller assemblies total. The rollers rested on an extruded aluminum roller track, snap-fit over the interior sill leg. |

**Reinforcement**

| | |
|---|---|
| Type | Galvanized steel box |
| Thickness | 16 gauge |
| Location | Internal hollow of all main frame members |

| | |
|---|---|
| Type | Shaped galvanized steel |
| Thickness | 14 gauge |
| Location | Internal hollow of each panel member |

**Pressure Equalization**

| | |
|---|---|
| Size | 6.35 mm (0.25”) diameter hole |
| Location | Through the main frame exterior leg on the head at 55.56 mm (2.1875”) from each end within the active panel opening, two (2) total. |

| | |
|---|---|
| Size | 22.23 mm (0.875”) notch |
| Location | Notched into the fixed top rail glazing gasket at 53.98 mm (2.125”) from each end, two (2) total. |

| | |
|---|---|
| Size | 41.28 mm (1.625”) notch |
| Location | Notched into the active top rail glazing gasket at 63.50 mm (2.50”) from each end, two (2) total. |

**Weep Description**

| | | |
|---|---|---|
| Size | | 27.91 mm x 6.35 mm (1.099” x 0.25”) slots |
| Location | 1. | From each glazing pocket, through the interior wall of the exterior sash leg draining into the exterior-most internal hollow at 60.33 mm (2.375”) from each end, three (3) per sash, six (6) weeps total. |
| | 2. | From the exterior-most internal sash hollow, draining to the exterior at 219.08 mm (8.625”) from each end; Two (2) per sash, four (4) weeps total. |
| Size | | 34.13 mm x 5.08 mm (1.34375” x 0.20”) slots |
| Location | 1. | From the sill channel, through the interior wall of the exterior frame leg draining into the exterior-most sill hollow at 66.68 mm (2.625”) from each end and from the fixed interlock within the active sash opening, three (3) weeps total. |
| | 2. | From the exterior-most internal sill hollow, draining out the exterior sill face at 192.09 mm (7.5625”) from each end, two (2) weeps total. |

**Weep Covers** None

**Interior/ Exterior Surface Finish** White vinyl (PVC)

**Sealant**

| | |
|---|---|
| Location | Glazing corners, meeting rail riser blocks and interlocks |
| Material | Silicone |

**Insect Screen** No screen was provided with the test sample

**Installation Method** The window was installed in a 60.3 mm x 139.7 mm (2.375” x 5.50”) engineered wood buck and the window was fastened through the main frame via #9 x 139.70 mm (5.50”) coarse thread screws at approximately 457.20 mm (18”) on center around the perimeter. The main frame exterior was sealed with silicone to the test buck.

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## *Test Results - AAMA/WDMA/CSA 101/I.S.2/A440-2011*

| Paragraph | Test |
|---|---|
| 9.3.1 | Operating Force and Force to Latch - Method B (Force Gauge)<br>ASTM E2068-00(08) |

| | | | |
|---|---|---|---|
| Initiate Motion | = | 93 N | (21 lbf) |
| Allowed (Normal Use) | = | 135 N | (30.35 lbf) |
| Maintain Motion - Opening | = | 67 N | (15 lbf) |
| Maintain Motion - Closing | = | 67 N | (15 lbf) |
| Allowed (Normal Use) | = | 90 N | (20.23 lbf) |
| Latches | = | 4 N | (1 bf) |
| Allowed | = | 100 N | (22.48 lbf) |

**NOTE**: The results above represent the maximum force among all sash tested.

---

| Paragraph | Test |
|---|---|
| 9.3.2 | Air Leakage Resistance<br>ASTM E283-04(12) |

The tested specimen meets or exceeds the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440-2011 for air infiltration at 75 Pa (1.57 psf).

| | | | |
|---|---|---|---|
| Maximum Allowable | = | 1.5 L/s/m$^2$ | (0.3 cfm/ft$^2$) |
| Infiltration | | | |
| Extraneous Air Leakage | = | 3.47 L/s | (7.36 cfm) |
| Total Air Leakage | = | 4.08 L/s | (8.63 cfm) |
| Air Infiltration Rate | = | 0.8 L/s/m$^2$ | (0.16 cfm/ft$^2$) |
| Exfiltration | | | |
| Extraneous Air Leakage | = | 3.29 L/s | (6.98 cfm) |
| Total Air Leakage | = | 4.08 L/s | (8.63 cfm) |
| Air Infiltration Rate | = | 0.8 L/s/m$^2$ | (0.16 cfm/ft$^2$) |

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| Paragraph | Test |
|---|---|
| 9.3.3 | Water Penetration Resistance<br>ASTM E547-00(09) |

No Leakage after 4 cycles of 5 minutes at 180 Pa (3.76 psf)

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| Paragraph | Test |
|---|---|
| 9.3.4.2 | Uniform Load Deflection at Design Pressure<br>ASTM E330-02(14) |

| | |
|---|---|
| No damage after positive | 1200 Pa (25.06 psf) held for 10 seconds |
| No damage after negative | 1200 Pa (25.06 psf) held for 10 seconds |
| Measured Deflection $_{Positive}$ | = 6.53 mm (0.257 inches) |
| Measured Deflection $_{Negative}$ | = 7.98 mm (0.314 inches) |

---

| Paragraph | Test |
|---|---|
| 9.3.4.3 | Uniform Load Structural Test<br>ASTM E330-02(14) |

No damage after positive 1800 Pa (37.59 psf) held for 10 seconds
No damage after negative 1800 Pa (37.59 psf) held for 10 seconds

Measured Permanent Set $_{Positive}$ = 1.19 mm (0.047 inches)
Measured Permanent Set $_{Negative}$ = 1.63 mm (0.064 inches)
Maximum Allowed (0.4%) = 8.13 mm (0.320 inches)

**NOTE:** Deflection and Permanent Set measurements taken on the active meeting rail over a 2029 mm (79.875") span

---

| Paragraph | Test |
|---|---|
| 9.3.5 | Forced Entry Resistance<br>ASTM F842-04 |

Type A Sliding Door Assembly/ Grade 25: Pass

| Test | Results | Allowed |
|---|---|---|
| Disassembly | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |
| Test A1 | No Entry | No Entry |
| Test A2 | No Entry | No Entry |
| Test A3 | No Entry | No Entry |
| Test A4 | No Entry | No Entry |
| Test A5 | No Entry | No Entry |
| Test A6 | No Entry | No Entry |
| Test A7 | No Entry | No Entry |
| Hardware Manipulation Test | No Entry | No Entry |
| Sash Manipulation Test | No Entry | No Entry |
| Fixed Sash tests | | |
| Test A | No Entry | No Entry |
| Test B | No Entry | No Entry |
| Test C | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |

**NOTE:** 1. T1 = 10 minutes, L1 = 800 lbf, L2 = 200 lbf, L3 = 50 lbf, L4 = 50 lbf
2. Loads were held for 60 seconds.

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| Paragraph | Test |
|---|---|
| 9.3.5 | Forced Entry Resistance<br>CMBSO 1-79, CAWM 301 |

Type I Sliding Door Assembly — Pass

| Test | Results | Allowed |
|---|---|---|
| Disassembly | No Entry | No Entry |
| Hand/Tool Manipulation Test | No Entry | No Entry |
| Test A | No Entry | No Entry |
| Test B | No Entry | No Entry |
| Test C | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |
| Test D | No Entry | No Entry |
| Test E | No Entry | No Entry |
| Test F | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |
| Fixed Panel Tests | | |
| Test A | No Entry | No Entry |
| Test B | No Entry | No Entry |
| Test C | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |

**Note:** Each Concentrated Load was maintained from the exterior side whenever possible and maintained for a period of one (1) Minute.
The disassembly sequence and the hand and tool manipulation tests were each conducted continuously for a period of five (5) minutes.

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| Paragraph | Test |
|---|---|
| 9.3.6.2 | Thermoplastic Corner Weld Test (PVC products only) - Pass |

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| Paragraph | Test |
|---|---|
| 9.3.6.3 | Deglazing Test<br>ASTM E987-88(09) |

| Rails – 230 N (51.71 lbf) | Results | Allowed |
|---|---|---|
| Top Rail | 35.5% | <90% (<100%) |
| Bottom Rail | 36.0% | <90% (<100%) |
| Stiles – 320 N (71.94 lbf) | Results | Allowed |
| Jamb Stile | 28.5% | <90% (<100%) |
| Meeting Stile | 27.5% | <90% (<100%) |

**NOTE:** The glass bite was approximately 12.7 mm (0.5”)

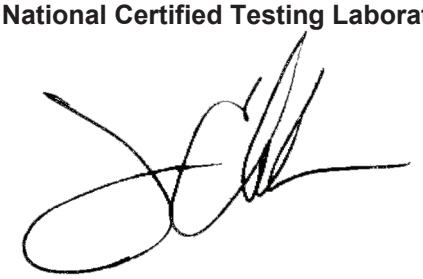
---

All testing was performed at NCTL NW Inc, 3310 Hill Avenue, Everett, WA 98201.

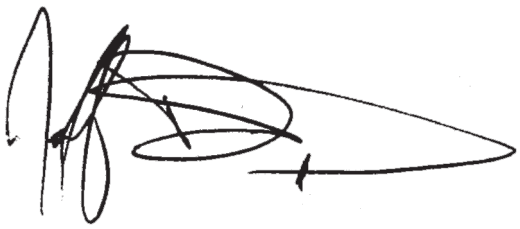
This test report was prepared by National Certified Testing Laboratory NW Inc. (NCTL), for the exclusive use of the above named client and it does not constitute certification of this product. The results are for the particular specimen tested and do not imply the quality of similar or identical products manufactured or installed from specifications identical to the tested product. The test specimen was supplied to NCTL NW by the above named client. No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen are to be drawn from the ASTM E330 test. Forced entry resistance test equipment used is in compliance with Section 7 of the ASTM F588-07 test method. NCTL NW is a testing lab and assumes that all information provided by the client is accurate and does not guarantee or warranty any product tested or installed. The results in this report are actual tested values and are applicable to the specimen tested only, using the components and construction methods described herein.

Detailed drawings were available for laboratory records and compared to the test specimen at the time of this report. Component drawings were reviewed for product verification. The bill of materials contains details with any deviations noted. Ambient conditions during the referenced testing are available upon request. A copy of this report along with representative sections of the test specimen will be retained by NCTL NW. This report does not constitute certification or approval of the product, which may only be granted by a certification program validator or recognized approval entity. All tests were conducted in full compliance with the referenced specifications and/or test methods. This report is the joint property of National Certified Testing Laboratories North West Inc. and the Client to whom it is issued. Permission to reproduce this report by anyone other than National Certified Testing Laboratories North West Inc and the Client must be granted in writing by both of the above parties. This report may not be reproduced, except in its entirety, without the written consent of NCTL NW.

**National Certified Testing Laboratories**



Jim Clarke
Structural Performance Technician



Jeffrey M. Douglas
Lab Manager

Attachments
- Appendix A – Revision Summary
- Appendix B – Drawings

## Appendix A

**Section 1:**

Component Drawings, with Applicable Part Numbers, Manufacturing and Modeling Details, were Reviewed (as submitted) for Product Verification
(Reference: NCTL-310-4328)

See Attached Documentation;
any deviations noted.

Note: The above referenced component drawings (if applicable) along with representative sections of the test specimen will be retained per procedure by NCTL. This testing facility assumes that all information provided by the client is accurate.

**Section 2:**

| Identification | Date | Page & Revision |
|---|---|---|
| Original Issue | 08/26/2014 | Not Applicable |

## Appendix B

## Drawings

NATIONAL CERTIFIED TESTING LABORATORIES

3310 HILL AVENUE • EVERETT, WASHINGTON 98201 • TELEPHONE (425) 259-6799
FAX (425) 259-4936
www.nctlinc.com

**AAMA/WDMA/CSA 101/I.S.2/A440-11**

**TEST REPORT SUMMARY**

**Rendered to:**

**ALUPLAST USA**
P.O.Box 496
Layton, UT 84041

**PRODUCT TYPE: OX – Lift and Slide Door**

**SERIES/ MODEL: 85 mm**

| Title | Summary of Results |
|---|---|
| Primary Product Designator | Class CW-PG35:Size tested 3658 x 2438 mm (144 x 96 in)-Type SD |
| Design Pressure | ± 1680 Pa (35.09 psf) |
| Operating Force | 44 N (10 lbf) – Initiate<br>40 N (9 lbf) – In Motion |
| Air Infiltration/Exfiltration | < 0.1 L/s/m$^2$ (< 0.01 cfm/ft$^2$) – Infiltration<br>< 0.1 L/s/m$^2$ (< 0.01 cfm/ft$^2$) – Exfiltration |
| Water Penetration Resistance Test Pressure | 960 Pa (20.05 psf) |
| Uniform Load Structural Test Pressure | ± 2520 Pa (52.63 psf) |
| Forced Entry Resistance | ASTM F842-04 - Grade 25 - Pass<br>CAWM 1-79, CMBSO 301 - Pass |

Test Completed: 07/22/14

Reference must be made to Report No. NCTL-310-4342 dated 08/18/14 for complete test specimen description and data.

