

Production of joinery (windows & doors)
Wood-aluminium solutions



Energy efficient



Unidas



Production of joinery (windows & doors) Wood, wood-aluminium, aluminium

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A wood-aluminium solution combines the best features of two natural materials – wood achieving a warm climate for the interior and aluminium, a material with a long life, maintaining a modern style for the building's facade. This combination is currently the most advanced use of these natural materials, to the global trend of sustainable development and conservation of natural resources. Our products meet the highest passive house standards. Surface finishing of joinery almost corresponds to furniture treatments thanks to high quality bases and varnishes.

During twenty years of operation, we produced over 20.000 of windows and doors, and installed them in both office and residential buildings.



**In collaboration with IFT Institute, Rosenheim (Germany)
Heat transfer coefficient $U_w=1,28 \text{ W/m}^2 \text{ } ^\circ\text{K}$**

general properties of wood-aluminium windows and doors

Since 2009, in EU, and latterly in our country, pursuant to Energy Efficiency Act, heat transfer coefficient (U-value) must be less than $1,3 \text{ W/m}^2 \text{ }^\circ\text{K}$. European standards regarding joinery in passive houses require U-value (overall heat transfer coefficient) of less than $0,8 \text{ W/m}^2 \text{ }^\circ\text{K}$.

UNIDAS provides solutions for each of these requirements.

A wood-aluminium solution combines the best features of wood, as an interior material, and aluminium, as exterior protection of wooden elements. Over time, wood as a material for joinery starts to lose its importance due to well-know reasons: appearance of cracks due to sun exposure and effects of weather and frost, distortion for the same reasons, which leads to bad sealing.

Latest technology treats wood as an industrial material with stabile mechanical properties. To achieve that result, wood had to be further processed namely laminated – thin layers of wood, 30x300 mm, are transversely and longitudinally glued together. This process increases mechanical strength, eliminates wood flaws (nodes) and gives a choice of wood grains. Laminate with continuously visible elements is mostly applied for wood-aluminium (only middle strip is from the continuation)





Lately, in addition to traditional white wood, oak and white pine types of wood such as cherry, maple and pear are also used, which up until recently have not been used for joinery.

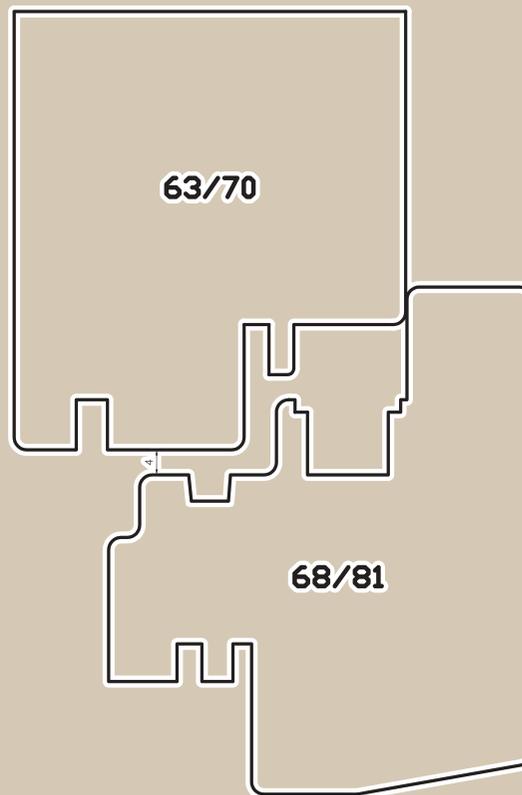
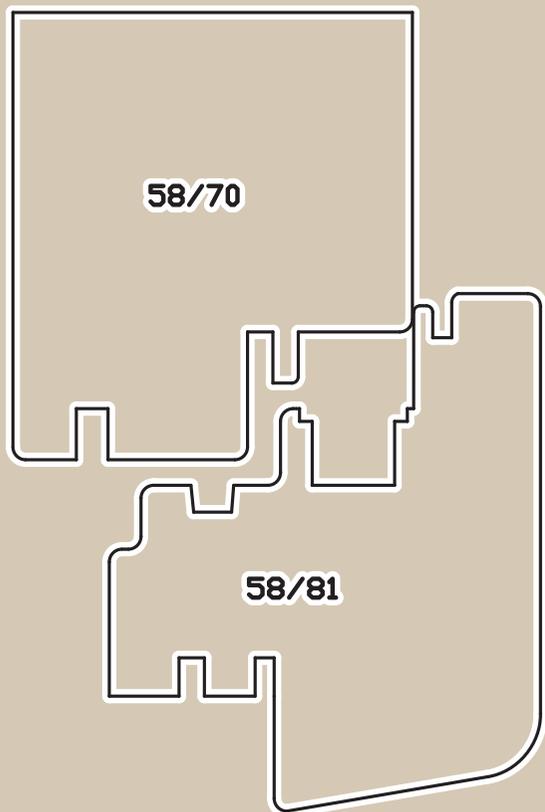
Wood decay process starts due to exposure to sunlight, followed by cracking and extreme pore widening, leaving bare wooden surfaces exposed to direct contact with water and moisture, and finally comes the frost that freezes the moist surfaces.

