

FREE eBook

Fenbro

CHOOSE THE PERFECT WINDOWS FOR YOU!

**GET TO KNOW THE PRODUCT
DO NOT OVERPAY!**

YOU CAN BUY CHEAPER!

**GET TO KNOW THE PRODUCT BEFORE PURCHASE
KNOW WHAT YOU PAY FOR**

DON'T BUY WHAT YOU DON'T REALLY NEED!

THANKS TO THE INFO IN THIS EBOOK, YOU WILL SAVE

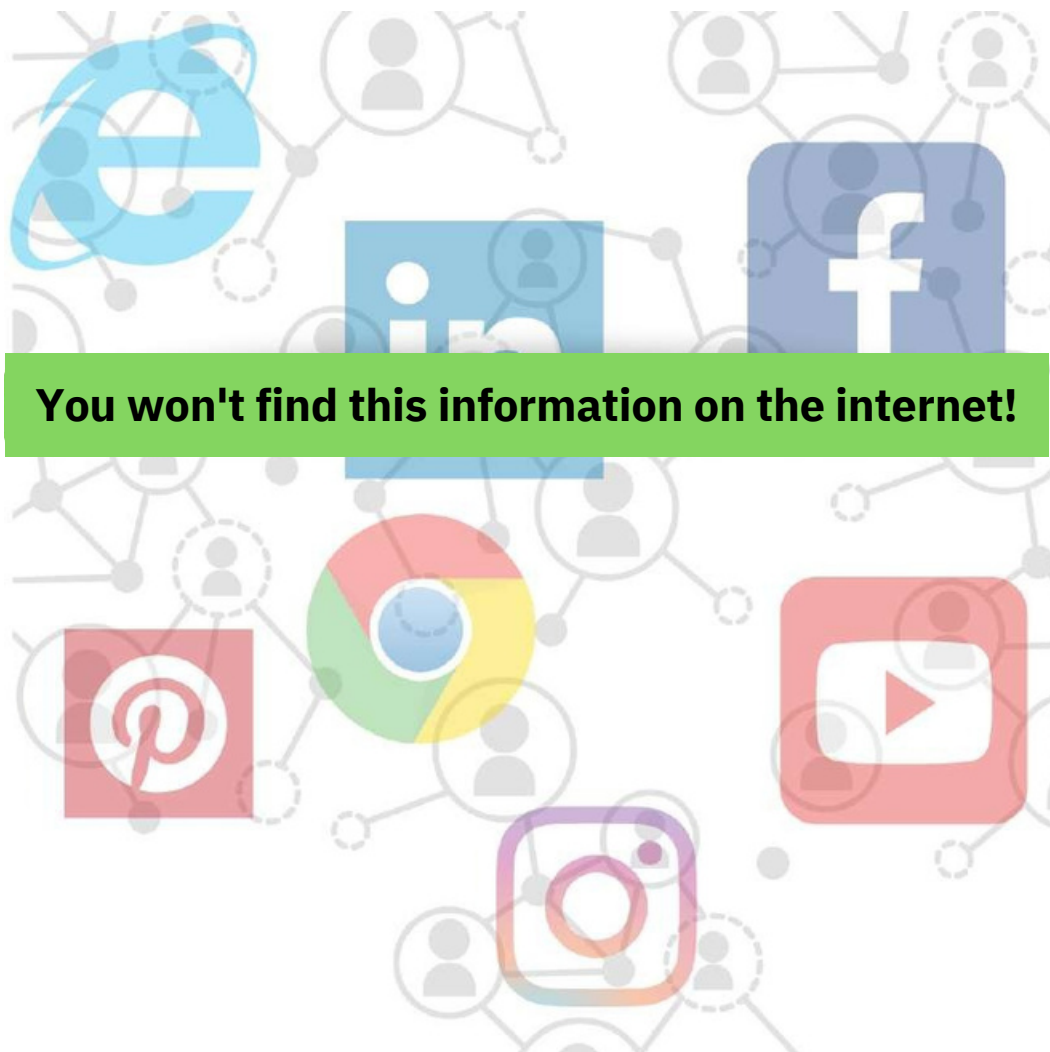
UP TO 40% ON THE PRICE OF WINDOWS!



In your hands, you are holding an e-book that will save your money and allow you to get to know the product you want to buy - namely, windows! Do not count on the seller in the warehouse or in the store to teach you everything about the chosen product. The seller does not have time for this, his or her task is to sell goods and make money on it. But when you are equipped with precious technical knowledge about the product you're planning to buy, you will simply know what you are looking for and what to pay attention to. Thanks to this knowledge, you will look for the offer that is the most advantageous to you.

Choosing windows is a difficult task. When you buy them, you want to be sure that you choose the product with optimal parameters at a reasonable price. This guide contains a collection of necessary information which will prove valuable when making such an important purchase as windows for your home.

Don't count on others, count on yourself! Gain all the useful knowledge if you do not want to spend a lot of money on windows - which, in return, you can spend on other purposes, such as furnishing your home, equipping it with household appliances / electronics, or landscaping the garden. Choose wisely and decide for yourself what windows you want!



You won't find this information on the internet!



My name is Paweł Brodzik, I am CEO at Fenbro.com. Fenbro is a wholesaler of windows, doors and garage doors. It was founded when my family business TRAZYT was expanded into online sale. TRAZYT has existed since 1996. As one of the first joinery selling companies in Poland, it began selling joinery in the town of Ostrołęka. To this day, the company is run by my father and brother.

In order to meet the needs of the growing market, we started selling joinery online. The main goal of the company is to deliver top quality products at an affordable price. We sell and send products to all regions of Poland as well as to all European countries. We will gradually expand the range with new products, as well as the scope of the company's activities, so as to meet the expectations of our customers. Do you want to get acquainted with our offer and the products offered by our store?

Please visit our **Facebook** and **Instagram** accounts.



Choose your dream windows with Fenbro

It has never been easier!



HOW TO CHOOSE WINDOWS FOR YOUR HOME?



How many times do you buy windows in your life?

Once, three times at best.

Is your knowledge of windows and windows selection sufficient to make sure you choose windows consciously? Do you know what you are paying for? What really do you expect from windows? How to know the product? How to choose optimally, so as not to regret the choice? What is important from the user's point of view?

You will find it all the answers in this ebook!

It all starts with a dream of your own home. You can see it with your imagination: a house with an attic, driveway, garage for a car, garden, trees, evenly cut grass, a balcony or maybe a terrace? Well, it is usually a long way from a dream to its realisation. The design of the house, the choice of materials, construction, a well-chosen construction team and most importantly - the preparation of expenses. We will not certainly help you to save on all house elements, but we'll surely show you how to optimise the cost of your chosen windows.

Already at the design stage, most of us dream of large windows or patio doors all the way to the wall. However, it's here where the first problems start: theoretical dimensions should be verified with reality (namely, with production possibilities).

The expected window size (width x height) is not always possible for manufacturers to provide. It often happens that the windows, which were supposed to be large in the project, are impossible to create in practice. This is due to production limitations or the risk of damaging the window, which may occur during transport or assembly. Of course, it happens that manufacturers make exceptions (e.g. large windows) for a customer, but you have to take into account the so-called customer risk. The latter means that the window may not be subject to full warranty conditions. So before you plan large windows for your home, it is worth checking what manufacturer would be able to make them.

WINDOW TECHNICAL PARAMETERS - MINIMUM REQUIREMENTS

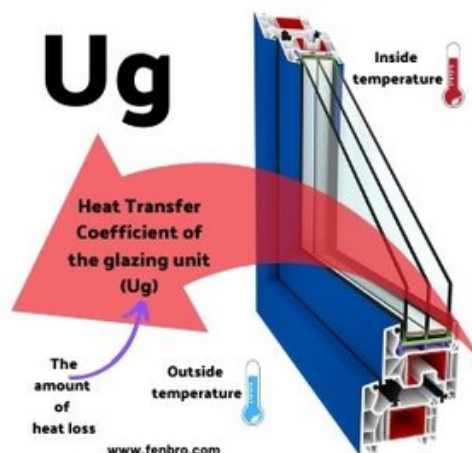
What's what? How to read the technical parameters of windows?
What to pay attention to?



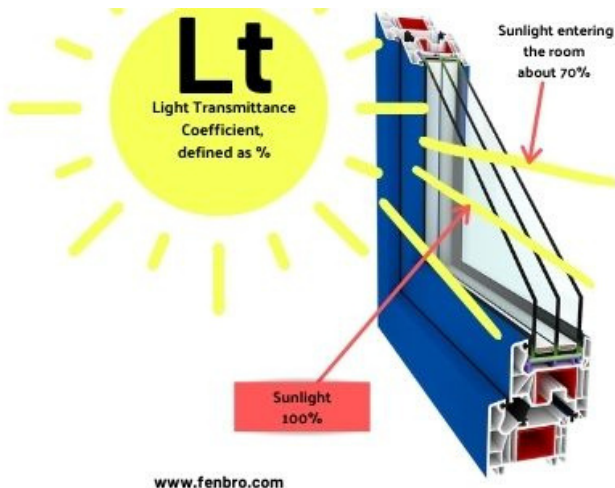
Uw (U-value) – the window's heat transfer coefficient. It informs you about the level of window thermal insulation. The Uw (U-value) shows how much heat will penetrate 1 m² of a window in one hour, with a difference between the temperatures on both sides of the window of one degree. This means that **the lower the Uw coefficient, the better the window's thermal insulation is.**



Ug – the heat transfer coefficient of the glazing unit. The higher it is, the more sun radiation reaches the interior of your house. The lower the Ug coefficient, the smaller the heat losses and greater savings during the heating period. In case of Ug, the number and type of glazing are essential. Nowadays, the most popular windows are the triple-glazed ones, but double-glazed windows are still common. In both cases, it is necessary to equip the window with a warm edge spacer and the right type of gas that fills the pane's spaces. For your information: the lowest energy losses are ensured by the so-called passive windows (the Ug starts from 0.9 W m²/k).



U_f – the heat transfer coefficient in the window frame. This parameter is influenced by the width of the applied window profiles. The most common material used in windows is steel. But although it improves the mechanical strength of the plastic, it “gives off” more heat, which is not beneficial either. Therefore, the use of composite filling gives a better thermal insulation result. The minimum value you should pay attention to is 1.1 W / (m²K).



L_t – the light transmittance coefficient. It is the amount of sunlight entering the room through the glazing unit. The L_t value depends on the thickness of the glass, the composition of the raw materials in the glass mass and the coating system used. This parameter is defined as a percentage (%). The higher the percentage of the transmitted light, the brighter the room.

R_w- Acoustic insulation coefficient. It determines the insulation of the window against noise from the outside. The unit of measurement is decibels (dB). This parameter is influenced by: the thickness of the glazing in the glazing unit, the use of PVB laminated glass or the use of an acoustic foil.

Important tip: before buying, pay close attention to the U parameter for whole windows (U_w), and not only for the glazing unit (U_g)!

WARNING

Remember that the technical parameters of the window are given by the manufacturers on the basis of a tested reference window. Therefore, the declared values of individual parameters should be compared with the dimensions of the tested window (the Window Characteristics Card is usually available on the manufacturer's website). The purchased window with dimensions other than those tested by the manufacturer will differ in technical parameters. It results from the fact that the glass and the frame have different U-values, which means that a larger pane = a warmer window.

What window parameters should you pay attention to?



In January 2017, new technical requirements for energy efficiency of buildings came into force. They refer to, among others, windows, doors and partitions. This proves that the building materials used for your home must have better thermal insulation properties. What does this mean for people who are planning to have their own houses?

Savings on heating and more warmth in the house.

According to the latest requirements, they are related to the heat transfer coefficient: U_w . Since 2017, the limit value has been reduced by approximately 13-15%.