**For National Certified Testing Laboratories**

Jim Clarke
Structural Performance Technician

*Professionals In The Science of Testing*

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# AAMA/WDMA/CSA 101/I.S.2/A440-11

# STRUCTURAL TEST REPORT

# NCTL-310-4342

REPORT TO:
ALUPLAST USA
P.O.BOX 496
LAYTON, UT 84041

REPORT NUMBER: NCTL-310-4342
REPORT DATE: 08/18/14

PRODUCT:
**OX – 3658 mm x 2438 mm (144” x 96”)**
**85 mm Series Lift and Slide Door**

*Professionals In The Science of Testing*

| | |
|---|---|
| **Report Number** | NCTL-310-4342 |
| **Report Date** | 08/18/14 |
| **Report To** | ALUPLAST USA<br>P.O. Box 496<br>Layton, UT 84041 |
| **Test Start Date**<br>**Test End Date** | 07/22/14<br>07/22/14 |
| **Specification** | AAMA/WDMA/CSA 101/I.S.2/A440-11<br>NAFS 2011 - North American Fenestration Standard/Specification for windows, doors and skylights |
| **Performance Results** | Class CW-PG35:Size tested 3658 x 2438 mm (144 x 96 in)-Type SD |

## *Description of Specimen Tested*

Note: All dimensions are in the order (Width x Height x Thickness) unless otherwise noted.

| | |
|---|---|
| **Model/ Series** | 85 mm Series Lift and Slide Door |
| **Configuration** | OX |
| **Overall Frame Size** | 3658 mm x 2438 mm (144” x 96”) |
| **Sash Size** | One (1) active panel 1803 mm x 2311 mm (71” x 91”)<br>One (1) fixed panel 1803 mm x 2311 mm (71” x 91”) |
| **Fixed Daylight Opening** | 1600 mm x 2108 mm (63” x 83”) |
| **Frame & Sash Type** | Extruded polyvinyl chloride (PVC) with a three (3) piece extruded aluminum/extruded polyvinyl chloride (PVC) sill |
| **Joint Construction** | Panels<br>All panel corners were mitered and welded. The interlocks were separate vinyl extrusions, sealed and multiple screw-connected to each respective meeting rail face.<br>Main Frame<br>All main frame corners were butt cut, sealed with a foam gasket and silicone and double screw-connected through the head and sill into each jamb. An extruded vinyl cover plate was sealed with a foam gasket and silicone and multiple screw-connected to each end of the head and sill. |
| **Fixed Panel Installation** | An extruded vinyl panel adaptor was snap-fit and sealed to the top rail and jamb stile of the fixed panel. The panel was set on the sill and multiple screw-connected to the main frame from within the glazing pocket. |
| **Glazing Components** | |
| Overall | 25.4 mm (1”) nominal |
| Glass Thickness | One (1) exterior pane of 6.35 mm (0.25”) nominal laminated and one interior pane of 4.76 mm (0.1875”) nominal annealed |
| Spacer Type/Size | 12.76 mm (0.50”) nominal stainless steel (SS-D) |
| Glazing System | Interior glazed with a soft vinyl gasket back-bedding and a snap-in extruded vinyl glazing bead with a dual fin soft vinyl glazing gasket. Each glazing corner was sealed with silicone sealant. |

**Weatherstrip**

| | | |
|---|---|---|
| Type | | Soft black vinyl bulb/fin seal |
| Size | | Approximately 9.90 mm (0.390”) diameter bulb with a 7.87 mm (0.310”) long fin |
| Location | | Two (2) rows along the edge face of the active panel top and bottom rails and the lock stile. |
| Type | | Soft black vinyl bulb seal |
| Size | | Approximately 12.19 mm (0.480”) diameter |
| Location | | Within the interlocking leg of each interlock. |
| Type | | Woolpile with integral center fin(s) |
| Size | | 9.65 mm (0.380”) high pile |
| Location | 1. | Along the interior face of the snap-fit exterior panel stop on the lock jamb and head within the active panel opening. |
| | 2. | Along the exterior face of the active panel interlock. |
| Type | | Closed cell foam chimney blocks |
| Location | | Applied to the head and sill at the fixed meeting stile |

**Filler Bars**

| | | |
|---|---|---|
| Type | | Extruded vinyl panel stop |
| Location | | snap-fit onto the lock jamb and to the head within the active sash opening towards the exterior |
| Type | | Extruded vinyl track |
| Location | | Snap-fit onto the lock jamb towards the interior. This track is where the lock points were located. |
| Type | | Extruded aluminum panel track |
| Location | | Multiple screw-connected to the head, full width towards the interior. Rigid nylon panel guides were double screw-connected to each end of the active top rail. |
| Type | | Extruded vinyl track cover |
| Location | | Snap-fit onto the edge face of each meeting stile |
| | Note: | See drawings for additional filler bar details |

**Operating Hardware**

Locks

| | |
|---|---|
| Type | Interior mounted swing handle/lift and slide mechanism |
| Location | Double screw-connected to the interior face of the active lock jamb at 1016 mm (40”) from the bottom of the panel. The swing handle also actuated the rollers, lifting the panel for operation. |

Keeper

| | |
|---|---|
| Type | Cast metal strikes |
| Location | Double screw-connected within the snap-fit lock jamb track at 266.70 mm (10.50”) from the sill and 469.90 mm (18.5”) from the head, two (2) lock points total. |

Rollers

| | |
|---|---|
| Type | Dual nylon wheel roller assemblies |
| Location | Near each end of the active bottom rail. The rollers rested on an integral extruded aluminum roller track on the sill. |

**Reinforcement**

| | | |
|---|---|---|
| Type | | Extruded aluminum with integral thermal break |
| Location | | Internal hollow of the head and jambs |
| Type | | Extruded aluminum |
| Location | | Internal hollow of the active lock stile and active bottom rail |
| Type | | Galvanized steel box |
| Thickness | | 15 gauge |
| Location | 1. | Internal hollow of each fixed panel member |
| | 2. | Internal hollow of the active top rail and meeting stile |

**Pressure Equalization**

| | |
|---|---|
| Size | 22.23 mm (0.875”) notch |
| Location | Notched into the fixed top rail glazing gasket at 53.98 mm (2.125”) from each end, two (2) total. |

**Weep Description**

| | |
|---|---|
| Size | 27.91 mm x 6.35 mm (1.099” x 0.25”) slots |
| Location | From each glazing pocket, through the interior wall of the exterior sash leg draining into the exterior-most internal hollow at 60.33 mm (2.375”) and 571.50 mm (22.50”) from each end, four (4) per sash, eight (8) weeps total. |
| Size | 27.91 mm x 4.76 mm (1.099” x 0.1875”) slots |
| Location | From the exterior-most internal bottom rail hollow, draining out the bottom face to the exterior at 238.13 mm (9.375”) from each end and at the midpoint, three (3) weeps total. |

**Weep Covers**

**Interior/ Exterior Surface Finish** White vinyl (PVC)

**Sealant**

| | |
|---|---|
| Location | Glazing corners and each main frame corner |
| Material | Silicone |

**Insect Screen** No screen was provided with the test sample

**Installation Method** The window was installed in a 60.3 mm x 139.7 mm (2.375” x 5.50”) engineered wood buck and the window was fastened through the main frame via #9 x 139.70 mm (5.50”) coarse thread screws at approximately 457.20 mm (18”) on center around the perimeter. The main frame exterior was sealed with silicone to the test buck.

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## *Test Results - AAMA/WDMA/CSA 101/I.S.2/A440-2011*

Paragraph 9.3.1 — Test: Operating Force and Force to Latch - Method B (Force Gauge)
ASTM E2068-00(08)

| | | | |
|---|---|---|---|
| Initiate Motion | = | 44 N | (10 lbf) |
| Allowed (Normal Use) | = | 180 N | (40.47 lbf) |
| Maintain Motion - Opening | = | 40 N | (9 lbf) |
| Maintain Motion - Closing | = | 36 N | (8 lbf) |
| Allowed (Normal Use) | = | 115 N | (25.85 lbf) |
| Latches | = | 18 N | (4 bf) |
| Allowed | = | 100 N | (22.48 lbf) |

**NOTE**: The results above represent the maximum force among all sash tested.

---

Paragraph 9.3.2 — Test: Air Leakage Resistance
ASTM E283-04(12)

The tested specimen meets or exceeds the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440-2011 for air infiltration at 75 Pa (1.57 psf).

| | | | |
|---|---|---|---|
| Maximum Allowable | = | 1.5 L/s/m$^2$ | (0.3 cfm/ft$^2$) |
| Infiltration | | | |
| Extraneous Air Leakage | = | 3.13 L/s | (6.63 cfm) |
| Total Air Leakage | = | 0.12 L/s | (0.25 cfm) |
| Air Infiltration Rate | = | < 0.1 L/s/m$^2$ | (< 0.01 cfm/ft$^2$) |
| Exfiltration | | | |
| Extraneous Air Leakage | = | 3.13 L/s | (6.63 cfm) |
| Total Air Leakage | = | < 0.01 L/s | (< 0.01 cfm) |
| Air Exfiltration Rate | = | < 0.1 L/s/m$^2$ | (< 0.01 cfm/ft$^2$) |

---

Paragraph 9.3.3 — Test: Water Penetration Resistance
ASTM E547-00(09)

No Leakage after 4 cycles of 5 minutes at 960 Pa (20.05 psf)

---

Paragraph 9.3.4.2 — Test: Uniform Load Deflection at Design Pressure
ASTM E330-02(14)

| | |
|---|---|
| No damage after positive | 1680 Pa (35.09 psf) held for 10 seconds |
| No damage after negative | 1680 Pa (35.09 psf) held for 10 seconds |

| | | |
|---|---|---|
| Measured Deflection $_{Positive}$ | = | 11.35 mm (0.447 inches) |
| Measured Deflection $_{Negative}$ | = | 12.07 mm (0.475 inches) |
| Maximum Allowed $_{L/175}$ | = | 13.21 mm (0.520 inches) |

---

| Paragraph | Test |
|---|---|
| 9.3.4.3 | Uniform Load Structural Test<br>ASTM E330-02(14) |

No damage after positive 2520 Pa (52.63 psf) held for 10 seconds
No damage after negative 2520 Pa (52.63 psf) held for 10 seconds

Measured Permanent Set $_{Positive}$ = 0.91 mm (0.036 inches)
Measured Permanent Set $_{Negative}$ = 0.94 mm (0.037 inches)
Maximum Allowed (0.3%) = 6.93 mm (0.273 inches)

**NOTE:** Deflection and Permanent Set measurements taken on the active meeting rail over a 1803 mm (91") span

---

| Paragraph | Test |
|---|---|
| 9.3.5 | Forced Entry Resistance<br>ASTM F842-04 |

Type A Sliding Door Assembly/ Grade 25: Pass

| Test | Results | Allowed |
|---|---|---|
| Disassembly | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |
| Test A1 | No Entry | No Entry |
| Test A2 | No Entry | No Entry |
| Test A3 | No Entry | No Entry |
| Test A4 | No Entry | No Entry |
| Test A5 | No Entry | No Entry |
| Test A6 | No Entry | No Entry |
| Test A7 | No Entry | No Entry |
| Hardware Manipulation Test | No Entry | No Entry |
| Sash Manipulation Test | No Entry | No Entry |
| Fixed Sash tests | | |
| Test A | No Entry | No Entry |
| Test B | No Entry | No Entry |
| Test C | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |

**NOTE:** 1. T1 = 10 minutes, L1 = 800 lbf, L2 = 200 lbf, L3 = 50 lbf, L4 = 50 lbf
2. Loads were held for 60 seconds.

---

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| Paragraph | Test |
|---|---|
| 9.3.5 | Forced Entry Resistance<br>CMBSO 1-79, CAWM 301 |

Type I Sliding Door Assembly — Pass

| Test | Results | Allowed |
|---|---|---|
| Disassembly | No Entry | No Entry |
| Hand/Tool Manipulation Test | No Entry | No Entry |
| Test A | No Entry | No Entry |
| Test B | No Entry | No Entry |
| Test C | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |
| Test D | No Entry | No Entry |
| Test E | No Entry | No Entry |
| Test F | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |
| Fixed Panel Tests | | |
| Test A | No Entry | No Entry |
| Test B | No Entry | No Entry |
| Test C | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |

**Note:** Each Concentrated Load was maintained from the exterior side whenever possible and maintained for a period of one (1) Minute.
The disassembly sequence and the hand and tool manipulation tests were each conducted continuously for a period of five (5) minutes.

---

| Paragraph | Test |
|---|---|
| 9.3.6.2 | Thermoplastic Corner Weld Test (PVC products only) - Pass |

---

| Paragraph | Test |
|---|---|
| 9.3.6.3 | Deglazing Test<br>ASTM E987-88(09) |

| Rails – 230 N (51.71 lbf) | Results | Allowed |
|---|---|---|
| Top Rail | 30.5% | <90% (<100%) |
| Bottom Rail | 31.0% | <90% (<100%) |
| Stiles – 320 N (71.94 lbf) | Results | Allowed |
| Jamb Stile | 28.0% | <90% (<100%) |
| Meeting Stile | 27.0% | <90% (<100%) |

**NOTE:** The glass bite was approximately 12.7 mm (0.5”)

---

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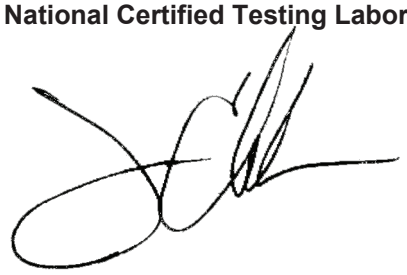
All testing was performed at NCTL NW Inc, 3310 Hill Avenue, Everett, WA 98201.

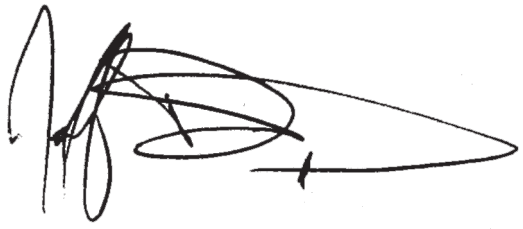
This test report was prepared by National Certified Testing Laboratory NW Inc. (NCTL), for the exclusive use of the above named client and it does not constitute certification of this product. The results are for the particular specimen tested and do not imply the quality of similar or identical products manufactured or installed from specifications identical to the tested product. The test specimen was supplied to NCTL NW by the above named client. No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen are to be drawn from the ASTM E330 test. Forced entry resistance test equipment used is in compliance with Section 7 of the ASTM F842-04 test method. NCTL NW is a testing lab and assumes that all information provided by the client is accurate and does not guarantee or warranty any product tested or installed. The results in this report are actual tested values and are applicable to the specimen tested only, using the components and construction methods described herein.

Detailed drawings were available for laboratory records and compared to the test specimen at the time of this report. Component drawings were reviewed for product verification. The bill of materials contains details with any deviations noted. Ambient conditions during the referenced testing are available upon request. A copy of this report along with representative sections of the test specimen will be retained by NCTL NW. This report does not constitute certification or approval of the product, which may only be granted by a certification program validator or recognized approval entity. All tests were conducted in full compliance with the referenced specifications and/or test methods. This report is the joint property of National Certified Testing Laboratories North West Inc. and the Client to whom it is issued. Permission to reproduce this report by anyone other than National Certified Testing Laboratories North West Inc and the Client must be granted in writing by both of the above parties. This report may not be reproduced, except in its entirety, without the written consent of NCTL NW.

**National Certified Testing Laboratories**



Jim Clarke
Structural Performance Technician



Jeffrey M. Douglas
Lab Manager

Attachments
- Appendix A – Revision Summary
- Appendix B – Drawings

## Appendix A

**Section 1:**

Component Drawings, with Applicable Part Numbers, Manufacturing and Modeling Details, were Reviewed (as submitted) for Product Verification
(Reference: NCTL-310-4342)

See Attached Documentation;
any deviations noted.

Note: The above referenced component drawings (if applicable) along with representative sections of the test specimen will be retained per procedure by NCTL. This testing facility assumes that all information provided by the client is accurate.

**Section 2:**

| Identification | Date | Page & Revision |
|---|---|---|
| Original Issue | 08/26/2014 | Not Applicable |

## Appendix B

## Drawings

NATIONAL CERTIFIED TESTING LABORATORIES

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FAX (425) 259-4936
www.nctlinc.com

**AAMA/WDMA/CSA 101/I.S.2/A440-11**

**TEST REPORT SUMMARY**

**Rendered to:**

**ALUPLAST USA**
P.O. Box 496
Layton, UT 84041

**PRODUCT TYPE: OX – Dual Action Tilt and Slide Door**

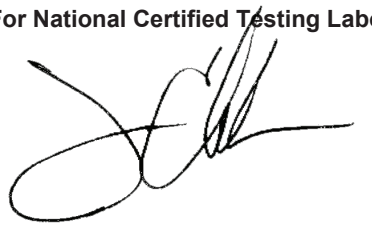
**SERIES/ MODEL: 80 mm**

| Title | Summary of Results |
|---|---|
| Primary Product Designator | Class LC-PG35:Size tested 2413 x 2108 mm (95 x 83 in)-Type SD |
| Design Pressure | ± 1680 Pa (35.09 psf) |
| Operating Force | 4 N (1 lbf) – Initiate<br>13 N (3 lbf) – In Motion |
| Air Infiltration/Exfiltration | 0.1 L/s/m$^2$ (0.01 cfm/ft$^2$) – Infiltration<br>0.1 L/s/m$^2$ (0.01 cfm/ft$^2$) – Exfiltration |
| Water Penetration Resistance Test Pressure | 580 Pa (12.11 psf) |
| Uniform Load Structural Test Pressure | ± 2520 Pa (52.63 psf) |
| Forced Entry Resistance | ASTM F842-04 - Grade 25 - Pass<br>CAWM 1-79, CMBSO 301 - Pass |

Test Completed: 07/22/14

Reference must be made to Report No. NCTL-310-4343 dated 08/27/14 for complete test specimen description and data.