All of these defects are eliminated using ALUMINIUM cladding. Here aluminium protects the wood from weather conditions - the wood remains the same as of the first day of operation. Different expansion coefficients of wood and aluminium are perfectly balanced by PVC joints; they connect these elements, but do not transfer mutual strains (for the purpose of widening

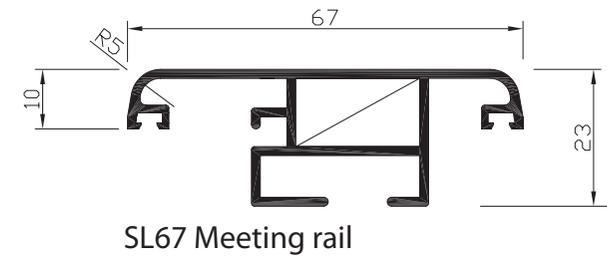
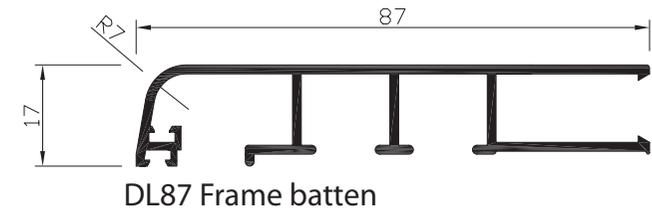
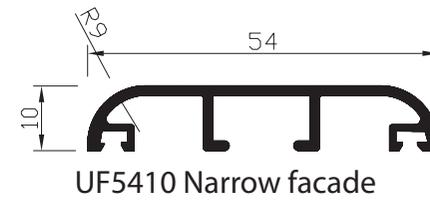
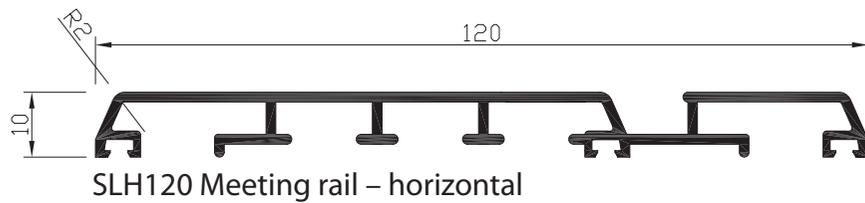
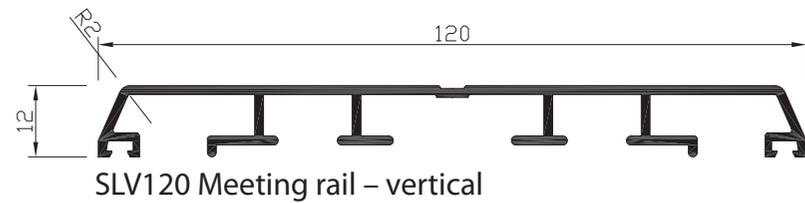
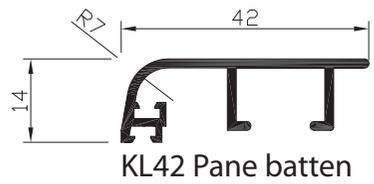
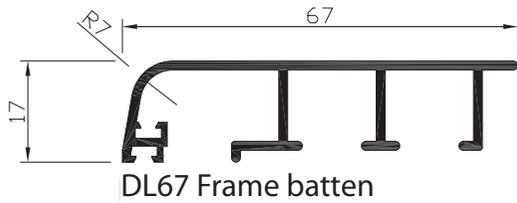
and shrinking, aluminium slides on the joints independently of the changes in the wood).

Finally, aluminium can be painted in a number of colours, by powder coating or anodizing.

Quality sealing of the gap between the leaf and the frame is ensured with the sealing system, one of which refers to sound. Permanent and quality handling of windows and doors is provided by applying high quality hardware from renowned world manufacturers. Glass is produced in various combinations such as thermal double pane glass 4+16+4, thermal triple pane glass 4+16+4+16+4, thermal pane glass with stopsol glass, low-e, sandblasted, laminated (pamplex) or other combination. Properties of the windows are regularly controlled by IMS Institute for testing materials, Belgrade and they are attached to this catalogue.



sistem UniLUX 2001



mechanical properties of window

Windows are the building's weakest link in its thermal envelope, but at the same time, sunny windows provide significant heat gains indoor. Heat gain/loss ratio is influenced by many factors: position and size of window, orientation, as well as window elements: window frame, glass, hardware, shutters.

Heat balance includes:

- heat loss through window elements due to difference between outside and inside temperatures
- heat loss due to infiltration at junctions window-wall or glazing-frame, or window-shutter box

The same factors influence thermal efficiency. All these influence heat balance and must be taken into account during design process.

	b	61	81	101	121	121	141	141	161	181	201
	m	60	80	100	121	121dk	140	140dk	160ss	180ss	200ss
	p	59	79	99	119	119	139	139	159	179	199
61											
81											
91											
101											
121											
141											
211											
221											

FACTORS THAT INFLUENCE THE SELECTION OF WINDOWS AND DOORS ARE FOLLOWING:

1. lighting
2. ventilation
3. thermal efficiency
4. conservation of natural resources (eco-friendly)

LIGHTING

Proper selection of joinery is the most important in order to provide quality natural light. The shape and size of window have direct impact on natural light coming in, and thus energy savings for additional lighting. According to applicable European standards, min window area is to be 7-10% of room area.

VENTILATION

This factor is directly related to heat loss in case of bad quality joinery. Tightness is very important. At the same time, windows have to provide controlled air exchange, in keeping with standards.

THERMAL EFFICIENCY

Selection of materials for window elements should provide good insulation properties, and we succeeded in achieving this goal by constant follow-up. UNIDAS windows, and rarely other, directly reduces heat loss and thus energy saving is visible.

ECO-FRIENDLY

Our contribution to the conservation of natural resources lies in the fact that our products are made from recyclable materials. Wood as a renewable resource, after the life cycle of window expires, is processed into a lower quality material for further processing. Aluminium is fully recyclable and be used for the same purposes. The same applies to rubber, glass, steel hardware elements. UNIDAS is entirely eco-friendly.



