

WINDOWS 2016

**M SORA**

Have your own perspective



# CENTURY OLD IDEAS

Rediscovering natural materials and traditional techniques is what our customers expect us to work on. We have been collaborating with nature for almost a hundred years and have never neglected our ancestors' experience.

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Žiri used to be an island of human habitation in the green expanse of virgin forests. There used to be a lot of excellent joiners and carpenters in our area and it comes as no surprise their workshops have survived for the last 100 years. In one of these workshops a new trend emerged: manufacturing of doors and windows. It was the predecessor of the many door & window manufacturing facilities today.

Through time the names have changed but patience & ingenuity of our hardworking employees have always been the backbone of M SORA; and the little plant continued to grow. Finally the new M SORA emerged – a company of dedicated masters.

The M SORA of today is a modern company based on continuous intertwining of tradition and innovation, knowledge and experience. The company constantly pursues research, tests new materials and discovers new horizons. That's why our windows can stand the test of time.

M SORA windows are recognized as excellent products used with the same amount of trust by builders of individual houses and by architects of larger office buildings. The Žiri larch, pine and beech adorn windows across Europe and even in faraway Japan.

M SORA is currently the only door & window manufacturer in Slovenia performing thermographic filming of facilities and buildings, enabling its customers to discover and see energy non-efficient points.



Žiri, 1913: the oldest known photograph of the Žiri carpenters and joiners

# COMPANY OF OPEN VIEWS

Windows are not just a piece of furniture. They are our connection to the outside world and in most cases the only real breathing component of our home. Windows frame our view of the world and bring fresh air into our home.

Wood is a living material that breathes and grows with us. It connects us to the environment and freshens us up. It stops the winter chills and the summer heat. Contrary to human beings wood is almost eternal and always an architecturally interesting element.

The forests of Žiri have been a natural treasury for centuries. This is where people learned to live in harmony with nature and this is where our renowned masters of carpentry come from. Living so close to nature has taught us to cherish traditional ways. That is why most of our windows are made of wood - except when modern cutting-edge technology makes a more permanent and reliable solution possible.

The fact that M SORA is not a factory is actually the best description of our windows. M SORA is a company of experienced masters united through commitment to their work, knowledge and experience.





Privately owned building, Slovenia, architecture: Marjeta Černe

# WE CAN PROMISE YOU PERFECTION

It may be too much to say that we are in love with windows. But we are - without doubt - passionate experts and our windows are manufactured to perfection using cutting-edge technology. Finding similar top quality windows on the market is therefore no easy task.

## **YOUR WINDOW WILL BE A MAGNIFICENT AND NOBLE PRODUCT**

Do not be misled by the simplicity of appearance. Each window is made of approximately 70 components. Quality depends on the commitment and experience of all the employees involved in the creation of these beautiful products. Their commitment is seen everywhere - you can see it in every detail; you can touch it on the subtle surfaces and feel it standing in front of the window. They are the fine details making your window one of a kind.

## **YOUR WINDOW WILL BE AS NATURAL AS POSSIBLE**

Wood is the finest construction material and a great choice for window making. It breathes, saves energy, gives every room a magnificent appearance and lasts longer - it can and may outlive you. Our wood coatings are water based - enabling your home to breathe and making you comfortable. Wood windows will transform your home into your very private cozy health center.

## **YOUR WINDOW IS CUTTING-EDGE TECHNOLOGY**

No matter which window model you choose, each and every part of it will undergo a careful process involving centuries of experience and cutting-edge technology. This technology is used only if it can do a better job than man: it for example cuts wood with greater precision and without error - and is more reliable in applying color and coatings.



Ortenia, Apartments in Nature, Podčetrtek, Slovenia; architecture: Petra Ostanek and Tinka Prekovič, Ostanek Prekovič Arhitektura





Wood is a noble natural material endowing windows with durability, insulation qualities and a nice appearance.



# BIRTH OF YOUR WINDOW

## NO HIDDEN DEFECTS IN YOUR WINDOW

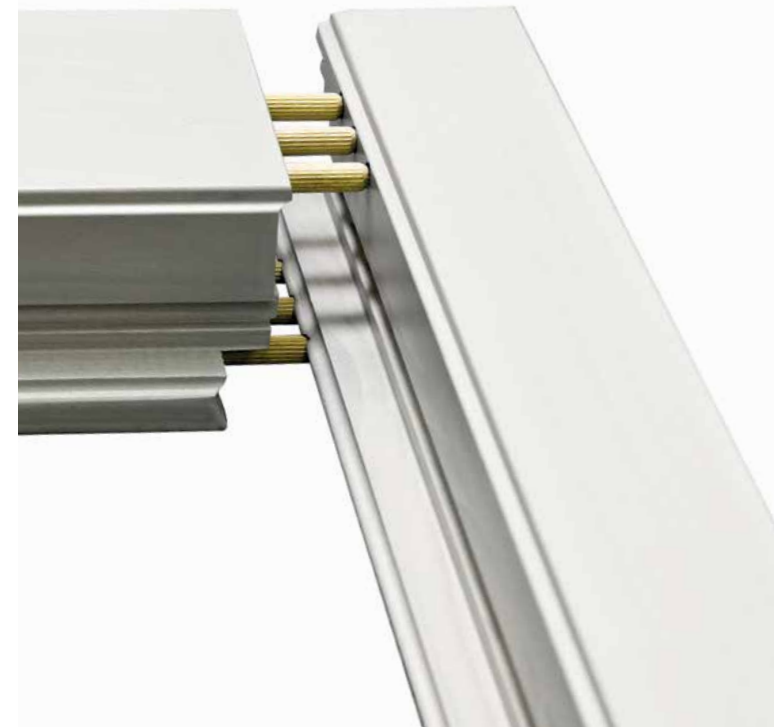
Avoiding mistakes has led us to a wonderful idea: as part of our groundbreaking production process every window component is first automatically coated/sprayed several times. That is why the finished product has no hidden or unprotected parts, unlike windows coated at the very end of the manufacturing process. The coloring too is technologically perfect as everything is done automatically. In just two steps we take care of the protection of the wood and the perfect appearance.

## PRODUCTION OF YOUR WINDOW IS ECO-FRIENDLY

Our production facilities are heated with biofuel. Water based coatings are used for wood protection. We minimize waste by making the coatings circle. Used water is recycled – thus minimizing the environmental impact. Cutting-edge eco-friendly technology now reduces the use of energy in buildings all over the world.



Only a well-programmed machine can process wood faultlessly and accurately.



Each and every window frame element is fully varnished before glueing.



# NATURE TRADITION AND TECHNOLOGY

NATURE window can be best described by an ancient wisdom: the best solutions are simple. The window concept is based on a century old tradition with the help of modern technology. The result is a simple yet generous window: generous because of the benefits it guarantees.

