

WWL Houses, SIA
Balta iela 3/9
1055 RIGA
Letland

Testing of burglary resistance according to PAS 24:2016

(4 appendices)

Conclusion

The tested door, WWL Houses ECO 92+3 side hung double door does not fulfil the requirements according to PAS 24:2016 *Enhanced security performance requirements for doorsets and windows in the UK*.

Classification D.

1 Introduction

At the request of WWL Houses, SIA, SP has performed a test of a door with respect to burglary resistance according to PAS 24:2016.

2 Test method

The tests are performed according to PAS 24:2016 *Enhanced security performance requirements for doorsets and windows in the UK*.

3 Test object

The door is designated ECO 92+3 (see drawing in the appendix).

The door is made of wood, 2000 x 2400 mm.

Hardware specification according to appendix 2 in this report.

Delivered at SP 2016-12-20 and testing performed 2016-12-22.

SP Technical Research Institute of Sweden

Postal address
SP
Box 857
SE-501 15 BORÅS
Sweden

Office location
Brinellgatan 4
SE-501 15 BORÅS

Phone / Fax / E-mail
+46 10 516 50 00
+46 33 13 55 02
info@sp.se

Laboratories are accredited by the Swedish Board for Accreditation and Conformity Assessment (SWEDAC) under the terms of Swedish legislation. This report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

4 Accomplishment and results

The test results showed in this report refer only to the tested objects. The clauses below are numbered according to PAS 24:2016.

4.1 General

4.1.1 Classification of use

To claim conformity to PAS 24, doorsets and windows shall be classified according to their intended use for all relevant characteristics in accordance with BS 6375 (all parts) and shall meet the requirements of the relevant material specific standard such as BS 7412, BS 4873, BS 6510, BS 8529 and BS 644.

The manufacturer shall provide written documentation that shows that the relevant characteristics according to their intended use and the materials used in the construction of the product fulfil this requirements. This will be controlled in conjunction with the examination of the technical file.

4.1.2 Doorsets

To claim conformity to PAS 24, doorsets shall meet the requirements of **4.2**, **4.3**, **4.4** and Annex A of PAS 24 and either Annex B of PAS 24 or BS EN 1627:2011, RC3.

Requirements fulfilled.

4.1.3 Windows

To claim conformity to PAS 24, windows shall meet the requirements of **4.2**, **4.3** and **4.4** and either Annex C of PAS 24 or BS EN 1627:2011, RC2N.

Not applicable for this test object.

4.2 Infill medium requirements

Where doorsets, coupled side panels and windows adjacent to doorsets contain glass, each glazed area shall include at least one pane of laminated glass meeting the requirements of BS EN 356:2000, Class P1A or higher, and shall be glazed in accordance with BS 6262.

Requirements fulfilled.

Where windows contain glass and non-key unlocking hardware, each glazed area shall include at least one pane of laminated glass meeting the requirements of BS EN 356:2000, Class P1A or higher, and shall be glazed in accordance with BS 6262.

Not applicable for this test object.

4.3 Letter plates

Where a letter plate is included:

- a) the letter plate shall have a maximum aperture size of (260 x 40) mm; and
- b) the letter plate shall meet the installation height requirements specified in BS EN 13724:2013, 5.4.1.2; and
- c) the letter plate shall meet the requirements of TS 008:2015 [N1], Enhanced security grade 2 with all fixing accessible from the external face removed. The TS 008:2015 test may be conducted on the letter plate when installed in a doorset or mounted in a test block as detailed in TS 008:2015 [N1].

There were no letter plate included in this test object.
Not applicable for this test object.

4.4 Classification

All doorsets shall be designated as D.

All windows shall be designated as W.

ECO 92+3 is a door conforming to Annex B in PAS 24:2016 classified D.

Test results according to Annex B in PAS 24:2016

B.4.3 Manipulation test

It was not possible to gain entry to the door by manipulating the door with tools from group A and B by any technic according to B.4.3.2 in PAS 24:2016 within 3 minutes.

Requirements fulfilled.

B.4.4 Cutting and infill medium removal test

B.4.4.2 Infill manual test

It was not possible to gain entry to the window by removal of infill of the window with tools from group A and B according to C.4.4.2 in PAS 24:2016 within 3 minutes.

Requirements fulfilled.

B.4.4.3 Infill mechanical test

2 kN were applied to each corner of the glass infill, it was not possible to gain entry to the door after this test.

Requirements fulfilled.

B4.4.4 Manual cutting test

Not applicable for this test object.

B.4.5 Mechanical loading test

B.4.5.3.2 Parallel-to-plane loading along the edge

1.5 kN were applied parallel to plane along the edge in the upper right corner according to B.4.5.3.2 in PAS 24:2016, there were not possible to gain entry to the window during this test.

Requirements fulfilled.

B.4.5.3.3 Parallel-to-plane loading at right angles to the edge

1.5 kN were applied parallel to plane at right angles to the edge in the centre of the window according to B.4.5.3.3 in PAS 24:2016, there were not possible to gain entry to the window during this test.

Requirements fulfilled.