production program

UNILUX

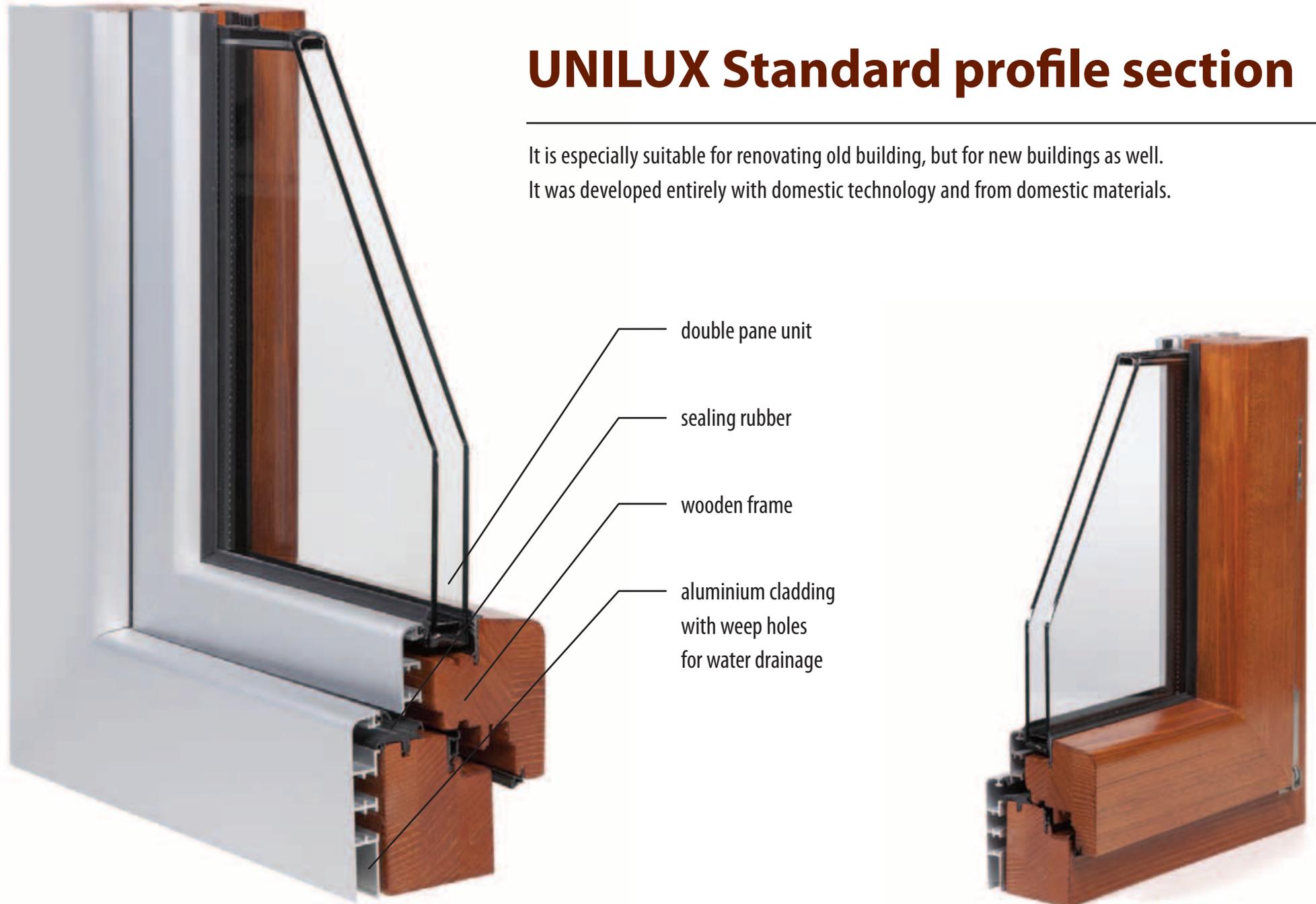
System Unilux is a result of many years of work and research in the field of wood-aluminium joinery. This system combines the best features of all European joinery manufacturers with emphasis on German robustness and Italian design. All elements are of domestic origin manufactured in domestic production units, starting from wooden elements, aluminium sealing profiles and high performance glass solutions. The Institute for testing materials IMS from Belgrade has participated in creating of this system through constant testing and quality control of product from its inception to the present, and its superior quality has been also confirmed by the Institute IFT Rosenheim (Germany) in January 2011, after which we obtained the right to mark products with **CE** in accordance with product standard EN 14351-1. System UNILUX has been in standard production since 2001, and 15.000 produced units in different sizes and shapes leaves no doubts in its reliability.



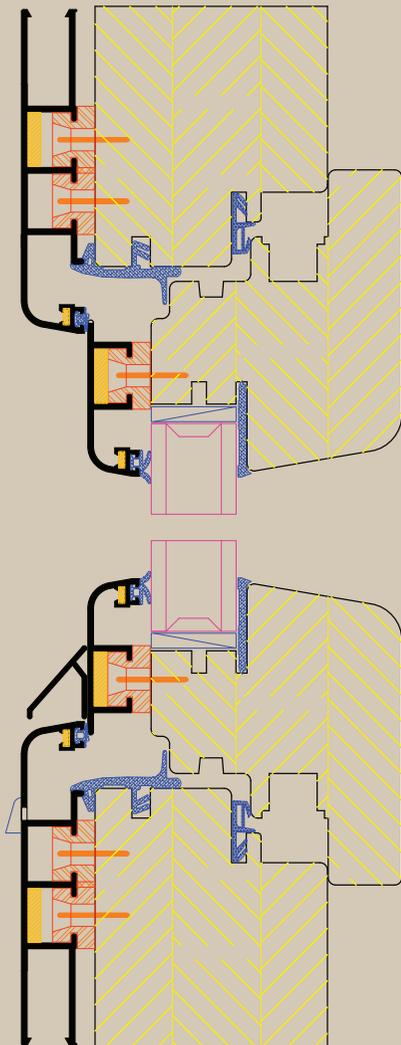


UNILUX Standard profile section

It is especially suitable for renovating old building, but for new buildings as well.
It was developed entirely with domestic technology and from domestic materials.



profile section



Profile characteristics

Basic model

Frame thickness: 82 mm

Glass 4+16+4 float

Rubber – 5 pcs.