For external windows and doors, U_w must not exceed $1.1 \text{ W / m}^2\text{K}$, for roof windows $1.3 \text{ W/m}^2\text{K}$.

These requirements were strengthened at the end of 2020 and the minimum requirements for vertical windows is now $U_w = 0.9$
For roof windows U_w it's 1.1 or less.

Passive windows

You can often hear about a passive house or a passive window, in other words: energy-efficient houses or windows. In their case, the heat transfer coefficient $U_w \leq 0.8 \text{ (W / (m}^2\text{K))}$. Such a window reduces heat energy losses. The table below shows the values for individual climatic zones - the Polish zone is marked by a yellow colour.

Climate zone	Thermal transmittance of the window $U_w \text{ (W / (m}^2\text{K))}$	Thermal transmittance of the glazing $U_g \text{ (W / (m}^2\text{K))}$
Polar	0,40	0,35
Cold	0,60	0,52
Temperate cool	0,80	0,70
Temperate warm	1,0	0,90
Warm	1,2	1,1
Tropical	1,2	1,1



The glazing unit is the largest and - consequently - the warmest element of the window. It is best to install large windows from the side where we have a lot of sunlight - then we take full advantage of the possibility to heat the room by the sun rays.

You build a house for years. Do you really want to wonder whether to choose windows with better or weaker parameters? When you choose the weaker ones, with time, the difference in price will begin to blur. You will have to spend more and more on heating the house in order to provide warmth, especially on winter evenings. Remember that choosing windows with better parameters is not only common sense, but also savings in the long run.



Another change in the requirements for energy consumption is the tightening of the EP index. The latter determines the energy consumption of a building and its energy demand for heating, ventilation, lighting and cooling. Currently, its value is 95 kWh/m². Currently, the average in Poland is 120-300 kWh/m² per year while in other European countries this value does not exceed 50 kWh/m².

The best thermal insulation parameters are typical for triple-glazed windows using low-emission glass and noble gases (incl. argon) for the shaft space fillings. Excellent energy efficiency is also due to the frames with increased insulation, e.g. made of wood, which perfectly keeps heat. The whole construction is complemented by warm spacer frames and special sealing systems.

Still not sure which windows to choose? Wooden, PVC or aluminum? Double or triple glazed? remember that these are not only the prices that differentiate the different types of windows, but also the technical parameters. In fact, the latter are the windows' most important characteristics - and they should be paid most attention to.

WHAT TO CONSIDER WHEN CHOOSING WINDOW PROFILES?

Which window profile should you choose?

Wooden windows have a uniform structure, while uPVC and aluminium windows have chambers that affect thermal insulation. The walls of the chambers have different thickness, which determines the class of the profile. The thickness of the profiles is defined by the PN-EN 12608: 2004 standard.

1. Class A

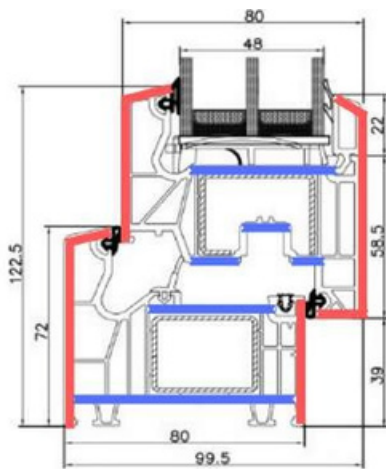
- ☐ The visible surface (red) $\geq 2,8\text{mm}$.
- ☐ The invisible surface (blue) $\geq 2,5\text{mm}$.

2. Class B

- ☐ The visible surface (red) $\geq 2,5\text{mm}$.
- ☐ The invisible surface (blue) $\geq 2,0\text{ mm}$.

3. Class C

- ☐ The standard does not set any requirements as to the thickness of the visible and invisible walls .

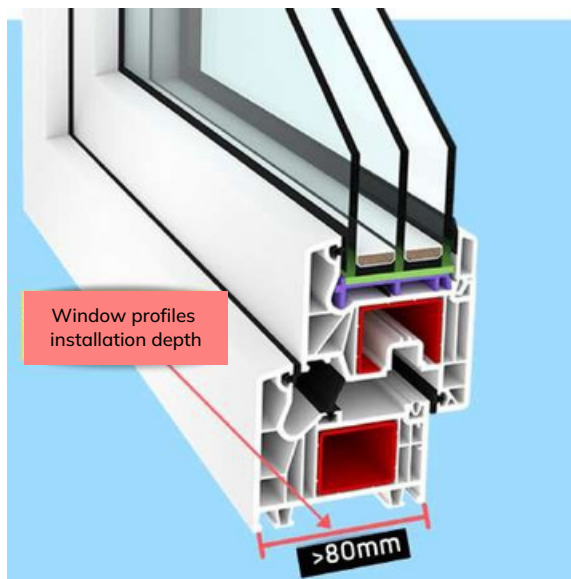


Obviously, Class A profiles are the best choice. They will provide us with the best window insulation. However, the selection of the so-called “warm” window should not be based only on comparing the classes of window profiles. You should also pay attention to such elements as the number of chambers, gaskets, fittings, spacer frames, glazing units and the heat transfer coefficient (U_w).

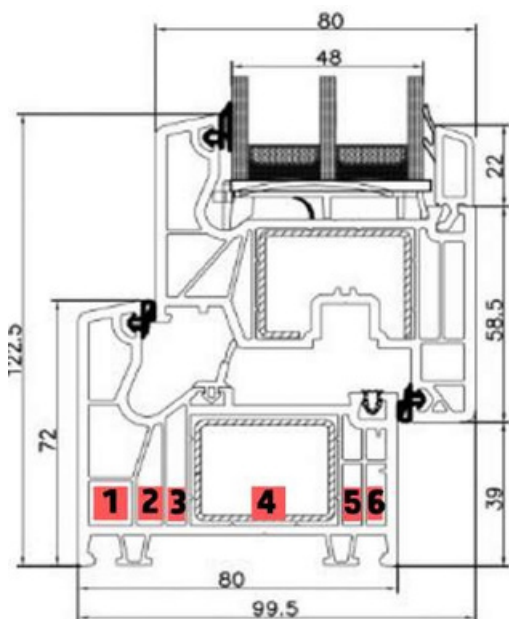
HOW MANY CHAMBERS IN THE WINDOW - Does more mean better?

How does the number of chambers affect the technical parameters of the window?

The number of chambers in the window, as well as the thickness of the profiles, affects the thermal insulation of the window. When choosing energy-saving (passive) windows, it is worth knowing that they most often come with a **6-chamber structure and a built-in depth of over 80 mm**.



Currently, there are construction solutions on the market that replace the metal elements of the window (steel reinforcements that emit heat) with composites or by gluing glazing packages. In this way, high technical parameters of the heat transfer coefficient in the entire window (U_w) are achieved. It is also worth comparing the windows by looking at U_f (heat transfer coefficient in the frame). Generally, remember not to go to extremes - for example, the width of the building increases the weight of the windows, as well as the ergonomics of use (heavy sashes).



We count the window chambers in the cross-section as seen perpendicular to the surface of the profiles. Additional chambers in the profile strengthen the structure, improving the strength properties of the window.

NOTE:

- It is not the number of chambers that is the most important for energy-saving windows. It is the quality of the materials used inside the window that influences the heat transfer coefficient (U_w).
- The depth of the window installation affects the stiffness of the window. This is especially important for larger sizes, but the narrower the profiles, the larger the surface of the glass in the window.



DOUBLE OR TRIPLE-GLAZED?

Choosing the right glazing unit gives you a headache? Well, the number of panes really matters. As you already know - window glazing is the warmest element of a window. Does it mean it's better to have more panes than... fewer?



The glazing unit consists of two or three panes of glass, 4 or 6 mm (sometimes even 8 mm) thick, separated by an edge spacer that keeps them in a vertical position at the appropriate distance. The width of the chamber is 10-18 mm, most often 16 mm. Its interior is filled with argon known for good insulating properties.

Is a double-glazed window good enough?

The most obvious factor to consider when choosing between double and triple-glazed windows is where your home is located. Depending on the climate (e.g. Southern Europe) and the average temperature prevailing in the year, buying double-glazed windows may be a good choice. Each pane absorbs some light, which is why these windows are brighter (Lt 77-80%). As double-glazed windows let more heat from the sun penetrate the home interior, the rooms will heat up faster. In colder climates, you will benefit more from the introduction of triple-glazed windows. This is particularly relevant in the case of windows that are not exposed to a great deal of sun during the winter months.

When to choose a double-glazed unit?

You can opt for double-glazed windows in the rooms which are used less frequently, or are not be kept at a higher temperature (e.g. garage or basement) or the ones located in the more sunny southern part of the house. If the house is old, it is poorly insulated and possibly has a lot of thermal bridges - there's no point investing in very well-insulated windows. The same with buildings with few or small windows. Undoubtedly, double-glazed windows are primarily a better choice in terms of price.

Triple-glazed windows: will they keep me warm?

Have you ever wondered what the third pane is for? Is it just marketing or does it matter? What would you choose: a more expensive but warm window, or a cheaper but cooler window?

The price of the window depends, among others, on the number of installed panes, where each subsequent pane affects the thermal insulation properties of the window and, thus, improves its technical parameters. However, as you already know - the window does not only consist of panes, so its other elements are important as well.

When to choose triple-glazed windows?

The cost of the window will pay off much faster when we compare it to the expenses we would have for heating or electricity. The triple glazing is also filled with gas (argon) which reduces the thermal permeability. Triple-glazed windows are dedicated for passive (energy-saving) houses, which also proves their properties.

How much does the third pane in the window cost?

Of course, the price is an important aspect when making a buying decision. Therefore, if you want to know the difference in prices, I will tell you how to check it on your own. Take the cost of an ordinary pane (e.g. PLN 100 / m²) and multiple it by square meter (m²) of a window, e.g. a window with dimensions of 1100x2200 mm, i.e. $1.1 * 2.2 \text{ m} * 100 = \text{PLN } 242$ (net). This is the cost you will incur for adding a third pane to your window.

(An example calculation used by some window manufacturers)

NOTE:

If these are warm windows that are important for you (and not the advertised ones!) , pay attention to the parameter such as U_w (window heat transfer coefficient) - the lower it is, the warmer the window is.

WINDOW GASKETS

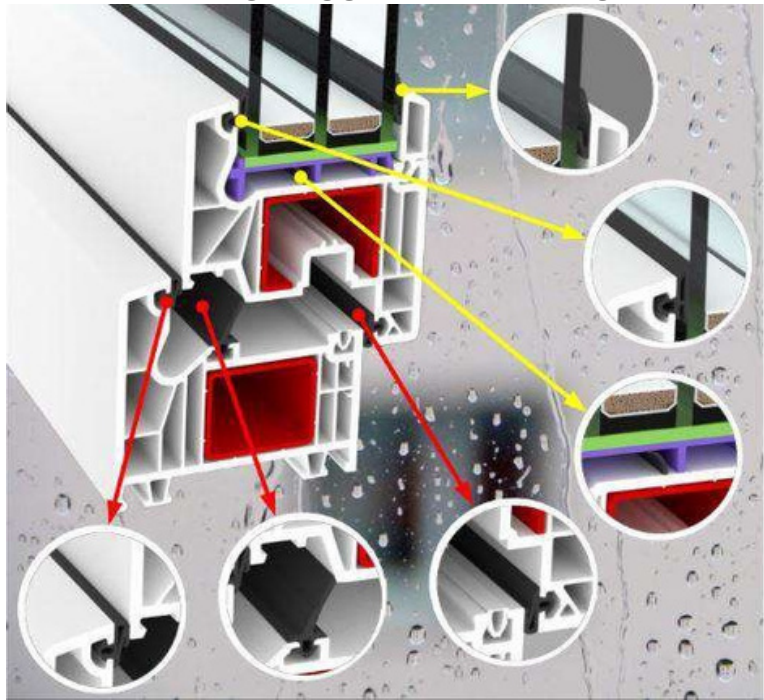
Their task is to improve the tightness and insulation of windows. The quality and quantity of seals in the window has an impact on such elements as:

- Weather resistance (wind, rain, low / high temperature)
- Resistance to fire from the outside
- Thermal transmittance
- Sound absorption
- Service life
- Resistance to opening and closing windows

Most of the gaskets are made of synthetic rubber (EPDM) or thermoplastic polyester elastomer (TPE-E). Window gaskets are divided into glazing gaskets and rebate gaskets, also known as retaining gaskets.