B.4.5.4 Perpendicular-to-plane loading

Table 1. Results perpendicular-to-plane loading

Test No	Load point	Load	Parallel-to-plane loading	Remarks
1	Left upper corner	4.5 kN	Along the edge 1.5 kN	No entry gained
2	Right upper corner / Locking point	4.5 kN	Along the edge 1.5 kN	No entry gained
3	Upper locking point	4.5 kN	Along the edge 1.5 kN	No entry gained
4	Centre locking point	4.5 kN	Along the edge 1.5 kN	No entry gained
5	Lower locking point	4.5 kN	Along the edge 1.5 kN	No entry gained
6	Right lower corner / locking point	4.5 kN	Along the edge 1.5 kN	No entry gained
7	Left lower corner	4.5 kN	Along the edge 1.5 kN	No entry gained
8	Hinge 1	4.5 kN	Along the edge 1.5 kN	No entry gained
9	Hinge 2	4.5 kN	Along the edge 1.5 kN	No entry gained
10	Hinge 3	4.5 kN	Along the edge 1.5 kN	No entry gained
11	Hinge 4	4.5 kN	Along the edge 1.5 kN	No entry gained
12	Left upper corner	4.5 kN	At the right angle 1.5 kN	No entry gained
13	Right upper corner / Locking point	4.5 kN	At the right angle 1.5 kN	No entry gained
14	Upper locking point	4.5 kN	At the right angle 1.5 kN	No entry gained
15	Centre locking point	4.5 kN	At the right angle 1.5 kN	No entry gained
16	Lower locking point	4.5 kN	At the right angle 1.5 kN	No entry gained
17	Right lower corner / locking point	4.5 kN	At the right angle 1.5 kN	No entry gained
18	Left lower corner	4.5 kN	At the right angle 1.5 kN	No entry gained
19	Hinge 1	4.5 kN	At the right angle 1.5 kN	No entry gained
20	Hinge 2	4.5 kN	At the right angle 1.5 kN	No entry gained
21	Hinge 3	4.5 kN	At the right angle 1.5 kN	No entry gained
22	Hinge 4	4.5 kN	At the right angle 1.5 kN	No entry gained

Requirements fulfilled.

B.4.6 Manual check test

Table 2. Results manual check test

Test No	Attack-point	Attack time	Tools used	Remarks
1	Glazing	>3 min	2 Nailbars	No entry gained
2	Lock side	<3 min	2 Nailbars	Entry gained
3	Hinge side	<3 min	2 Nailbars	Entry gained

Requirements not fulfilled.

B.4.8 Soft body impact test

Table 3. Results Soft body impact test

Test No	Impact point	Remarks
1	0.8 m from floor	No entry gained
2		
3		
4	1.25 m from floor	No entry gained
5		
6		
7	1.7 m from floor	No entry gained
8		
9		

Requirements fulfilled.

B.4.9 Hard body impact test

Table 4. Results hard body impact test

Test No	Impact point	Remarks
1	Left upper corner	No entry gained
2	Right upper corner / Locking point	No entry gained
3	Upper locking point	No entry gained
4	Centre locking point	No entry gained
5	Lower locking point	No entry gained
6	Right lower corner / locking point	No entry gained
7	Left lower corner	No entry gained
8	Hinge 1	No entry gained
9	Hinge 2	No entry gained
10	Hinge 3	No entry gained
11	Hinge 4	No entry gained

Requirements fulfilled.

6 Measurement uncertainty

The measurement uncertainty for the applied load is $\leq 1.3\%$ and for deformation measurement $\leq 1.6\%$. The test results apply solely to the example tested. Reported uncertainty corresponds to an approximate 95 % confidence interval around the measured value. The interval has been calculated in accordance with EA-4/16 (EA guidelines on the expression of uncertainty in quantitative testing), which is normally accomplished by quadratic addition of the actual standard uncertainties and multiplication of the resulting combined standard uncertainty by the coverage factor $k=2$.

SP Technical Research Institute of Sweden Safety - Mechanics Research

Performed by

Examined by

Christian Larsson

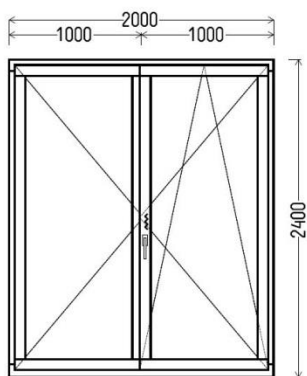
Peter Blomgren

Appendices

1. Description of test sample
2. Technical documentation
3. Drawings
4. Assembly instruction

Appendix 1

L3



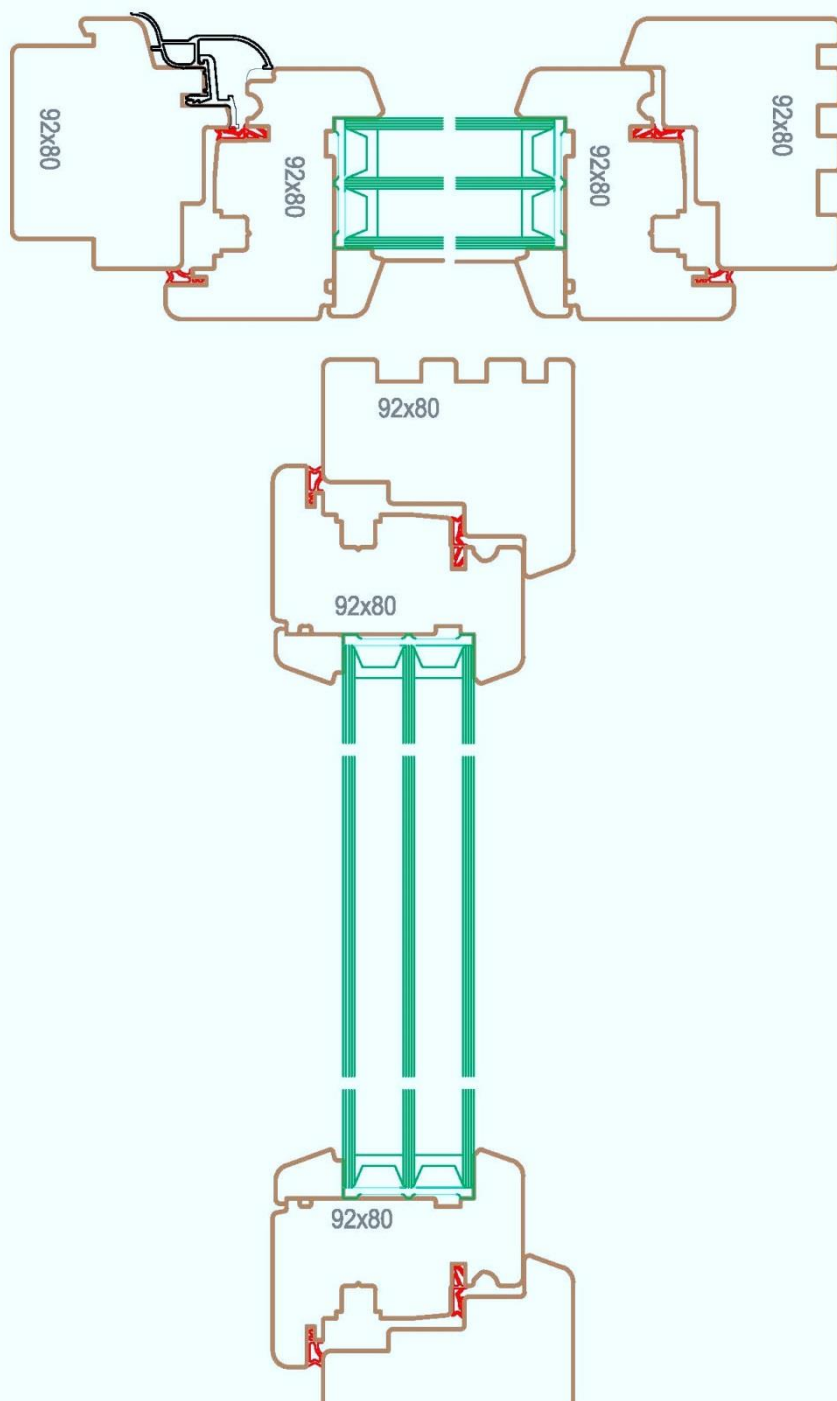
L3 (1pcs)

