



## 1. Insulated glass/U-value (Double and triple glazing, spacer)

We supply double and triple glazing. The main difference between these two is the U-value (thermal insulation). Double glazing can achieve a centre pane U-value as low as 1,0 Ug, and triple glazing achieve a centre pane U-value as low as 0,47 Ug (The lower the better insulation properties).

It is possible to choose between 2 different low emission coatings; 1,0 (ES) and 1,1 (LE). Although they serve the same purpose, they have different insulation (U-value), light transmission (LT) and solar factor (Gg) properties.

The 1,0 coating gives U-value 1,0 on a glass constructed 4+16G+ES4. 1,1 coating gives U-value 1,1 on a glass with the same construction. The 1,0 coating, described as ES in our glass compositions, offers the best U-value properties. But it has a lower light transmission (Lt) and Solar factor (Gg), compared to the 1,1 (LE) coating. The differences magnifies on triple glazing vs double glazing.

All our insulated glass units are composed with warm edge spacers (VKS) and the cavities filled with argon gas. We offer 2 warm edge spacer options. Our standard VKS and the optional MTECH spacer.

The thermal insulation properties on an MTech spacer is slightly better than the VKS spacer. E.g. two identical insulated glass units, one with MTech spacer and one with VKS spacer, will produce the same centre glass pane U-value. But the MTech unit will perform better in the overall U-value calculation of the product, due to better insulation properties on the edges, which is a critical part of the construction.

## 1. Solar/heat-absorbing glass

Solar and heat-absorbing glass have specially designed properties to reduce the transmission of solar heat radiation.

Glass with these properties reduces the heat radiation. Transmitting through the insulated glass units, reducing the risk of overheating the building. An efficient, passive contributor in preserving a stable indoor temperature.

There are multiple options of solar and heat absorbing glass to choose from. Depending on the purpose of use, they are typically differentiated by the degree of solar factor (Gg) and light transmission (Lt). The lower the solar factor (Gg) the better heat absorbing properties. The variation in the solar factor (Gg) value will have an almost proportionate effect on the light transmission (Lt) value.

However, be aware that you may also need to block the sunlight out in addition to the heat. Even solar glass with low light transmission (Lt) values may require optional extras like screens and blinds to achieve this. We can offer a wide variety.

You may also consider preventing letting in invisible light, like UV radiation. UV radiation contributes about 50% of the fading of the interior. Laminated glass filters away approximately 98% of the UV radiation.

## 2. Safety/Security glass

Safety glass is toughened or laminated glass, tailored for multiple purposes and degrees of safety and protection of persons and property. Depending on the protection purpose and degree of protection, safety glass will be offered according to applicable standards and classifications.

Toughened glass is heat treated after it's been cut. The heat treating process increases the glass strength, making it up to 5 times more resistant on impact than ordinary float glass. It also provide the glass with the property of granulating into small and less harmful pieces if broken upon impact. Typical used at locations where personal injury poses a risk. Laminated glass is made by applying heat and pressure to two or more layers of glass, separated by an interlayer. The interlayer works to hold the glass fragments together if hit with an impact that would normally shatter the glass.

We are gluing the glass fixed to our products, and where toughened glass will fall out, laminated glass will maintain as a barrier if shattered.



### 3. Noise-control glass

Noise control glass is developed with the purpose of reducing outside noise from reaching the inside building by reflection and absorption.

Acoustic properties may not appear as expected. E.g. double glazing may perform better than triple glazing. Our best acoustic test results achieved on a single product shows exactly that.

The acoustic properties can be altered by changing the glass or the spacer. If you increase the thickness of the glass, the weight and mass break the sound waves in a different way. Asymmetric glass construction gives the best results.

Noise-control glass is usually a combination of different glass thickness and spacers in an insulated double- or triple glazed unit. The best acoustic properties is obtained by using laminated glass. The interlayer is a different type than the one used for laminated safety glass. However the interlayer for acoustic purposes also offers some degree of personal safety protection depending on type.

Acoustic properties for glass only will not be comparable with acoustic properties for a complete product. Our acoustic properties are based on complete products being tested, without ventilator. See product sheet: PA-02003.

Ventilators are not available on products with the best noise-absorbing glasses.

### 4. Fire resistant glass

NorDan uses Pyrobel as fire resistant glass, on both EI30 and EI60 fire rated products.

All our fire rated products are tested and approved fire rated both sides. I.e. Fire on the inside or on the outside.

Fire products have other size limitations than standard products.

Fire rated glass is laminated glass with a special interlayers. The laminated glass also offers some degree of personal safety protection depending on type.

The fire-resistant glass (internal glass) is sensitive to UV-radiation and high temperatures. For example a fire rated balcony door cannot be placed in open position letting the sun shine on the internal fire rated glass. To prevent heat built up inside, we do not recommend internal sun protective products or tight curtains too close to the fire rated glass.