The first ones protect the glazing unit, the second ones constitute a water, moisture and dust barrier between the movable window frame and its sash.

Window gaskets do not require special maintenance, apart from removing dirt from them. If the window has received the appropriate certificate, with the appropriate parameters, there is no need to worry about the quality of the gaskets used and the fact whether they need to be replaced in a short time.



WINDOW FITTINGS

Glass fittings are the basic structural protective elements. Their number depends on the class of the window. Those with the lowest class will be functional only in apartments on the upper floors, where they will ensure tightness, but not the security itself. Therefore, to ensure protection on the low storeys of the building, it is worth taking a closer look at the windows with anti-burglary fittings, which are marked with a higher class. They are equipped with a larger number of special catches that prevent breaking the window from the frame.

We should remember here that it is the opening of the window, not the breaking of the glass, that is the most common method of getting into our homes.

Do we need to adjust window fittings?

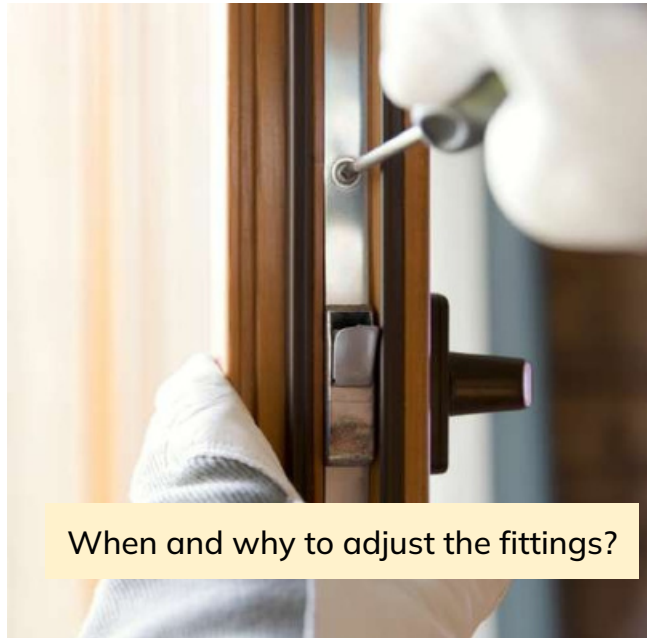
Already when installing the windows, it is necessary to adjust the fittings. It is due to the weight of the windows, which causes them to fall. Further adjustment is required after their installation. The window signals that the fittings require adjustment with characteristic sounds or resistance felt when closing the window (sash rubbing against the frame). Sometimes it is also the handle that moves harder than usual.

Adjustment

We need an allen key. In the bottom hinge we find the head of the adjustment screw . By tightening it and unscrewing it, we adjust the sash in the up-down position. To set the sash position in other directions, the window must be open.

The screw in the lower hinge is tightened so that the sash moves towards the handle or hinge.

We also adjust the sash pressure against the window frame by changing the position of the "mushrooms" locking the sash. Many manufacturers equip the "mushrooms" with eccentrics. The latter, thanks to their positioning in relation to the axis of the "mushroom" , allow to adjust the pressure of the sash to the frame - this is the so-called winter-summer position.



When and why to adjust the fittings?



SELECTING THE TYPE OF WINDOWS






Wooden window






uPVC window



Aluminium window

WOODEN	uPVC	ALUMINIUM
 <p>PROS</p> <ul style="list-style-type: none"> ● Possibility of personalisation (change of colour, pattern, shape, selection of dimensions) ● High technical parameters ● The visual aspect ● They are tight (warm) and they dampen ambient sounds well ● Wooden profiles have very high stiffness, therefore they can be used to produce much larger windows than, for example, uPVC profiles 	 <p>PROS</p> <ul style="list-style-type: none"> ● Low price ● Availability ● Low weight - they are light thanks to the use of plastics and a chamber structure ● They do not need special cleaning or maintenance, just washing with ordinary cleaning agents 	 <p>PROS</p> <ul style="list-style-type: none"> ● Large selection of colours ● Possibility of forming any shape with frame profile (circle, trapezoid, arch, etc.) ● Possibility to use glazing with larger surfaces (rigid and durable) ● They do not require much care and maintenance ● Light construction (compared to PVC and wooden windows) ● Resistant to weather conditions:

<ul style="list-style-type: none"> ● Suitable for large glazing, they are rigid and stress-free ● If damaged or scratched, they can be easily repaired ● Service life > 80 years (depending on maintenance and weather conditions) 		<p>snow, rain, moisture, sunlight</p> <ul style="list-style-type: none"> ● Less prone to damage and deformation
<div>  <p>CONS</p> </div> <ul style="list-style-type: none"> ● High cost (30-50% more expensive than PVC windows) ● They require care and maintenance every few years ● In humid rooms, they require additional protection (construction, renovation) ● They are less resistant to weather conditions (rain, sun) 	<div>  <p>CONS</p> </div> <ul style="list-style-type: none"> ● Bright profiles may change shade under the influence of UV rays and weather conditions ● A scratched or damaged window cannot be repaired, it must be replaced 	<div>  <p>CONS</p> </div> <ul style="list-style-type: none"> ● The cost of windows (50-70% more expensive than uPVC windows) ● Cold to the touch ● No possibility of repair or renovation

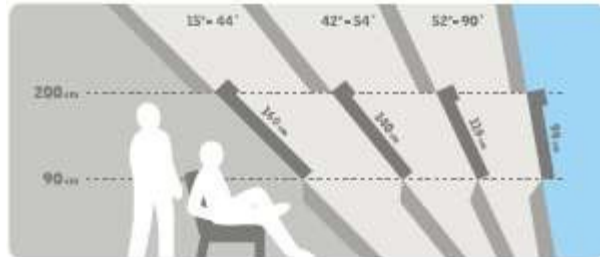
ROOF WINDOWS

What to pay attention to before purchase?

Firstly, roof slope angle - the smaller the roof slope, the longer the window should be. Secondly, the height of the knee wall - the choice of the method of opening the roof window depends on it. Depending on the manufacturer, you can find roof windows with an upper or lower opening system, top-hung roof windows, as well as electrically operated and solar-operated roof windows.

Where and what window to install?

The type of room in which the roof windows are to be installed matters. Windows with a rain suppression package will work in the bedroom, while in the kitchen or bathroom - wood-polyurethane windows, which are resistant to moisture. The more windows in a room, the better the comfort of staying in it. According to the regulations, the glass area should be at least 1/8 of the floor area. The skylights also provide a view to the outside. In order to have a good view, the angle of the roof and the size of the window should be taken into account. The smaller the roof slope, the longer the window should be. This will allow you to get the best view both when sitting and standing. It is optimal to install the window at a height of 90 cm above the floor.

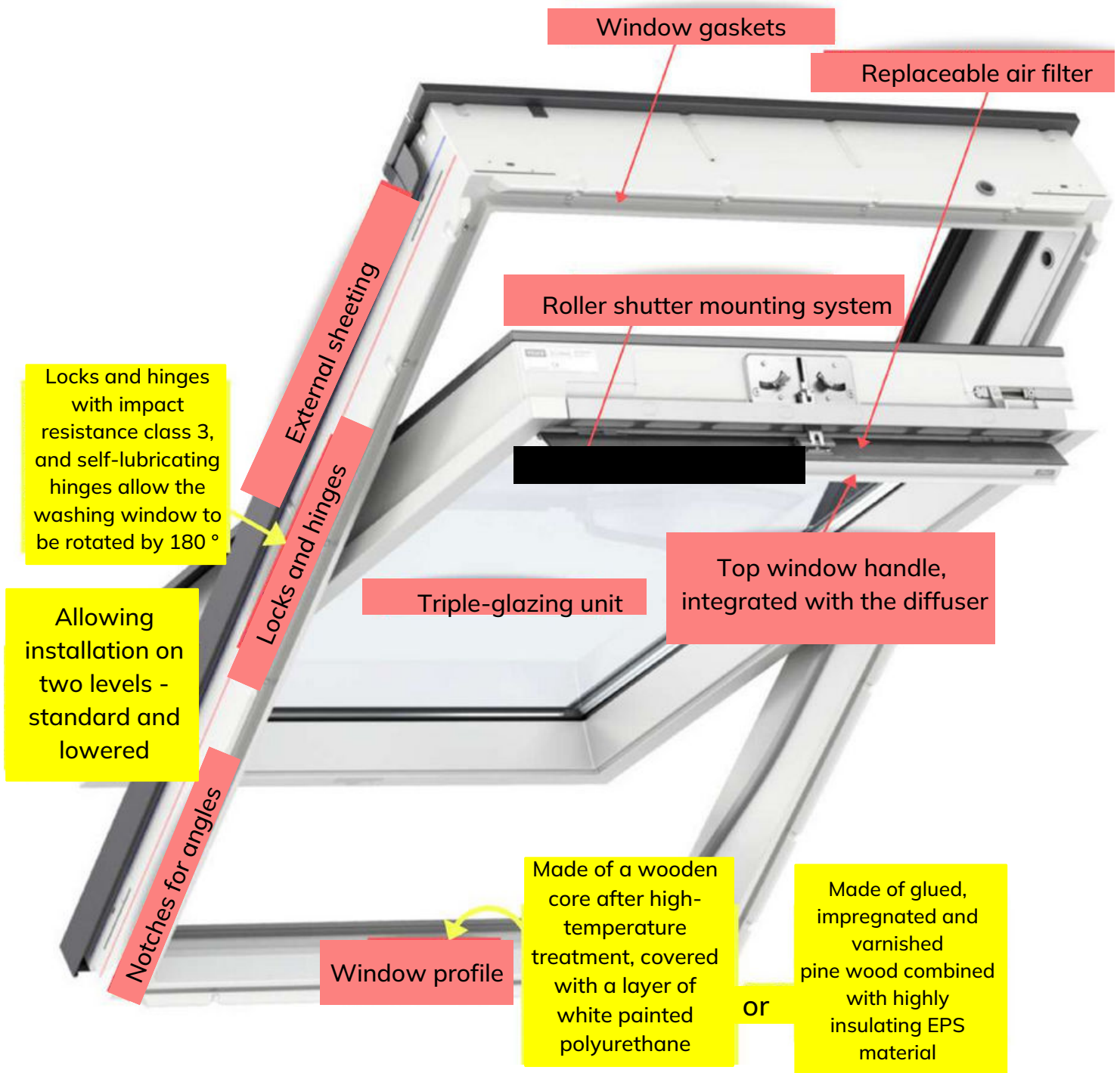


What material are roof windows made of ? (Manufacturer: VELUX)