1. Type: ECO 92+3 wooden windows
2. Wood: Fingered pine
3. Painting: White paint TEKNOS RAL 9010
4. Glass: 33.1LowE-16Arg-4CF16Arg-33.1LowE (3 pane LowE glass unit, $U_g=0.6$)
5. Locking: G-U UniJet

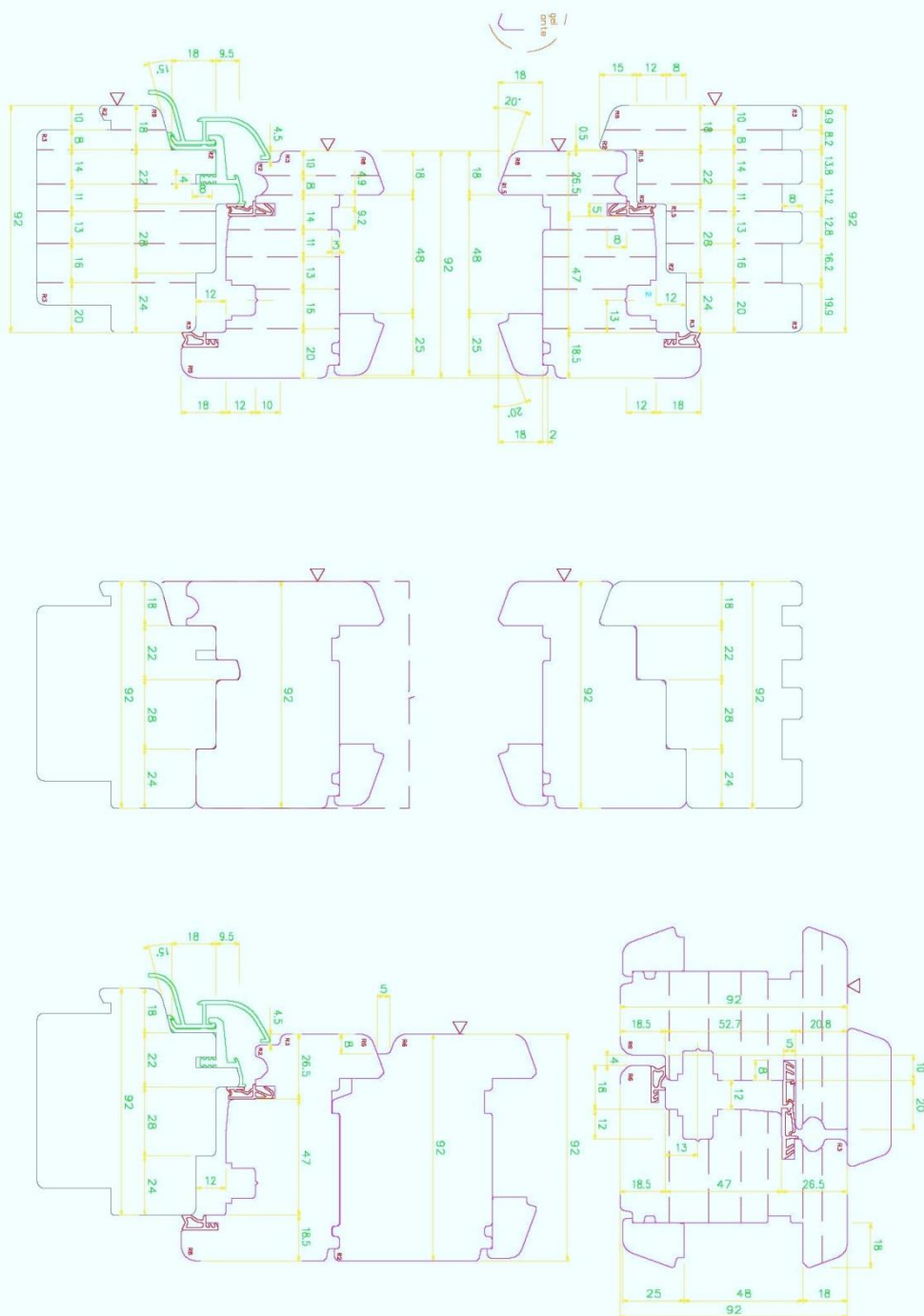
Appendix 2

Position L3	
Manufacturer	Gretsch-Unitas GmbH Baubeschläge. Johann-Maus-Str. 3, 71254 Ditzingen Deutschland
Type	UNI-JET M6/12
Class	RC2 in acc. with DIN EN 1627-1630
Handle	Modena (6-34397-33-0-7) 100 Nm