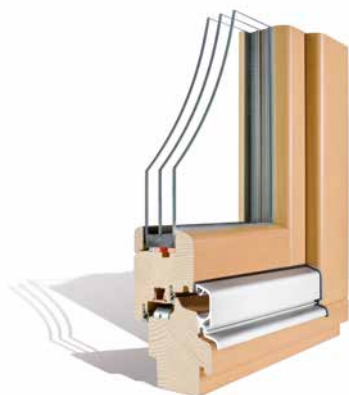


Privately owned building, Slovenia, architecture: Katarina Pepeljnak





NATURE 3



## FITTINGS

top quality fittings by a renowned European manufacturer allow one-hand opening both horizontally and vertically; it is also possible to install safety and/or concealed fittings and upperlight opening system

## SEAL

the window has two seals, third seal is optional

## WOOD

a 68mm window is made of quality wood (pine fir/larch/oak/meranty) and is glued together without finger joint



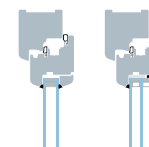
NATURE 3

## ROUND EDGES

fine round lines ensure a nicer look and at the same time also a more even coating application

## SURFACE TREATMENT

durable and environment-friendly water based coatings are available in different tones; a 10 year warranty is optional



NATURE

68

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NATURE 3

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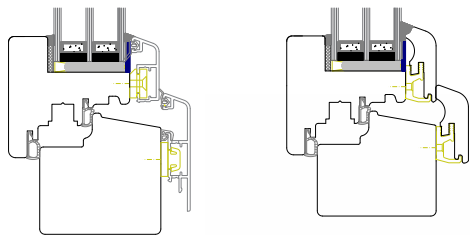
# NATURE PASSIVE SIMPLY CONTEMPORARY

NATURE PASSIVE window effectively contributes to saving energy in buildings. Energy saving & sound insulation were a top priority when designing and developing this window. But in spite of the superb insulation qualities the window preserves all other superior features – from modern design to brilliant final touches.



VDC INCE Mengeš, architecture: Jereb and Budja arhitekti





## DIFFERENT VERSIONS

### GLASS

built-in three-layer glass  
( $U_g = 0,6$  or  $U_g = 0,7$  W/m<sup>2</sup>K)

### FITTINGS

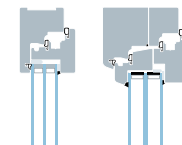
top quality fittings from a renowned European manufacturer allow one-hand opening on the horizontal and vertical axes; it is possible to install safety and concealed fittings and upperlight opening system

### SURFACE TREATMENT

durable and environment-friendly water based coatings are available in different tones

### WOOD

a 68mm window is made of quality wood (pine fir/larch/oak/meranty) and is glued together without finger joint



NATURE  
PASSIVE

NATURE  
E112

68

113

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NATURE PASSIVE

M SORA

# NATURE OPTIMO SUSTAINABLE BALANCE

NATURE OPTIMO is a novelty, which is distinguished by all advantages of NATURA windows – optimized thermal efficiency, wisdom of tradition and cutting-edge technologies. Window profile is thicker, which additionally contributes to reduced energy losses and sound transmission. A fresh shape connects the frame and the casement into a straight line, undersigned by an impressive modern look.



Privately owned building, Slovenia, architecture: Ravnikar | Potokar Arhitekturni biro





## Timber

### 1. Price

NATURE OPTIMO XLT



## GLASS

built-in three-layer glass  
( $U_g = 0,5$  or  $U_g = 0,6$  or  $U_g = 0,7 \text{ W/m}^2\text{K}$ )

## FITTINGS

top quality fittings from a renowned European manufacturer allow one-hand opening on the horizontal and vertical axes; it is possible to install safety and concealed fittings and upperlight opening system

## SURFACE TREATMENT

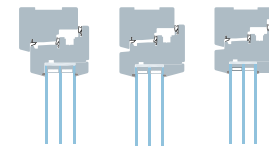
durable and environment-friendly water based coatings are available in different tones

## WOOD

a 92 or 110mm window is made of quality wood (pine fir/larch/oak/meranty) and is glued together without finger joint



NATURE OPTIMO



NATURE OPTIMO	NATURE OPTIMO L	NATURE OPTIMO XL
93	93	110
107	116	116
•	•	•
•	•	•
•	•	•
•	•	•
•	•	•
•	/	/
•	•	/
•	/	/
•	•	/
•	/	/
/	/	/
/	/	/
0,89	0,88	0,86
0,82	0,81	0,79
0,74	0,73	0,71

# VISION ELEGANT AND INNOVATIVE

The VISION window is designed and created in the spirit of modern, innovative approaches to architecture. With this window, wood is not visible on the external side, because the entire outer surface is elegantly covered by an innovative combination of insulation glass and an enamelled edge.



Privately owned building, Slovenia, architecture: Božo Č. Rozman — arhitekturni biro bcr





VISION

## GLASS

The triple-pane window with an enamelled edge  
( $U_g = 0,5$  or  $U_g = 0,6$  or  $U_g = 0,7$  W/m<sup>2</sup>K)

## ALUMINIUM

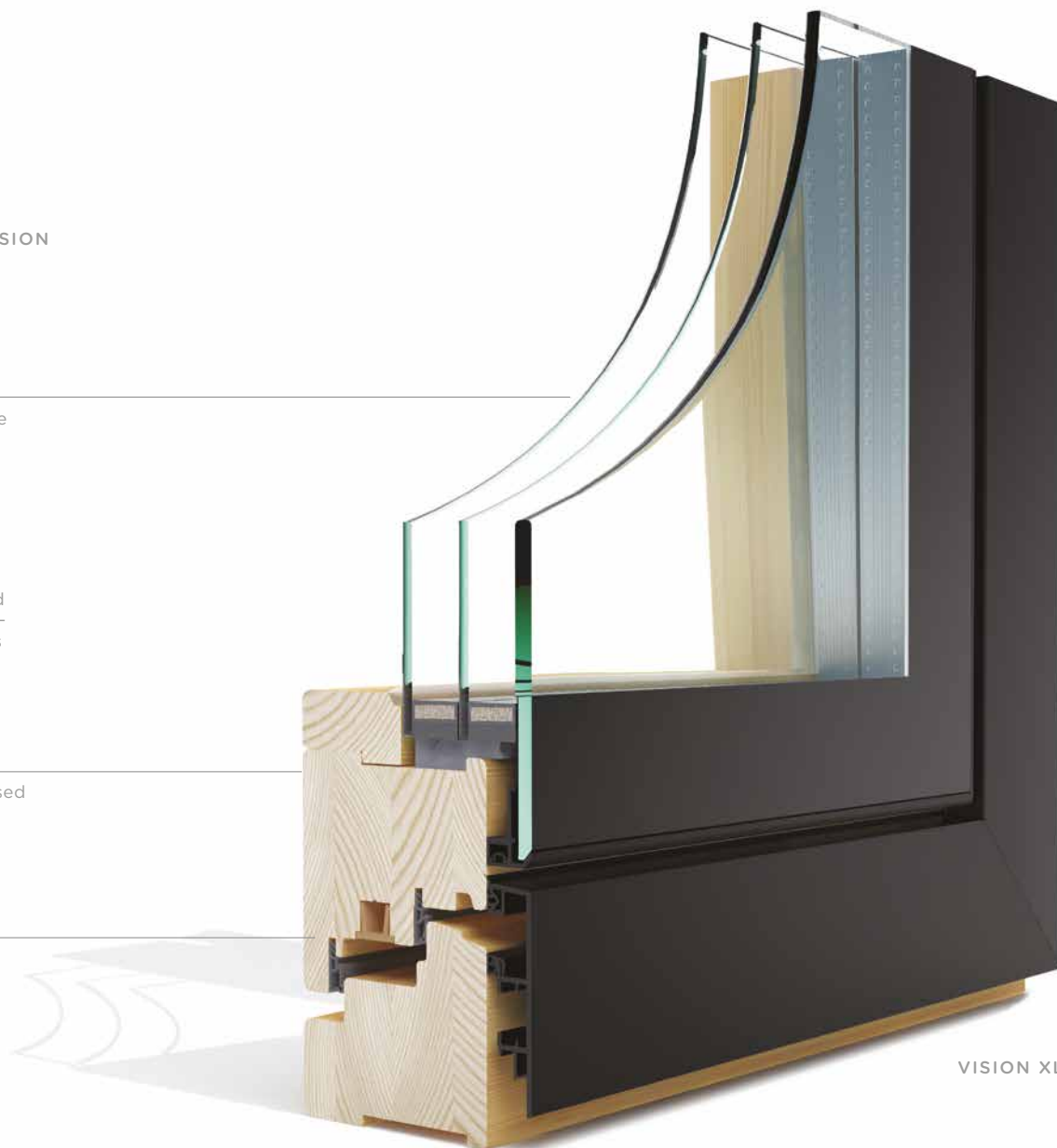
Aluminium effectively protects the external surface of the window against the elements and humidity. A wide variety of colours is available – from RAL colours to Antico colours and colours which mimic the different types of wood