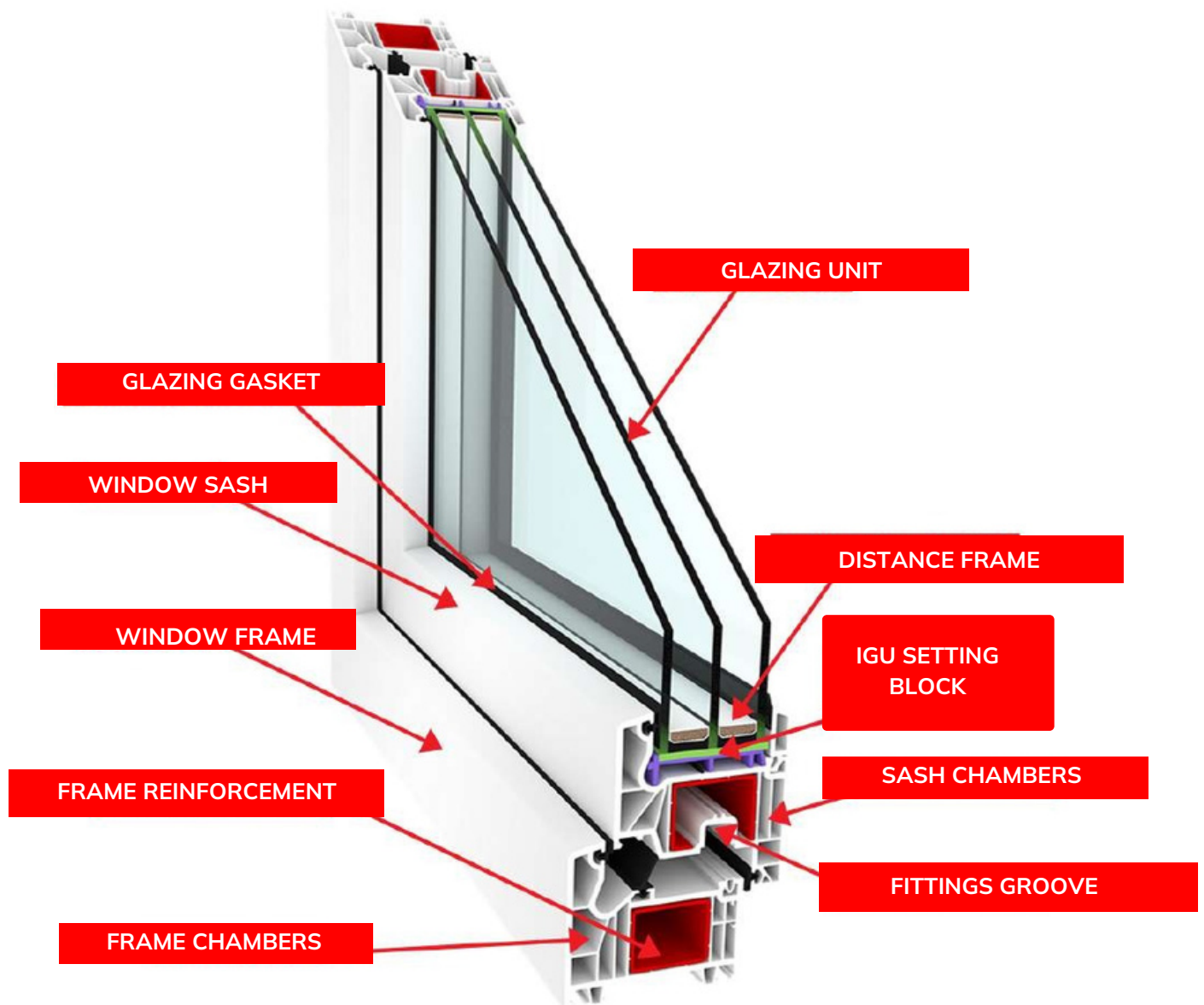
Wooden windows and wooden-polyurethane windows



ROOF WINDOW CONSTRUCTION



VERTICAL WINDOW CONSTRUCTION



TYPICAL / NON-STANDARD WINDOWS. Does this division matter?

The windows have the so-called standard (typical) or non-standard (non-standard) dimensions. In case of the former, the influence on the price is negligible. However, already at the design stage, customers more often think about large glazing units, the size of rooms or proper room lighting rather than about choosing windows of typical dimensions.

Nowadays, non-standard windows are perceived as unique only from the marketing point of view.

The current possibilities of personalising windows are endless: from changing the frame material (PVC, wood, aluminum), the method of opening, colour, handles, number of glass panes, type of glass, spacers etc. Because of that, the so-called "typicality" of windows (in terms of dimensions) does not completely matter. All these factors make a window a personalised product, i.e. prepared for the sole needs of the customer. Of course, there will still be a need to use typical windows, e.g. in case of renovating and replacing old white windows with the new ones (when you do not need anything sophisticated at all). In such cases, you can choose among windows that are already in stock.



SLIDING DOORS - HOW ARE THEY DIFFERENT FROM ONE ANOTHER? (PSK or HS?)



PSK



HS



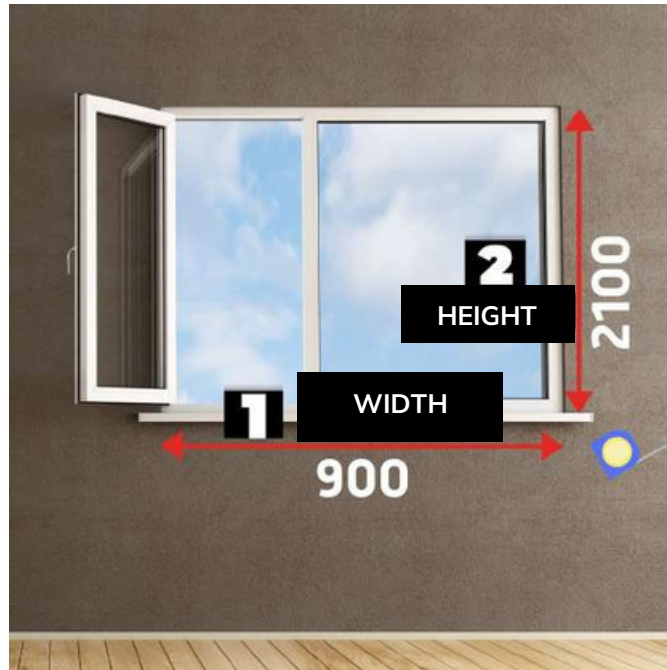
<div></div> <div>PROS</div> <div><ul style="list-style-type: none">● ● Low price● High tightness. ● Tilt and slide● They do not take up space when opened inside the room (as opposed to balcony doors)● Quiet operation (when moving))</div>	<div></div> <div>PROS</div> <div><ul style="list-style-type: none">● Reliability● Low threshold (or built into the floor)● Easy to move (no force required)● Window appearance</div>
<div></div> <div>CONS</div> <div><ul style="list-style-type: none">● High threshold● Difficult to operate● Problematic mechanism ● Easily damaged mechanism</div>	<div></div> <div>CONS</div> <div><ul style="list-style-type: none">● High price (up to 3x more expensive than PSK doors)● Window weight</div>

PSK. One of the advantages of these doors over typical tilt & turn balcony or terrace doors is that the PSK windows do not occupy the space inside the room when opened. When the PSK tilt and slide doors are closed, their fixed leaf together with the sliding leaf form a straight line. The PSK tilt and slide system enables smooth and very quiet sliding of even very large and heavy terrace windows. In order to move the wing, it must first be tilted and pushed to the right track. However, tilting PSK windows is carried out in the same way as in traditional windows. PSK are sold with dimensions of max. 3 m x 2.4 m (width x height) - depending on the manufacturer.

HS. This type of patio door has a sliding sash and a fixed sash that are offset to each other and located parallel to each other. The HS lift and slide window is opened by sliding the movable sash behind the fixed sash. The advantage in this case is the fact that you do not need to use force for this, because the movable sash moves along the rail hidden in the floor on special rollers, and this movement is very smooth. The HS window is tilted by stopping its movable sash in any place and then lowering it using the handle. The high price of this solution is mentioned as a disadvantage of HS windows. It is much higher than in the case of traditional balcony or terrace tilt windows. It is also higher than the prices of tilt and slide windows made in the PSK system. HS are sold in the maximum dimensions of 5 m x 2.7 m - depending on the manufacturer.

HOW TO GIVE THE WINDOW DIMENSIONS ?

In order to avoid mistakes, be it at the stage of measuring or evaluating windows - it is assumed that we first enter the width of the window, and then the height. So as in the example below: 900 mm - this is our width, and 2100 mm - this is our height.

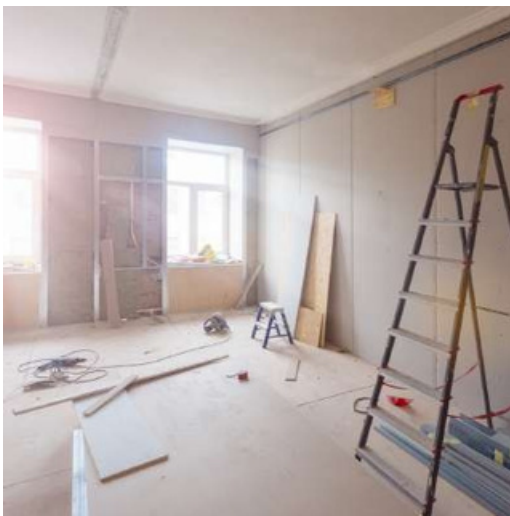


HOW TO MEASURE WINDOWS?

Windows are measured, among others, to get the quote on your chosen products. The whole process consists of dimensioning the opening in the wall for the windows in which they will be ultimately installed. The measurement of the window varies depending on whether the building is in a shell condition (new house) or if we are replacing the currently embedded windows (in the old building).

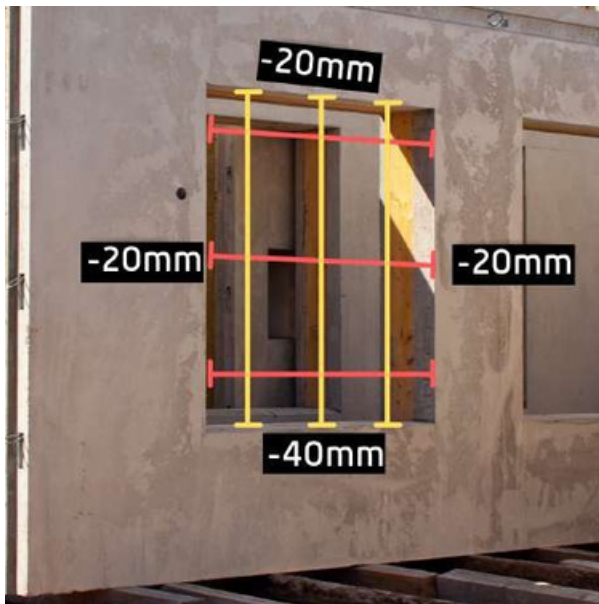
The best possible solution is for the assembly team (who will install the windows or other people who have experience in this) to make such a measurement for us. If, on the other hand, we do not know who will install the windows for us, and we want to know the offer from the sellers, we can do it ourselves. To perform the measurement, we will need:

- a yardstick,
- metal folding ladder,
- help of a second person (optional)



Window replacement in the shell construction - how to measure windows correctly

1. To measure, use a yardstick.
2. The opening for the window should be measured in 3 places in width and in height.
3. If the dimensions differ, we take the smallest measured value into account.



4. Correctly sized window should be about 40 mm narrower (therefore we subtract 20 mm from the size of the opening on each side of the window) and about 60 mm lower than the hole (therefore, we subtract 20 mm from the top and 40 mm from the bottom of the hole) where it will be mounted.

5. Keeping such a difference guarantees the correct mounting and sealing (the use of mounting foam), as well as installation of window sills.

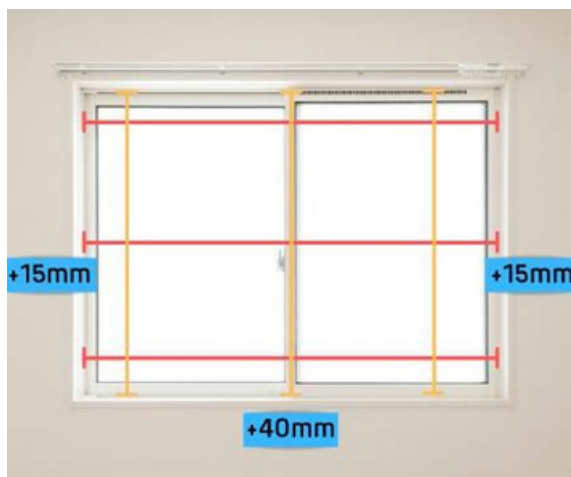
For example: The smallest measured dimension in width was 900 mm, so we subtract 40 mm from this dimension, which gives us the width of our window to be 860 mm.

