Partial visualization of the Standard

BODESA

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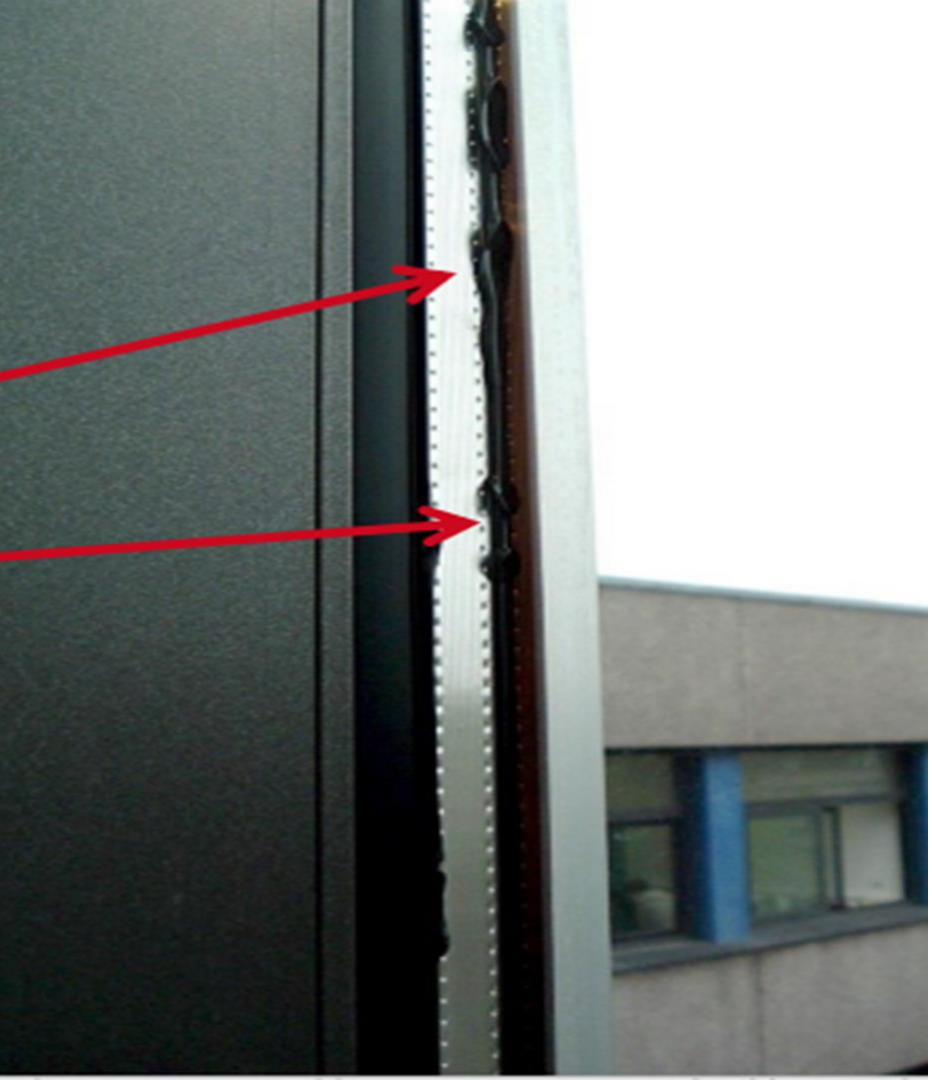