## SURFACE COATING

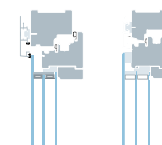
Durable and environmentally-friendly water-based coatings are available in a variety of shades

## WOOD

The window profile is 92 or 110 mm thick and made of quality wood (spruce, fir, larch, oak, meranti, pine) and sealed without a visible longitudinal joint



VISION XL



VISION	VISION XL
85	92
113	122
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/	/
/	/
/	/
/	/
/	0,94
0,88	0,87
/	0,80

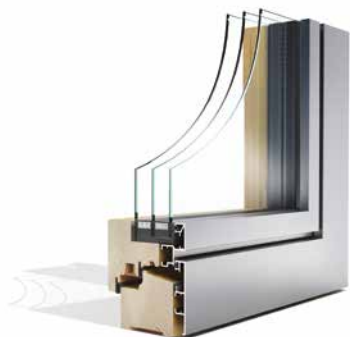
# COMFORT SIMPLY COMFORTABLE

COMFORT window is warm and friendly on the inside, firm and durable on the outside. The interior appearance of your window can be adjusted to match your furniture; the outside appearance of the window can match the facade.



Privately owned building, Slovenia, architecture: Miha Kajzelj, Mojca Gregorski; Modular arhitekti

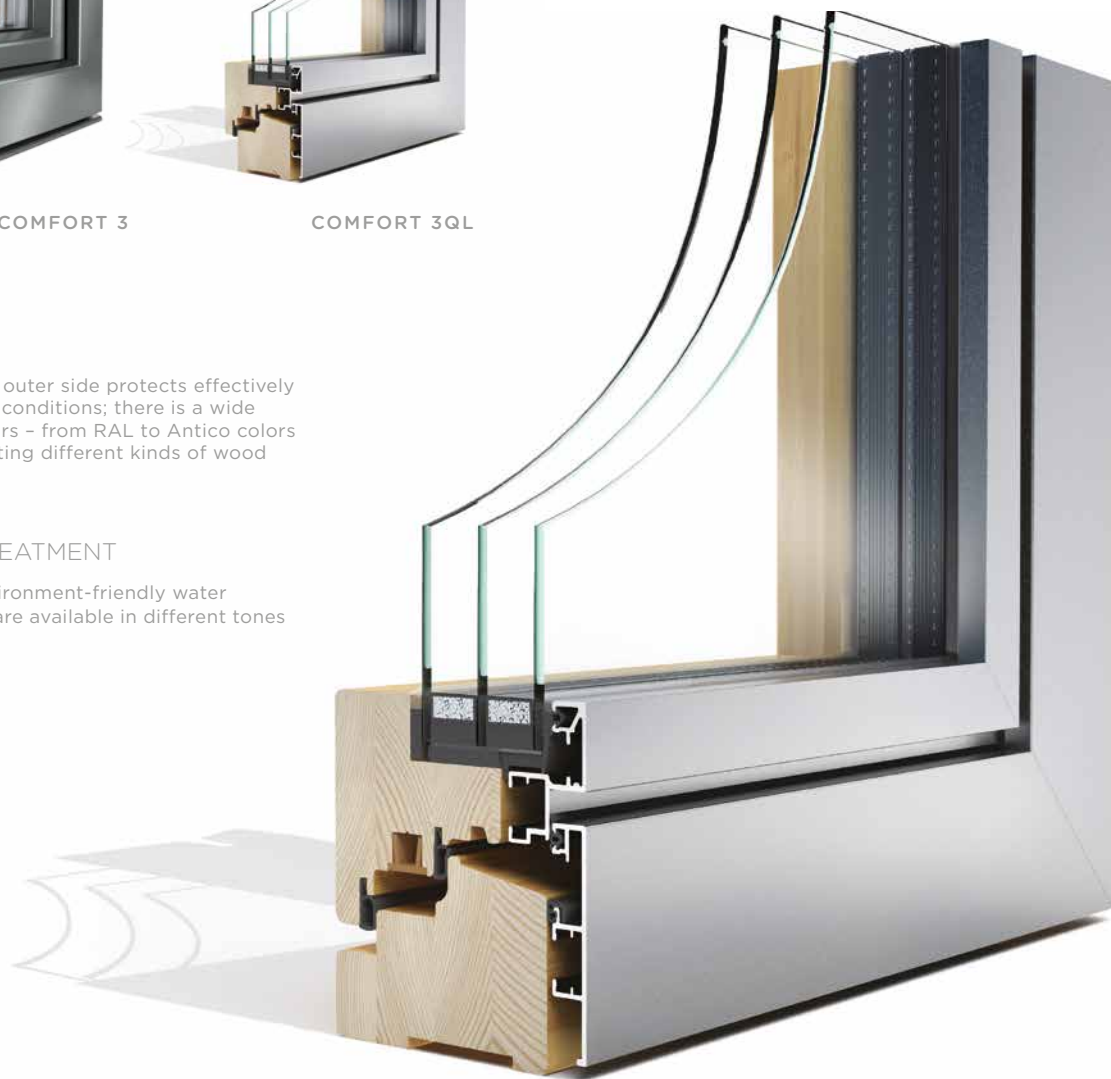




COMFORT 3QL

the mask on the outer side protects effectively against weather conditions; there is a wide selection of colors - from RAL to Antico colors and colors imitating different kinds of wood

durable and environment-friendly water  
 based coatings are available in different tones



100

108

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0.95

0.88

0.80

M SORA

# COMFORT PASSIVE DECISIVE PARTICULARITIES

COMFORT PASSIVE is a window successfully combining two positive characteristics of two noble materials. The wood part on the outer side of the window is joined with aluminum for better durability, appearance and energy efficiency. The additional third pane makes all these qualities of the window even better.