**For National Certified Testing Laboratories**



Jim Clarke
Structural Performance Technician

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# AAMA/WDMA/CSA 101/I.S.2/A440-11

# STRUCTURAL TEST REPORT

# NCTL-310-4343

REPORT TO:
ALUPLAST USA
P.O. BOX 496
LAYTON, UT 84041

REPORT NUMBER: NCTL-310-4343
REPORT DATE: 08/27/14

PRODUCT:
**OX – 2413 mm x 2108 mm (95” x 83”)**
**80 mm Series Dual Action Tilt and Slide Door**

*Professionals In The Science of Testing*

| | |
|---|---|
| **Report Number** | NCTL-310-4343 |
| **Report Date** | 08/27/14 |
| **Report To** | ALUPLAST USA<br>P.O. Box 496<br>Layton, UT 84041 |
| **Test Start Date**<br>**Test End Date** | 07/22/14<br>07/22/14 |
| **Specification** | AAMA/WDMA/CSA 101/I.S.2/A440-11<br>NAFS 2011 - North American Fenestration Standard/Specification for windows, doors and skylights |
| **Performance Results** | Class LC-PG35:Size tested 2413 x 2108 mm (95 x 83 in)-Type SD |

### *Description of Specimen Tested*

Note: All dimensions are in the order (Width x Height x Thickness) unless otherwise noted.

| | |
|---|---|
| **Model/ Series** | 80 mm Series Dual Action Tilt and Slide Door |
| **Configuration** | OX |
| **Overall Frame Size** | 2413 mm x 2108 mm (95” x 83”) |
| **Sash Size** | 1143 mm x 2000 mm (45” x 78.75”) |
| **Frame & Sash Type** | Extruded polyvinyl chloride (PVC) |
| **Joint Construction** | All corners were mitered and welded. The integral vertical mullion was fitted, supported by a cast metal end cap, sealed with a foam gasket and silicone and double screw-connected to the head and sill extrusions. |
| **Glazing Components** | |
| Overall | 25.40 mm (1.00”) nominal |
| Glass Thickness | One (1) exterior pane of 6.35 mm (0.25”) nominal laminated and one (1) interior pane of 4.76 mm (0.1875”) nominal annealed |
| Spacer Type/Size | 14.29 mm (0.5625”) stainless steel (SSU-D) |
| Glazing System | Interior glazed with a soft black vinyl gasket back-bedding and a snap-in extruded vinyl glazing bead with a co-extruded dual fin soft black vinyl gasket. Each gasket/snap bead corner joint was sealed with silicone. |
| **Weatherstrip** | |
| Type | Soft vinyl bulb/fin seal |
| Size | Approximately 9.91 mm x 0.37 mm (0.390” x 0.145”) bulb |
| Location | Around the perimeter of the interior face of the exterior frame leg within the active panel opening |
| Type | Soft vinyl fin seal |
| Size | Approximately 6.86 mm (0.270”) long |
| Location | Around the perimeter of the exterior face of the interior sash leg |

**Operating Hardware**

Locks

| | |
|---|---|
| Type | Multipoint lock and handle assembly |
| Location | The interior mounted swing latch/handle was double screw-connected over bored holes on the interior face of the lock stile at 1066.80 mm (42”) from the sill. The swing latch actuated the multipoint lock hardware which was multiple screw-connected into an integral groove around the perimeter edge face of the active sash. Twelve (12) lock points total. |

Keeper

| | |
|---|---|
| Type | Cast metal strikes |
| Location | Triple screw-connected to the interior edge face of the main frame at 117.80 mm (7”), 628.65 mm (24.75”) and 762.00 mm (30”) from the lock jamb on the head, 107.95 mm (4.25”) and 444.50 mm (17.50”) from the lock jamb on the sill, 584.20 mm (23”), 1257.30 mm (49.50”) and 1714.50 mm (67.50”) from the head on the lock jamb and at 425.45 mm (16.75”), 863.60 mm (34”), 1530.35 mm (60.25”) and 2006.60 mm (79”) from the head on the integral vertical mullion. Twelve (12) lock points total. |

Rollers

| | |
|---|---|
| Type | Tilt and slide hardware with rigid nylon wheels |
| Location | The tilt and slide assembly was multiple screw-connected to the interior face of the top and bottom active rails respectively. The rollers rested on an extruded aluminum roller track, multiple screw-connected to the interior face of the sill. The top rail hardware was attached to the corresponding hardware, inside an extruded aluminum guide track, multiple screw-connected to the interior face of the head. |

Panel Stop

| | |
|---|---|
| Type | Rubber bumper in a cast aluminum housing |
| Location | Single screw-connected to the sill roller track near the fixed jamb |
| | |
| Type | Rubber panel stop |
| Location | Single screw-connected to the head guide track near the fixed jamb |

**Reinforcement**

| | |
|---|---|
| Type | Shaped galvanized steel |
| Thickness | 14 gauge |
| Location | Internal hollow of each active sash member |
| | |
| Type | Galvanized steel box |
| Thickness | 14 gauge |
| Location | Internal hollow of each main frame member |
| | |
| Type | Galvanized steel box |
| Thickness | 12 gauge |
| Location | Internal hollow of the integral vertical mullion |

**Pressure Equalization**

| | |
|---|---|
| Size | 44.45 mm (1.75”) long notches |
| Location | Notched into the glazing gasket on the head within the fixed lite opening and active sash opening at 79.38 mm (3.125”) from each end, two per lite, four (4) total |
| | |
| Size | 28.58 mm x 6.35 mm (1.125’ x 0.25”) slots |
| Location | From the active glazing pocket, through the interior wall of the exterior sash leg on the top rail at 60.33 mm (2.375”) from each end and at the midpoint, three (3) total |

**Pressure Equalization (cont.)**

| | | |
|---|---|---|
| Size | | 27.41 mm x 4.76 mm (1.079” x 0.1875”) slots |
| Location | | On the top face of the active top rail at 187.33 mm (7.375”) from each end, two (2) total |

**Weep Description**

| | | |
|---|---|---|
| Size | | 27.50 mm x 6.35 mm (1.083” x 0.25”) slots |
| Location | 1. | From the active glazing pocket, through the interior wall of the exterior sash leg draining into the bottom rail exterior-most hollow at 57.15 mm (2.25”) from each end and at the midpoint, three (3) total |
| | 2. | From the sill floor, through the interior wall of the exterior frame leg draining into the exterior-most internal sill hollow at 60.33 mm (2.375”) from each end, 85.73 mm (3.375”) from either side if the integral vertical mullion and at the midpoint of both the fixed lite and active sash openings, six (6) total |
| Size | | 27.41 mm x 4.76 mm (1.079” x 0.1875”) slots |
| Location | | From the bottom rail exterior-most hollow, draining out the bottom face onto the sill floor at 212.73 mm (8.375”) from each end, two (2) total |
| Size | | 27.69 mm x 5.08 mm (1.09” x 0.20”) slots |
| Location | | From the exterior-most internal sill hollow draining out the exterior face at 203.2 mm (8”) from each end and from either side of the integral vertical mullion, Four (4) total |

**Weep Covers** None

**Interior/ Exterior Surface Finish** White vinyl (PVC)

**Sealant**

| | |
|---|---|
| Location | Glazing corners and ends of integral mullion |
| Material | Silicone |

**Insect Screen** No screen was provided with the test sample

**Installation Method** The window was installed in a 60.3 mm x 139.7 mm (2.375” x 5.50”) engineered wood buck and the window was fastened through the main frame via #9 x 139.70 mm (5.50”) coarse thread screws at approximately 457.20 mm (18”) on center around the perimeter. The main frame exterior was sealed with silicone to the test buck.

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## *Test Results - AAMA/WDMA/CSA 101/I.S.2/A440-2011*

| Paragraph | Test |
|---|---|
| 9.3.1 | Operating Force and Force to Latch - Method B (Force Gauge)<br>ASTM E2068-00(08) |

| | | | |
|---|---|---|---|
| Initiate Motion | = | 4 N | (1 lbf) |
| Allowed (Normal Use) | = | 180 N | (40.47 lbf) |
| Maintain Motion - Opening | = | 11 N | (2.5 lbf) |
| Maintain Motion - Closing | = | 13 N | (3 lbf) |
| Allowed (Normal Use) | = | 115 N | (25.85 lbf) |
| Latches | = | 18 N | (4 bf) |
| Allowed | = | 100 N | (22.48 lbf) |

**NOTE**: The results above represent the maximum force among all sash tested.

---

| Paragraph | Test |
|---|---|
| 9.3.2 | Air Leakage Resistance<br>ASTM E283-04(12) |

The tested specimen meets or exceeds the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440-2011 for air infiltration at 75 Pa (1.57 psf).

| | | | |
|---|---|---|---|
| Maximum Allowable | = | 1.5 L/s/m$^2$ | (0.3 cfm/ft$^2$) |
| Infiltration | | | |
| Extraneous Air Leakage | = | 2.22 L/s | (4.70 cfm) |
| Total Air Leakage | = | 0.36 L/s | (0.76 cfm) |
| Air Infiltration Rate | = | 0.1 L/s/m$^2$ | (0.01 cfm/ft$^2$) |
| Exfiltration | | | |
| Extraneous Air Leakage | = | 1.98 L/s | (4.20 cfm) |
| Total Air Leakage | = | 0.36 L/s | (0.76 cfm) |
| Air Exfiltration Rate | = | 0.1 L/s/m$^2$ | (0.01 cfm/ft$^2$) |

---

| Paragraph | Test |
|---|---|
| 9.3.3 | Water Penetration Resistance<br>ASTM E547-00(09) |

No Leakage after 4 cycles of 5 minutes at 280 Pa (12.11 psf)

---

| Paragraph | Test |
|---|---|
| 9.3.4.2 | Uniform Load Deflection at Design Pressure<br>ASTM E330-02(14) |

| | |
|---|---|
| No damage after positive | 1680 Pa (35.09 psf) held for 10 seconds |
| No damage after negative | 1680 Pa (35.09 psf) held for 10 seconds |
| Measured Deflection $_{Positive}$ | = 13.97 mm (0.550 inches) |
| Measured Deflection $_{Negative}$ | = 14.02 mm (0.552 inches) |

---

| Paragraph | Test |
|---|---|
| 9.3.4.3 | Uniform Load Structural Test<br>ASTM E330-02(14) |

No damage after positive 2520 Pa (52.63 psf) held for 10 seconds
No damage after negative 2520 Pa (52.63 psf) held for 10 seconds

Measured Permanent Set $_{Positive}$ = 1.70 mm (0.067 inches)
Measured Permanent Set $_{Negative}$ = 1.63 mm (0.064 inches)
Maximum Allowed (0.4%) = 8.00 mm (0.315 inches)

**NOTE:** Deflection and Permanent Set measurements taken on the active meeting rail over a 2000 mm (78.75") span

---

| Paragraph | Test |
|---|---|
| 9.3.5 | Forced Entry Resistance<br>ASTM F842-04 |

Type A Sliding Door Assembly/ Grade 25: Pass

| Test | Results | Allowed |
|---|---|---|
| Disassembly | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |
| Test A1 | No Entry | No Entry |
| Test A2 | No Entry | No Entry |
| Test A3 | No Entry | No Entry |
| Test A4 | No Entry | No Entry |
| Test A5 | No Entry | No Entry |
| Test A6 | No Entry | No Entry |
| Test A7 | No Entry | No Entry |
| Hardware Manipulation Test | No Entry | No Entry |
| Sash Manipulation Test | No Entry | No Entry |
| Fixed Sash tests | | |
| Test A | No Entry | No Entry |
| Test B | No Entry | No Entry |
| Test C | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |

**NOTE:** 1. T1 = 10 minutes, L1 = 800 lbf, L2 = 200 lbf, L3 = 50 lbf, L4 = 50 lbf
2. Loads were held for 60 seconds.

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| Paragraph | Test |
|---|---|
| 9.3.5 | Forced Entry Resistance<br>CMBSO 1-79, CAWM 301 |

Type I Sliding Door Assembly — Pass

| Test | Results | Allowed |
|---|---|---|
| Disassembly | No Entry | No Entry |
| Hand/Tool Manipulation Test | No Entry | No Entry |
| Test A | No Entry | No Entry |
| Test B | No Entry | No Entry |
| Test C | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |
| Test D | No Entry | No Entry |
| Test E | No Entry | No Entry |
| Test F | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |
| Fixed Panel Tests | | |
| Test A | No Entry | No Entry |
| Test B | No Entry | No Entry |
| Test C | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |

**Note:** Each Concentrated Load was maintained from the exterior side whenever possible and maintained for a period of one (1) Minute.
The disassembly sequence and the hand and tool manipulation tests were each conducted continuously for a period of five (5) minutes.

---

| Paragraph | Test |
|---|---|
| 9.3.6.2 | Thermoplastic Corner Weld Test (PVC products only) - Pass |

---

| Paragraph | Test |
|---|---|
| 9.3.6.3 | Deglazing Test<br>ASTM E987-88(09) |

| Rails – 230 N (51.71 lbf) | Results | Allowed |
|---|---|---|
| Top Rail | 25.5% | <90% (<100%) |
| Bottom Rail | 26.4% | <90% (<100%) |
| Stiles – 320 N (71.94 lbf) | Results | Allowed |
| Jamb Stile | 22.8% | <90% (<100%) |
| Meeting Stile | 24.6% | <90% (<100%) |

**NOTE:** The glass bite was approximately 12.7 mm (0.5”)

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All testing was performed at NCTL NW Inc, 3310 Hill Avenue, Everett, WA 98201.

This test report was prepared by National Certified Testing Laboratory NW Inc. (NCTL), for the exclusive use of the above named client and it does not constitute certification of this product. The results are for the particular specimen tested and do not imply the quality of similar or identical products manufactured or installed from specifications identical to the tested product. The test specimen was supplied to NCTL NW by the above named client. No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen are to be drawn from the ASTM E330 test. Forced entry resistance test equipment used is in compliance with Section 7 of the ASTM F842-04 test method. NCTL NW is a testing lab and assumes that all information provided by the client is accurate and does not guarantee or warranty any product tested or installed. The results in this report are actual tested values and are applicable to the specimen tested only, using the components and construction methods described herein.