Adequately: the smallest measurement in height was 2100 mm, we subtract 60 mm from this dimension. It gives us the height of our window equal to 2040 mm. Therefore, we are asking for a quote on the windows with dimensions of 860 mm x 2040 mm.



Replacing old windows with new ones - renovation

1. To measure, use a yardstick.
2. The opening for the window should be measured in 3 places in width and height.
3. If the dimensions differ from each other - we take the smallest measured value into account.



4. To measure correctly, we add 30 mm to the width (+15 mm on each side of the window), and 40 mm to the height (including installation of a window sill).

[In this case, we have to take into account space for partial development of the outer frame of the window, that's why we'll add dimensions to previous window measurement results].

For example: The smallest measured width dimension was 1700 mm, we add 30 mm to this dimension, which gives us the result of 1730 mm. At the height, we got the measurement of 2150 mm, add 40 mm, which gives us the result of 2190 mm. Therefore, we are sending a request for a quote on the windows with dimensions of 1730 mm x 2190 mm.



NOTE: Before confirming the window order, the measurement should be confirmed by the construction and assembly team or someone who has experience in construction or installation of windows. It is very important to avoid mistakes in window sizing. This will save the time needed to correct the valuation and money to correct the opening during installation, not to mention completely incorrectly selected windows.

PVC WINDOW SILLS - WHAT TO PAY ATTENTION TO WHEN MEASURING?

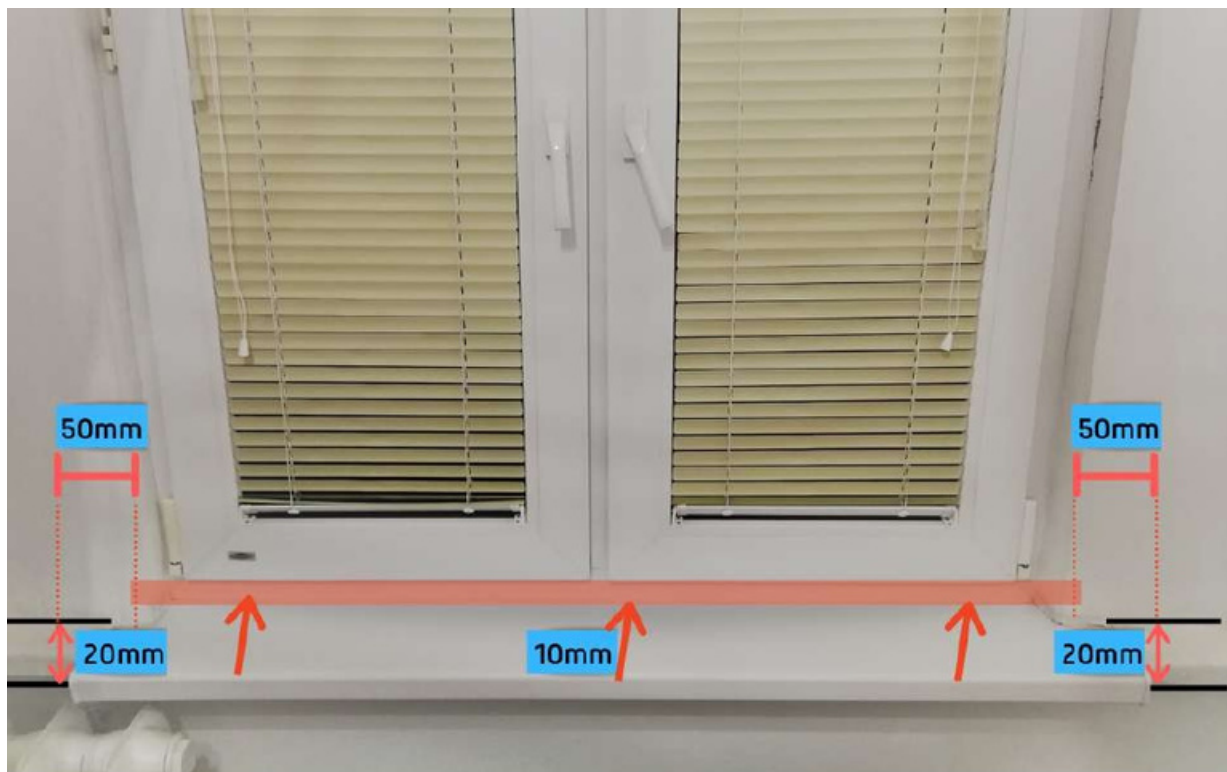
Pay attention to the shape of the window recess, because the sides (so-called glyphs) may not be perpendicular to the base of the opening (where the window will be placed). It is a good practice to make a template out of cardboard, which will greatly facilitate its measuring:

- Height - the gap between the window and the wall should be about 10 - 20 mm so that the sill can easily slide under the frame
- Depth - the sill should go under the window by about 10 mm
- Width of the window recess - we should add 30-50 mm on each side.

Depth (the dimension to which the sill will be "hidden" in the wall) is about 20 - 30 mm

- Width - the second option is to select a window sill identical to the width of the window (In this case, ensure proper sealing with silicone)

Fix the window sill only on the surface that is even, leveled and cleaned.



WINDOW OPENING DIRECTION

In order for us to understand the client's needs - it is necessary to learn the basic rules of drawing the directions for opening windows. This is very crucial knowledge as it accounts for the highest percentage of customer complaints when picking up or installing windows.

It happens that people are surprised that the window opens differently than previously planned. That is why it is so important to have a "common language" already at the pricing stage, let alone ordering windows.



In Poland, working drawings of windows are made from the point of view from inside the room.

Window manufacturers also assume that customers expect to receive the windows that open to the inside of the room.

If it is otherwise (i.e. the window is to open to the outside),

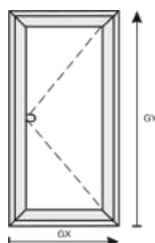
the seller should be informed about it.

It is common to define the left or right direction of window opening according to the position of the hinges on the window frame.

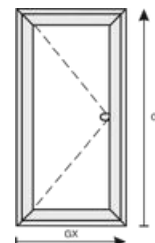
If the hinges are on the right and the handle on the left, we are dealing with a right window, which is marked "OP".

If the hinges are on the left side and the handle is on the right, then we are dealing with a left window, which is described as "OL".

OP - Right window



OL - Left window



DIVISION OF WINDOWS BY THE OPENING METHOD :

- Fixed - or FIX. The window does not open at all.
- Tilt - windows with tilt fittings. Top-down swing sash window.
- Turn - this means that the sash opens to the side.
- Tilt & Turn - windows that open in two ways: to the side and tilt from top to bottom.
- Sliding - the window slides to the side.

WINDOW SYMBOLS

The letter symbols and abbreviations of the names of windows, depending on the method of opening them, may differ depending on the manufacturer and the way the product is presented by the seller. However, the full names and the way the windows are drawn are identical (they remain the standard).





Fixed glazing



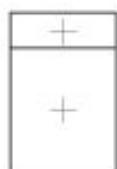
Side-hung



Turn outward-opening



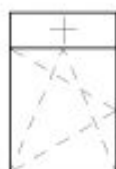
Turn-tilt



Fixed glazing with fixed toplite



Turn-tilt with fixed lowlite



Turn-tilt with fixed toplite



Side-hung with fixed lowlite



Tilt,



Top-hung,



Slanted, turn



TbT

Turn-tilt
Tilt before turn



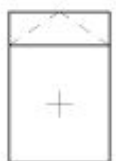
Side-hung,
outward-opening



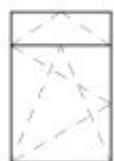
Bottom hung



French window
(turn/turn)



Fixed glazing
with toplite tilt



Turn-tilt
with toplite tilt



Bottom hung
with fixed lowlite

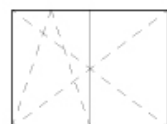


French window
(Tilt before turn/turn)

TbT



Semi-circular arched, turn



French window

ROOF WINDOWS - OPENING METHOD (Brand: VELUX)

Top operated roof windows - Centre pivot roof windows

It will work when the window is mounted relatively low. The handle is then at your fingertips without having to bend down. These windows are recommended for attic rooms where the

lower edge of the window will be between 80 cm and 130 cm high.

If you plan to put furniture under the window, e.g. a desk in a children's room, a sofa in the living room or a kitchen counter, the furniture will not hinder the opening of the window.

Perfect for use in a child's room, where the child cannot reach the handle. (photo: VELUX)



When to choose bottom-operated roof windows ?

These roof windows are perfect for rooms where:

- the lower edge of the window will be at a height of 130 cm to 150 cm,
- you do not plan to place furniture under the window - then you have free access to the bottom handle,
- you want to have a direct view of the sky,
- roof windows with bottom opening are equipped with an elegant, galvanised handle, fixed in the center of the lower frame of the window. (photo: VELUX)



Top-hung roof windows

Another type of windows, due to the way they open, are top-hung windows. They have a large opening angle - they allow the sash to be raised up to 45°, thanks to which they provide a panoramic view from the window. These roof windows are perfect for rooms where:

- the roof slope is 45 ° and the knee wall is high,
- you want to be able to open a window in two ways - top-hung windows are equipped with an opening handle at the top and a handle at the bottom,
- you want to enjoy an unlimited panoramic view - the window can be tilted to 45° or continuously stopped in any position.

They can be easily washed because they have the function of rotating the sash by 180° and a locking bolt. (photo: VELUX)



Air vents in roof windows

All VELUX roof windows are equipped with air vents that allow fresh air to flow in even when the window is closed. In windows with an upper opening system, the ventilation flap is integrated with the opening handle. The ventilation is equipped with a removable filter that guarantees fresh air free of insects and contamination. (photo: VELUX)



Electric sunroof opening

For greater comfort, it is worth choosing electric roof windows that you can open or close using an application on your phone. You can install the electrical system later, but already at the construction stage, it is worth bringing power to the area of the roof window. This way you will avoid additional work in the future. Outside the window there is a sensor that collects air data (pressure, temperature, precipitation) and manages all electrically controlled VELUX products by itself. If it detects that the attic bedroom is too warm, it will automatically close the skylights and cover the blinds to keep the interior warm.

Sloping and vertical roof window combination

Wooden vertical window that extends the VELUX sloping roof window. The main advantage of such L-shaped windows is the ability to let in even more light, due to the large glazing area. The windows can be combined with other roof windows and fanlights. They are used for roofs with a slope angle of 15 to 90 degrees with a knee wall not lower than 85 cm. They must be installed in conjunction with the skylight and combined with a special sealing collar. The installation of L-shaped windows should be performed by a roofer or a trained installer. The opening for an L-shaped window should always be 2-3 cm wider on both sides. L-shaped windows are available in a tilt and turn version in the wooden technology and the non-opening version in the wood-polyurethane technology. (photo: VELUX)



Bottom fixed windows

They enable an attractive downward extension of the window and provide an even wider view - even down to the floor. For attics without a knee wall, lower lighting elements are intended, which are mounted at the same angle as the window installed above. (photo: VELUX)



Roof terrace or balcony

The VELUX roof balcony is a special window that can be transformed into a small balcony in just a few moments. The mechanism is very simple - the upper part rises to an angle of 45 °, the lower part with the rails on the sides slides forward. What's more, the balcony is so large that two people can easily use it at the same time. (photo: VELUX)



What else can you do with roof windows?