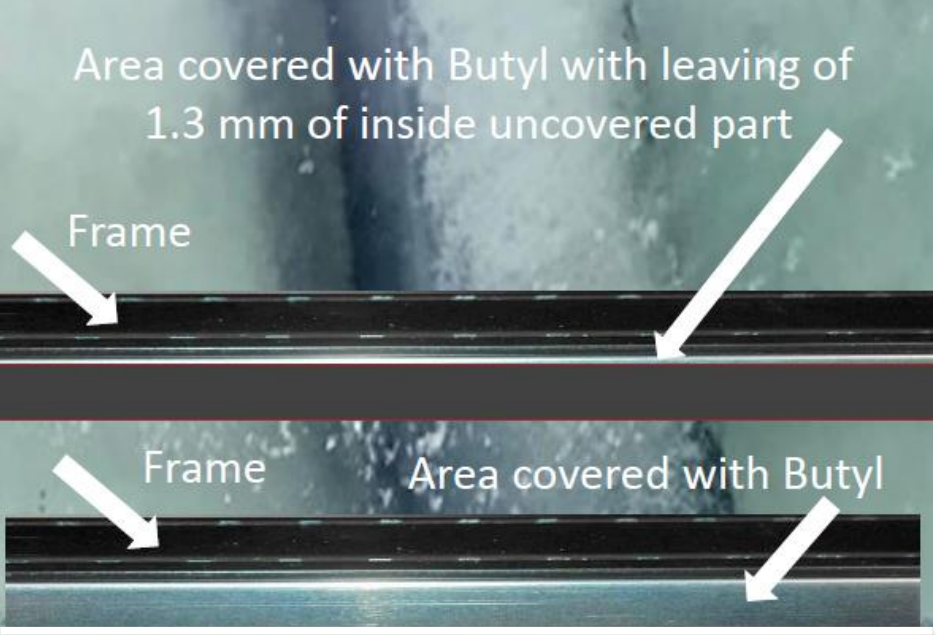
1. Expansion of the primary sealant

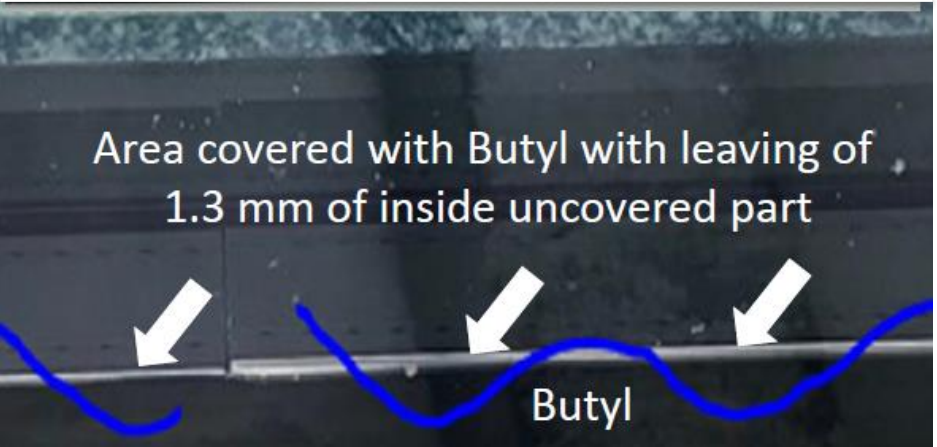
The primary sealant (butyl) is located between the spacer and the glass, along the edge of the spacer through the entire perimeter of the insulated glass unit (IGU). When the glass unit is installed in the window frame, the sealant can expand into the inner visible side of the IGU.

This is not a defect.

The spread (ingress) of butyl inside the IGU during the production of the glass unit is allowed up to 2 mm. Not regulated later.

The expansion of butyl is influenced by:
- environment temperature;
- installation of a glass unit into a window frame;
- other exploitation conditions.





2. Visibility of the metallised part of the spacer

Warm edge spacer

The dark spacer which has a light metallized inside part and the dark part.

We cover the dark part of the spacer with primary sealant (butyl) so that, in case of its dispersion during exploitation, it spreads less into the inner visible part of the IGU. In this case, the metallised part of the line remains visible.

This is not a defect.

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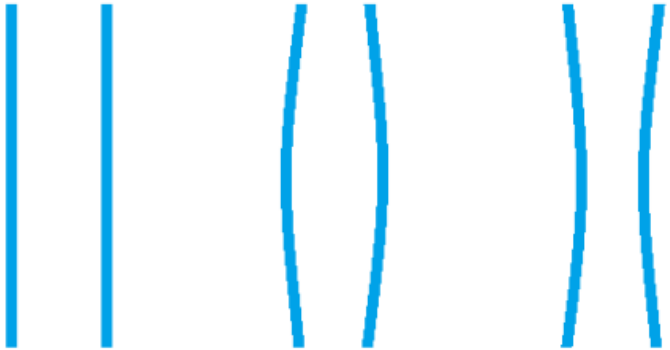
3. Regulation of the pressure

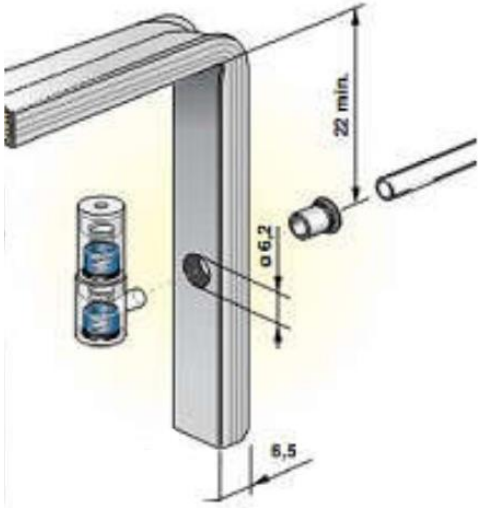


Picture No. 1

The production premises have certain corresponding atmospheric pressure and temperature conditions, during the production of the insulated glass units (IGU).