Detailed drawings were available for laboratory records and compared to the test specimen at the time of this report. Component drawings were reviewed for product verification. The bill of materials contains details with any deviations noted. Ambient conditions during the referenced testing are available upon request. A copy of this report along with representative sections of the test specimen will be retained by NCTL NW. This report does not constitute certification or approval of the product, which may only be granted by a certification program validator or recognized approval entity. All tests were conducted in full compliance with the referenced specifications and/or test methods. This report is the joint property of National Certified Testing Laboratories North West Inc. and the Client to whom it is issued. Permission to reproduce this report by anyone other than National Certified Testing Laboratories North West Inc and the Client must be granted in writing by both of the above parties. This report may not be reproduced, except in its entirety, without the written consent of NCTL NW.

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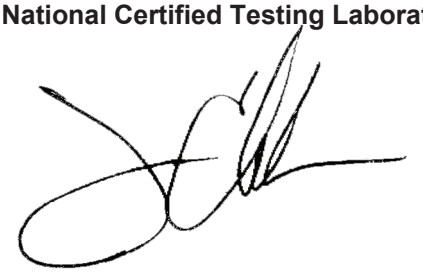
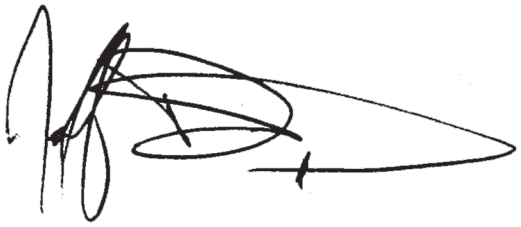


Jim Clarke
Structural Performance Technician



Jeffrey M. Douglas
Lab Manager

Attachments
- Appendix A – Revision Summary
- Appendix B – Drawings

## Appendix A

**Section 1:**

Component Drawings, with Applicable Part Numbers, Manufacturing and Modeling Details, were Reviewed (as submitted) for Product Verification
(Reference: NCTL-310-4343)

See Attached Documentation;
any deviations noted.

Note: The above referenced component drawings (if applicable) along with representative sections of the test specimen will be retained per procedure by NCTL. This testing facility assumes that all information provided by the client is accurate.

**Section 2:**

| Identification | Date | Page & Revision |
|---|---|---|
| Original Issue | 08/28/2014 | Not Applicable |

## Appendix B

## Drawings

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FAX (425) 259-4936
www.nctlinc.com

**AAMA/WDMA/CSA 101/I.S.2/A440-11**

**TEST REPORT SUMMARY**

**Rendered to:**

**ALUPLAST USA**
P.O. Box 496
Layton, UT 84041

**PRODUCT TYPE: OX – Dual Action Composite Window**

**SERIES/ MODEL: 80 mm TNT**

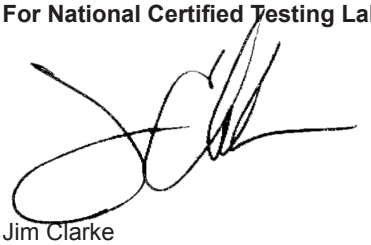
| Title | Summary of Results |
|---|---|
| Primary Product Designator | Class CW-PG40:Size tested 2134 x 1676 mm (84 x 66 in)-Type DAW* |
| Design Pressure | ± 1920 Pa (40.10 psf) |
| Operating Force (in motion $_{max}$) | 4 N (1 lbf) |
| Air Infiltration/Exfiltration | 0.1 L/s/m$^2$ (0.02 cfm/ft$^2$) – Infiltration<br>0.1 L/s/m$^2$ (0.01 cfm/ft$^2$) – Exfiltration |
| Water Penetration Resistance Test Pressure | 960 Pa (20.05 psf) |
| Uniform Load Structural Test Pressure | ± 2880 Pa (60.15 psf) |
| Forced Entry Resistance | ASTM F588-07 - Grade 20 - Pass<br>CAWM 1-79, CMBSO 301 - Pass |

*Reference NCTL Report #NCTL-310-4331 for Original Gateway Performance

Test Completed: 07/21/14

Reference must be made to Report No. NCTL-310-4363 dated 08/12/14 for complete test specimen description and data.

**For National Certified Testing Laboratories**



Jim Clarke
Structural Performance Technician

*Professionals In The Science of Testing*

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# AAMA/WDMA/CSA 101/I.S.2/A440-11

# STRUCTURAL TEST REPORT

# NCTL-310-4363

REPORT TO:
ALUPLAST USA
P.O. BOX 496
LAYTON, UT 84041

REPORT NUMBER: NCTL-310-4363
REPORT DATE: 08/12/14

PRODUCT:
**OX – 2134 mm x 1676 mm (84” x 66”)**
**80 mm TNT Series Dual Action Composite Window**

*Professionals In The Science of Testing*

| | |
|---|---|
| **Report Number** | NCTL-310-4363 |
| **Report Date** | 08/12/14 |
| **Report To** | ALUPLAST USA<br>P.O. Box 496<br>Layton, UT 84041 |
| **Test Start Date**<br>**Test End Date** | 07/21/14<br>07/21/14 |
| **Specification** | AAMA/WDMA/CSA 101/I.S.2/A440-11<br>NAFS 2011 - North American Fenestration Standard/Specification for windows, doors and skylights |
| **Performance Results** | Class CW-PG40:Size tested 2134 x 1676 mm (84 x 66 in)-Type DAW*<br><br>*Reference NCTL Report #NCTL-310-4331 for Original gateway Performance. See Reinforcement description for configuration details. |

## *Description of Specimen Tested*

Note: All dimensions are in the order (Width x Height x Thickness) unless otherwise noted.

| | |
|---|---|
| **Model/ Series** | 80 MM TNT Series Dual Action Composite Window |
| **Configuration** | OX |
| **Overall Frame Size** | 2134 mm x 1676 mm (84” x 66”) |
| **Sash Size** | 1002 mm x 1572 mm (39.4375” x 61.875”) |
| **Frame & Sash Type** | Extruded polyvinyl chloride (PVC) |
| **Joint Construction** | All corners were mitered and welded. The integral vertical mullion was fitted, supported by a cast metal end cap, sealed with a foam gasket and silicone and double screw-connected to the head and sill extrusions. |
| **Glazing Components** | |
| Overall | 25.40 mm (1.00”) nominal |
| Glass Thickness | One (1) exterior pane of 6.35 mm (0.25”) nominal laminated and one (1) interior pane of 3.97 mm (0.15625”) nominal annealed |
| Spacer Type/Size | 14.50 mm (0.571”) stainless steel (SSU-D) |
| Glazing System | Interior glazed with a soft black vinyl gasket back-bedding and a snap-in extruded vinyl glazing bead with a co-extruded dual fin soft black vinyl gasket. Each gasket/snap bead corner joint was sealed with silicone. |
| **Weatherstrip** | |
| Type | Soft vinyl bulb/fin seal |
| Size | Approximately 9.91 mm x 0.37 mm (0.390” x 0.145”) bulb |
| Location | Around the perimeter of the interior face of the exterior frame leg |
| Type | Soft vinyl fin seal |
| Size | Approximately 6.86 mm (0.270”) long |
| Location | Around the perimeter of the exterior face of the interior sash leg |

**Operating Hardware**

Locks

| | |
|---|---|
| Type | Multipoint lock and handle assembly |
| Location | The interior mounted swing latch/handle was double screw-connected over bored holes on the interior face of the lock stile at 800.10 mm (31.50”) from the sill. The swing latch actuated the multipoint lock hardware which was multiple screw-connected into an integral groove around the perimeter edge face of the active sash. Nine (9) lock points total. |

Keeper

| | |
|---|---|
| Type | Cast metal strikes |
| Location | Triple screw-connected to the interior edge face of the main frame at 114.30 mm (4.50”) and 493.71 mm (19.0625”) from the lock jamb on the head, 114.30 mm (4.50”) and 569.91 mm (22.0625”) from the lock jamb on the sill, 484.19 mm (19.0625”) and 966.79 mm (38.0625”) from the sill on the lock jamb/integral vertical mullion and at 317.50 mm (12.50”), 788.99 mm (31.0625”) and 1474.79 mm (58.0625”) from the sill on the hinge jamb. Nine (9) total. |

Hinge Hardware

| | |
|---|---|
| Type | Dual action hinges |
| Location | The hinge bodies were screw-connected to the interior face of the hinge jamb near the head and sill and attached to the sash via the corresponding hardware |

**Reinforcement**

| | |
|---|---|
| Type | Shaped galvanized steel |
| Thickness | 17 gauge |
| Location | Internal hollow of each active sash member |
| | |
| Type | Galvanized steel box |
| Thickness | 14 gauge |
| Location | Internal hollow of each main frame member |
| | |
| Type | Galvanized steel box |
| Thickness | 13 gauge |
| Location | Internal hollow of the integral vertical mullion |

**Pressure Equalization**

| | |
|---|---|
| Size | 44.45 mm (1.75”) long notches |
| Location | Notched into the glazing gasket on the head within the fixed lite opening and active sash opening at 79.38 mm (3.125”) from each end, four (4) total |
| | |
| Size | 28.58 mm x 6.35 mm (1.125’ x 0.25”) slots |
| Location | From the active glazing pocket, through the interior wall of the exterior sash leg on the top rail at 60.33 mm (2.375”) from each end and at the midpoint, three (3) total |
| | |
| Size | 27.41 mm x 4.76 mm (1.079” x 0.1875”) slots |
| Location | On the top face of the active top rail at 187.33 mm (7.375”) from each end, two (2) total |

**Weep Description**

| | | |
|---|---|---|
| Size | | 28.58 mm x 6.35 mm (1.125' x 0.25") slots |
| Location | 1. | From the active glazing pocket, through the interior wall of the exterior sash leg draining into the bottom rail exterior-most hollow at 57.15 mm (2.25") from each end and at the midpoint, three (3) total |
| | 2. | From the sill floor, through the interior wall of the exterior frame leg draining into the exterior-most internal sill hollow at 60.33 mm (2.375") from each end and at the midpoint of both the fixed lite and active sash openings, six (6) total |
| Size | | 27.41 mm x 4.76 mm (1.079" x 0.1875") slots |
| Location | | From the bottom rail exterior-most hollow, draining out the bottom face onto the sash floor at 212.73 mm (8.375") from each end, two (2) total |
| Size | | 27.69 mm x 5.08 mm (1.09" x 0.20") slots |
| Location | | From the exterior-most internal sill hollow draining out the exterior face at 203.2 mm (8") from each end and from either side of the integral vertical mullion, Four (4) total |

**Weep Covers** None

**Interior/ Exterior Surface Finish** White vinyl (PVC)

**Sealant**

| | |
|---|---|
| Location | Glazing corners and ends of integral mullion |
| Material | Silicone |

**Insect Screen** No screen was provided with the test sample

**Installation Method** The window was installed in a 60.3 mm x 139.7 mm (2.375" x 5.50") engineered wood buck and the snap-fit and multiple screw-connected nail fin was set into a kerf in the test buck, capturing the test sample. The main frame exterior was sealed with silicone to the test buck.

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## *Test Results - AAMA/WDMA/CSA 101/I.S.2/A440-2011*

| Paragraph | Test |
|---|---|
| 9.3.1 | Operating Force and Force to Latch - Method B (Force Gauge)<br>ASTM E2068-00(08) |

| | | | |
|---|---|---|---|
| Initiate Motion | = | 31 N | (7 lbf) |
| Allowed (Normal $Use_{11}$) | = | Report Only | |
| Maintain Motion - Opening | = | 4 N | (1 lbf) |
| Maintain Motion - Closing | = | 4 N | (1 lbf) |
| Allowed (Normal $Use_{11}$) | = | 135 N | (30.35 lbf) |
| Latches | = | 44 N | (10 lbf) |
| Allowed | = | 100 N | (22.48 lbf) |

**NOTE**: The results above represent the maximum force among all sash tested.

---

| Paragraph | Test |
|---|---|
| 9.3.2 | Air Leakage Resistance<br>ASTM E283-04(12) |

The tested specimen meets or exceeds the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440-2011 for air infiltration at 75 Pa (1.57 psf).

| | | | |
|---|---|---|---|
| Maximum Allowable | = | 1.5 L/s/$m^2$ | (0.3 cfm/$ft^2$) |
| Infiltration | | | |
| Extraneous Air Leakage | = | 1.50 L/s | (3.19 cfm) |
| Total Air Leakage | = | 0.36 L/s | (0.76 cfm) |
| Air Infiltration Rate | = | 0.1 L/s/$m^2$ | (0.02 cfm/$ft^2$) |
| Exfiltration | | | |
| Extraneous Air Leakage | = | 1.32 L/s | (2.80 cfm) |
| Total Air Leakage | = | 0.24 L/s | (0.51 cfm) |
| Air Infiltration Rate | = | 0.1 L/s/$m^2$ | (0.01 cfm/$ft^2$) |

---

| Paragraph | Test |
|---|---|
| 9.3.3 | Water Penetration Resistance<br>ASTM E547-00(09) |

No Leakage after 4 cycles of 5 minutes at 960 Pa (20.05 psf)

---

| Paragraph | Test |
|---|---|
| 9.3.4.2 | Uniform Load Deflection at Design Pressure<br>ASTM E330-02(14) |

| | |
|---|---|
| No damage after positive | 1920 Pa (40.10 psf) held for 10 seconds |
| No damage after negative | 1920 Pa (40.10 psf) held for 10 seconds |

| | | |
|---|---|---|
| Measured Deflection $_{Positive}$ | = | 8.74 mm (0.344 inches) |
| Measured Deflection $_{Negative}$ | = | 8.84 mm (0.348 inches) |
| Allowed Deflection $_{L/175}$ | = | 9.22 mm (0.363 inches) |

---

| Paragraph | Test |
|---|---|
| 9.3.4.3 | Uniform Load Structural Test<br>ASTM E330-02(14) |

| | |
|---|---|
| No damage after positive | 2880 Pa (60.15 psf) held for 10 seconds |
| No damage after negative | 2880 Pa (60.15 psf) held for 10 seconds |

| | | |
|---|---|---|
| Measured Permanent Set $_{Positive}$ | = | 0.36 mm (0.014 inches) |
| Measured Permanent Set $_{Negative}$ | = | 0.51 mm (0.020 inches) |
| Maximum Allowed (0.3%) | = | 4.85 mm (0.191 inches) |

**NOTE:** Deflection and Permanent Set measurements taken on the integral vertical mullion over a 1613 mm (63.50”) span

---

Reference NCTL Report #NCTL-310-4331 for Forced Entry Resistance and all Auxiliary Test Results. For convenience, the results are repeated here.

---

| Paragraph | Test |
|---|---|
| 9.3.5 | Forced Entry Resistance<br>ASTM F588-07 |

Type B Window Assembly/ Grade 20: Pass

| Test | Results | Allowed |
|---|---|---|
| Disassembly | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |
| Test B1 | No Entry | No Entry |
| Test B2 | No Entry | No Entry |
| Test B3 | No Entry | No Entry |
| Test A7 | No Entry | No Entry |
| Hardware Manipulation Test | No Entry | No Entry |
| Sash Manipulation Test | No Entry | No Entry |

**NOTE:** 1. T1 = 10 minutes, L1 = 300 lbf, L2 = 150 lbf, L3 = 60 lbf
2. Loads were held for 60 seconds.

---

| Paragraph | Test |
|---|---|
| 9.3.5 | Forced Entry Resistance<br>CMBSO 1-79, CAWM 301 |

Type II Window Assembly Pass

| Test | Results | Allowed |
|---|---|---|
| Disassembly | No Entry | No Entry |
| Hand/Tool Manipulation Test | No Entry | No Entry |
| Test A | No Entry | No Entry |
| Test B | No Entry | No Entry |
| Test C | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |

**Note:** Each Concentrated Load was maintained from the exterior side whenever possible and maintained for a period of one (1) Minute.
The disassembly sequence and the hand and tool manipulation tests were each conducted continuously for a period of five (5) minutes.