You can combine roof windows into combi sets, by e.g. installing two identical VELUX roof windows side-by-side, one above the other or both above and beside each other. It floods the space with natural light and opens your room up to create a bright, welcoming place.

FLASHINGS FOR ROOF WINDOWS



A sealing flashing is required to install the window in the roof structure. It is selected depending on the roofing material. The task of the flashing is to ensure the tightness of the window and its insulation. Its design ensures safe drainage of rainwater and snow outside the window while maintaining the distances between the window and the roofing as specified in the installation manual. Sealing flashings and window covers are made of the maintenance-free aluminium sheet as standard.

How does the correctly mounted flashing influence the window insulation?

The recessed installation places the window 40 mm deeper in the roof structure, which ensures better integration with the roofing and an aesthetic appearance. Therefore, a better solution is to use a roof window with a recessed installation flashing. (for. VELUX)



Standard installation



Recessed
installation

ACCESSORIES FOR VERTICAL WINDOWS

The choice of windows in terms of size and type of material (PVC, wood or aluminium) is just the beginning of the personalisation possibilities. Windows can be fully personalised. Check (below) which changes affect the visual aspect only and which - the technical parameters of the window.

Handles - what to pay attention to?

As standard, you will always receive a handle for the window, whether it is an aluminium, plastic or another material handle - it depends on the manufacturer or the seller's offer. You can also choose a colour (e.g. white, silver, gold, brown, etc.) that will suit you whether the window or the colour of the interior of the room. When choosing white windows, remember that the shade of white on the handle may be different (which may result from the material or different colours of the paint used to cover the handle). However, this usually applies to the selection of handles from other manufacturers rather than to the set from one window

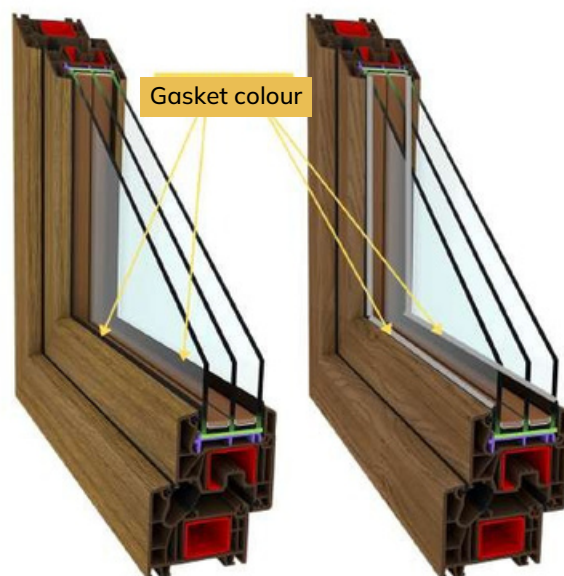


manufacturer. The shape of the handle may be important taking into account ergonomics, i.e. the comfort of everyday use - how often you will open the window and in what conditions the handle will be used. The handles not only have a decorative purpose, but they can also serve as safety devices. For example, a handle with a button can be operated only when the button is pressed. It is good protection against opening attempts by small children. Handles with a key lock act as a blockade, protecting the window against burglary (opening the window from the outside).

They will work very well as an external balcony, terrace, or garden handle. A handle should ensure failure-free, smooth operation and compatibility with the window. Remember: the cost of the handle is relatively small but it is an element that you can have contact with almost every day. That's why is worth getting acquainted with all available models to choose the most optimal solution for you.

The colour of the external glazing gasket

It has only a visual impact, without affecting window properties. There are two gaskets in the window itself: external and internal. It is often included in the price of a window, you can choose between two or more colours (e.g. grey or black). The external gasket itself seals the glazing, and in the case of aluminium windows or doors, it protects against direct contact between glass and metal.



Things to remember before choosing coloured window frames

Colour is the most frequently modified feature when choosing windows. That is why so many window colours are available in the manufacturers' offer. A veneer (foil) applied to the window is resistant to weather conditions and scratches. Some manufacturers make veneers with a wooden, matte or structured look. The structure of the foil is usually used

exclusively by window manufacturers.

Therefore, it is not worth choosing a window colours from different manufacturers, because they will always be different.

Windows are always white as standard, this colour is offered for free.

Any colour change incurs an additional fee.

Depending on the manufacturers' offer, changing the window colour on one side or the inside may increase the price of the window by 20%, while both sides - by 40%.

When choosing non-standard colours, differences in the surcharge may entail percentage increases.



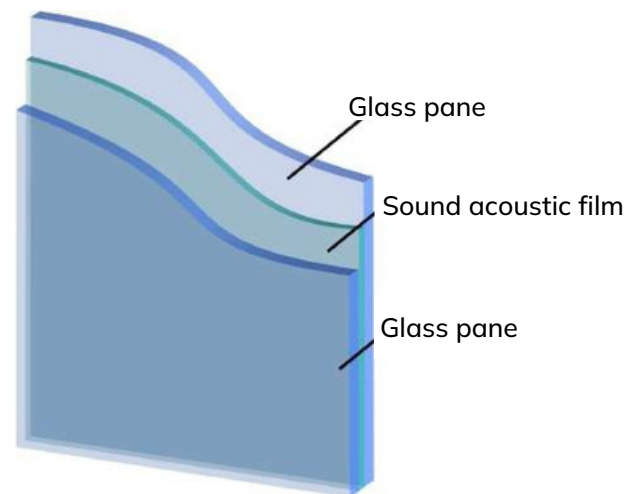
FROSTED, SOUND-ABSORBING OR REFLECTIVE? TYPES OF WINDOW PANES

Float panes

They have a very smooth surface and high transparency (min. 82%). The disadvantage is poor thermal insulation.

Sound-absorbing panes

They are thicker and heavier than standard float glass. Greater mass causes better sound attenuation. Such panes are made of ordinary, toughened or laminated glass (minimum two glass panes connected with PVB foil). In practically every window, one pane should be at least 50% thicker than the other - sounds of different frequencies will be effectively suppressed.



Safety panes

When broken, it does not break into small pieces, so it protects against injury. It is toughened, laminated, glued with resin or reinforced with a wire mesh (the glass remains in one piece when broken). Safety glass is marked with the symbols O1, O2 - they only protect against injury - and P1, P2 - they are more durable and more difficult to break during a break-in.



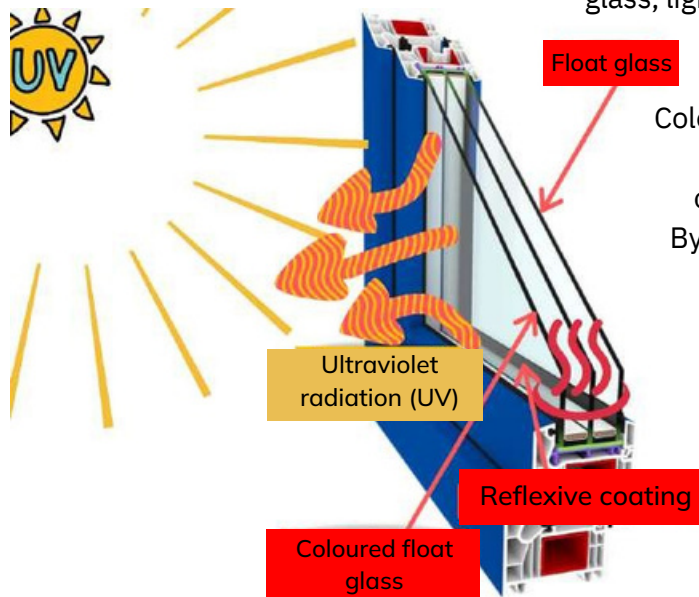
Anti-burglary panes

As the name suggests, they protect against theft. They are marked with the symbol from P3 to P8. They consist of glass panes glued in layers, which are interleaved with a special foil, resistant to tearing.



Solar control panes (antisol)

They absorb the energy of solar radiation, their task is to protect rooms against excessive heating. They are made of coloured float glass. Depending on the thickness and colour of the glass, light transmittance decreases to 32-72%.



Glass absorbent is coloured in the mass during the melting process. Colouring in blue, brown, graphite, or green causes a strong absorption of the appropriate part of the spectrum. By absorption phenomenon such as glass heats up strongly, absorbing about 50% of the energy of solar radiation, and then dissipates the energy, directing it back outside. They are used as the outer pane in the glazing unit.

Reflective panes (reflex or stopsol)

They are made of plain or coloured glass, covered with a layer of metal oxides or precious metals, e.g. gold. Another solution used is to stick a sun protection film on the glass from the side of the room, which at the same time protects the glass from breaking.

The reflection layer works like a mirror - it reflects part of the solar radiation, protecting the room from overheating. Reflective glass is available in clear, silver, grey, blue, green and brown. Windows with reflective glass also protect from uninvited peering, because you can't see much through them from the outside.

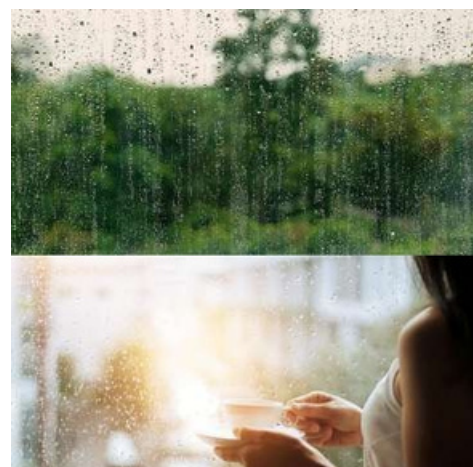


Decorative panes

These are panes of various designs and colours. The so-called frosted glass is ideal for use in e.g. bathrooms. It completely prevents anyone from the outside from seeing what is happening in the room (despite e.g. the light inside the room).

Self-cleaning panes

This is a good choice for those who do not like cleaning windows. The glass surface is covered with a special coating on which organic dirt is decomposed by the UV radiation. Then, thanks to the hydrophilic properties of the coating covering the glass, rainwater removes dirt, flowing down the entire pane without creating stains. It is worth considering using these panes for large glazing, where window cleaning may be difficult. If you think these windows don't need to be washed, I'll have to disappoint you. They have to be cleaned, just less often than ordinary window panes.



ROOF WINDOWS ADD-ONS

Roof window panes

All VELUX roof windows are equipped with tempered glass on the outside for full protection against the elements.

Energy-saving tempered pane

PA triple glazing unit. The heat transfer coefficient, or U-value is 1.1 W/m²K.

Rain-muting, energy-saving laminated pane

Safety laminated inner glass, P2A class. The outer pane with a washable coating, increased insulation and effective noise reduction.

Triple-glazed, energy-saving, rain-muting tempered laminated pane

A triple-glazing unit filled with krypton, ensuring an excellent level of noise reduction and thermal insulation. Safe, glued internal glass, P2A class. The outer pane is toughened with an anti-fog coating that reduces the deposition of dew on the glass from the outside.

Super energy-saving pane

A triple-glazing unit filled with krypton with excellent thermal insulation properties. Safe, laminated, P2A class internal pane and outer tempered pane with washable and anti-fog coatings that reduce glass staining and the deposition of dew on the pane from the outside.

Perfect thermal insulation

A triple-glazing and energy-saving unit filled with argon. Safe, laminated, P2A-class laminated pane and outer tempered pane with anti-dew coating to reduce the deposition of dew on the pane from the outside.

Pane recommended for bathrooms

The glazing unit includes a matte internal ornamental pane, ideal for ensuring privacy.