IGU can be installed in the places of their final use (installation, storage, operation, etc.) where the atmospheric pressure and temperature differ from the original production conditions, which can cause deformation of the IGU (picture No. 1), during which the glasses in the IGU can split and/or brake.

In order to prevent deformation of the IGU at the installation site and/or transportation route, on the day of manufacture, the IGU must be seald (adjust) at the particular pressure that would correspond to the pressure at the IGU installation site and/or it‘s transportation route.



3.1. Two-way pressure valves

Two-way pressure valves are installed in the IGU (to each chamber) in case the IGU will be transported in a mountainous area and/or installed in high mountains, where the air/external pressure changes and differs from the pressure inside the IGU.

If the size of the IGU is ≥4 m2, then it is necessary to install two two-way pressure valves in each chamber of the IGU.

The two-way valve performs its function only in a vertical position.

NOTE. No warranty applicable for hermeticity/tightness of the IGU.

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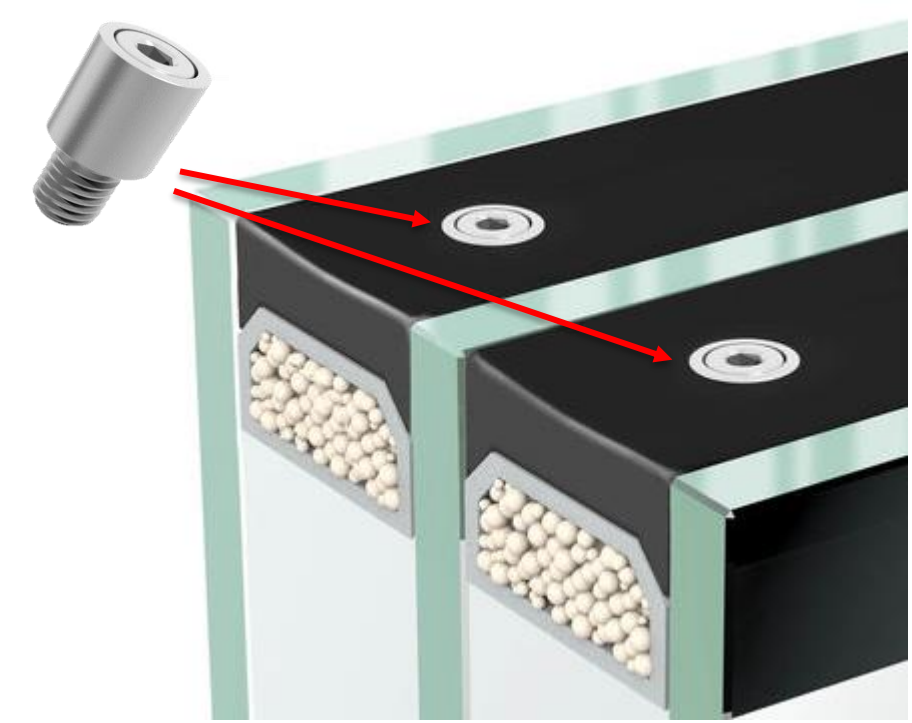
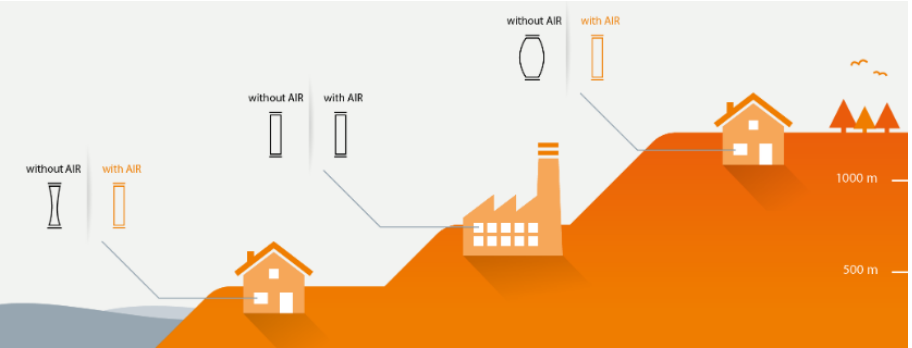


3.2. SWS AIR

Swisspacer spacers have a pressure valves designed especially for them - SWS Air.
They are screwed into the outer edge of the spacer and sealed with a secondary sealant.
These specially designed swisspacer peassure valves are not visible visually inside the IGU.

SWS Air perform the same function as traditional two-way pressure valves.



NOTE. No warranty applicable for hermeticity/tightness of the IGU.