Privately owned building, Austria, architecture: Ana Ocic, Robert Lamprecht — Pixlab studios





COMFORT  
PASSIVE

85

107

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0,98

0,92

0,83

## GLASS

built-in three-layer glass  
( $U_g = 0,5$  or  $U_g = 0,6$  or  $U_g = 0,7$  W/m<sup>2</sup>K)

## FITTINGS

top quality fittings from a renowned European manufacturer allow one-hand opening on the horizontal and vertical axes; it is possible to install safety and concealed fittings and upperlight opening system

## ALUMINUM

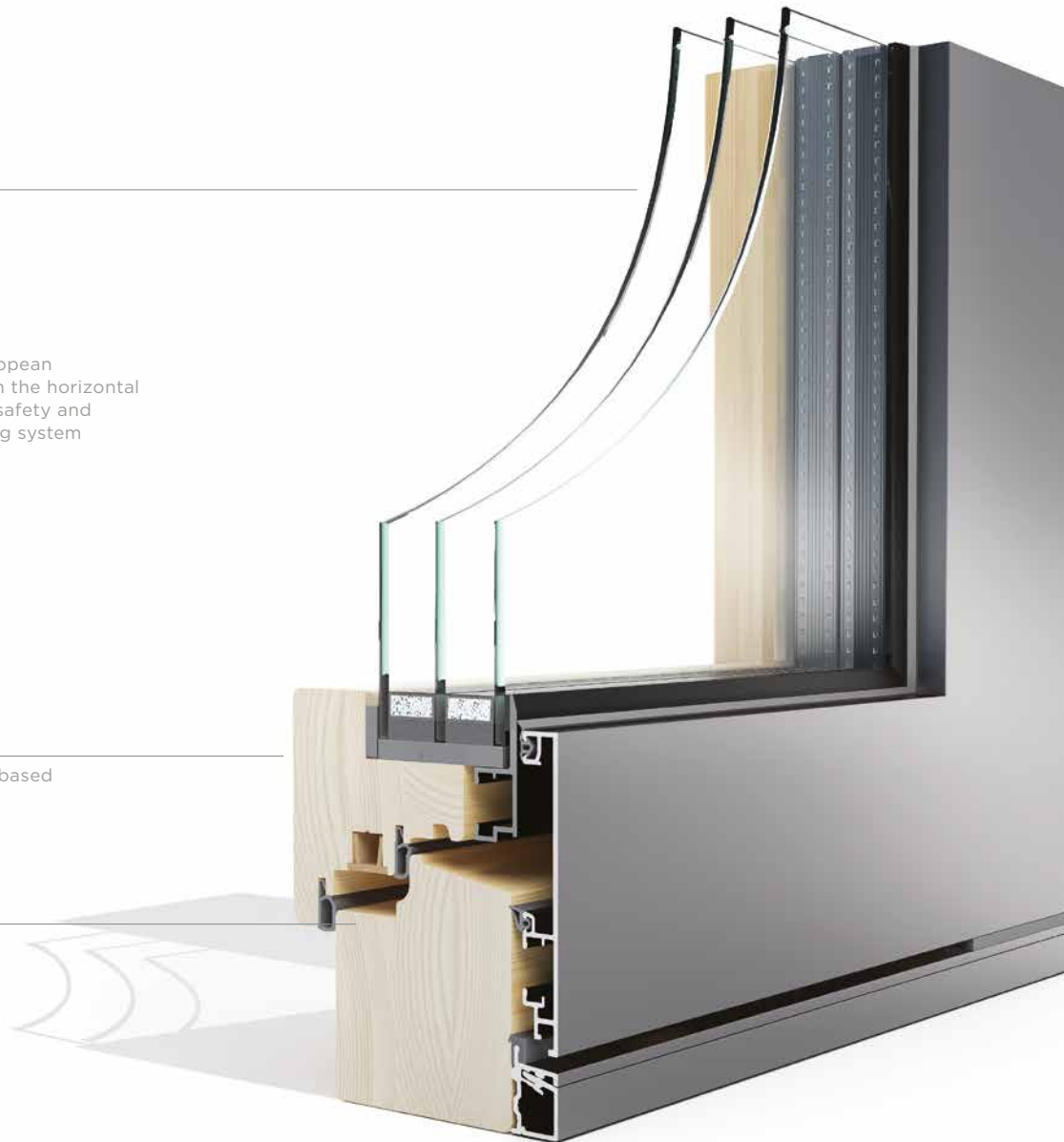
the mask on the outer side protects effectively against weather conditions; there is a wide selection of colors – from RAL to Antico colors and colors imitating different kinds of wood

## SURFACE TREATMENT

durable and environment-friendly water based coatings are available in different tones

## SEAL

the window has two seals, third seal is optional



COMFORT PASSIVE

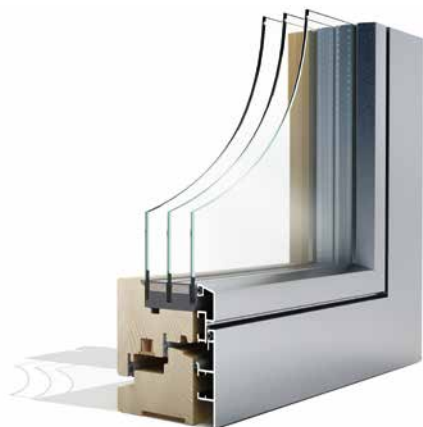
# COMFORT OPTIMO ENERGY EFFICIENCY

COMFORT OPTIMO is a window with clear lines, which boldly complements contemporary-shaped architecture. Trendy look is particularly emphasized by levelled window frame and casement, and thanks to its thicker profile this window is also an expert on thermal efficiency. Aluminium-coated exterior can be colour-adapted to fascinating trends or easy-going needs. The most sought-after panoramic windows provide a wide passage with a very small surface intended for opening.

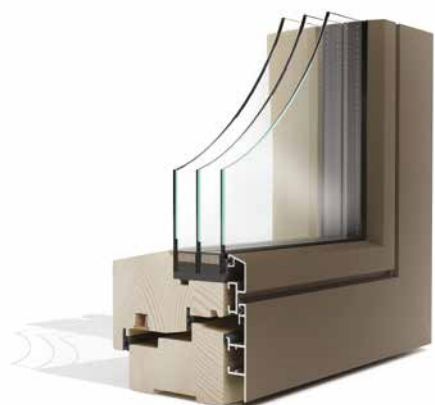


Privately owned building, Slovenia, architecture: Božo Č. Rozman — arhitekturni biro bcr





COMFORT OPTIMO XLS



COMFORT OPTIMO L

## GLASS

built-in three-layer glass  
( $U_g = 0,5$  or  $U_g = 0,6$  or  $U_g = 0,7$  W/m<sup>2</sup>K)