Colour: colourless and terracotta shade

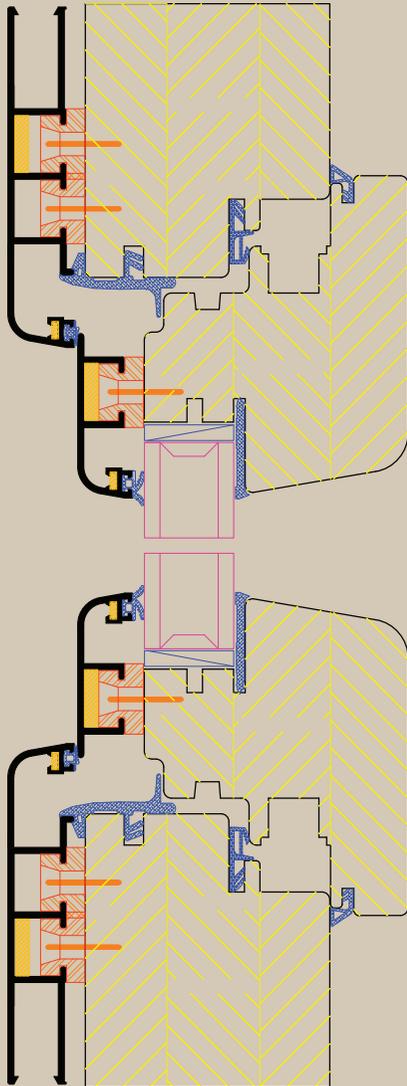
U-value: $1.46 \text{ W/m}^2 \text{ } ^\circ\text{K}$

UNILUX Univerzal

This model is of the widest application in our country, with improved acoustic and thermal properties. It is especially suitable for new buildings with high requirements regarding thermal conductivity and sound properties, as well as for old buildings. It was developed entirely with domestic technology and from domestic materials.



profile section



Profile characteristics

Profile thickness: 82 mm

Glass 4+16+4, low-E glass with argon gas fill

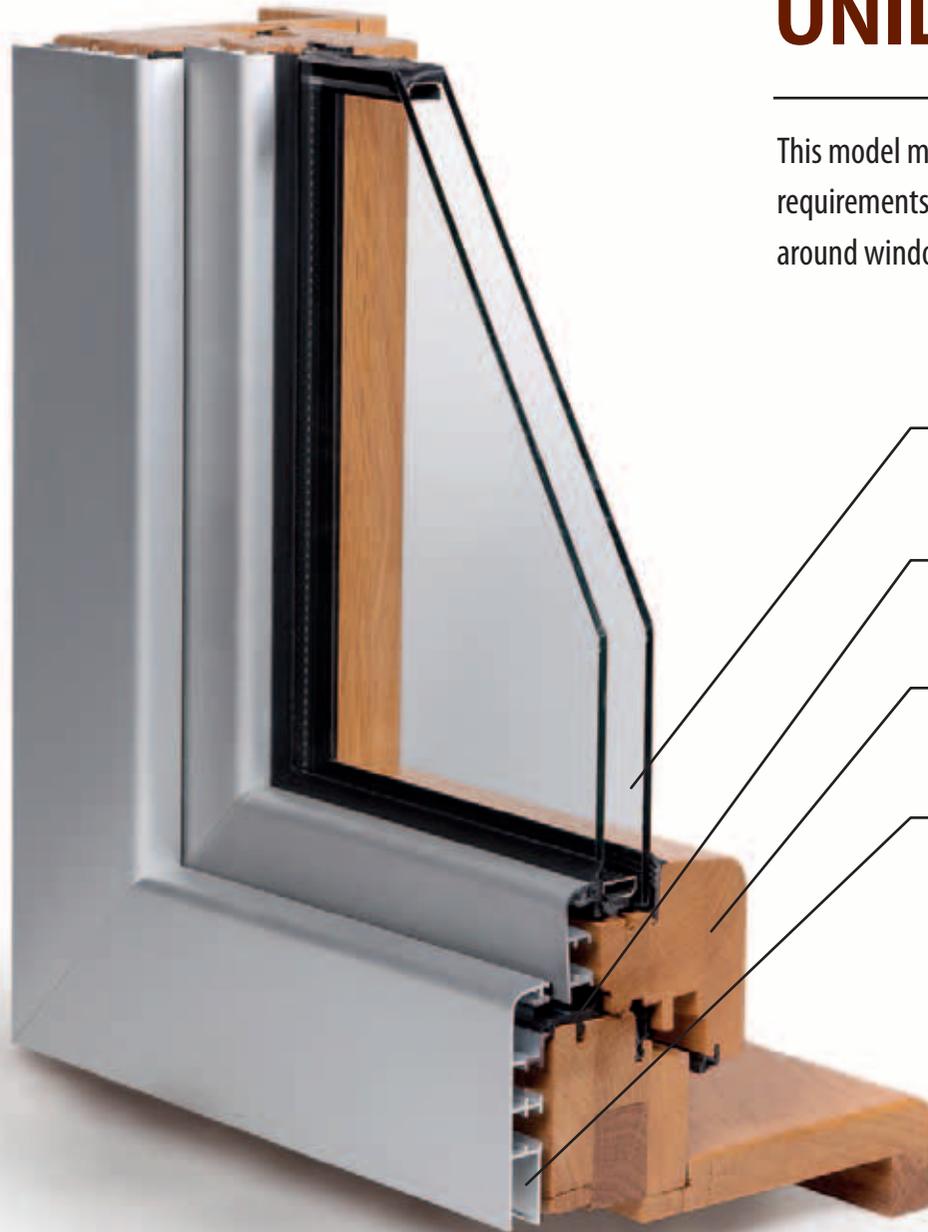
Rubber – 6 pcs.