---

| Paragraph | Test |
|---|---|
| 9.3.6.2 | Thermoplastic Corner Weld Test (PVC products only) - Pass |

| Paragraph | Test |
|---|---|
| 9.3.6.4.3 | Sash/Leaf Concentrated Load Test - Pass |

| Test Load | Allowed | Measured |
|---|---|---|
| Perpendicular 135 N (30.35 lbf) | 1.5 mm (0.06”) | 0.5 mm (0.02”) |
| Parallel 230 N (51.71lbf) | 3.3 mm (0.13”) | 3.2 mm (0.0625”) |

| Paragraph | Test |
|---|---|
| 9.3.6.5.3 | Stabilizing Arm Load Test |

| Test Load | Results |
|---|---|
| Sash Corners 890 N (200.08 lbf) | Pass |
| Center of Top Rail 1780 N (400.16 lbf) | Pass |

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All testing was performed at NCTL NW Inc, 3310 Hill Avenue, Everett, WA 98201.

This test report was prepared by National Certified Testing Laboratory NW Inc. (NCTL), for the exclusive use of the above named client and it does not constitute certification of this product. The results are for the particular specimen tested and do not imply the quality of similar or identical products manufactured or installed from specifications identical to the tested product. The test specimen was supplied to NCTL NW by the above named client. No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen are to be drawn from the ASTM E330 test. Forced entry resistance test equipment used is in compliance with Section 7 of the ASTM F588-07 test method. NCTL NW is a testing lab and assumes that all information provided by the client is accurate and does not guarantee or warranty any product tested or installed. The results in this report are actual tested values and are applicable to the specimen tested only, using the components and construction methods described herein.

Detailed drawings were available for laboratory records and compared to the test specimen at the time of this report. Component drawings were reviewed for product verification. The bill of materials contains details with any deviations noted. Ambient conditions during the referenced testing are available upon request. A copy of this report along with representative sections of the test specimen will be retained by NCTL NW. This report does not constitute certification or approval of the product, which may only be granted by a certification program validator or recognized approval entity. All tests were conducted in full compliance with the referenced specifications and/or test methods. This report is the joint property of National Certified Testing Laboratories North West Inc. and the Client to whom it is issued. Permission to reproduce this report by anyone other than National Certified Testing Laboratories North West Inc and the Client must be granted in writing by both of the above parties. This report may not be reproduced, except in its entirety, without the written consent of NCTL NW.

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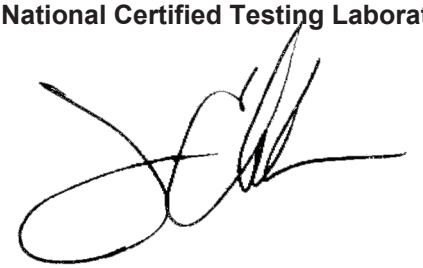
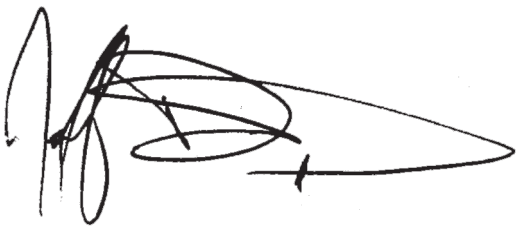


Jim Clarke
Structural Performance Technician



Jeffrey M. Douglas
Lab Manager

Attachments
- Appendix A – Revision Summary
- Appendix B – Drawings

## Appendix A

**Section 1:**

Component Drawings, with Applicable Part Numbers, Manufacturing and Modeling Details, were Reviewed (as submitted) for Product Verification
(Reference: NCTL-310-4363)

See Attached Documentation;
any deviations noted.

Note: The above referenced component drawings (if applicable) along with representative sections of the test specimen will be retained per procedure by NCTL. This testing facility assumes that all information provided by the client is accurate.

**Section 2:**

| Identification | Date | Page & Revision |
|---|---|---|
| Original Issue | 08/26/2014 | Not Applicable |

## Appendix B

## Drawings

NATIONAL CERTIFIED TESTING LABORATORIES

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**AAMA/WDMA/CSA 101/I.S.2/A440-11**

**TEST REPORT SUMMARY**

**Rendered to:**

**ALUPLAST USA**
P.O. Box 496
Layton, UT 84041

**PRODUCT TYPE: OX – Dual Action Composite Window**

**SERIES/ MODEL: 60 mm TNT**

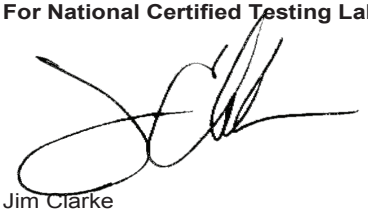
| Title | Summary of Results |
|---|---|
| Primary Product Designator | Configuration 1<br>Class CW-PG40:Size tested 2134 x 1676 mm (84 x 66 in)-Type DAW*<br>Configuration 2<br>Class CW-PG70:Size tested 2134 x 1676 mm (84 x 66 in)-Type DAW* |
| Design Pressure | Configuration 1<br>± 1920 Pa (40.10 psf)<br>Configuration 2<br>± 3360 Pa (70.18 psf) |
| Operating Force (in motion $_{max}$) | 4 N (1 lbf) |
| Air Infiltration/Exfiltration | 0.1 L/s/m$^2$ (0.02 cfm/ft$^2$) – Infiltration<br>0.1 L/s/m$^2$ (0.01 cfm/ft$^2$) – Exfiltration |
| Water Penetration Resistance Test Pressure | 960 Pa (20.05 psf) |
| Uniform Load Structural Test Pressure | Configuration 1<br>± 4320 Pa (90.23 psf)<br>Configuration 2<br>± 4320 Pa (90.23 psf) |
| Forced Entry Resistance | ASTM F588-07 - Grade 20 - Pass<br>CAWM 1-79, CMBSO 301 - Pass |

*Reference NCTL Report #NCTL-310-4329 for Original Gateway Performance

Test Completed: 07/21/14

Reference must be made to Report No. NCTL-310-4338 dated 08/12/14 for complete test specimen description and data.

**For National Certified Testing Laboratories**



Jim Clarke
Structural Performance Technician

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# AAMA/WDMA/CSA 101/I.S.2/A440-11

# STRUCTURAL TEST REPORT

# NCTL-310-4338

REPORT TO:
ALUPLAST USA
P.O. BOX 496
LAYTON, UT 84041

REPORT NUMBER: NCTL-310-4338
REPORT DATE: 08/12/14

PRODUCT:
**OX – 2134 mm x 1676 mm (84” x 66”)**
**60 mm TNT Series Dual Action Composite Window**

| | |
|---|---|
| **Report Number** | NCTL-310-4338 |
| **Report Date** | 08/12/14 |
| **Report To** | ALUPLAST USA<br>P.O. Box 496<br>Layton, UT 84041 |
| **Test Start Date**<br>**Test End Date** | 07/21/14<br>07/21/14 |
| **Specification** | AAMA/WDMA/CSA 101/I.S.2/A440-11<br>NAFS 2011 - North American Fenestration Standard/Specification for windows, doors and skylights |
| **Performance Results** | Configuration 1<br>Class CW-PG40:Size tested 2134 x 1676 mm (84 x 66 in)-Type DAW*<br>Configuration 2<br>Class CW-PG70:Size tested 2134 x 1676 mm (84 x 66 in)-Type DAW*<br><br>*Reference NCTL Report #NCTL-310-4329 for Original gateway Performance. See Reinforcement description for configuration details. |

## *Description of Specimen Tested*

Note: All dimensions are in the order (Width x Height x Thickness) unless otherwise noted.

| | |
|---|---|
| **Model/ Series** | 60 MM TNT Series Dual Action Composite Window |
| **Configuration** | OX |
| **Overall Frame Size** | 2134 mm x 1676 mm (84” x 66”) |
| **Sash Size** | 1016 mm x 1602 mm (40” x 63.0625”) |
| **Frame & Sash Type** | Extruded polyvinyl chloride (PVC) |
| **Joint Construction** | All corners were mitered and welded. The integral vertical mullion was fitted, supported by a cast metal end cap, sealed with a foam gasket and silicone and double screw-connected to the head and sill extrusions. |
| **Glazing Components** | |
| Overall | 25.40 mm (1.00”) nominal |
| Glass Thickness | One (1) exterior pane of 6.35 mm (0.25”) nominal laminated and one (1) interior pane of 3.97 mm (0.15625”) nominal annealed |
| Spacer Type/Size | 14.50 mm (0.571”) stainless steel (SSU-D) |
| Glazing System | Interior glazed with a soft black vinyl gasket back-bedding and a snap-in extruded vinyl glazing bead with a co-extruded dual fin soft black vinyl gasket. Each gasket/snap bead corner joint was sealed with silicone. |
| **Weatherstrip** | |
| Type | Soft vinyl bulb/fin seal |
| Size | Approximately 9.91 mm x 0.37 mm (0.390” x 0.145”) bulb |
| Location | Around the perimeter of the interior face of the exterior frame leg |
| Type | Soft vinyl fin seal |
| Size | Approximately 6.86 mm (0.270”) long |
| Location | Around the perimeter of the exterior face of the interior sash leg |

**Operating Hardware**

Locks

| | |
|---|---|
| Type | Multipoint lock and handle assembly |
| Location | The interior mounted swing latch/handle was double screw-connected over bored holes on the interior face of the lock stile at 800.10 mm (31.50”) from the sill. The swing latch actuated the multipoint lock hardware which was multiple screw-connected into an integral groove around the perimeter edge face of the active sash. Nine (9) lock points total. |

Keeper

| | |
|---|---|
| Type | Cast metal strikes |
| Location | Triple screw-connected to the interior edge face of the main frame at 114.30 mm (4.50”) and 493.71 mm (19.0625”) from the lock jamb on the head, 114.30 mm (4.50”) and 569.91 mm (22.0625”) from the lock jamb on the sill, 484.19 mm (19.0625”) and 966.79 mm (38.0625”) from the sill on the lock jamb/integral vertical mullion and at 317.50 mm (12.50”), 788.99 mm (31.0625”) and 1474.79 mm (58.0625”) from the sill on the hinge jamb. Nine (9) total. |

Hinge Hardware

| | |
|---|---|
| Type | Dual action hinges |
| Location | The hinge bodies were screw-connected to the interior face of the hinge jamb near the head and sill and attached to the sash via the corresponding hardware |

**Reinforcement**

| | |
|---|---|
| Type | Shaped galvanized steel |
| Thickness | 17 gauge |
| Location | Internal hollow of each active sash member |
| | |
| Type | Galvanized steel box |
| Thickness | 14 gauge |
| Location | Internal hollow of each main frame member |
| | |
| Type | Galvanized steel box |
| Thickness | 13 gauge |
| Location | Internal hollow of the integral vertical mullion |
| | |
| | <u>Configuration 2 ONLY</u> |
| Type | Galvanized steel box |
| Thickness | 15 gauge |
| Location | Multiple screw-connected to the interior face of the integral vertical mullion. An extruded vinyl cover was snap-fit over this reinforcement. |

**Pressure Equalization**

| | |
|---|---|
| Size | 44.45 mm (1.75”) long notches |
| Location | Notched into the glazing gasket on the head within the fixed lite opening and active sash opening at 79.38 mm (3.125”) from each end, four (4) total |
| | |
| Size | 28.58 mm x 6.35 mm (1.125’ x 0.25”) slots |
| Location | From the active glazing pocket, through the interior wall of the exterior sash leg on the top rail at 60.33 mm (2.375”) from each end and at the midpoint, three (3) total |

**Pressure Equalization (cont.)**

| | | |
|---|---|---|
| Size | | 27.41 mm x 4.76 mm (1.079” x 0.1875”) slots |
| Location | | On the top face of the active top rail at 187.33 mm (7.375”) from each end, two (2) total |

**Weep Description**

| | | |
|---|---|---|
| Size | | 28.58 mm x 6.35 mm (1.125’ x 0.25”) slots |
| Location | 1. | From the active glazing pocket, through the interior wall of the exterior sash leg draining into the bottom rail exterior-most hollow at 57.15 mm (2.25”) from each end and at the midpoint, three (3) total |
| | 2. | From the sill floor, through the interior wall of the exterior frame leg draining into the exterior-most internal sill hollow at 60.33 mm (2.375”) from each end and at the midpoint of both the fixed lite and active sash openings, six (6) total |
| Size | | 27.41 mm x 4.76 mm (1.079” x 0.1875”) slots |
| Location | | From the bottom rail exterior-most hollow, draining out the bottom face onto the sash floor at 212.73 mm (8.375”) from each end, two (2) total |
| Size | | 27.69 mm x 5.08 mm (1.09” x 0.20”) slots |
| Location | | From the exterior-most internal sill hollow draining out the exterior face at 203.2 mm (8”) from each end and from either side of the integral vertical mullion, Four (4) total |

**Weep Covers** None

**Interior/ Exterior Surface Finish** White vinyl (PVC)

**Sealant**

| | |
|---|---|
| Location | Glazing corners and ends of integral mullion |
| Material | Silicone |

**Insect Screen** No screen was provided with the test sample

**Installation Method** The window was installed in a 60.3 mm x 139.7 mm (2.375” x 5.50”) engineered wood buck and the snap-fit and multiple screw-connected nail fin was set into a kerf in the test buck, capturing the test sample. The main frame exterior was sealed with silicone to the test buck.