## FITTINGS

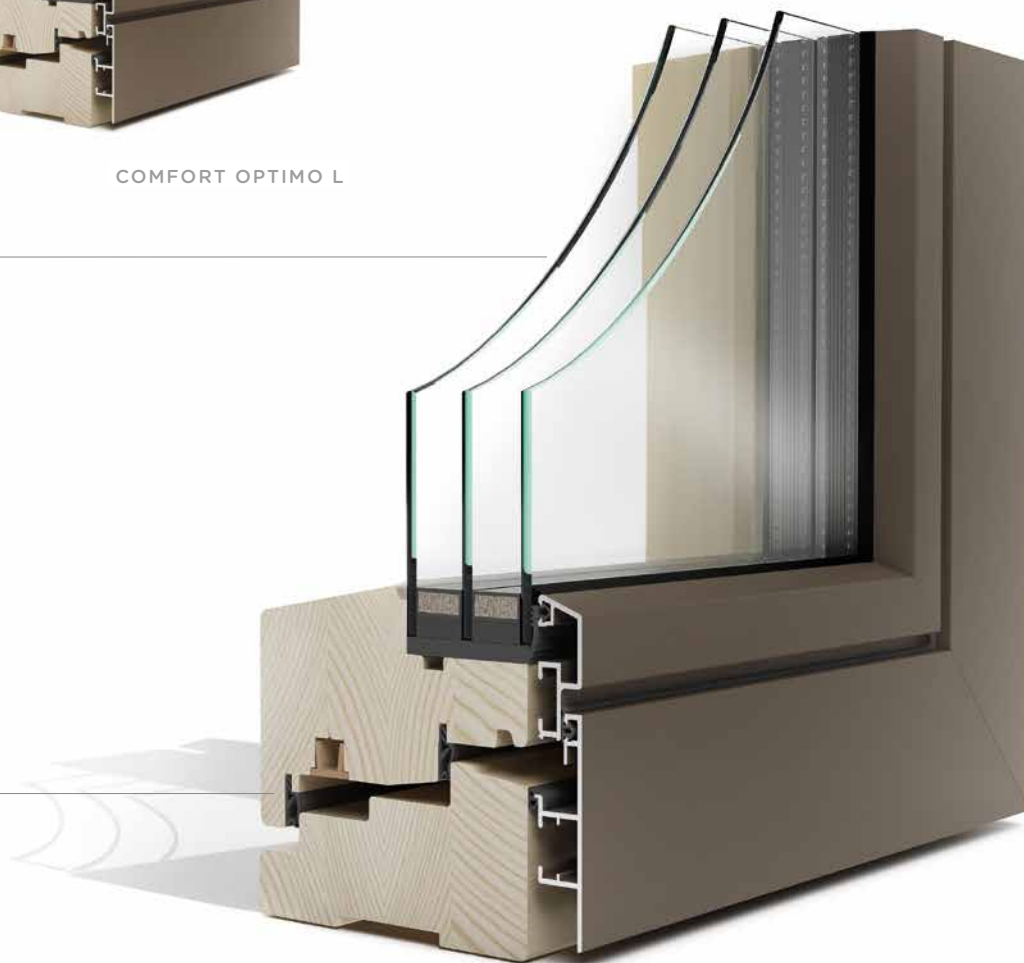
top quality fittings from a renowned European manufacturer allow one-hand opening on the horizontal and vertical axes; it is possible to install safety and concealed fittings and upperlight opening system

## ALUMINUM

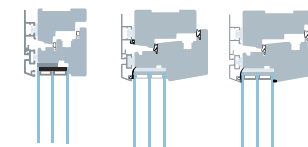
the mask on the outer side protects effectively against weather conditions; there is a wide selection of colors – from RAL to Antico colors and colors imitating different kinds of wood

## WOOD

the 92 or 112 mm thick window profile with a patented system of air pockets has been made of quality timber (spruce/fir/larch/oak/meranti/pine) and glued without a visible longitudinal seam. In order to better fit other furniture, windows can also be made of walnut, pearwood, cherrywood, etc.



COMFORT OPTIMO XL



COMFORT OPTIMO XLS	COMFORT OPTIMO L	COMFORT OPTIMO XL
95	113	130
104	107	107
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/	/	/
/	•	/
/	/	/
/	/	/
/	/	/
/	/	/
0,92	0,89	0,88
0,85	0,82	0,81
0,76	0,73	0,73







# PANORAMIC WINDOWS

## OPENING THE VIEWS

A panoramic window brings light into your home; it instantly inspires and links you with the great outdoors. Panoramic windows are also an effective means to improve the quality of life because they enhance the mood, minimize lack of space problems and provide a better use of space.



Sliding wall can be opened without extending into the interior space.

The most searched panoramic walls offer a wide transition at a very small area for opening.

Strong construction and quality hardware guarantee flawless performance for years to come.

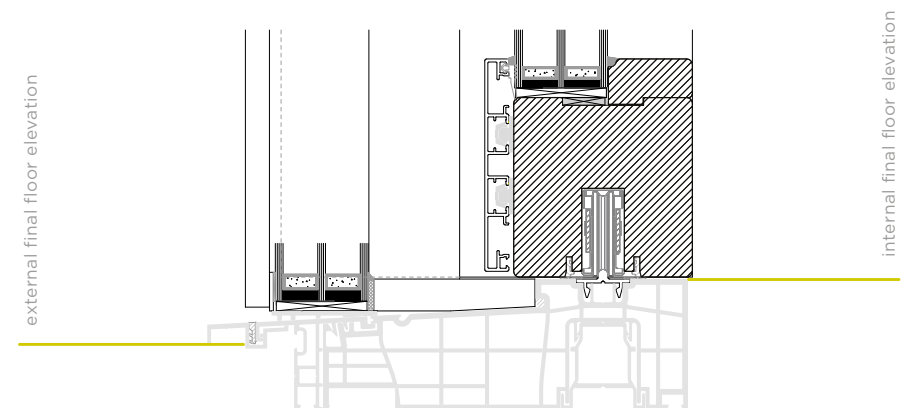
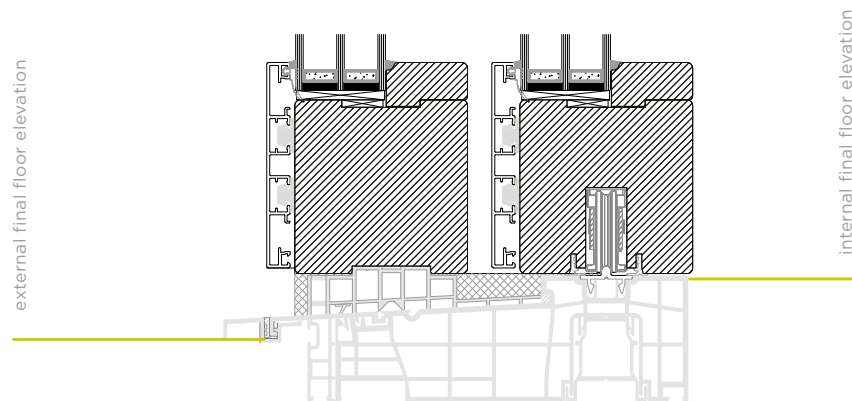




**Classical sliding wall**



**Panoramic sliding wall**









Glass corner outside



Glass corner inside



Panoramic fixed glazing in combination with the balcony door





Panoramic fixed glazing







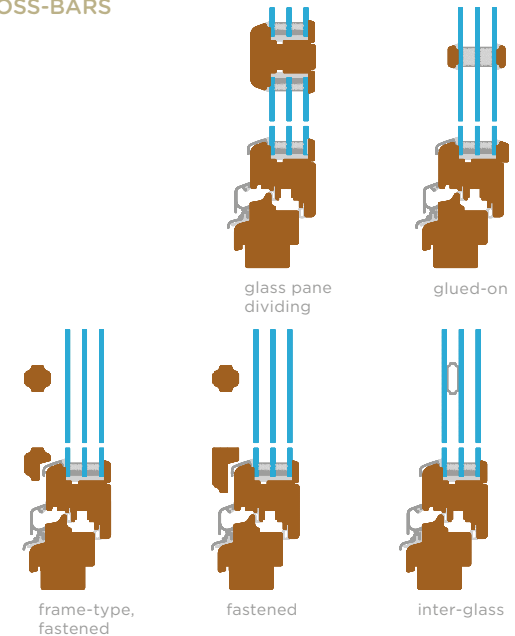
# SHADES

## THOUGHTFUL EMPHASES

M SORA searches for new solutions every day: how to remove functional obstacles, how to transform different dwellings into comfortable apartments and inspirational places to work. That is why we manufacture a wide selection of quality products - thus enhancing the use value of a window or any other product.