Available in all colours, except bleached colour

U-value: less than $1.28 \text{ W/m}^2 \text{ } ^\circ\text{K}$

UNILUX Lux

This model meets high thermal and acoustic requirements, as well as aesthetic requirements. It is the same as model "Universal", with additional parapet cladding around windows, doors and radiator covers.



double pane unit

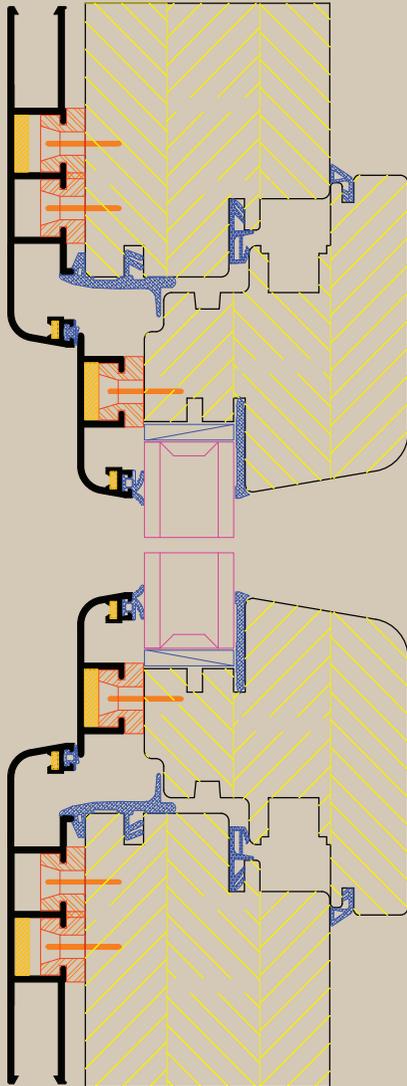
sealing rubber

wooden profile

aluminium cladding
with weep holes
for water drainage



profile section



Profile characteristics

Profile thickness: 82mm

Glass 4+16+4, low-E glass with argon gas fill

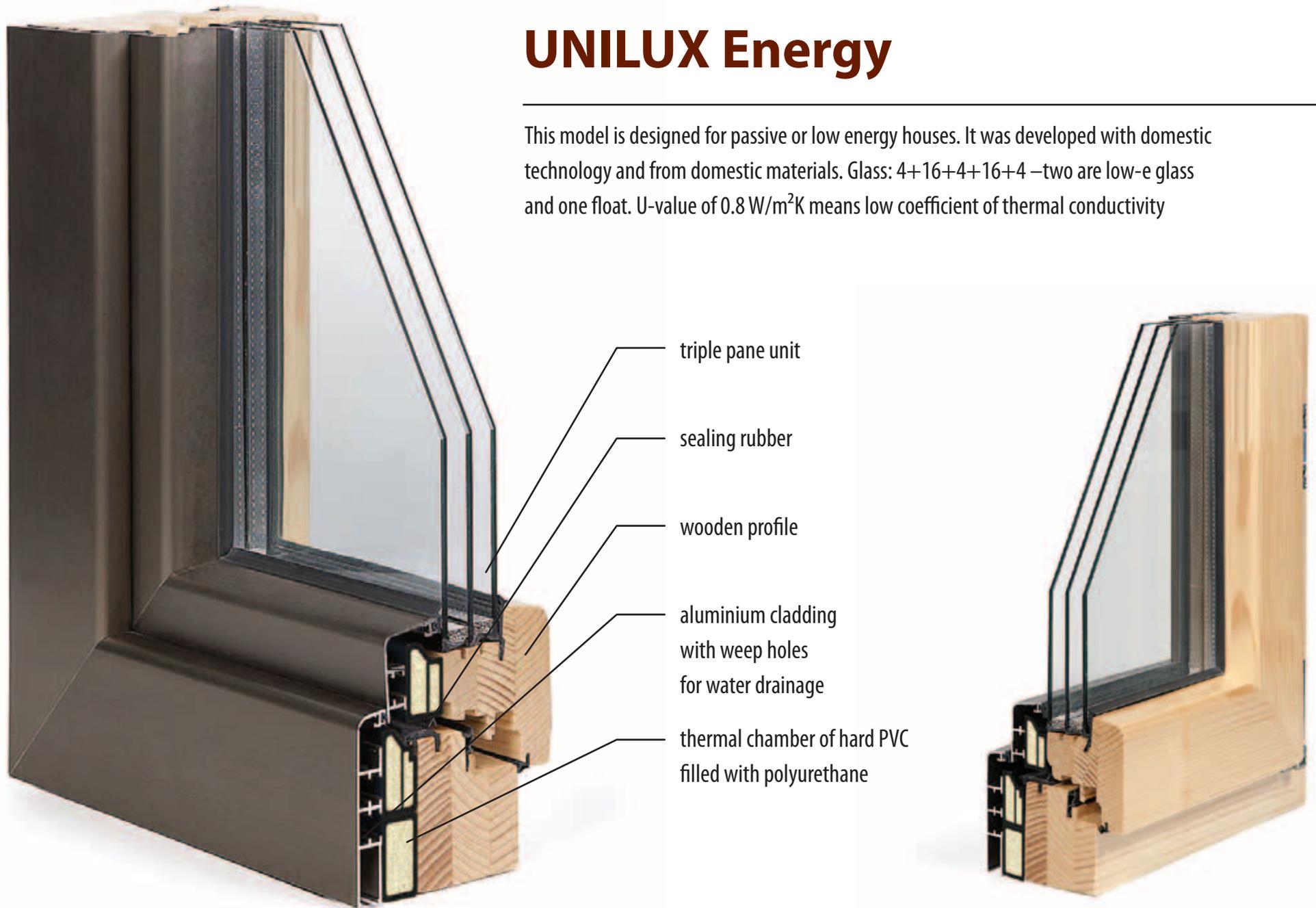
Rubber: 6 pcs.