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| Paragraph | Test |
|---|---|
| 9.3.1 | Operating Force and Force to Latch - Method B (Force Gauge)<br>ASTM E2068-00(08) |

| | | | |
|---|---|---|---|
| Initiate Motion | = | 31 N | (7 lbf) |
| Allowed (Normal Use$_{11}$) | = | Report Only | |
| Maintain Motion - Opening | = | 4 N | (1 lbf) |
| Maintain Motion - Closing | = | 4 N | (1 lbf) |
| Allowed (Normal Use$_{11}$) | = | 135 N | (30.35 lbf) |
| Latches | = | 44 N | (10 lbf) |
| Allowed | = | 100 N | (22.48 lbf) |

**NOTE**: The results above represent the maximum force among all sash tested.

---

| Paragraph | Test |
|---|---|
| 9.3.2 | Air Leakage Resistance<br>ASTM E283-04(12) |

The tested specimen meets or exceeds the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440-2011 for air infiltration at 75 Pa (1.57 psf).

| | | | |
|---|---|---|---|
| Maximum Allowable | = | 1.5 L/s/m$^2$ | (0.3 cfm/ft$^2$) |
| Infiltration | | | |
| Extraneous Air Leakage | = | 1.50 L/s | (3.19 cfm) |
| Total Air Leakage | = | 0.36 L/s | (0.76 cfm) |
| Air Infiltration Rate | = | 0.1 L/s/m$^2$ | (0.02 cfm/ft$^2$) |
| Exfiltration | | | |
| Extraneous Air Leakage | = | 1.32 L/s | (2.80 cfm) |
| Total Air Leakage | = | 0.24 L/s | (0.51 cfm) |
| Air Infiltration Rate | = | 0.1 L/s/m$^2$ | (0.01 cfm/ft$^2$) |

---

| Paragraph | Test |
|---|---|
| 9.3.3 | Water Penetration Resistance<br>ASTM E547-00(09) |

No Leakage after 4 cycles of 5 minutes at 960 Pa (20.05 psf)

---

| Paragraph | Test |
|---|---|
| 9.3.4.2 | Uniform Load Deflection at Design Pressure<br>ASTM E330-02(14) |

Configuration 1 (w/o interior mounted reinforcement)

| | |
|---|---|
| No damage after positive | 1920 Pa (40.10 psf) held for 10 seconds |
| No damage after negative | 1920 Pa (40.10 psf) held for 10 seconds |

| | | |
|---|---|---|
| Measured Deflection $_{Positive}$ | = | 8.74 mm (0.344 inches) |
| Measured Deflection $_{Negative}$ | = | 8.84 mm (0.348 inches) |
| Allowed Deflection $_{L/175}$ | = | 9.22 mm (0.363 inches) |

---

| Paragraph | Test |
|---|---|
| 9.3.4.2 | Uniform Load Deflection at Design Pressure<br>ASTM E330-02(14) |

Configuration 2 (with interior mounted reinforcement)

| | |
|---|---|
| No damage after positive | 3360 Pa (70.18 psf) held for 10 seconds |
| No damage after negative | 3360 Pa (70.18 psf) held for 10 seconds |
| Measured Deflection $_{Positive}$ | = 9.14 mm (0.360 inches) |
| Measured Deflection $_{Negative}$ | = 8.74 mm (0.344 inches) |
| Allowed Deflection $_{L/175}$ | = 9.22 mm (0.363 inches) |

---

| Paragraph | Test |
|---|---|
| 9.3.4.3 | Uniform Load Structural Test<br>ASTM E330-02(14) |

Configuration 1 (w/o interior mounted reinforcement)

| | |
|---|---|
| No damage after positive | 2880 Pa (60.15 psf) held for 10 seconds |
| No damage after negative | 2880 Pa (60.15 psf) held for 10 seconds |
| Measured Permanent Set $_{Positive}$ | = 0.36 mm (0.014 inches) |
| Measured Permanent Set $_{Negative}$ | = 0.51 mm (0.020 inches) |
| Maximum Allowed (0.3%) | = 4.85 mm (0.191 inches) |

Configuration 2 (with interior mounted reinforcement)

| | |
|---|---|
| No damage after positive | 5040 Pa (105.26 psf) held for 10 seconds |
| No damage after negative | 5040 Pa (105.26 psf) held for 10 seconds |
| Measured Permanent Set $_{Positive}$ | = 1.22 mm (0.048 inches) |
| Measured Permanent Set $_{Negative}$ | = 1.17 mm (0.046 inches) |
| Maximum Allowed (0.3%) | = 4.85 mm (0.191 inches) |

**NOTE:** Deflection and Permanent Set measurements taken on the integral vertical mullion over a 1613 mm (63.50”) span

---

Reference NCTL Report #NCTL-310-4329 for Forced Entry Resistance and all Auxiliary Test Results. For convenience, the results are repeated here.

---

| Paragraph | Test |
|---|---|
| 9.3.5 | Forced Entry Resistance<br>ASTM F588-07 |

Type B Window Assembly/ Grade 20: Pass

| Test | Results | Allowed |
|---|---|---|
| Disassembly | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |
| Test B1 | No Entry | No Entry |
| Test B2 | No Entry | No Entry |
| Test B3 | No Entry | No Entry |
| Test A7 | No Entry | No Entry |
| Hardware Manipulation Test | No Entry | No Entry |
| Sash Manipulation Test | No Entry | No Entry |

**NOTE:** 1. T1 = 10 minutes, L1 = 300 lbf, L2 = 150 lbf, L3 = 60 lbf
2. Loads were held for 60 seconds.

---

| Paragraph | Test |
|---|---|
| 9.3.5 | Forced Entry Resistance<br>CMBSO 1-79, CAWM 301 |

Type II Window Assembly — Pass

| Test | Results | Allowed |
|---|---|---|
| Disassembly | No Entry | No Entry |
| Hand/Tool Manipulation Test | No Entry | No Entry |
| Test A | No Entry | No Entry |
| Test B | No Entry | No Entry |
| Test C | No Entry | No Entry |
| Hand Manipulation Test | No Entry | No Entry |
| Tool Manipulation Test | No Entry | No Entry |

**Note:** Each Concentrated Load was maintained from the exterior side whenever possible and maintained for a period of one (1) Minute.
The disassembly sequence and the hand and tool manipulation tests were each conducted continuously for a period of five (5) minutes.

---

| Paragraph | Test |
|---|---|
| 9.3.6.2 | Thermoplastic Corner Weld Test (PVC products only) - Pass |

---

| Paragraph | Test |
|---|---|
| 9.3.6.4.3 | Sash/Leaf Concentrated Load Test - Pass |

| Test Load | Allowed | Measured |
|---|---|---|
| Perpendicular 135 N (30.35 lbf) | 1.5 mm (0.06”) | 0.5 mm (0.02”) |
| Parallel 230 N (51.71lbf) | 3.3 mm (0.13”) | 3.2 mm (0.0625”) |

---

| Paragraph | Test |
|---|---|
| 9.3.6.5.3 | Stabilizing Arm Load Test |

| Test Load | Results |
|---|---|
| Sash Corners 890 N (200.08 lbf) | Pass |
| Center of Top Rail 1780 N (400.16 lbf) | Pass |

---

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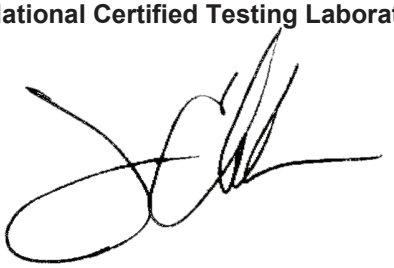
All testing was performed at NCTL NW Inc, 3310 Hill Avenue, Everett, WA 98201.

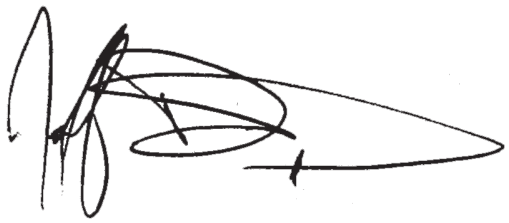
This test report was prepared by National Certified Testing Laboratory NW Inc. (NCTL), for the exclusive use of the above named client and it does not constitute certification of this product. The results are for the particular specimen tested and do not imply the quality of similar or identical products manufactured or installed from specifications identical to the tested product. The test specimen was supplied to NCTL NW by the above named client. No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen are to be drawn from the ASTM E330 test. Forced entry resistance test equipment used is in compliance with Section 7 of the ASTM F588-07 test method. NCTL NW is a testing lab and assumes that all information provided by the client is accurate and does not guarantee or warranty any product tested or installed. The results in this report are actual tested values and are applicable to the specimen tested only, using the components and construction methods described herein.

Detailed drawings were available for laboratory records and compared to the test specimen at the time of this report. Component drawings were reviewed for product verification. The bill of materials contains details with any deviations noted. Ambient conditions during the referenced testing are available upon request. A copy of this report along with representative sections of the test specimen will be retained by NCTL NW. This report does not constitute certification or approval of the product, which may only be granted by a certification program validator or recognized approval entity. All tests were conducted in full compliance with the referenced specifications and/or test methods. This report is the joint property of National Certified Testing Laboratories North West Inc. and the Client to whom it is issued. Permission to reproduce this report by anyone other than National Certified Testing Laboratories North West Inc and the Client must be granted in writing by both of the above parties. This report may not be reproduced, except in its entirety, without the written consent of NCTL NW.

**National Certified Testing Laboratories**



Jim Clarke
Structural Performance Technician



Jeffrey M. Douglas
Lab Manager

Attachments
- Appendix A – Revision Summary
- Appendix B – Drawings

## Appendix A

**Section 1:**

Component Drawings, with Applicable Part Numbers, Manufacturing and Modeling Details, were Reviewed (as submitted) for Product Verification
(Reference: NCTL-310-4338)

See Attached Documentation;
any deviations noted.

Note: The above referenced component drawings (if applicable) along with representative sections of the test specimen will be retained per procedure by NCTL. This testing facility assumes that all information provided by the client is accurate.

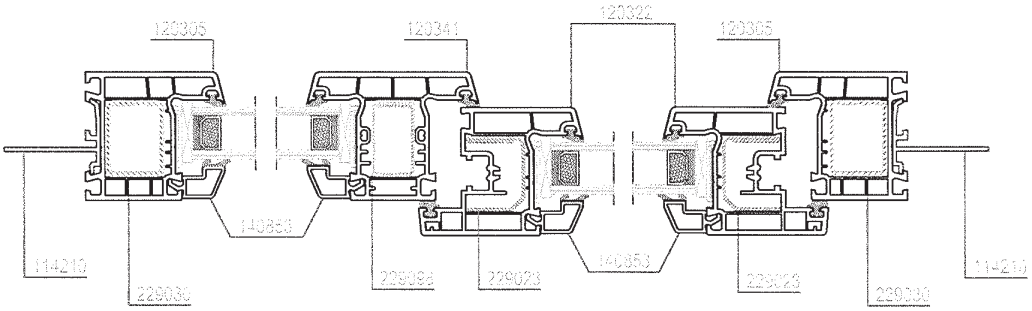
**Section 2:**

| Identification | Date | Page & Revision |
|---|---|---|
| Original Issue | 03/22/2016 | Not Applicable |

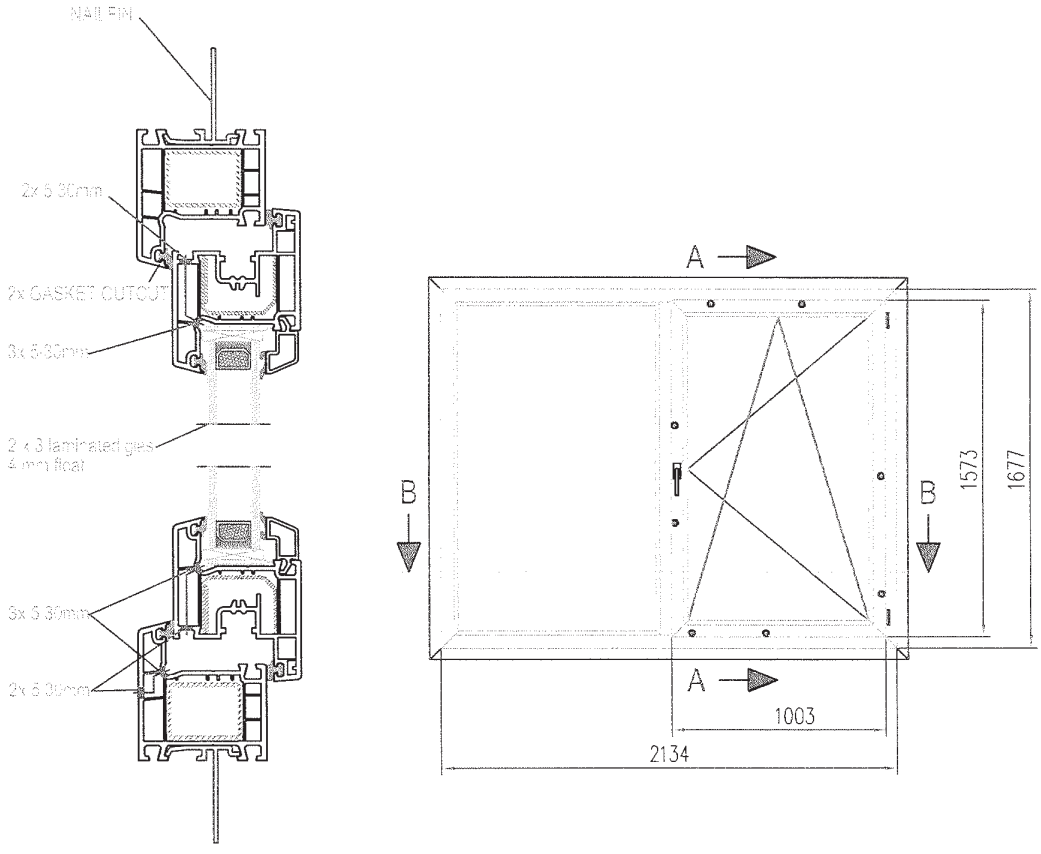
## Appendix B

## Drawings

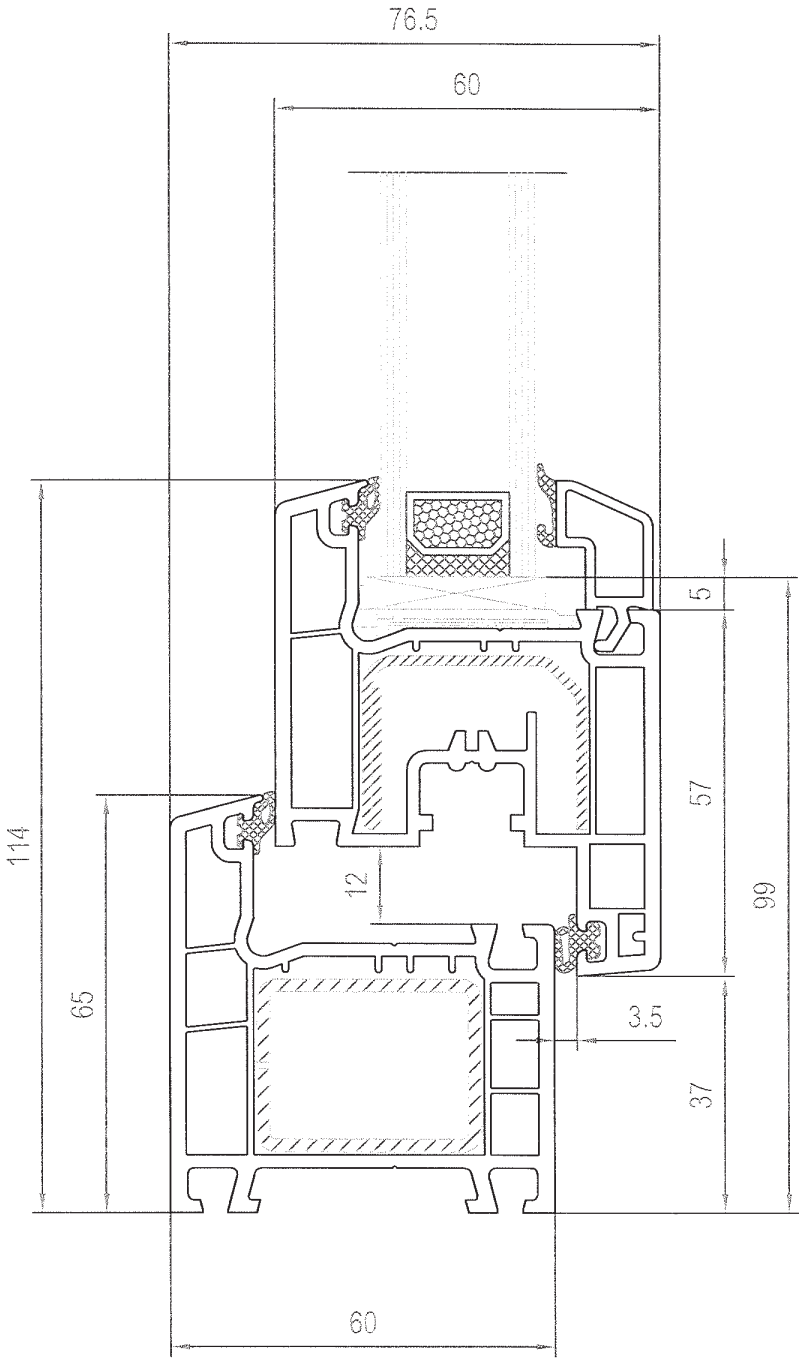
aluplast® GmbH
Kunststoffprofile, Auf der Breit 2, D-76227 Karlsruhe
Telefon: +49 (721) 4 71 71 - 0; Telefax: +49 (721) 4 71 71 - 999
E-Mail: info@aluplast.de / www.aluplast.de