### CROSS-BARS



#### glass pane dividing

Solid wood crossbars of various widths divide the glass into several parts

#### glued-on

wood laths glued on the glass from both sides; an aluminum spacer fitted between the glass;

#### frame-type, fastened

wood grid with a frame, fastened to the external side of the window

#### fastened

removable frameless grid, fastened to the external side of the window

#### inter-glass

a brass or aluminum grid of different colors fitted in the inter-glass space; no obstruction to cleaning.



OUTSIDE BLINDS



ZIP SCREEN



INSECT SCREENS



## THERMAL CONDUCTIVITY OF WINDOWS

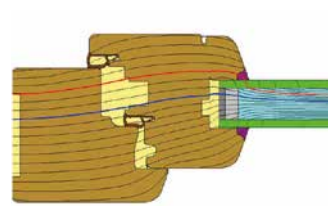
A special feature of M SORA windows is a built-in TGI spacer providing better insulation than aluminum.

Cutting-edge technology helps us to check points where mould and condensation are most likely to occur.

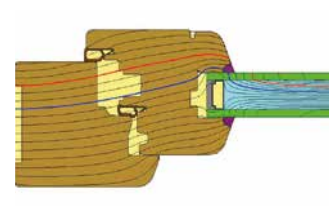
## CONSULTING

Thermographic consulting gives you an insight into the insulation qualities of buildings (whole buildings or just parts of them). Special high-tech thermographic equipment is used for thermography.

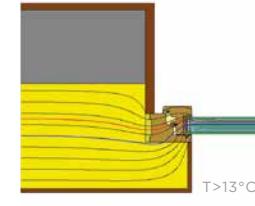
## ISOTHERM



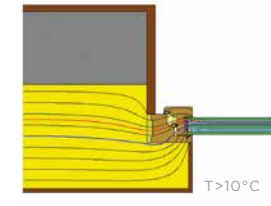
Insulate TGI



Aluminum spacer

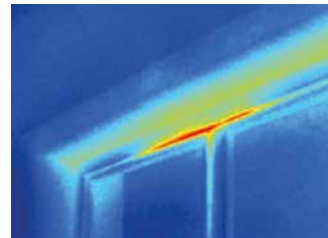


Mould control



Condensation control

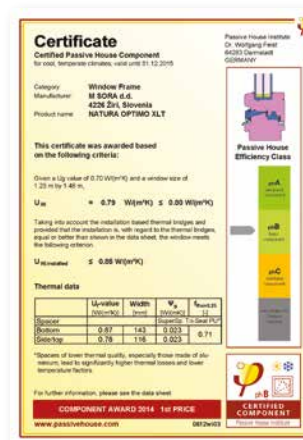
## THERMOGRAPHY



## CALCULATING THERMAL CONDUCTIBILITY



certificate



PHI Nature Optimo XLT certificate



IFT certificate Uf Nature E112



ZAG certificate Nature 3

# ADDITIONAL EQUIPMENT DETAILS THAT MATTER

## WINDOW HANDLES



Dallas window handles



Amsterdam F69 handle on panoramic window

Dallas F41-R



Los Angeles F41



Toulon



Amsterdam F69, F1/F69



Atlanta F9



Brest



Elba F55



Singapore F56



Valencia F55





## SAFETY

If safety is very important to you, you can improve it even further by installing safety fittings (WK1, WK2), special glass or heavy-duty handles (secustic).

## ENERGY EFFICIENCY

Special heavy-duty fittings ensures ventilation/airing through a minuscule aperture and prevents force entries from outside.

## AESTHETICS

When window is closed concealed fittings is not visible

## CARE & MAINTENANCE

You can extend the window's lifespan and preserve its appearance on the inner side by using the provided maintenance kit that includes cleaning liquid, special balm/conditioner and two cloths.

## WINDOW SILLS

A wide selection of inner (wood, marble, granite) and outer (aluminum, marble, granite) window sills can enhance the window's appearance and/or functionality.