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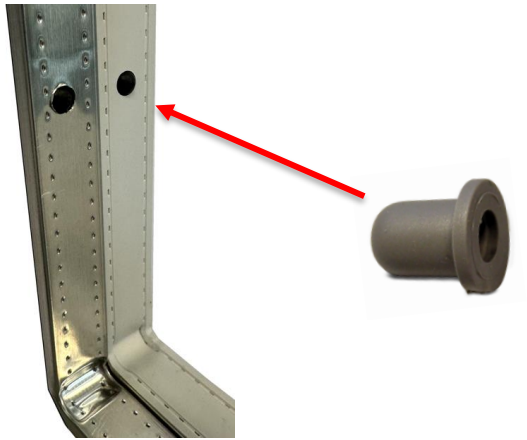
3.3. ALTIMETER



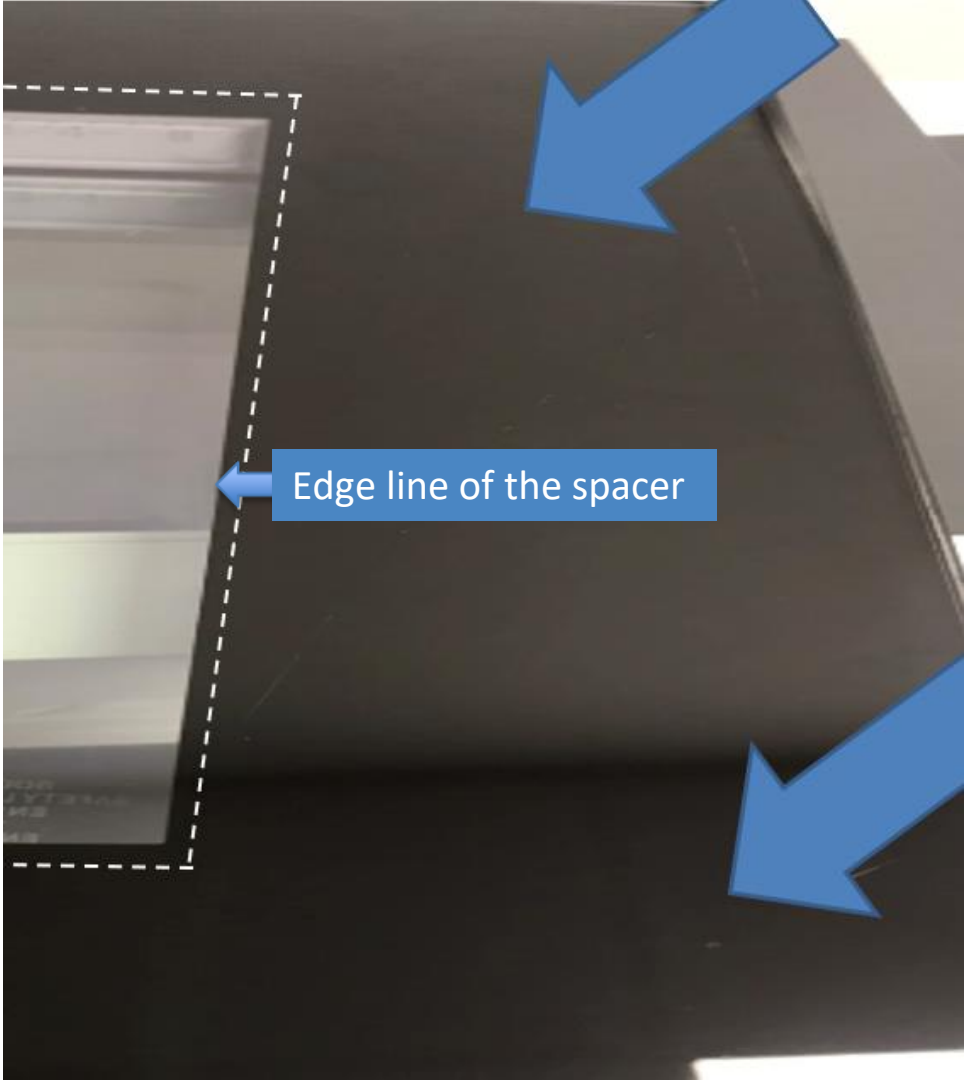
A special device that balances the final height pressure and temperature of the insulated glass unit (IGU). The HELANTEC valve is a small but important detail. Only with this valve can it be ensured that the executed pressure balance remains intact and that assured characteristic of the IGU does not change.

When ordering products, the buyer must indicate:

- average annual temperature of the place of installation of IGU (°C)
- height of the installation site (in meters), above sea level.

More information is provided in the company standard appendix No. 7:
https://www.bodesa.lt/useful-tools-company-standard/

NOTE. Warranty for hermeticity/tightness of the IGU is applicable.