Appendix 3



Appendix 3



Appendix 4

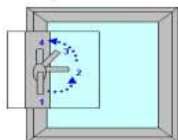


Wooden windows and doors Recommendations for use

Maintenance:

After installation of wood products to clean only with a soft sponge moistened with water without any chemical additives in the window decoration material completely polymerise only 3 weeks after application.

1. Insulated glass products for the assembly to clean very carefully not to damage the silicon surface, because it is completely polymerise only 3 weeks after application.
2. Should not clean the wood parts and silicone seal with a coarse cleaning items and chemically active agents.
3. Cover at least 2 times a year in wood components with a special wooden windows provide a guard of wax, which can be ordered from our office.
4. Door sash when it opens to the outside, before they leave open, make sure that it will not be damaged to the wind striking the barrier.
5. check the verify before closing doors if ther isn't left in an unnecessary subject between the sash and the cans.
6. At least once a year make furniture oiling of moving parts with a viscous mineral oil (eg sewing machines, oil), if necessary attracted to the facility containing screws.
7. It is prohibited to change the position of the handle when sash is in the open position.



1. window closed.
2. window opens (the classic opening).
3. window open to ventilate.
4. window open maximum to ventilate.

Open window may not change the handle position!

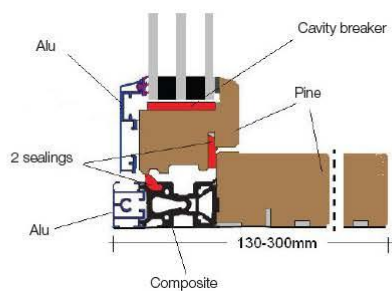
8. It is prohibited to draw against the heating element products.
9. Before the premises cosmetic repair wooden parts covered with a protective breathing, but to strengthen the product may be limited by the low adhesion adhesive tape stock and no longer on the 24th hours.
10. Products should not be stored at the premises where the relative humidity above 65% when the glass is formed packages condensate, then it gets purged and space.
11. Each year, a survey corner sealing compounds, where they fill in the gaps resulting from the sealing or seek the assistance of the manufacturer.
12. Necessarily be above the front door shelter that protects them from direct exposure to external conditions.
13. Do not allow any building materials to get to a wooden or glass surface, where it has been happen carefully remove until it is stiff.
14. Accessories mechanisms must be cleaned from dust and debris, to avoid any damage.
15. windows and doors should not be transported or stored in the upper part of the sash down. In the case where they are confined to the lateral edge of the bottom of the hinge should be.
16. Products are prohibited for use as load-bearing.

Appendix 4



17. Wood products are recommended (by necessity) repaint once every 5-8 years, if the finish is opaque (painted) once in 3-5 years if coverage is chosen in a transparent (varnished with lacquer) to increase product stability against external weather conditions. Finishing materials can be ordered from our office.

Appendix 4



INSTALLATION MANUAL

FOR WOOD ALUMINIUM GLAZED STRUCTURES

01/2015

Appendix 4

CONTENT

1.	Components of a window	3
2.	Unloading and storage of elements	3
2.1.	On arrival	3
2.2.	Storage of windows/ doors	4
2.3.	Storage of insulating glass units	4
3.	Fixing to the building	4
3.1.	Window opening	4
3.2.	Fitting	5
3.3.	Temporary fixing	5
3.4.	Support	5
3.5.	Fixing	6
3.6.	Filling	8
3.7.	Fitting handle and cylinders	8
4.	Adjustment	9
5.	Glass removing and blocking	9
5.1.	Hanging the glass in opening windows/ fixed windows	9
5.2.	Removing the glass from a sash	9
5.3.	Removing the glass from fixed frame windows	9
5.4.	Blocking	10
6.	Protection of the visible frame surface	11
7.	Window cleaning	11
8.	Commissioning	11

These instructions are in addition to the standard instructions issued by Danish Window Certification (DVC).

Appendix 4

1. COMPONENTS OF A WINDOW



2. UNLOADING AND STORAGE OF ELEMENTS

2.1. On arrival

Elements must be unloaded and handled with due care. On arrival they should be checked to ensure that elements correspond to the order confirmation, that they are free from defects and the quantity is correct. Should there be any defects or mistakes, the vendor or the plant should be informed about it within one week as of delivery (Refer "Operation and Maintenance Instructions for Wood Aluminium Structures").

Glass may be lifted using various hoists/lifts with a solid surface under the element or with assembly lift equipment. The element should always be positioned vertically – elements weighing under 30 kg may be lifted also by using the upper frame.

Please note!

Windows, doors and glass are delivered at the side of the delivery vehicle, and it is the customer's responsibility to unload. Similarly, it is the customer's responsibility to see that elements are correctly stored, and that they are protected against dirt, sun, water and snow at all times.

The wrapping of elements is to be considered as temporarily for transport and not for storage and cover against dirt, rain, sun or snow.

As soon as the goods are unloaded, responsibility is taken over by the customer.

Appendix 4

2.2. Storage of windows/ doors:

All elements must immediately after delivery be protected against water, direct sunlight, dirt and other damage risks.