Available in all colours, except bleached colour

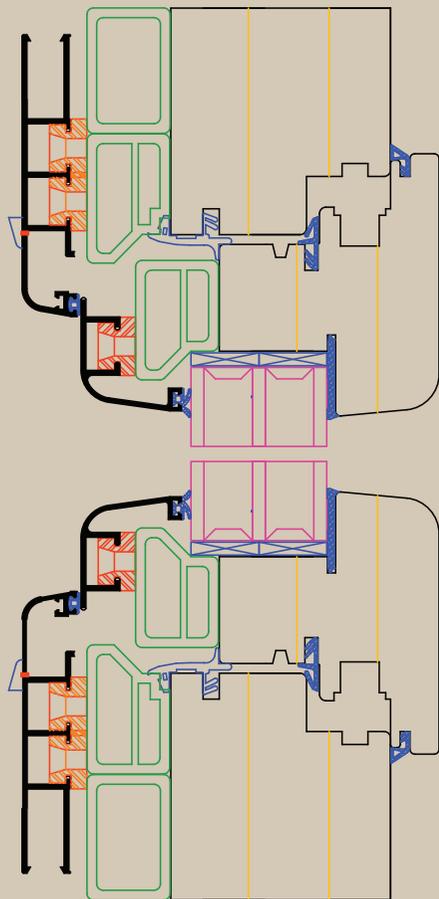
U-value: less than $1.28 \text{ W/m}^2 \text{ } ^\circ\text{K}$

UNILUX Energy

This model is designed for passive or low energy houses. It was developed with domestic technology and from domestic materials. Glass: 4+16+4+16+4 – two are low-e glass and one float. U-value of 0.8 W/m²K means low coefficient of thermal conductivity



profile section



Profile characteristics

Profile thickness: 82mm

Glass 4+16+4+16+4, low-E glass with argon gas fill

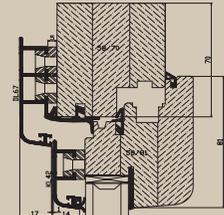
Rubber: 6 pcs.

Available in all colours

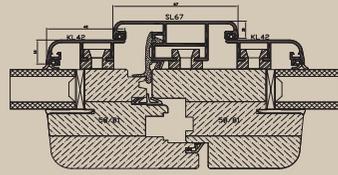
U-value: less than 0.8 W/m²·K



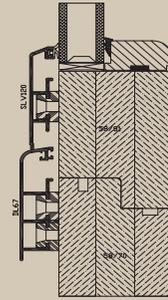
typical facade joinery details



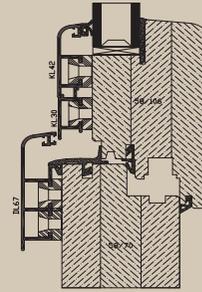
Tilt and turn 1-leaf window



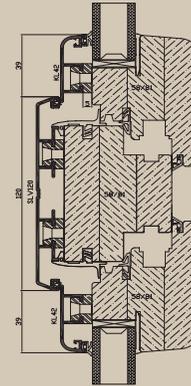
Tilt and turn 2-leaf window



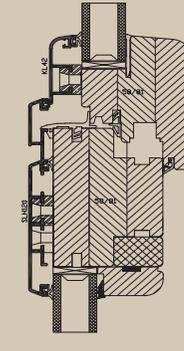
Fixed with parapet



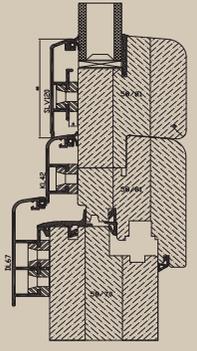
Patio door with parapet



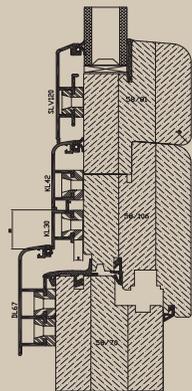
2-leaf window with horizontal bar



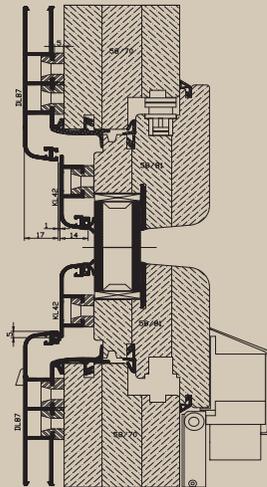
Window with one fixed



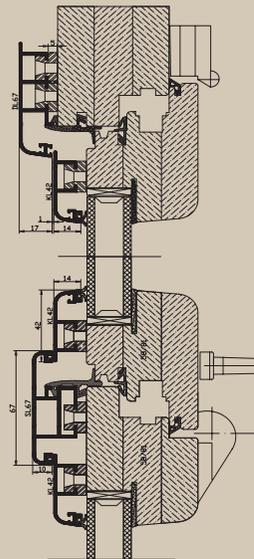
Patio door with parapet



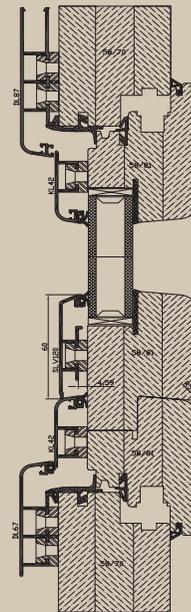
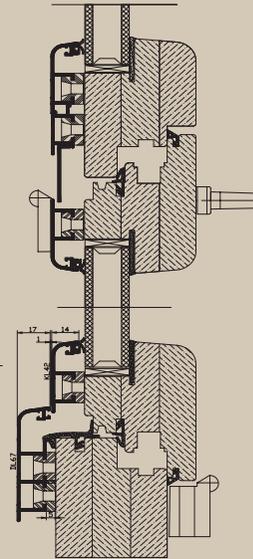
Patio door with parapet