For more information see: Fire rated glass information, PU-022, this is attached to all fire rated products.

UV-radiation and high temperature on the fire rated glass (50 degrees +) can lead to small white spots in the fire rated glass. These will not make the glass less fireproof, but it don't look good.

When there is a fire, the interlayer will expand and form an opaque barrier that insulates against heat radiation and flame penetration (the glass will get white and you will not be able to look through it).

Openable fire rated windows (EI30) are only fire rated when they are closed, thus always delivered without handles and with blanking plates. The fire rating will be invalid as long as handles are fixed onto the sash or the sash is left in open position. Only time handles should be used to open a fire rated window, is during installation and maintenance. The fire rating will of course be invalid during these operations.

### 5. Bioclean glass

"Bioclean glass" are glass that remains cleaner longer than ordinary glass, if the the weather conditions are right. The glass has a transparent coating on the outside of the glass that uses the UV-radiation and rain to absorb. And remove dirt.

See the right method for cleaning the glass in the document: *Maintenance of Bioclean glass.*

### 6. Antifog glass

Antifog is a glass that reduces the risk of for condensation and icing on the outside of the glass.



The glass has an external pyrolytic coating that leads to higher temperatures on the glass surface which prevents condensation.

External condensation is something that can occur on. Triple glazed units during certain weather conditions.

Antifog can be used on windows where there is a risk of condensation and icing, typically on kitchens- og living room windows.

Antifog can't be combined with solar glass. Only Energy 1,1. Available also on laminated glass.

The glass can be washed as normal. However, be aware that sharp objects and metal may damage the coating.

## 7. Combination glass (several properties can be combined)

Several properties can be combined in the same. Insulated glass unit.

It can apply to following combinations:

Noise control glass can be combined with solar, security, Bioclean and some antifog combinations.

Fire rated glass can be combined with solar, security, Bioclean, antifog and noise-control glass.

Energy-glass can be combined with solar, security, Bioclean, antifog and noise-control glass.

Laminated glass reduces the UV-radiation by 98%, thus also prevent fading of interior. The external pane of glass in a fire rated product must always be laminated glass for the same reason.

## 8. Decorating glass/Ornament glass

This is usually opaque glass, with the purpose of preventing visibility into a room.

It can be used in doors and windows. Typically used at locations such as bathrooms etc.

There are several types, with etched surface and pattern surface.

## 9. Dew/condensation – internal/external

Internal dew on isolated glass is caused by two things: High humidity in the room and the temperature on the glass.

Humidity inside during the cold seasons should not exceed 30-35%. Ventilation is very important. In old houses without balanced ventilation, you should ventilate several times a day. Triple glazing with warm edge spacers, reduces the risk of internal dew.

Recommendations to prevent internal dew:

- Do not dry clothes in inside the house.
- Make sure to regularly air/ventilate the house (provide enough ventilation).
- If it is possible, keep the temperature to 21 degrees inside the house.

External condensation is caused by high humidity outside in combination with energy efficient products with very little heat loss. The surface is getting colder and below the dew point as heat from the inside don't leak out, generating energy to evaporate the dew.

External condensation/dew on isolated glass is affected by local conditions and requires the coincidence of several factors before it possibly occurs.

The risk of external dew can be reduced by fitting the product further into the wall or a canopy.

By using antifog, the temperature will get higher on the glass surface.

Condensation and dew will be significantly reduced.

## 10. Pressure equalization glass to be fitted or transported at heights over 800 meters above sea level.

Because of the different air pressure between low and high land, glass must be pressure equalized if fitted or transported on locations from and above 800 m.



Gäller för:  
Alla NTech med glas

Glass produced at sea level without pressure equalization will get a higher pressure between the glass layers than the normal air pressure on 800 m. Higher pressure between the glass layers will lead to dents (deflection), which leads to cracks (pressure rupture). Small insulated glass units are most exposed.

Customer/project owner needs to give the information about the high over the sea level where the product will be installed (for high over 800 m). When ordering, the sales person need to inform about this.

It is important to know the average yearly temperature where the product is installed.

**See the information: Pressure equalization of glass to be installed at heights over 800 meter above the sea level **?(Price)****

## 11. Colour differences on glass

Colour differences can occur on glass that has mixed coatings (solar/energy) in the same facade.

Mixing 2-layered and 3-layered glass can also lead to differences.

Our recommendation is to have the same coating and construction in the whole facade (with construction it is meant 2- and 3-layered glass, not thickness on the glass).

## 12. Colour on the spacer

NorDan delivers spacers in 3 different colours. Standard grey (RAL7035). Additional we have black (RAL9004) and white (RAL9016).

## What to do with a reclamation

Send a request to Customer Service Manager.