Supplied structures shall be stored vertically. It is not permissible to store structures horizontally or differently than provided for by their structure. The best storage conditions are indoor, on a smooth surface at a dry and clean place. Structures may not be stored directly on the ground. Alternatively the elements can be stored outdoor if the top and sides of the pallets are covered by water tight tarpaulins. The tarpaulins have to be fastened to avoid damage from windy weather, and in a way that allows air to circulate underneath the pallet (Refer "Operation and Maintenance Manual for Wood Aluminium Glazed Structures").

2.3. Storage of Insulated glass units (IGU):

It is most important that IGU should be covered immediately. While storing IGU on site or in a warehouse, special attention should be paid not only to the above provisions, but also to solar and any other thermal effect on glass. IGU which are exposed to sunlight during storage absorb so much heat that they rupture thermally (Refer "Operation and Maintenance Manual for Wood Aluminium Glazed Structures").

3. FIXING TO THE BUILDING

The quality of a high quality window depends on the installation. For this reason the professional fastening and the soundness of the connection are of vital importance.

3.1. Window opening

Fully finished windows should be installed into preformed openings. Building in fully finished windows during the course of construction should be avoided if possible. Where this is not possible, the materials adjacent to the opening should not be fitted tightly to prevent distortion of the frame. Side tolerances should not exceed 10mm on each side. When not building in, openings can be formed using either proprietary cavity closers or site constructed templates. These templates should produce openings that are between 10mm to 20mm larger than the actual window size.

When attaching window and door elements, please note: blocking up and fixing must be carried out with the DVC directions as a minimum standard, i.e. never more than 900mm centres between fixing points – always under or close to bearing mullions or transoms and always under door sills etc. (A and B), see Figure 1.

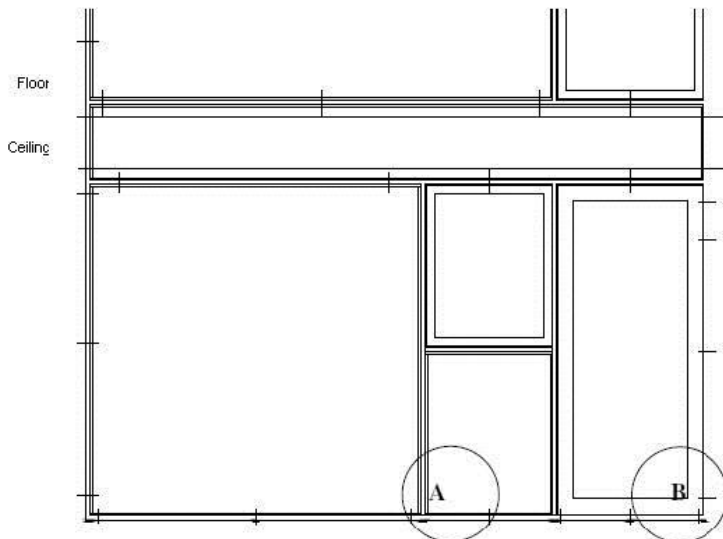


Figure 1 . Typical frame fixing points – max 900mm centres

NB! That the element must be positioned in the building and horizontally and vertically aligned before fixing. Check the element via cross-measurements.

Screws placed in the composite bottom casing must be sealed with silicone at the screw head before tightening.

OO10_installation
01/2015

4

Appendix 4



Windows and doors should be installed in the warm part of the wall (below the dew-point) to avoid condensation building on the coldest parts of those building elements.

3.2. Fitting

Fully Damp Proof Courses (DPC) should be fitted during construction, either by fixing to the frame prior to building-in or by fitting the DPC into the structure when making pre-formed openings.

To reduce the amount of heat lost from the inside of the building to the outside through the window edges (a cold bridge *tech.*), the window must be set back to overlap the inner face of the outer works by at least 30mm. Adequate insulation should be fitted between the outer and inner wall construction to reduce heat loss around the wind opening.

3.3. Temporary fixing

For temporary fixing and leveling (both – vertically and horizontally) wooden or plastic blocks can be used. Bearing blocks must be made of solid hard wood or plastic. After leveling it is important to check diagonal length equivalence especially of the opening parts. Layout scheme of the blocks is described in Figure 2.

 support block  bearing pads

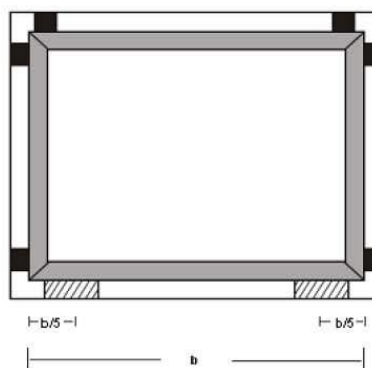


Figure 2. Layout scheme of the bearing and support blocks.

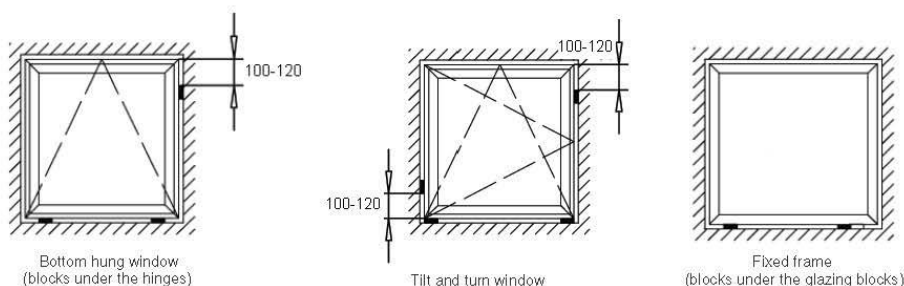
3.4. Support

Windows should be fitted level and plumb; failure to do so can impair the function of the window openings and hardware and may also result in cracking of the glazed units.

The windows should be supported on durable blocks at a maximum of 150mm from each jamb and beneath the mullions. Side blocks should be located where fixings occur and should not distort the frame. The frame should be supported so as to prevent distortion and not damage any protection or finish.