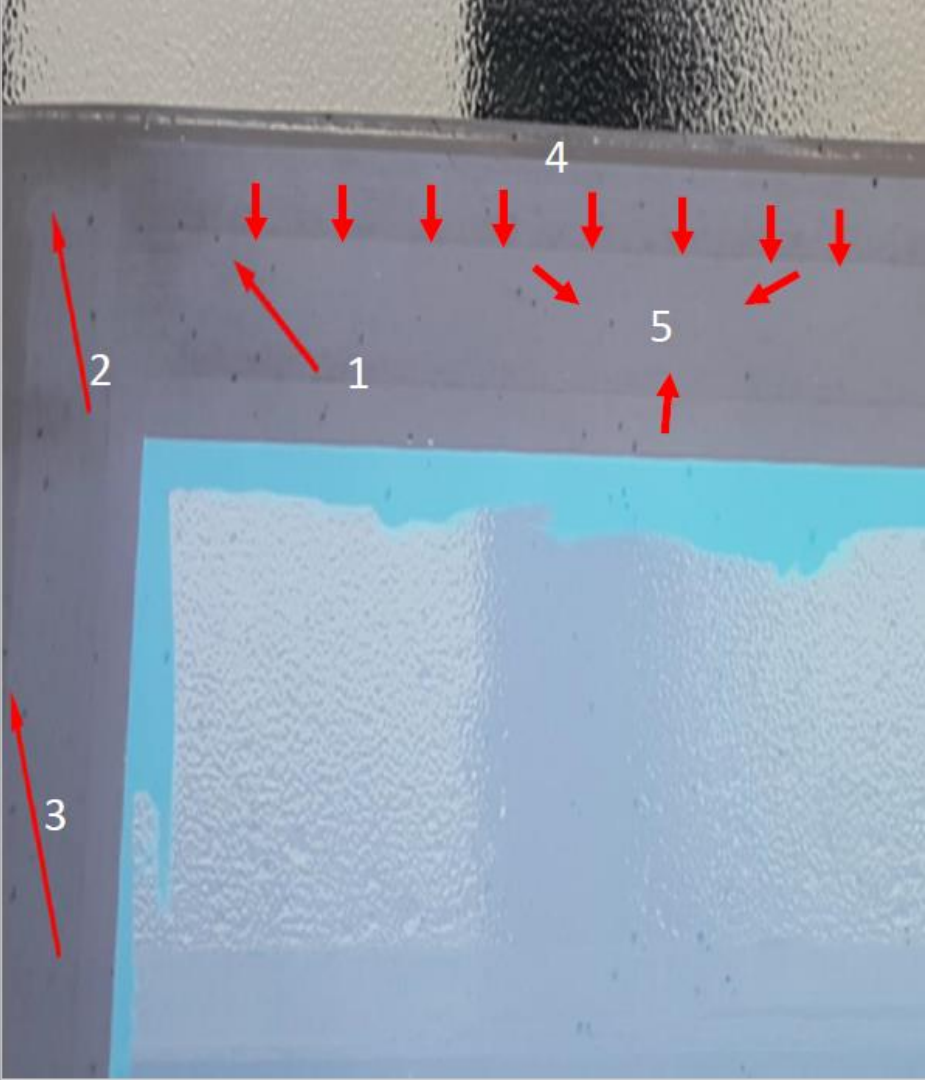
4. Coating shade of insulated glass unit

The surface color of the glass coating will be homogeneous in the following cases:

1. If painted with TEA paint (for Guardian glass only). In the example, the inner surface of the glass is coated with a TEA coating that covers the primary sealant and the spacer (dotted line). The TEA coating is 2-3 mm shifted inside the IGU.