SECTIONAL VIEW B-B




SECTIONAL VIEW A-A

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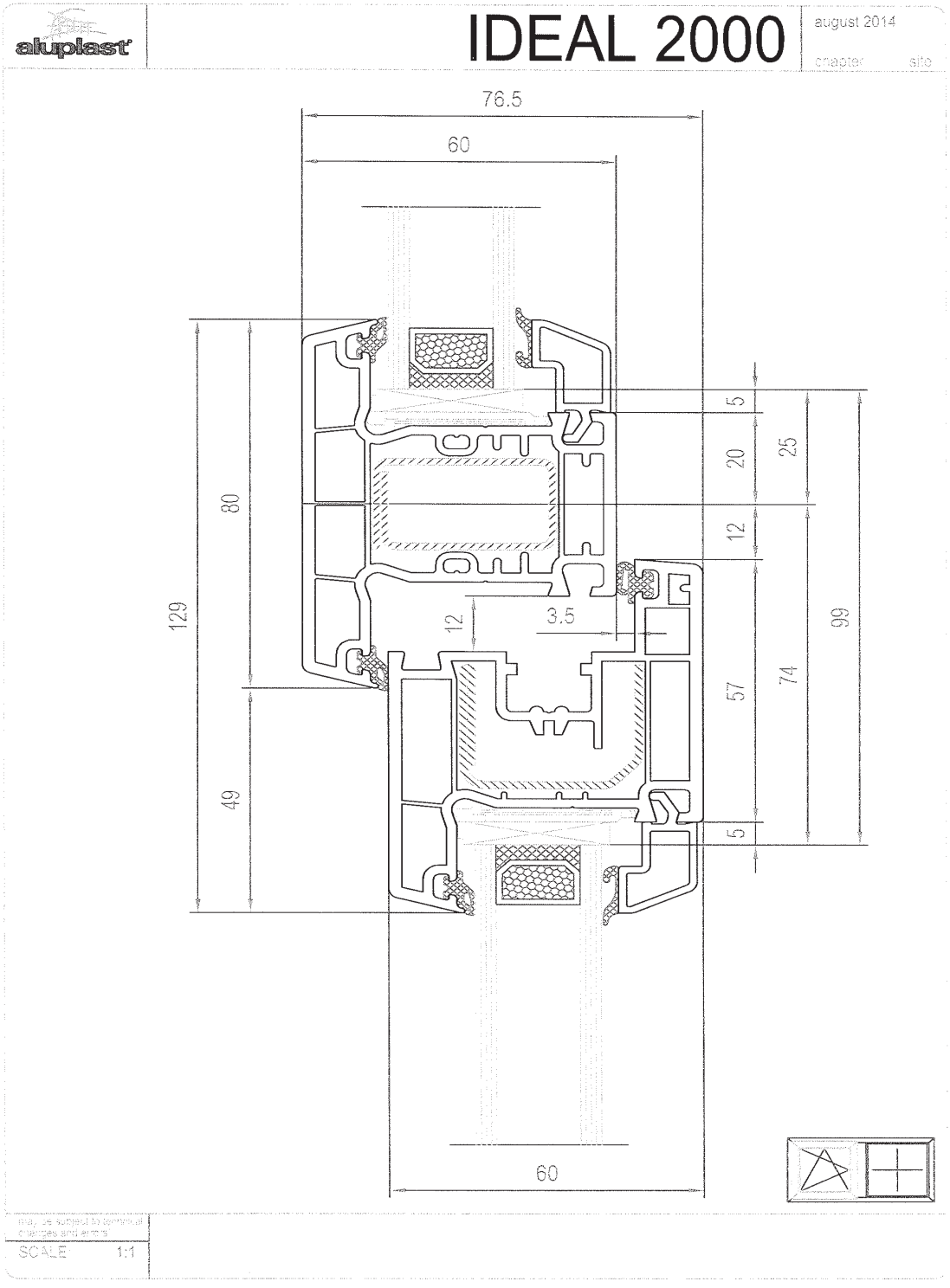
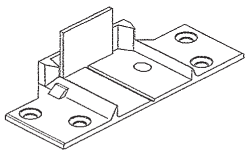

aluplast
IDEAL 2000
august 2014
76.5
60
129
80
49
12
3.5
5
20
25
12
57
74
99
5
60
SCALE 1:1

# IDEAL 2000

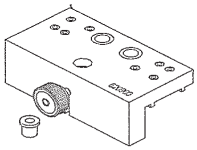
September 2011
02 D 01
chapter page

120x41
MULLION / TRANSOM
80mm

Pfosten / Sprosse
meneau / traverse
montante / traverso
poste / travesaño
Classic-line

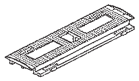


metal cross connector
627102 with sticks
627132 without sticks

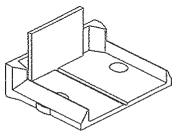


620900 drilling jig
->627101 / 627131 mullion coupler
->620111 / 620141 mullion coupler
->627102 / 627132 cross connector
->627107 cross connector

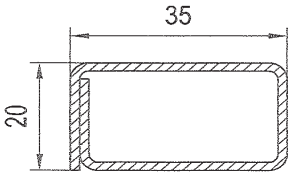
620301 compensating block



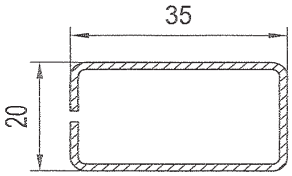
620305 compensating block
with integrated 5mm-spacer



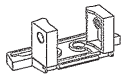
metal mullion coupler ⟷ plastic mullion coupler
627101 with sticks ⟷ 620111 with sticks
627131 without sticks ⟷ 620141 without sticks



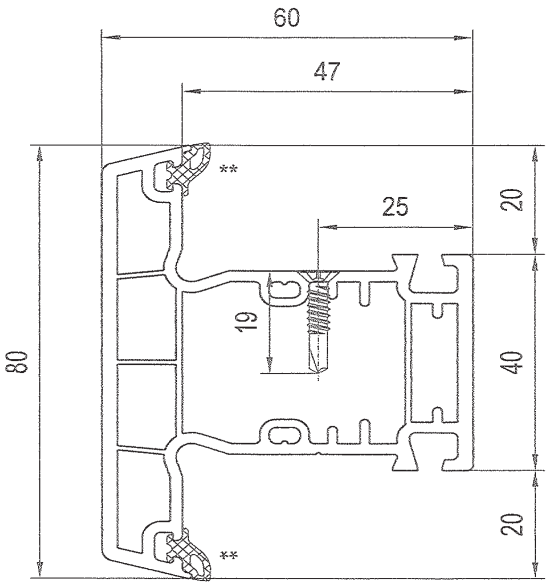

229098 s=2.5mm 4.0*
229101 s=1.5mm 2.8*




229100 s=1.25mm 1.9*



626072 mullion coupler
->229059/229060 threshold 20/60mm
->249059/249060 threshold 20/70mm
->269060 threshold 20/85mm
->249058 threshold 20/120mm




Fix reinforcement in the profile with self-drilling window screws, e.g.: FD21 3.9 x 19mm.
Seal screw heads in the horizontal bottom rebate.

* Ix-value in cm4
** Gasket(s) inserted in factory: see current price list

May be subject to change and errors excepted!

scale: 1:1
02_D_01_2*

## Main Profiles: Mullions / Transoms
## Mullion / Transom, 80mm: 120x41

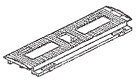
# IDEAL 2000

September 2011
02 B chapter 03 page

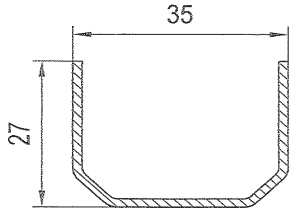
120x05
FRAME
65mm

Rahmen
dormant
telaio
marco
Classic-line

620301 compensating block



620305 compensating block
with integrated 5mm-spacer

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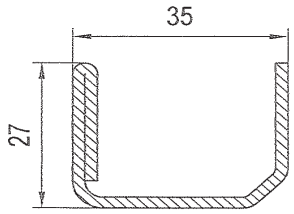
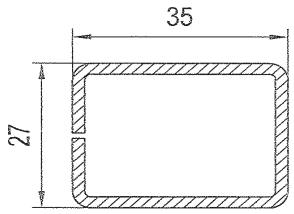
229025 s=1.0mm 1.6*




229024 s=1.5mm 2.9*
229026 s=2.0mm 3.8*
249026 s=3.0mm 5.1*

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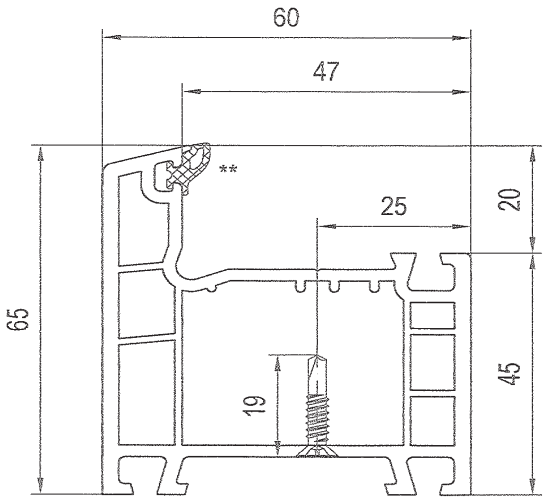



Fix reinforcement in the profile with self-drilling window screws, e.g.: FD21 3.9 x 19mm.

* Ix-value in cm4
** Gasket(s) inserted in factory: see current price list

May be subject to change and errors excepted!

scale: 1:1
02_B_01_2*

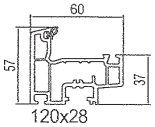
## Main Profiles: Frames
## Frame, 65mm: 120x05

# IDEAL 2000

October 2011
02 C chapter 03 page

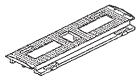
120x22
SASH
recessed (fv.) 77mm

Flügel
ouvrant
anta
hoja
Classic-line

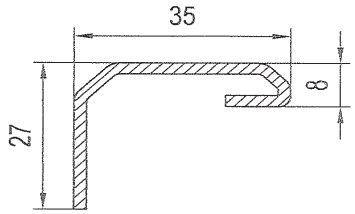



120x28
compatible false mullion sash

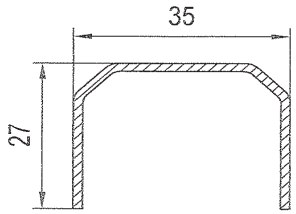
620301 compensating block



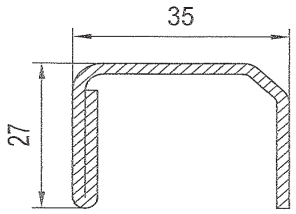
620305 compensating block
with integrated 5mm-spacer



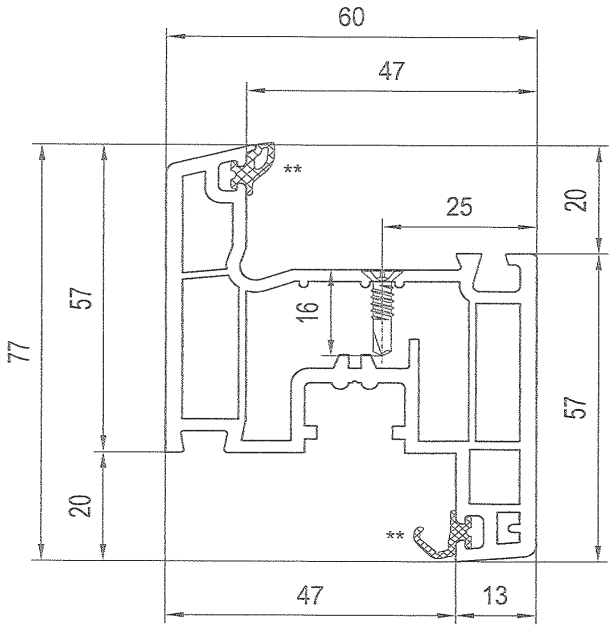

229027 s=1.5mm 1.6*
229028 s=2.0mm 2.1*




229023 s=1.5mm 2.3*
229025 s=1.0mm 1.6*




229024 s=1.5mm 2.9*
229026 s=2.0mm 3.8*
249026 s=3.0mm 5.1*




Fix reinforcement in the profile with self-drilling window screws, e.g. FD21 3.9 x 16mm.
Seal screw heads in the horizontal bottom rebate.

* Ix-value in cm4
** Gasket(s) integrated in factory: see current price list

May be subject to change and errors excepted!

scale: 1:1
02_C_01_2*

## Main Profiles: Sashes
## Sash, Recessed 77mm: 120x22

A·L·I

(Validator / Operations Administrator)

# AAMA
# CERTIFICATION PROGRAM

## AUTHORIZATION FOR PRODUCT CERTIFICATION

**aluplast US Corp**
**445 N 700 W Unit 105**
**North Salt Lake, UT 84054**

**Attn: Frank LaSusa**

This authorization is based on the successful completion of tests, and the reporting to the AAMA Validator of the results of the tests by an AAMA Accredited Laboratory. The listing below will be added to the next update to the AAMA Certified Products Directory.

| SPECIFICATION | RECORD OF PRODUCT TESTED | | | |
|---|---|---|---|---|
| AAMA/WDMA/CSA 101/I.S.2/A440-11 CW-PG55-1219x1803 (48x71)-DAW | | | | |
| COMPANY AND CODE | CPD NO. | SERIES MODEL & PRODUCT DESCRIPTION | MAXIMUM SIZE TESTED | |
| aluplast US Corp Code: ALU | 15533 | 80 mm TNT SERIES DUAL ACTION WINDOW (PVC) (X) (IG) (INS LAM GL) (REINF) (ASTM) (CMBSO) | FRAME 1219mm x 1803 mm (4'0" x 5'11") | VENT 1113 mm x 1700 mm (3'8" x 5'7") |

1. This Certification will expire **July 17, 2019** and requires validation until then by continued listing in the current AAMA Certified Products Directory.