The element must always be chocked up just under the side casings. Note that the chocking must always be performed so that both aluminium and wooden frames are supported. If the element contains a vertical mullion, chocking must also be directly under the mullion.

The bearing pads are recommended to leave in the windows according to opening direction.



Appendix 4

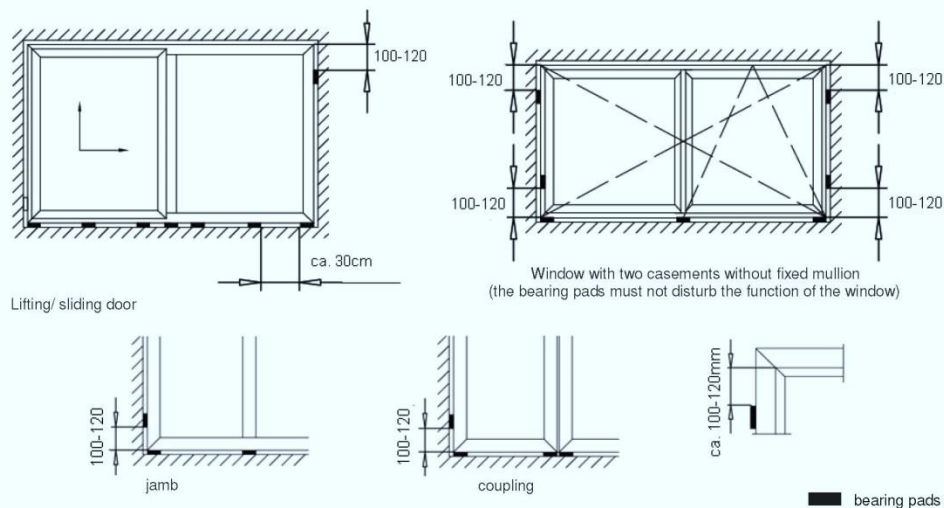


Figure 3. Layout scheme of the bearing pads

3.5. Fixing

Please make sure the fixing method chosen is appropriate – fixing with Adjufix anchors, with screws or with brackets. Recommended method for system Aile COto – fixing with **Adjufix anchors**:

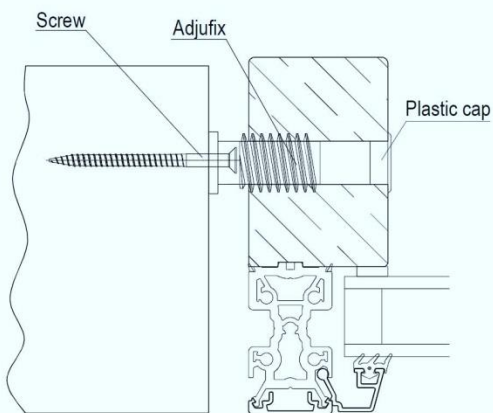


Figure 4. Fixing with Adjufix

- Lift into the window/door opening;
- Adjust the frame in the correct position with Adjufix;
- Fasten fixing screws: when mounting to concrete, aerated concrete etc. the hole must be drilled through the Adjufix.

When necessary, readjust the frame to the correct position.

Appendix 4

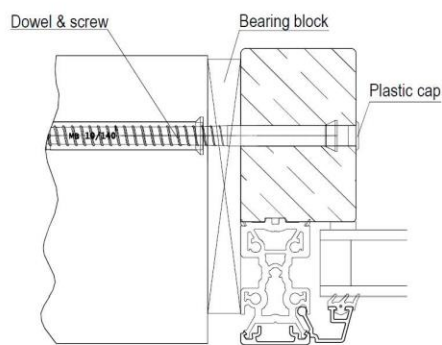


Figure 5. Fixing with screws

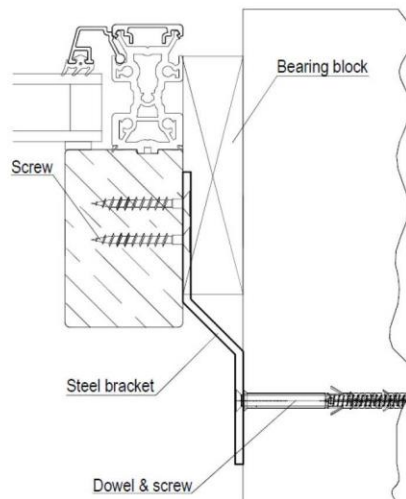


Figure 6. Fixing with brackets

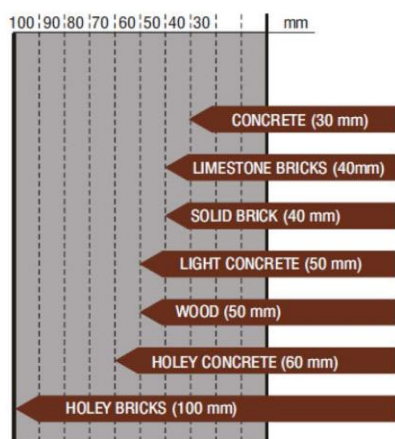
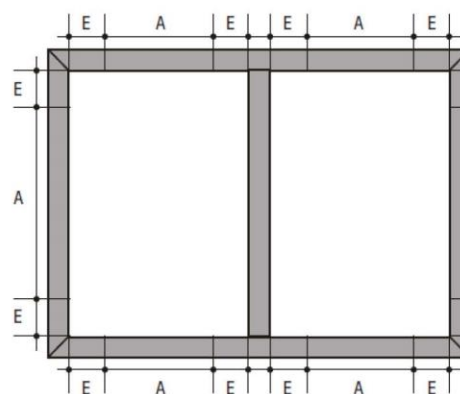


Figure 7. Recommended drill fastening in various materials



- = attachment points
- A = distance of the fixing points ca. 700mm
- E = distance of the inner corner profile ca. 100-120mm

Figure 8. Distances for the fastening of windows



! When mounting the doors that have heat-insulating frame in composite must be inserted screws in the hinges, which goes directly into the vertical load-bearing wall.