2. Using Swisspacer black spacer, which will have less visibility of the metallized part of the spacer.

5. Removal of the glass protective (Low-e) coating

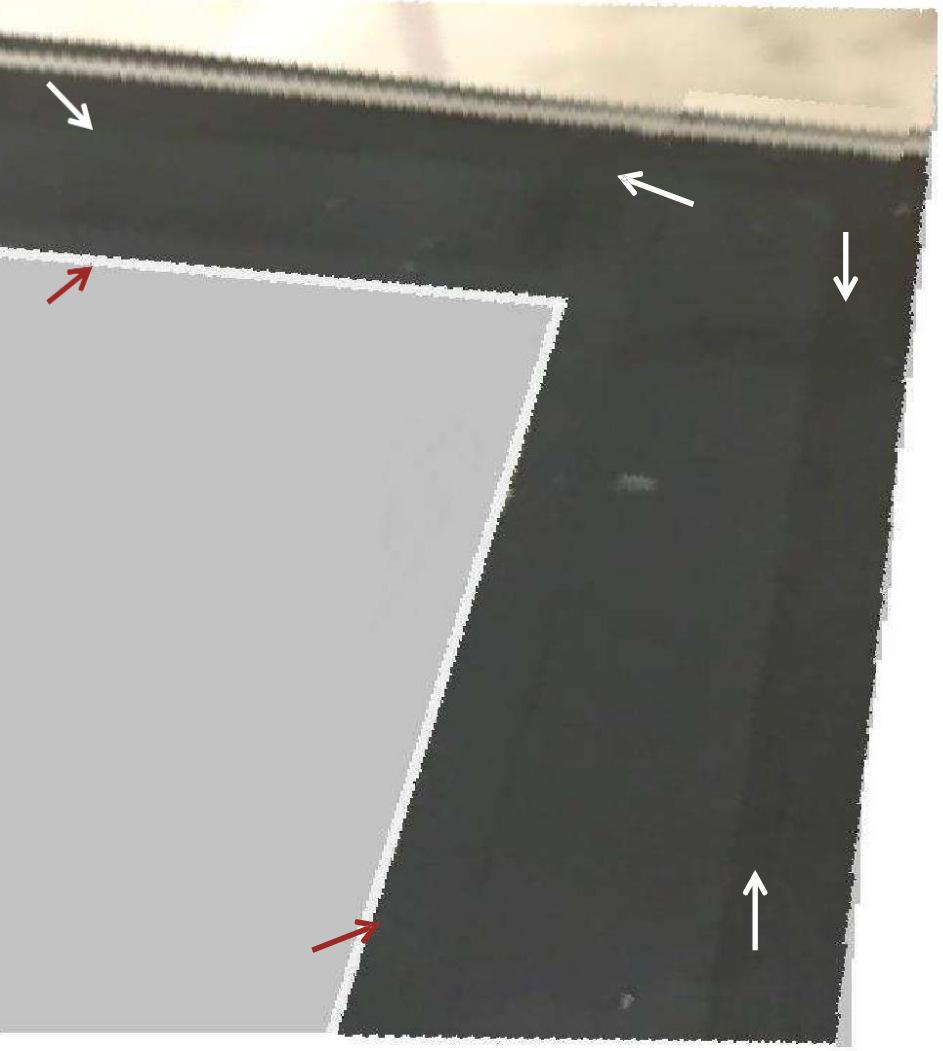


During one stage of grinding, the disc removes 10 mm of the glass protective (Low-E) coating. In this case, the removed surface of the coating will be almost homogeneous (5), except for the corners (2) where the disk stages overlap (grinding several times).

When the width of removed coating is more than 10 mm, the removal is performed in several steps and darker lines at the connections (3, 4) and corners (1, 2) will be visible.

This is not a defect.

Darker lines will always appear when the coating is removed with the help of discs.



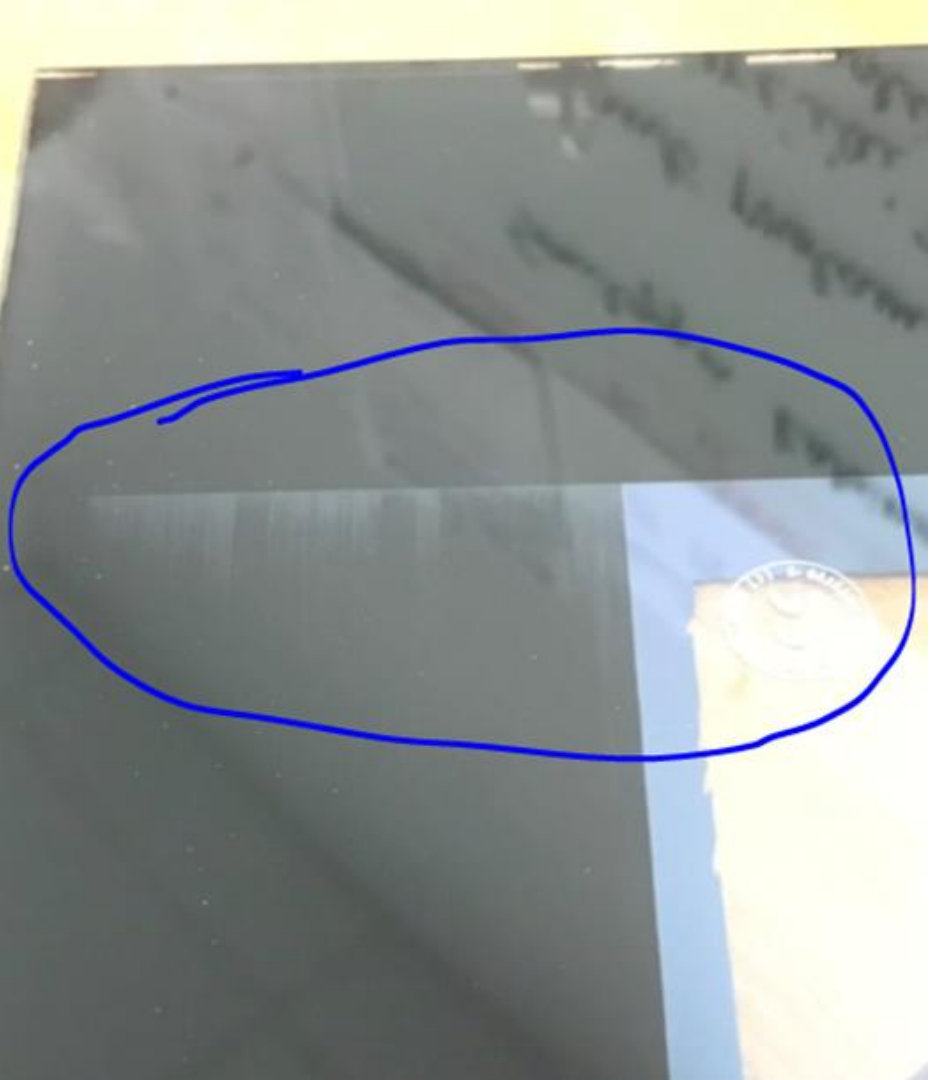
6. The grinded glass surface covered with the secondary sealant