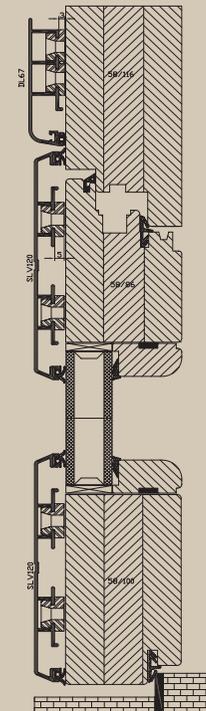
Tilt and slide patio door



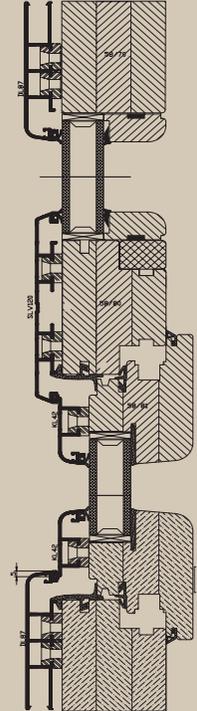
Folding patio door



Folding patio door



Outward opening patio door



Tilt and slide patio door

hardware



painting of aluminium

COLOUR ANODIZING



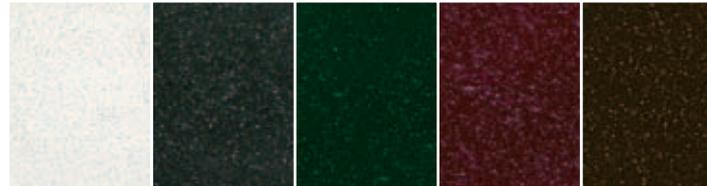
EO

E1

E2

E4

POWDER COATING



bianco

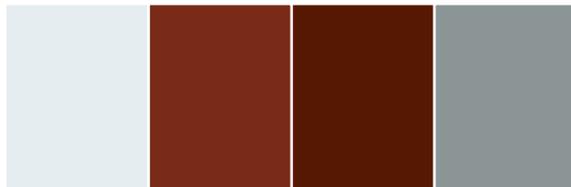
grigio

verde

rosso

marone

RAL COLOUR



9016

8012

8017

9006

WOOD GRAIN



Light walnut

light oak

dark walnut

mahogany

lighter white wood

dark oak

maple

darker light wood

painting of wood

Č10

Č11

Č12

Č13

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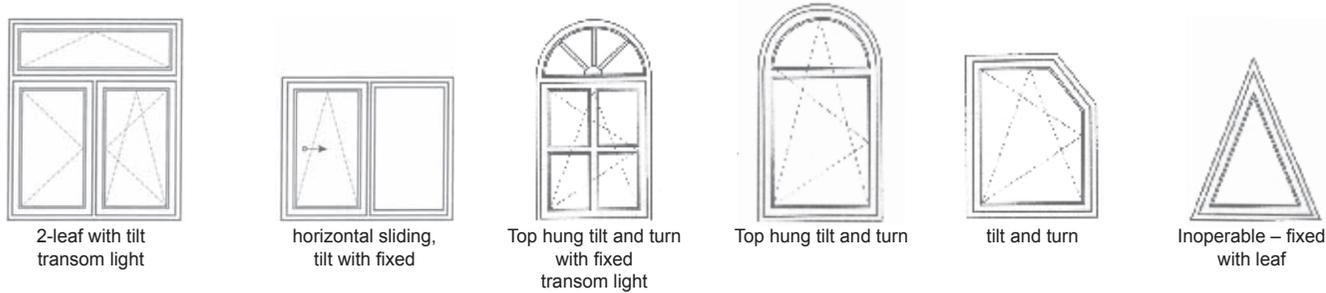
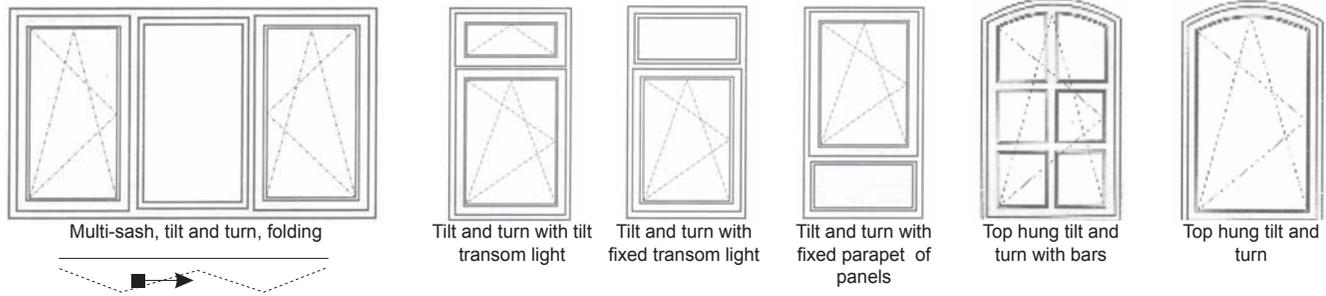
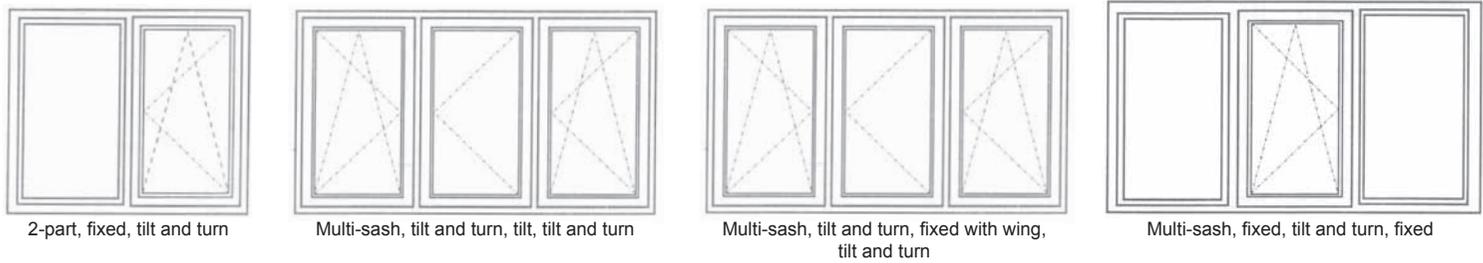
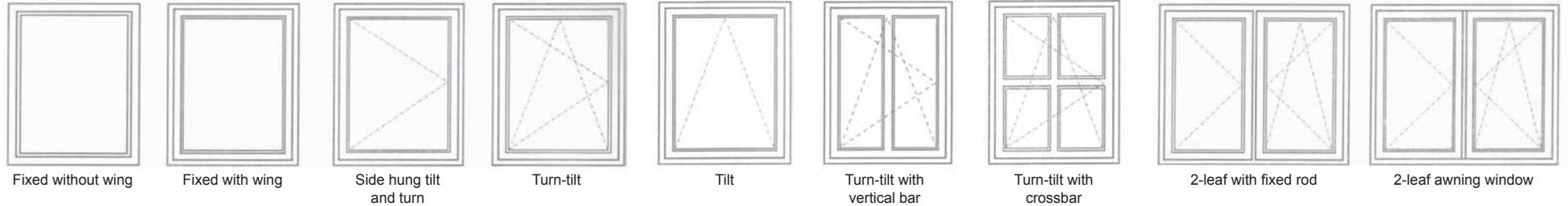
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Č16