The hinges are constructed with a 6mm hole for direct wall mounting. There are normally used 6x90 or 110mm frame screws (AMO). It is sufficient to secure the hinges with frame screw after insertion and adjustment.

Figure 9. Mounting the doors

Appendix 4

3.6. Filling

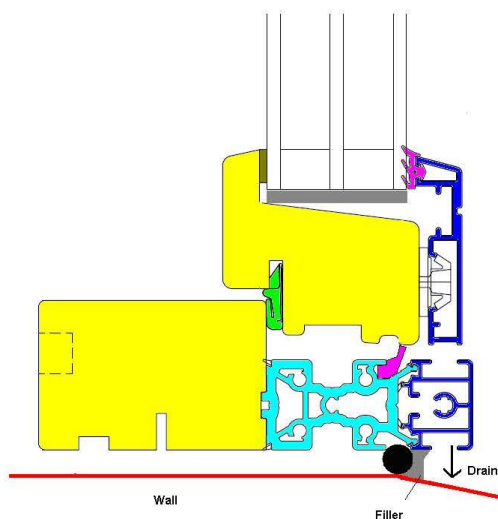
To prevent air and moisture passage between the window and the adjacent wall, the gap should be completely filled with insulating material (1-component or 2-component polyurethane foam, glass wool, rock wool, cork, insulation tape) and sealed. Various sealing methods can be used, e.g. expanding closed cell foam or a silicone or mastic sealant.



Insulation materials used stay dry during installation. Otherwise, they will not maintain their insulating function.

PU-foams establish more or less pressure during the curing, this pressure has to be absorbed by the window construction.

If excess sealant spreads over the painted surface, in order to avoid aesthetic damage, clean it off as soon as possible: Do not allow it to set. When installation works are done in a winter time (below zero degrees), so called "winter" construction foam or filler materials are to be used. After foam has cured, leftover must be cut off. In order to ensure thermal insulation, foam should be sealed with silicone or alternative sealing materials.



Never block the drain holes in the bottom frame/sash with sealant.

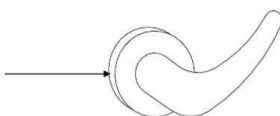
Figure 10. Sealing for drainage

3.7. Fitting handle and cylinders

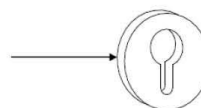
Handles are supplied unfitted within the window packaging to prevent damage during transport and handling. The windows openers are pre-drilled to accept the handle screws. Do not over-tighten the screws during fitting, e.g. by using a power drill driver with the incorrect torque setting.

When fitting door handles and cylinders, remember to seal and tighten under the rosettes before screwing them on. The reason for this is that gaps under rosettes or back plates often mean that water can seep into the lock case or espagnolette system and not least down onto the floor.

Seal here



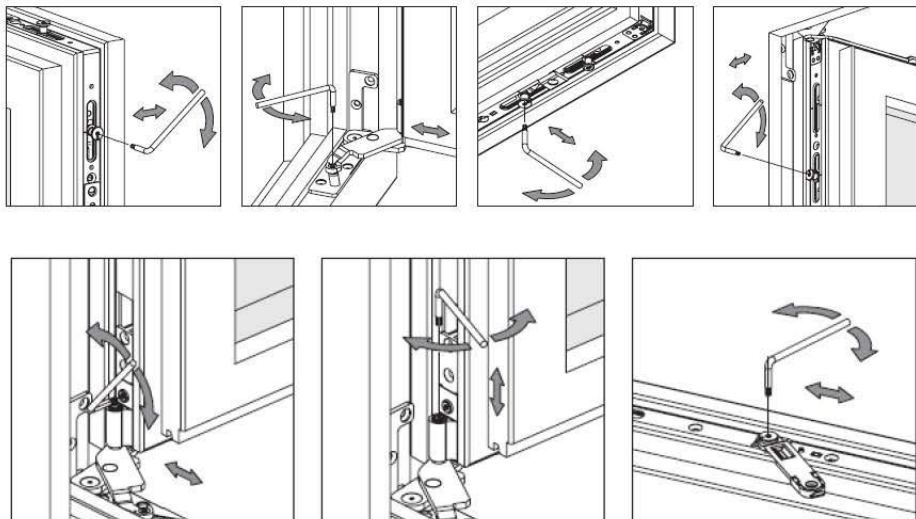
Seal here



Appendix 4

4. ADJUSTMENT

Adjustment of the frame/sash can be made via the adjustment screws. The adjustment screws can be found on the frame and sash part.



5. GLASS REMOVING AND BLOCKING

5.1. Hanging the glass in opening windows/ fixed windows

The IGU in our windows and doors conform to Dansk Vindues Certificering (DVC) standards and installation of the glazed window panes is performed in accordance with the assembling requirements of DVC. However, the frame packers should be laid 20mm from the side frames/posts. This is done to avoid bending the horizontal post under the weight of the glass.

Glass is usually delivered fitted from the factory, but if specially requested or if stated on the order confirmation, glass (or panels) for fixed sections can be delivered separately for the customer to install the glass on site.



To retain the factory warranty please make sure that the insulating glass units are handled only by trained window installation experts.

Glass is marked with the order number and window type for easy identification – see the info-marking on the glass. It is then easy to match the frame with the glass to be installed.

5.2. Removing the glass from the sash

- Carefully remove the exterior gasket on the outer edge of the sash;
- Place a polished 19mm fork key between the wooden sash and the aluminium profile in the sash; turn the plastic spacer clips 90° so that the aluminium cover profile comes free of the sash. The plastic spacer clips are located approx. every 100-150mm;
- Lift off the aluminium cover profile and take out the insulating glass unit. After re-assembling please turn the clip 90° and tap on the sash with a rubber mallet carefully.