The photo demonstrates changes (white arrows) of grinding lines on glass after the removal of protective coating:

- when the coating is removed with the help of grinding discs;
- the removed coating is wider than the disc width (10 mm);
- the grinding of the whole width is performed several times.

This is not a defect.

Red arrows - the visible edge of the spacer prior the primary sealant.

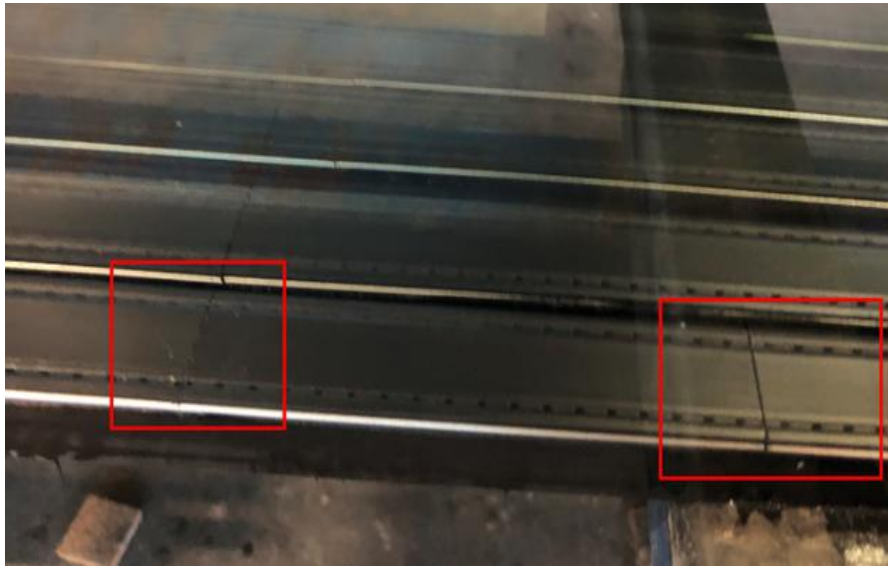


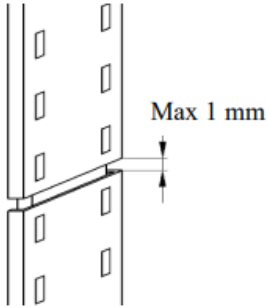
7. View on the glass after removing the protective(Low-e) coating

The photo demonstrates visible changes on the glass, which appears in the connections during grinding.

This is not a defect.

This effect (darker lines) always appears when the coating is removed with the help of discs.





The joint spacing of the distance spacer ends is allowed up to 1 mm.

8. Connections of distance spacers

When preparing distance frames (cut or bend with a bending machine), there may be more than one joint along the perimeter of the spacer. The number of joints depends on the size of the spacer and the yield of the material.

According to the company standard:

1. The maximum number of bend spacer joints along the perimeter of the spacer – 4 joints (in each chamber of glass unit).
2. The maximum number of cut spacer joints along the perimeter of the spacer – 4 joints (in each chamber of glass unit). Not counting corner joints.