17% more heat - External blinds

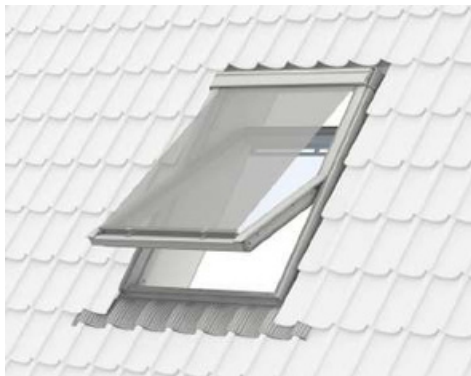
They are used for security purposes, i.e. to protect the house against burglary, as well as to protect against overheating in summer or cooling down in winter. (photo: VELUX)



Solar awning blinds

They stop the sun rays before they reach the window pane, thus reducing the passive heating of the interior. This allows you to maintain a comfortable temperature in the room, even on a warm, sunny day. The solar awning blinds are transparent, so they do not limit visibility to the outside. (photo: VELUX)

They reduce the heating of the attic up to 76%.



Internal blinds

- Blackout blind (99.9% blackout)



- Decorative roller blind (reduces the intensity of light and provides a sense of privacy)



- Energy-saving roller blind (improvement of insulation by 27%, 98% of shading effect)



- Pleated blind (decoration and light diffusion, free operation with the upper or lower rail)



● PAL venetian blinds



● Mosquito nets (protection against insects)



How to operate roof windows with a phone?

In VELUX windows, depending on changes in temperature and humidity, the system can automatically manage the opening or closing of windows, blinds, or external / internal roller shutters. To operate the windows, you have to instal the system consisting of a motor, powered from the mains or from solar batteries. All you need to do is provide a Wi-Fi connection. The system can be managed using the smartphone application.

ACCESSORIES FOR VERTICAL WINDOWS (continued)

Air Vents - why do we need them?

Opening the window brings in fresh air, but on cold days it causes the rooms to cool down too rapidly. However, when we use air-vents, we can optimise the air flow in the rooms and reduce air humidity (too high humidity (> 80%)

has a negative impact on our health). Currently, new buildings and windows insulate us well enough from the environment (noise, cold) that it affects the lack of fresh air (which improves our well-being and allows us to reduce the humidity inside the room). The necessity to use air-vents may also result from the construction plan of a house or a multi-apartment building.



How do air-vents work?

The air-vents are mounted at a height of more than 2 m above the floor (most often in the upper window frame). Fresh air flowing into the interior is heated by warm air masses in the apartment. The ventilation slots are small enough not to let in sounds. They can have a constant cross-section ensuring regular air exchange. This is due to the fact that its access through the air vents depends on the pressure difference inside and outside the house.

You can also choose adjustable window diffusers, in which the damper allows you to dose the amount of admitted air. The higher models include automatic vents, which react to changes in pressure, humidity, or temperature inside and outside. The greater the pressure difference, the smaller the gap.

Energy efficiency and fresh air - is it worth it?

Outdoor air vents are not the devices that contribute to energy savings intended for home heating. Air-vents are a reasonable choice when you have a house equipped with gravity ventilation (operation is more efficient), but also in this case their use may generate heat energy losses.

Microventilation



Unsealing windows is a solution that ensures micro-ventilation, but still does not protect against cold and noise. This is an alternative to using air-vents. The downside of this solution is the need to manually manage the airflow. When purchasing windows, such an "add-on" is usually received as standard.

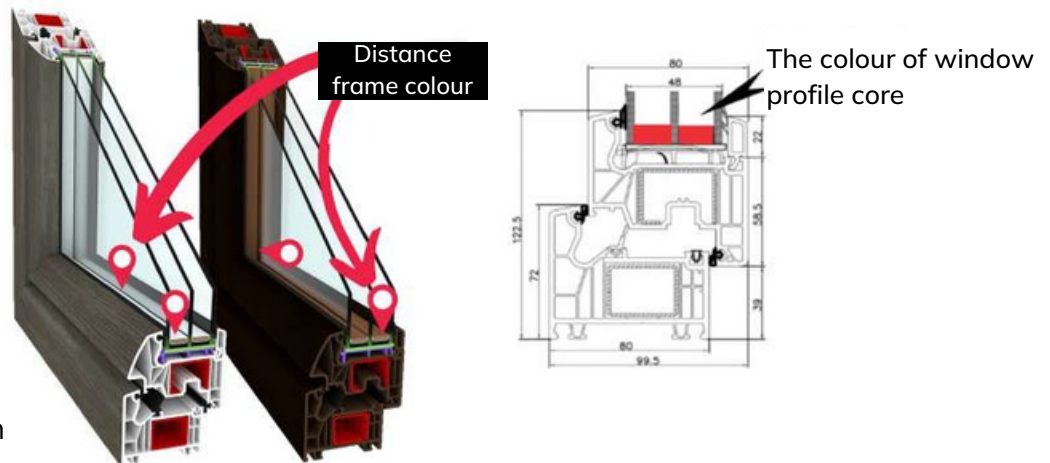


How does it work?

When you set the handle of your window at 45 degrees (regardless if up or down), the pressure of the sash to the window frame is reduced. As a result, fresh air from outside flows into the room.

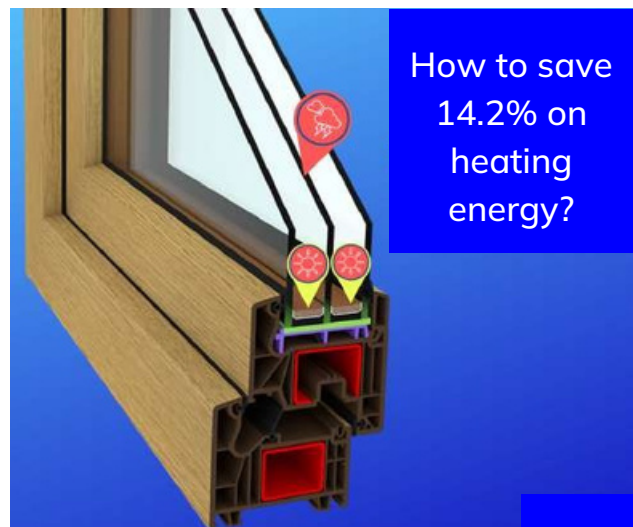
The colour of the distance frame

The distance frame is located inside the window, i.e. between the panes of the glazing unit. It is one of the options for personalising the appearance of the window, affecting only the visual aspect. Depending on the manufacturer, you can choose different colours of the distance frame.



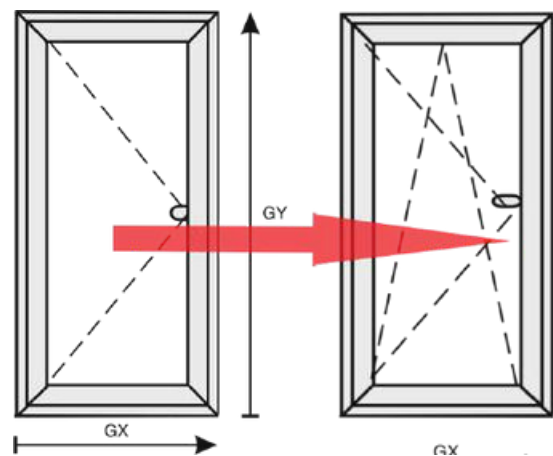
How to save 14.2% on heating energy? The benefits of a warm edge spacer

An aluminium warm edge spacer is installed in the window as standard. As you know, metals easily give up and absorb heat, which affects the insulating properties of the window. The use of warm edge spacers made of materials other than aluminium in the production of insulating glass panes allows for the reduction of heat losses as a result of the thermal bridge created at the contact between the glass pane and the window section. When the window construction uses plastic frames instead of aluminium ones, and the glazing unit consists of three panes instead of two, the annual heating energy savings can bring over 14%. Windows with such structural elements also provide warmth and look nice.



Fitting change

Thinking about the comfort of using the window, it is worth considering changing the fittings from turn-only [R] to turn-tilt [RU]. The cost is low and the comfort of using the window that can be both open and tilted - incomparable.



Muntin bars in the windows

These are slats that divide the window into smaller parts. Their use only affects the appearance.

Structural muntins - made of the same material as the window and given the width of the frame,

Glued-on muntins - slats glued to the window glass,

Inter-pane muntins - made of aluminum. They are located in the middle of the glazing unit. They are available in the following widths: 8 mm, 18 mm, 26 mm or 45 mm.



Friction brake (R and RU leaf opening blockade)

How many times has a draft slammed a window or door? A friction brake is a solution for this type of situation - the hinge arm blocks the maximum opening of the window.



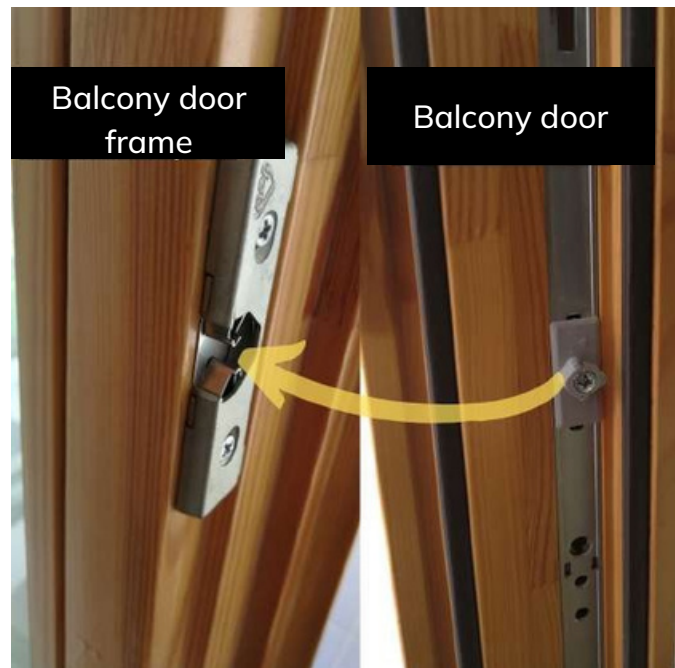
Brake in the handle



When opening a window or patio door, turn the handle to the "window close" position. Then the sash position is locked - as a result of which the window sash cannot be moved in any direction. It is a very useful function - during drafts it will protect our windows against accidental damage, and certainly against slamming.

Balcony latch

It is worth considering this option, especially when you often go out on the balcony / terrace and do not want to leave the balcony door open. Then you just need to gently pull it towards you to close it (the mushroom cam in the balcony door fits smoothly into the recess in the fitting installed in the frame). Such doors are opened from the outside by gently pushing them.

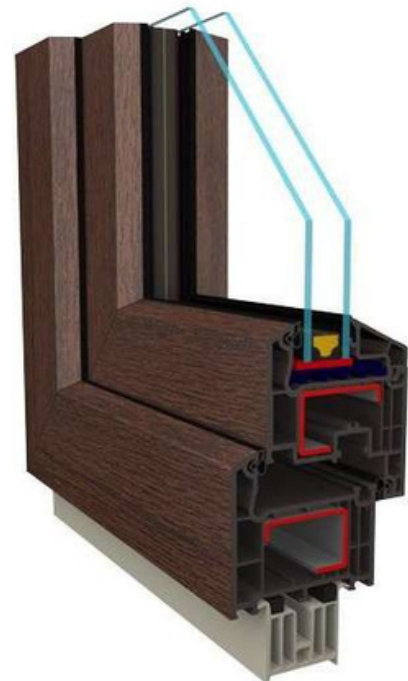
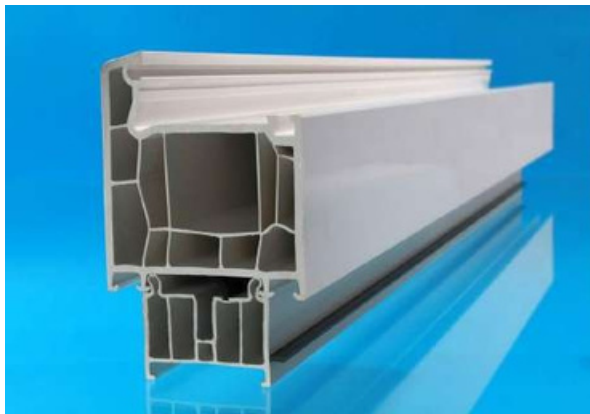


Under sill strip

It is located between the window and the windowsill. It is usually attached to each of the windows as standard (according to the width of the windows). The under sill strip is a PVC profile about 3 cm high, which is very useful when installing window sills. The correctly seated sill should fit under the window profile.