## COVERING CAPS



dark brown



titanium grey



bronze

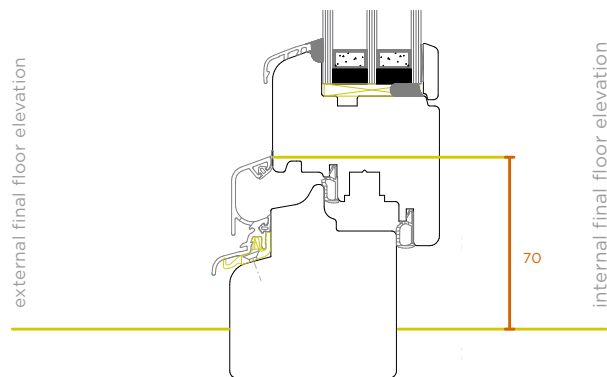


white

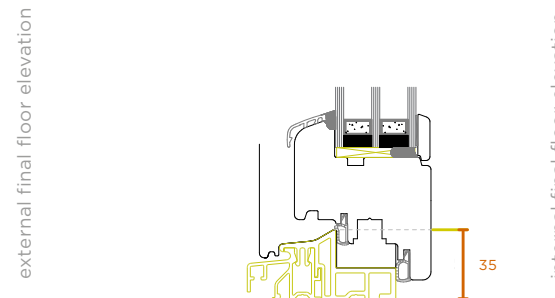


gold

## Balcony bottom classic



## Balcony bottom low (threshold)



## HINGES



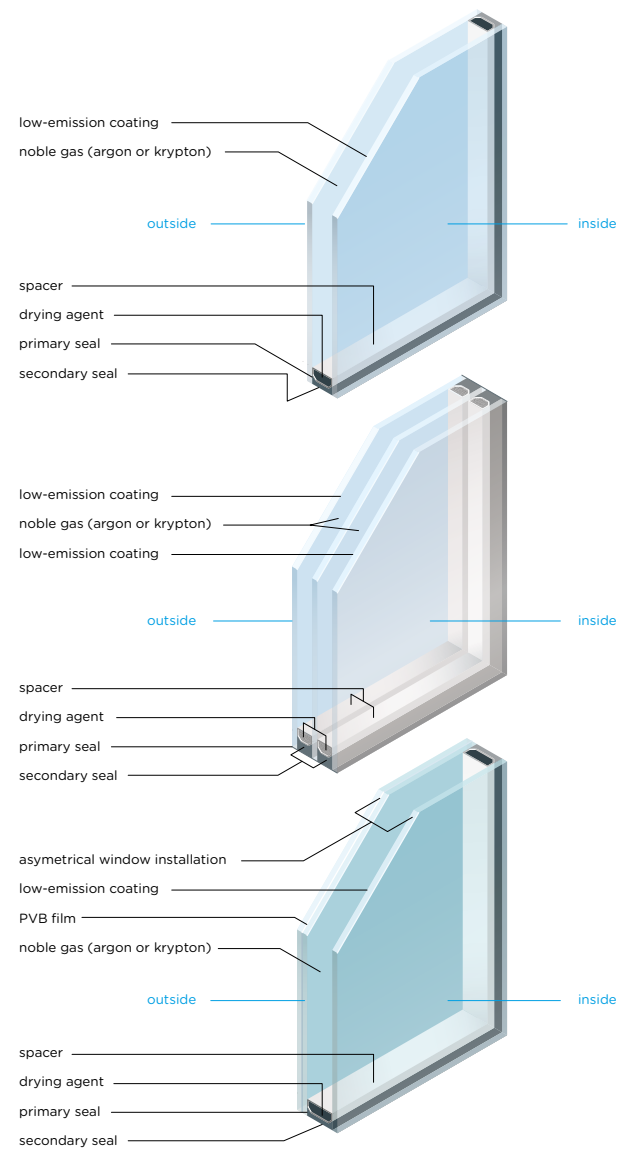
classical hinges



hidden hinges

# GLASS INVISIBLE ALLY

Glass is a precious layer between the interior and exterior living spaces. It is one of the most crucial comfort providing elements because on one side it ensures the basic functions of a window and on the other side it takes care of a lot of different – equally important – things: from obstructing views to saving the energy and sound insulation.



## Standard glazing

### RX WARM: 2-layer thermal insulation glass

Insulation glass is filled with argon or krypton gases. One glass is covered with low-emission coating.

Structure	$U_g$	LT	g	LR	Rw
4/16Ar/4 (24 mm)	1.1	80	62	13	31 (-2; -5)
	1.0	71	50	20	31 (-2; -5)

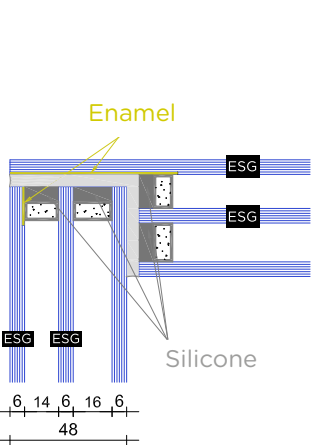
### RX WARM: 3-layer thermal insulation glass

Structure	$U_g$	LT	g	LR	Rw
4/14Ar/4/14Ar/4 (40 mm)	0.7	73	62	18	31 (-2; -6)
	0.6	70	49	18	31 (-2; -6)
6/12Ar/4/12Ar/6 (40 mm)	0.8	72	60	18	36 (-2; -6)
	0.7	69	48	18	36 (-2; -6)
6/14Ar/6/16Ar/6 (48 mm)	0.7	72	59	18	35 (-2; -6)
	0.6	69	48	18	35 (-2; -6)
4/18Ar/4/18Ar/4 (48 mm)	0.6	73	62	18	31 (-2; -6)
	0.5	70	49	18	31 (-2; -6)

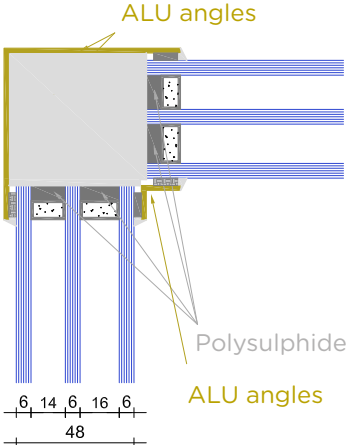
$U_g$	Thermal conductivity of glass
$U_w$	Thermal conductivity of window
LT	Transmission of visible light
LR	Reflection of visible light
g	Solar energy transmittance of glass
Rw	Sound protection



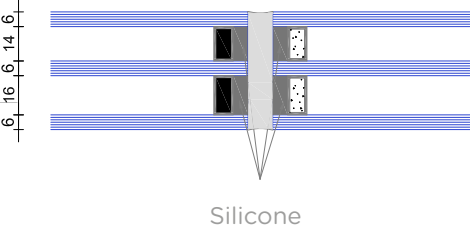
GLASS BONDING



Glass structure:  
6ESG:/14Ar/6ESG/16Ar/:6  
 $U_g = 0,6 \text{ W/m}^2\text{K}$



Glass structure:  
6:/14Ar/6/16Ar/:6  
 $U_g = 0,6 \text{ W/m}^2\text{K}$



Glass structure:  
6:/14Ar/6/16Ar/:6  
 $U_g = 0,6 \text{ W/m}^2\text{K}$



# DEVELOPMENT A VIEW TO THE FUTURE



Wood insects and fungi are organisms that attack and degrade timber, organisms that can severely cut short the lifespan of timber products. Similarly, one of the most influential factors in wood degradation is humidity – specifically wood humidity [specifically the moisture trapped inside the wood]. As a result, it is tremendously important to keep the wood dry, which can be effectively achieved in a couple of ways: with intelligent structural solutions or by protecting the wooden parts of a structure with surface coatings – or preferably, using a combination of both. Synthetic surface coatings effectively protect wood from humidification, while oils, which are commonly used in window construction, are not as effective. What's the alternative?

Within the framework of the European project WINTERWAX, M SORA is actively developing a passive window made of thermally modified spruce treated with a natural based wax, designed to provide windows with effective protection against excess or extended humidification. These innovative new window solutions are now in the process of testing in the field, in natural climatic conditions, in Žiri and Ljubljana (Slovenia), Madrid (Spain), Hanover (Germany) and Skellefteå, in northern Sweden. In addition, windows will be subjected to a demanding artificial accelerated ageing procedure in a specially developed chamber which will simulate a product life cycle of roughly 10 years. New solutions for tomorrow's challenges – today.

[www.winterwax.si](http://www.winterwax.si)

Environmental Prize 2015 for an environmentally-friendly product.



Co-founded by:





# RESEARCH AND DEVELOPMENT ACTIVITIES OF M SORA

Research and development projects represent an important part of M SORA's activities. They are either internal in nature or connected with different companies and research and scientific institutions with which M SORA has been successfully cooperating. In the last few years, a large percentage of our development activities took place within the framework of national or European projects covering everything from the field of using innovative materials to recycling wood windows at the end of their product life cycle.

## THERMAL INSULATION OF WOOD WINDOWS

One of the most important characteristics of windows is their thermal insulation or thermal conductivity. Better thermal insulation or lower thermal conductivity can be achieved by choosing a specific window profile, installing insulation materials into the window profile or using wood with lower thermal conductivity. Within the framework of the European project ECO-S (Eco-Innovation), M SORA has developed wood insulation with special air cavities which significantly contribute to thermal insulation of windows. Within the framework of the European project WINTHERWAX (Obzorje 2020), M SORA has been developing a passive window made of thermally modified spruce treated with innovative natural based waxes.