5.3. Removing the glass from fixed frame windows

- Carefully remove the glazing bead with the help of, for example, a stronger putty knife;
- Lift the IGU out of the frame. After replacing, please push back the glazing beads into the groove, first horizontal, then vertical ones. The glazing bead is easier to push down if a little bit of soapy water is applied to the glass and gasket beforehand.

The min gap between glazing unit and rebate is 4mm.

Appendix 4

For the blocks to function properly they must be fixed in the prescribed position. Nails, pins etc. must not be used to fix blocks in a manner that may damage the IGU. The position of the blocks must not impede the compression or the sealing properties of the glazing bead against the glazing unit.

5.4. Blocking

- ▲ **Setting blocks** - must always be used. Setting blocks transfer loads between glazing units and rebate while also contributing to the overall stability of the unit. The gap to a glazing unit corner must always exceed 50mm. In case the glazing unit is supported by one block only, e.g. in turn window, the block must have a length of 10mm for glazing units less than 2m² and otherwise 200mm.
- **Guide block** - ensure the gap between glazing unit edge and rebate. Measured from the corner of the glazing unit edge the gap must exceed 50mm.
- × **Riser block** - if necessary, a riser block may be used to ensure the functioning of the hardware and the centering of the glazing unit during transport and operation. The length must be at least 5mm for glazing unit less than 2m² and otherwise 100mm.

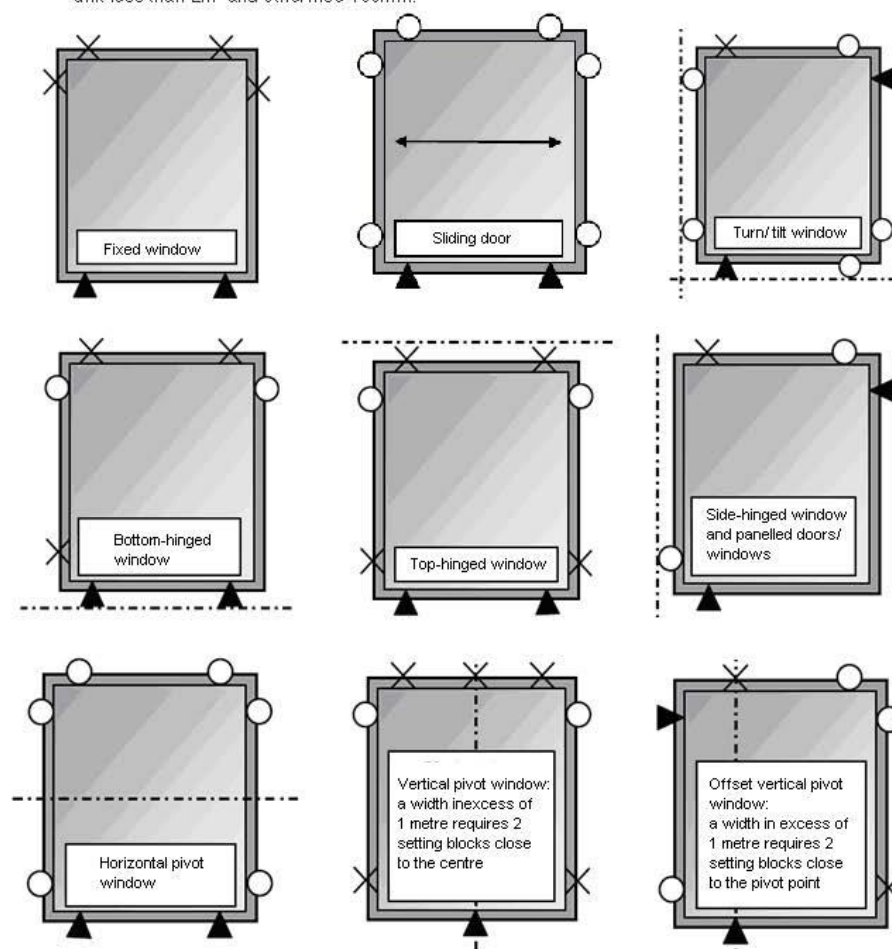


Figure 11 : Layout scheme of blocks for windows of different types

Appendix 4

6. PROTECTION OF THE VISIBLE FRAME SURFACE

"Operation and Maintenance Manual for Wood Aluminium Glazed Structures" applies to the protection of the completed units. If the visible surfaces are not covered at the factory, it is advisable to cover them with a protective plastic foil as protection of the frame surfaces against soiling or installation damages, PU-foams etc. These protective foils, even if they are applied at the factory, shall be removed after the installation.

7. WINDOW CLEANING

The cleaning of the windows includes the removal of any contamination, which is caused during installation by the consignee. Only cleaning agents recommended by the windows manufacturer are to be used (Refer "Operation and Maintenance Manual for Wood Aluminium Glazed Structures").



Do not use high pressure cleaner for cleaning glazed structures!

8. COMMISSIONING

Before commissioning the person-in-charge should make sure whether:

- sealing strips, assembly elements and grooves are cleaned and do not have any plaster left, drilling dust and other construction dirt left;
- opening parts are installed and adjusted and operate properly;
- hinges and closure fittings are adjusted and operate properly;
- all moving parts, excluding friction parts, are oiled with an appropriate lubricant;
- any surface damages are eliminated ;
- users are instructed regarding proper operation of the elements;
- users are informed of the necessity of ventilation to avoid condensate.

Please note:

- to avoid condensate on glass and moisture absorption, the building requires ventilation;
- recommended air moisture in premises where our structures are installed, is 50-60%, air temperature at least +18°C (Refer "Operation and Maintenance Manual for Wood Aluminium Glazed Structures").