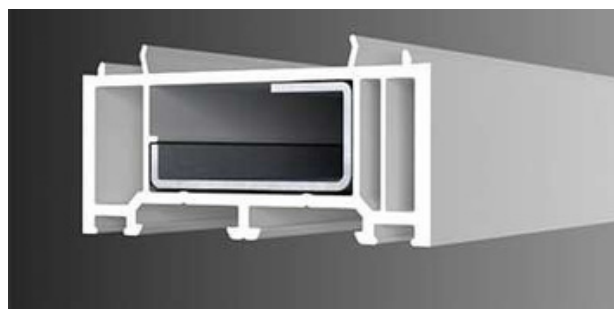
The use of an under-sill strip has an impact on:

- thermal insulation
- protection against wind, rain and snow
- stability of the window



Window frame width extensions

These are PVC profiles that fit the width of the window frame. Most often they are 30, 50 or 100 mm high. The extensions can be easily combined with the frames of window frames, allowing for modification of the dimensions of the total width. In some situations, it also refers to the depth of the window structure.



When to use extensions?

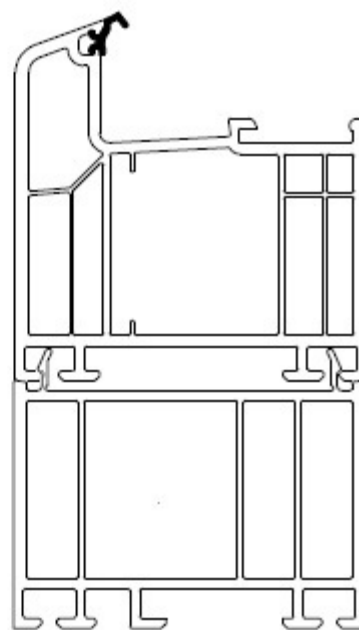
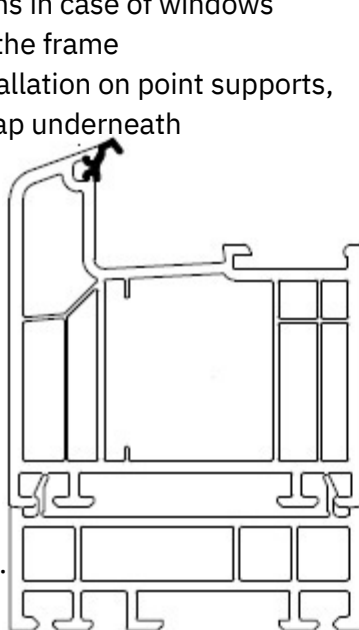
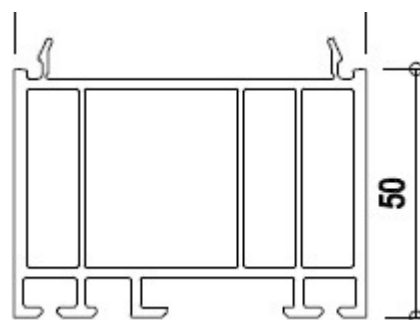
The use of extensions should be considered when:

- The window is smaller than the opening in which it is to be fitted. Using extensions in case of windows which weight may deform the frame of the window pending installation on point supports, we try to ensure that the gap underneath is the same as on the sides or at the top, i.e. ranging from 10 to 30 mm.

- You install external roller shutters. They do not have to be hidden in isolation, and the extensions can be used as the basis for roller shutters construction.

- You replace windows.

After the casement windows are dismantled, there is a very large difference in the dimensions of the window opening inside and out. Commonly, in such cases, the gap between the frame of a new window and the wall is filled with foam and pieces of polystyrene. The latter is completely inconsistent with the principles of proper installation.



The use of extensions allows for the correct dimension of the assembly gap and stable fitting of the window in the window opening.

Not using extensions may cause problems, eg outside the building, the entire window frame will "hide" in thermal insulation.

It is worth knowing that window manufacturers offer steel reinforcement extensions for an additional fee. Thanks to that, they can be more solidly connected to the window frame. In addition, the extensions can be in various colours (white, one-sided or two-sided colour). Window extensions are an "extension" and "support" of standard balcony doors and the balcony door threshold.

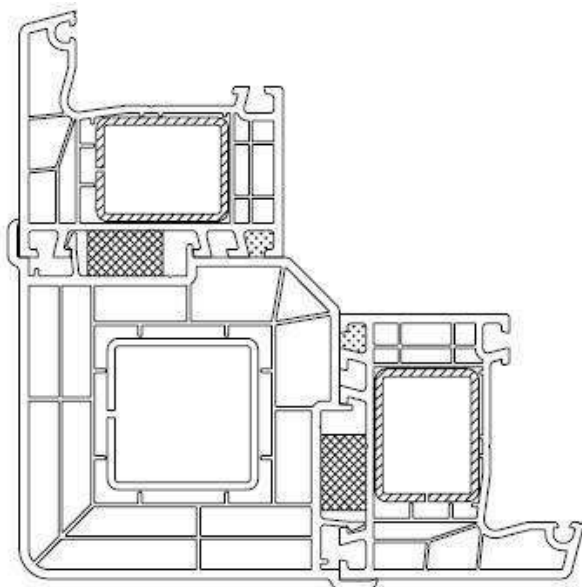
Reinforcement

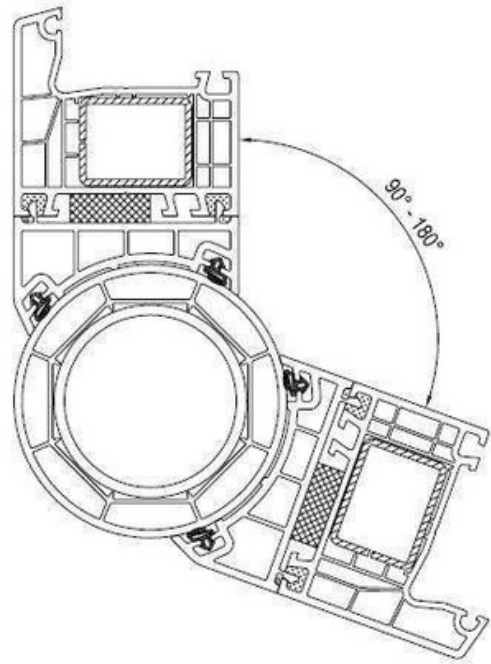
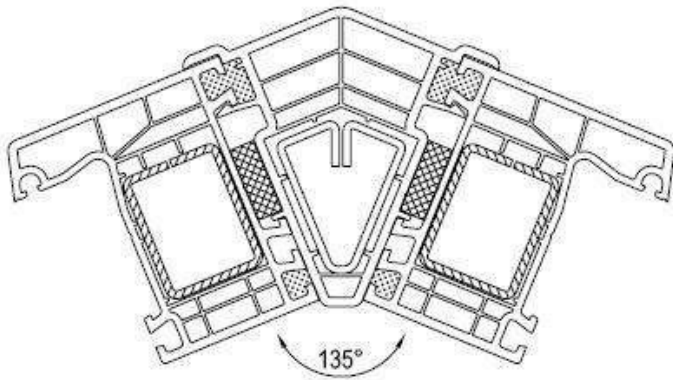
It is a steel profile (section) located inside the PVC profile. It is designed to strengthen the structure subjected to loads and forces resulting from the weight of the window / door. Reinforcements can be used in extensions, connectors, PVC profiles.



Window connectors

In various house constructions, we can find combined windows (e.g. bay window, window + balcony, window + patio door), the outer surface of which does not run in a straight line. The structures are combined with each other at different angles. For such connections, it is necessary to use corner connectors of 90 degrees, 135 degrees or a pipe connector that allows joining windows at various angles.





135° connector - with no extensions in the window frame



Pipe connector + window extensions

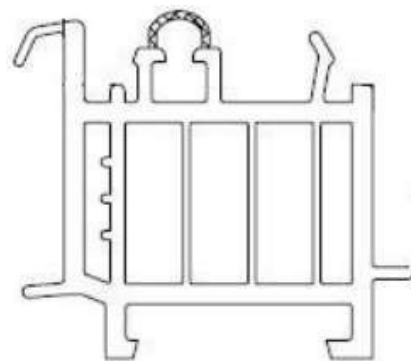
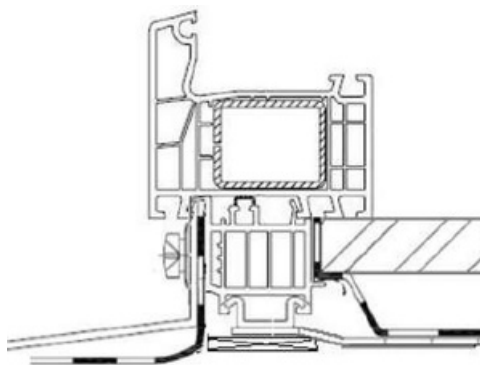
Transport strip

It is used during the transport of windows. It is a PVC profile usually screwed to the bottom of the window frame. It protects the profile against scratching or damage.



Threshold strip

It is a multi-chamber section, clipped into the lower part of the window frame. It should also be permanently attached to it. The profile is equipped with additional seals to improve the tightness of connections in the threshold part of the window. The profiled lower part of the strip is prepared for mounting anchors. The purpose of the threshold strip is to facilitate the correct installation of window sills, especially the external window sill, which is screwed to the threshold strip with the appropriate number of screws. Thanks to the use of a threshold strip, it is also easier to solve the problem of applying sealing films, which protect against the penetration of moisture into the area of thermal insulation.



The threshold for patio / balcony doors

How many times have you tripped over a protruding threshold?



Pros and cons of a low threshold



As a standard, the threshold is the same as the window frame height, i.e. > 50 mm.

If we want a lower threshold without investing

- we can lower the window (in the floor) as much as possible during assembly.

We speak of a low threshold when its height is below 20 mm.

The low threshold looks good and is practical.

However, it also has its drawbacks

- it does not insulate from external conditions as well as a higher threshold.

In winter, you should also, remember to remove snow from near the threshold

(freezing of the door may affect the life of the seals and ensure the tightness of the window).

It is good to plan the use of a low threshold at the design stage - so that the recess in the floor is adapted to its installation. Also, take into account the slope of the floor to the outside of the window (so that water does not accumulate around the window). Installing drainage grates can help here. The low threshold can be used in tilt and turn, folding, sliding or tilt and slide doors. The surcharge to such a threshold is approx. PLN 200 net / running meter.

THE IMPACT OF INSTALLATION ON WINDOW PROPERTIES

Choosing even the best windows (energy-saving, which cost quite a lot), with the lowest heat transfer coefficient (U_w) can be useless if you do not pay enough attention to the proper installation of windows. In order to maintain the declared thermal insulation parameters of the window, it is crucial to properly seal its connection with the wall. Leakage in this place means that the thermal insulation layer is exposed to moisture. In such a case, the damp layer of polyurethane foam loses its insulating properties very quickly and permanently.

Everyone wants to pay as little as possible for windows, right? If the windows assembly is included in the final price, it looks like savings - but is it really worth it? The window offers together with an assembly is not always a good solution, simply because you do not know if this service will be performed well. Therefore, beforehand, check the company for evaluation and comments on the Internet.

As a result of improper assembly, you can expect problems such as:

- moisture ingress
- the formation of stains, and even fungus or mould
- heat loss from the room
- possibility of blow-outs around the window



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