2. Product Tested and Reported by: **National Certified Testing Laboratories**

   Report No.: **NCTL-310-4331**

   Date of Report: **March 22, 2016**

Evaluated for Certification: **July 12, 2016**

Brad Schultz

Associated Laboratories, Inc.

Authorized for Certification: **July 12, 2016**

SBS/JTS

American Architectural Manufacturers Association

*ACP-04 (Rev. 6/16)*

# Test report

## Nr. 402 25317/1e *)

| | |
|---|---|
| **Report Date** | 14. December 2004 |
| **Customer** | **aluplast GmbH**<br>**Kunststoff-Fenstersysteme**<br>Englerstr. 23<br><br>76275 Ettlingen |
| **Order** | Determination of the thermal transmittance $U_f$<br>by hot box method– Part 2: Frames<br>(prEN 12412–2: 2001–02) |
| **Specimen** | PVC-profile with the product designation<br>„IDEAL 4000 5-Kammer Version“ |
| **Contents** |  |

***)** The test report no. 402 25317/1e is a translation of the test report no. 402 25317/1 dated 2. March 2002

ift Rosenheim GmbH
Geschäftsführer:
Dipl.-Ing.(FH) Ulrich Sieberath
Dr. Jochen Peichl

Theodor-Gietl-Straße 7-9
D-83026 Rosenheim
Tel.+49 (0) 8031 / 261-0
Fax+49 (0) 8031 / 261-290
www.ift-rosenheim.de

Sitz: 83026 Rosenheim
AG Traunstein, HRB 14763
Sparkasse Rosenheim
Kto. 38 22
BLZ 711 500 00

Anerkannte Prüf-, Überwachungs- und Zertifizierungsstelle
nach Landesbauordnung: BAY18
Notifizierung in Europa: Nr. 0757

01-09
VL **01-09**

## Definition of tasks

The **ift** Rosenheim was charged by the company aluplast GmbH, 76275 Ettlingen to determine the thermal transmittance $U_f$ of frames with the product designation „IDEAL 4000 5-Kammer Version“.

## 1 Test specimen

| | |
|---|---|
| Product designation | IDEAL 4000 5-Kammer Version |
| Test specimen | PVC profile |
| Length | 1480 mm |
| Projected width | 124 mm |
| Thickness of insulation | 24 mm |

**Table 1** Test specimen data

| | Product-Nr. | profile cross section in mm | Reinforcement |
|---|---|---|---|
| frame | 140 025 | 82/79 | steel reinforcement (249 010) |
| sash | 140 002 | 70/70 | steel reinforcement (249 010) |

| | |
|---|---|
| Type of sampling | The specimen were selected by the customer. |
| Specimen delivery | 19. February 2002 |
| Test date | 02. March 2002 |

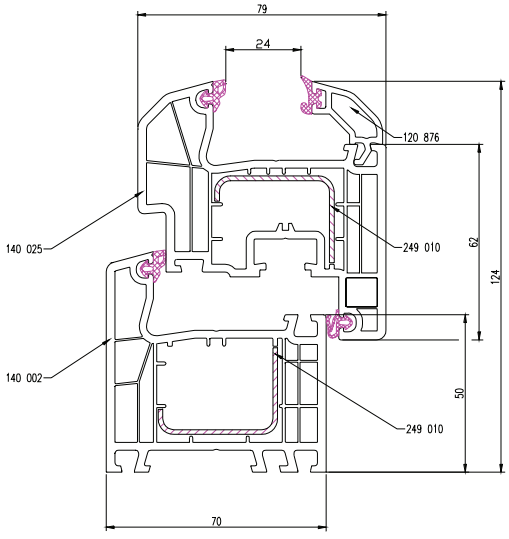



**Figure 1** Representation of test specimen [1])

[1]) *Note*
*The representation is based on documentation provided by the customer.*
*A complete verification of the accurateness was not performed.*

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## 2 Test procedure

The measurement is conducted according to the procedure: Measurement prEN 12412-2: 2001–02 Determination of the thermal transmittance $U_f$ by hot box method– Part 2: Frames.

The test specimen is mounted into the surround panel between the cold and the warm chamber such that the internal side of the specimen is facing the chamber with the warmer temperature. The temperature difference of the air between the two sides of the surround panel was approx. 20 K.

On the side facing the warm side a hot box is attached and is kept at the same temperature as the warm chamber by electric heating. The energy that is supplied to the hot box is transmitted through the test specimen during the test.

The thermal transmittance is determined using the air temperature difference and the heat flow density.

## 3 Results

### 3.1 Determined thermal transmittance

The thermal transmittance $U_f$ for the frame construction „IDEAL 4000 5-Kammer Version“ was determined as:

$$U_f = 1{,}3 \text{ W/(m}^2\cdot\text{K)}$$

According to the regulations of the German Bauregelliste, for a classification of the frame construction into Rahmenmaterialgruppe 1 according to DIN V 4108-4 :1998-10, Table 2 a measurement according to DIN 52619-3 : 1985-02 is required, if a classification is not possible using the definitions of DIN V 4108-4 : 1998-10, Table 2.

### 3.2 Validity of the results

The values given in this test report are only valid for the tested specimen described in clause 2.

Testing the thermal transmittance does not allow any statement to be made on further characteristics of the present construction which could define performance and quality.

The document prEN 12412-2:2001-02 is a draft standard, which is not yet published. Until an acceptance of the draft changes can occur which might affect test results.

## 4 Information for use of ift test reports

Regulations for the use of test reports are given in the enclosed information sheet „Conditions and information for the use of **ift** test reports for publication and commercial purposes“.

The test report no. 402 25317/1e is a translation of the test report no. 402 25317/1 dated 2. March 2002

**ift** Rosenheim
14. December 2004

Ulrich Sieberath
Director

ift Rosenheim
Anerkannte Prüfstelle im bauaufsichtlichen Verfahren zur Bestimmung des Wärmedurchgangskoeffizienten
BAY 18

i. A. Hans-Jürgen Hartmann
Head of Heat Insulation and Energy Technology Department

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## Diagrams with results from calibration measurements

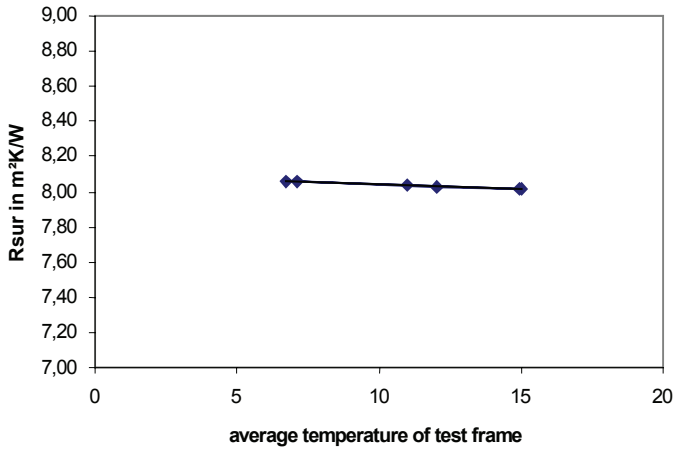


**Figure 1** Thermal transmittance surround panel

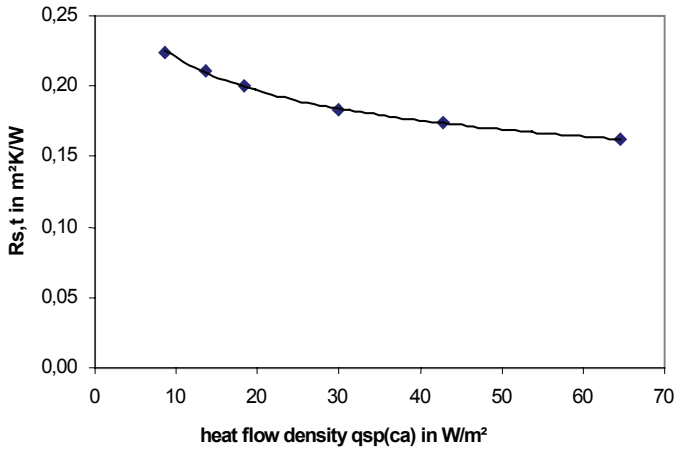


**Figure 2** Total surface resistance

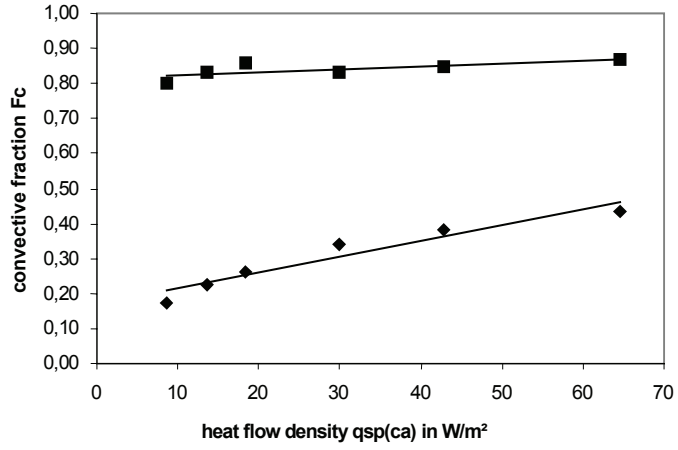


**Figure 3** Convective fraction

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**Table 1** Determination of the $U_f$ – Values for the frame construction

| Designation | | | |
|---|---|---|---|
| $A_{sp}$ | Projected area of test specimen | $m^2$ | 0,722 |
| $L$ | Surround length | m | 5,42 |
| $\theta_{me,sur}$ | (average temperature of surround panel) | °C | 12,0 |
| $R_{sur}$ | (thermal resistance of surround panel) | $m^2$ K/W | 8,04 |
| $\Delta\theta_{s,sur}$ | (temperature difference of surround panel) | K | 19,9 |
| $\Delta\theta_c$ | (air temperature difference) | K | 20,0 |
| $\Phi_{in}$ | (Input power into hot box) | W | 40,5 |
| $\Phi_{sur}$ | (heat flow via surround panel) | W | 3,1 |
| $\Phi_{ed}$ | (heat flow in edge area) | W | 1,6 |
| $q_t$ | (heat flow density via frame and infill panel) | $W/m^2$ | 19,7 |
| $U_{mt}$ | (measurement value of the thermal transmittance of frame and infill panel) | $W/(m^2 K)$ | 0,96 |
| $F_{ci}$ | (convective fraction – warm side) | – | 0,259 |
| $F_{ce}$ | (convective fraction – cold side) | – | 0,832 |
| $R_{s,t}$ | (total thermal resistance) | $m^2$ K/W | 0,196 |
| $\theta_{ri}$ | (radiant temperature – warm side) | °C | 23,1 |
| $\theta_{re}$ | (radiant temperature – cold side) | °C | 2,6 |
| $\theta_{ni}$ | (environmental temperature – warm side) | °C | 23,0 |
| $\theta_{ne}$ | (environmental temperature – cold side) | °C | 2,5 |
| $\Delta\theta_n$ | (environmental temperature - difference) | K | 20,4 |
| $U_f$ | (measurement value $U_f$) | $W/(m^2 K)$ | **1,3** |
| $\Delta U_f$ | (measurement uncertainty) | $W/(m^2 K)$ | 0,03 |

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# Evidence of Performance
## Thermal transmittance

**Test report 422 38255/1 e***

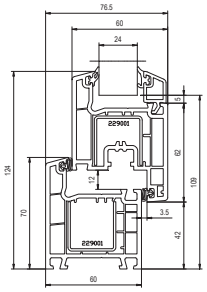
*This test report is a translation of Test Report 422 38255/1 dated 13 March 2009

| | |
|---|---|
| Client | **aluplast GmbH**<br>**Kunststoffprofile**<br>Auf der Breit 2<br><br>76227 Karlsruhe<br>Germany |
| Product | Plastic profiles,<br>Profile combination: casement-frame |
| Designation | IDEAL 2000 |
| Installation depth | Frame member: 60 mm<br>Casement member: 60 mm |
| Face width | 124 mm |
| Material | uPVC / white |
| Reinforcement | Steel, galvanised |
| Infill panel | Thickness: 24 mm<br>Installation depth: 15 mm |
| Special features | - |

**Basis**

EN ISO 10077-2 : 2003-10 Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - Part 2: Numerical method for frames

**Representation**



**Instructions for use**

This test report serves to demonstrate the thermal transmittance $U_f$ .

**Validity**

The data and results given refer solely to the described and tested specimen.

Testing the thermal transmittance does not allow any statement to be made on any further characteristics of the present structure regarding performance and quality.

Thermal transmittance

$U_f = 1.6\ W/(m^2 \cdot K)$

ift Rosenheim
Anerkannte Prüfstelle im bauaufsichtlichen Verfahren zur Bestimmung des Wärmedurchgangskoeffizienten
BAY 18

**ift** Rosenheim
16 December 2010

Klaus Specht, Dipl.-Ing. (FH)
Deputy Head of Testing Department

Horst Kellermann, Dipl. Phys.
Head of Laboratory
Computerassisted Simulation

**Notes on publication**

The **ift** Guidance Sheet "Conditions and Guidance for the Use of **ift** Test Documents" applies.

The cover sheet can be used as an abstract.

**Contents**

The report comprises a total of 5 pages.



07-09 / 388


**ift** Rosenheim GmbH
Geschäftsführer:
Dipl.-Ing. (FH) Ulrich Sieberath
Dr. Jochen Peichl

Theodor-Gietl-Str. 7 - 9
D-83026 Rosenheim
Tel.: +49 (0)8031/261-0
Fax: +49 (0)8031/261-290
www.ift-rosenheim.de

Sitz: 83026 Rosenheim
AG Traunstein, HRB 14763
Sparkasse Rosenheim
Kto. 3822
BLZ 711 500 00

Notified Body Nr.: 0757
Anerkannte PÜZ-Stelle: BAY 18
DAP-PL-0808.99
DAP-ZE-2288.00
TGA-ZM-16-93-00
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aluplast®
Kunststoff-Fenstersysteme

Karlsruhe, 13.02.2017
*F. Spies*
*+49 (721) 47171 - 380*

## Statement on lead-free profiles

Within the aluplast-group the change to lead-free stabilization had already begun years ago and was faced out by the end of 2008.

We are glad to confirm, that the profiles made of virgin Dryblend produced in our plants are produced with CaZn-stabilization and therefore are stabilized lead-free.

Different studies and risk evaluations show that the use of calzium/zinc stabilizers, cross linked in PVC profiles, is ecologically safe and pose no risk to health.

PVC is used in the food industry for water pipes as well as in the medical technology for blood sampling systems, which underlines the safety of raw material. As soon as the stabilizers are bound in the PVC matrix, they cannot be washed out anymore.

Best Regards

i.A. Frank Oliver Spies
Head of International Operations and
Material Development
aluplast GmbH

aluplast GmbH, Kunststoff-Fenstersysteme, Auf der Breit 2, D-76227 Karlsruhe
Telefon +49 (721) 47171-0, Telefax +49 (721) 47171-999, HRB Karlsruhe 9526, Geschäftsführer: Dirk Seitz, Patrick Seitz, Stefen Walter
e-mail: info@aluplast.net / www.aluplast.net