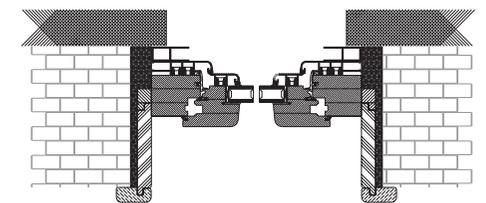
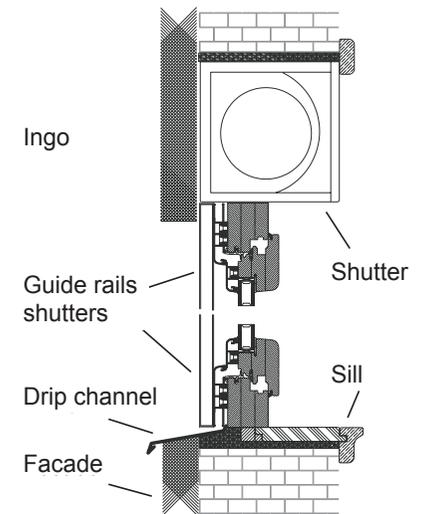
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typical models of facade joinery



Installation detail including shutter



glass

Glass is the most important element of the window. Between 60% and 90% of a fixed window area is made up of glass. Thermal properties of a window depend on up to 90% of thermal properties of used glass. Joints between glass unit and frame must prevent air and water penetration. Depending on the desired properties of windows, following kinds of glass may be installed: standard thermal pane glass, glass with improved thermal properties (triple thermal pane glass,

low emmission glass, climaguard solar glass, stopsol glass), with a possibility of inert gas filling the space between panes. There are kinds of glass with improved mechanical properties: laminated (pamplex), tempered, multi-layer laminated glass, and with improved acoustic properties, which directly influences the weight of glass. Some properties of the most commonly used glass are given in the table below.



Double pane unit

DESCRIPTION	GLASS PROPERTIES		
	U_g	U_v	R_w (dB)
Standard thermal pane unit	2.7	47	30
Thermal pane unit with e-low glass	1.4	21	30
Thermal pane unit with low-e glass and argon gas fill	1.1	21	30



Triple pane unit

Standard thermal pane unit	2.0	38	32
Thermal pane unit with e-low glass	1.5	18	32
Thermal pane unit with low-e glass and argon gas fill	1.0	18	32

U_g – Heat transfer coefficient of glass

U_v – Coefficient of UV permeability

R_w (dB) – Sound insulation



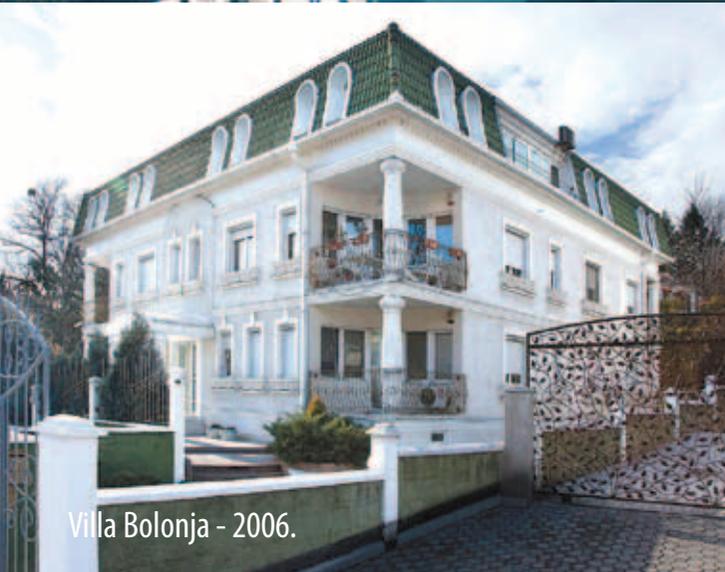
Building in Novi Sad - 2010.



Complex Panorama - 2005.



Villa Firenca - 2010.



Villa Bolonja - 2006.



Villa Firenca - 2010.



Building C-7- Kumanovska Str - 2006.



Apartment in Vracar - 2008.



Building in Deligradska Str - 2007.



Villa in Vrsac 2 - 2006.



House in Kosancicev venac - 2002.



Villa in Vršac - 2007.



Apartment in Vracar - 2008.

REFERENCE LIST (Excerpt)

- Complex PANORAMA – Banjica (behind the Orthopedic Hospital) - 11 residential buildings
- Filling/bottling plant – Indjija – area of 500m²
- Building for Belgrade Water Enterprise in Danijelova Str. – area of 800m²
- Building KOLUBARA –42 Sanja Živanović Str., Senjak, Belgrade – area of 300m²
- Building C – 7 – Kumanovska Str., Belgrade – area of over 300m²
- Known salaš in Čenej 3161 – in the shape of turtle – area of over 300m²

Some of over 100 villas are:

- Villa Bolonja, Villa Firenca – Lisički potok, Belgrade
- Villa, Tolstojeva Str., Belgrade
- Villa and swimming pool (continuous facade –wood-aluminium and aluminium) in Telep, Novi Sad
- Villas in Podgorica, Budva, Žabljak, Montenegro
- Clinical Centre in New Belgrade
- Ethnographic museum in Belgrade
- Residential building, Bokeljska and Rudnicka Str., Belgrade; area of 3000m²
- ALU FONSTER I MALMO – SWEDEN – Wood-aluminium front door