## RECYCLING OLD WOOD WINDOWS

At the end of their product life cycle, wood windows end up on landfills. After the recycling, the wooden parts are used for producing thermal energy, whilst glass is sold abroad for recycling. Within the framework of the European project CaReWood (WoodWisdom-Net), M SORA has been developing products with higher added value. Because they are made from old wood windows (i.e. recovered wood), they ensure an additional life cycle to wood. For this purpose, M SORA has organised a talent competition entitled ReWin M SORA, at which students from the entire Slovenia participated to develop and create products from old windows.



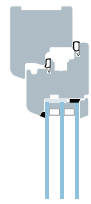
In addition to the aforementioned development projects, M SORA has been participating in other projects from the field of sustainable development, renovation of buildings and surface coatings.



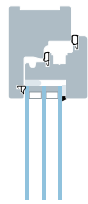
## WOOD WINDOWS



NATURE



NATURE 3



NATURE  
PASSIVE



NATURE  
E112



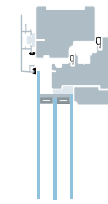
NATURE  
OPTIMO



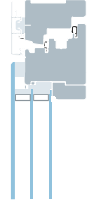
NATURE  
OPTIMO L



NATURE  
OPTIMO XL



VISION



VISION  
XL

### profile dimensions (mm / inch)

installation depth	68 $2\frac{43}{64}$	68 $2\frac{43}{64}$	68 $2\frac{43}{64}$	113 $4\frac{29}{64}$	93 $3\frac{21}{32}$	93 $3\frac{21}{32}$	110 $4\frac{1}{3}$	85 $3\frac{11}{32}$	92 $3\frac{5}{8}$
visible width	118 $4\frac{41}{64}$	122 $4\frac{4}{5}$	100 $3\frac{15}{16}$	117 $4\frac{3}{5}$	107 $4\frac{7}{32}$	116 $4\frac{4}{7}$	116 $4\frac{4}{7}$	113 $4\frac{29}{64}$	122 $4\frac{4}{5}$

### installation options

rectangular	●	●	●	●	●	●	●	●	●
oblique	●	●	●	/	●	●	●	●	●
dividing, semicircular	●	●	/	/	●	●	●	/	/

### opening options

fixed	●	●	●	●	●	●	●	●	●
combined (d & dk)	●	●	●	●	●	●	●	●	●
folding doors	●	●	/	/	●	/	/	/	/
tilt-slide doors	●	●	●	/	●	●	/	●	/
lift-slide doors	●	●	/	/	●	/	/	●	/
opening towards outside	●	●	/	/	●	●	/	/	/
2-side handle	●	●	/	/	●	/	/	/	/

### Thermal insulation of the window $U_w$ (W/m<sup>2</sup>K)



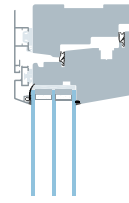
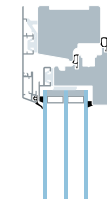
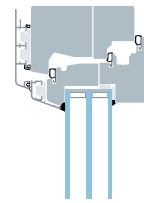
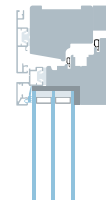
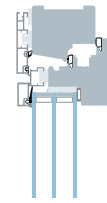
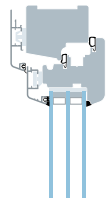
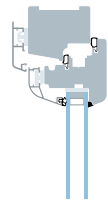
$U_g = 1,1 / 0.194 / 5.162$	1,3 0.229 4.368	/	/	/	/	/	/	/	/
$U_g = 1,0 / 0.176 / 5.679$	1,2 0.211 4.732	/	/	/	/	/	/	/	/



$U_g = 0,7 / 0.123 / 8.112$	/	0,99 0.174 5.736	0,94 0.166 6.041	0,80 0.141 7.098	0,89 0.157 6.380	0,88 0.155 6.453	0,86 0.151 6.453	/	0,94 0.166 6.041
$U_g = 0,6 / 0.106 / 9.464$	/	0,91 0.160 6.240	0,84 0.148 6.760	0,73 0.129 7.779	0,82 0.144 6.925	0,81 0.143 7.011	0,79 0.139 7.188	0,88 0.155 6.453	0,87 0.153 6.527
$U_g = 0,5 / 0.088 / 11.357$	/	/	/	0,65 0.114 8.736	0,74 0.130 7.674	0,73 0.129 7.779	0,71 0.125 7.998	/	0,80 0.141 7.098



# WOOD-ALUMINUM WINDOWS



COMFORT

COMFORT  
3

COMFORT  
3Q

COMFORT  
3QL

COMFORT  
3QXL

COMFORT  
E112

COMFORT  
PASSIVE

COMFORT  
OPTIMO XLS

COMFORT  
OPTIMO L

COMFORT  
OPTIMO XL

installation depth

85 3<sup>11/32</sup>

85 3<sup>11/32</sup>

85 3<sup>11/32</sup>

83 3<sup>1/4</sup>

100 3<sup>15/16</sup>

129 5<sup>5/64</sup>

85 3<sup>11/32</sup>

85 3<sup>11/32</sup>

113 4<sup>29/64</sup>

130 5<sup>1/8</sup>

visible width

107 4<sup>7/32</sup>

107 4<sup>7/32</sup>

107 4<sup>7/32</sup>

108 4<sup>1/4</sup>

108 4<sup>1/4</sup>

114 4<sup>1/2</sup>

107 4<sup>7/32</sup>

107 4<sup>7/32</sup>

107 4<sup>7/32</sup>

107 4<sup>7/32</sup>

rectangular



oblique



/



dividing, semicircular



/

/



fixed



combined (d & dk)



folding doors



/

/

/

/

/

/

/

tilt-slide doors



/

/



/

/

/

lift-slide doors



/

/

/

/

/



/

opening towards outside



/

/

/

/

/

/

/

2-side handle



/

/

/

/

/

U<sub>g</sub> = 1,1 / 0.194 / 5.162

1,3 0.229 4.368

/

/

/

/

/

/

/

/

/

U<sub>g</sub> = 1,0 / 0.176 / 5.679

1,2 0.211 4.732

/

/

/

/

/

/

/

/

/

U<sub>g</sub> = 0,7 / 0.123 / 8.112

/

0,97 0.171 5.854

0,95 0.167 5.997

0,98 0.173 5.794

0,95 0.167 5.997

0,80 0.141 7.098

0,98 0.173 5.794

0,92 0.162 6.172

0,89 0.157 6.380

0,88 0.155 6.453

U<sub>g</sub> = 0,6 / 0.106 / 9.464

/

0,88 0.155 6.453

0,88 0.155 6.453

0,92 0.162 6.172

0,88 0.155 6.453

0,73 0.129 7.779

0,92 0.162 6.172

0,85 0.150 6.681

0,82 0.144 6.925

0,81 0.143 7.011

U<sub>g</sub> = 0,5 / 0.088 / 11.357

/

/

0,80 0.141 7.098

0,83 0.146 6.842

0,80 0.141 7.098

0,65 0.114 8.736

0,83 0.146 6.842

0,76 0.134 7.472

0,73 0.129 7.779

0,73 0.129 7.779



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