9. View of the corner of the bended spacers

The compression mark visible in the corners of the spacers is formed by the bending tool of the automatic spacer bending device.
The shape of the compression mark may vary, depending on the spacer type.

This is not a defect.

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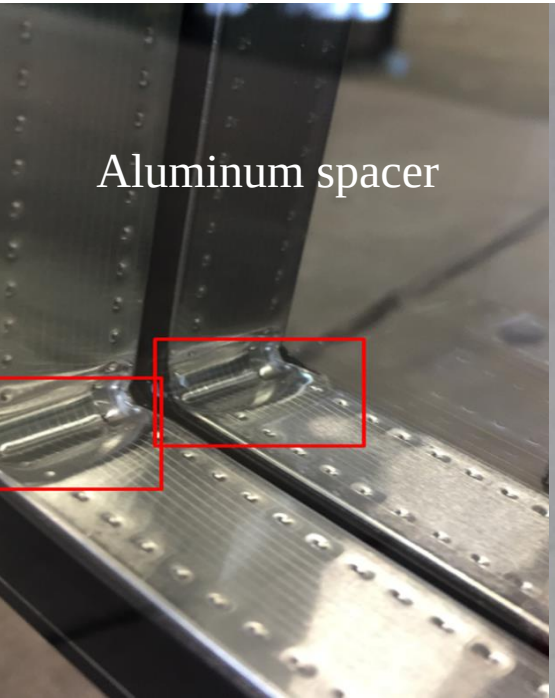
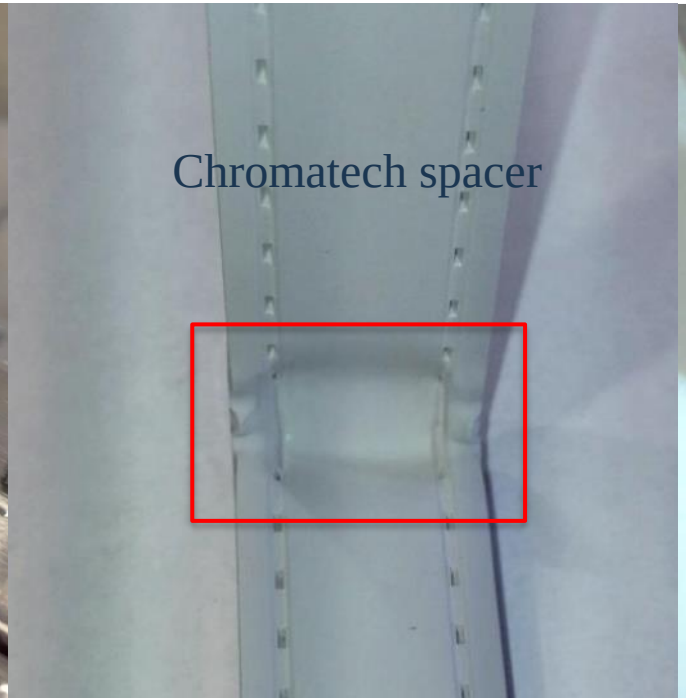
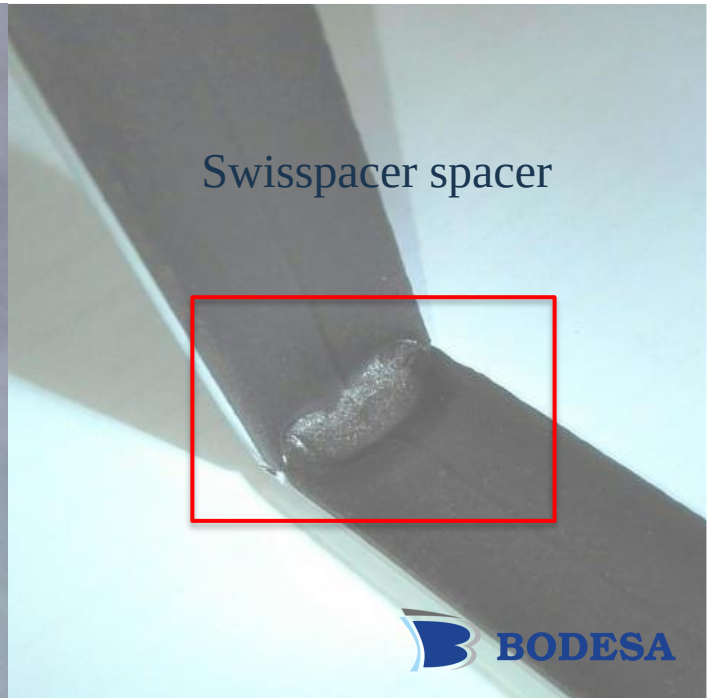


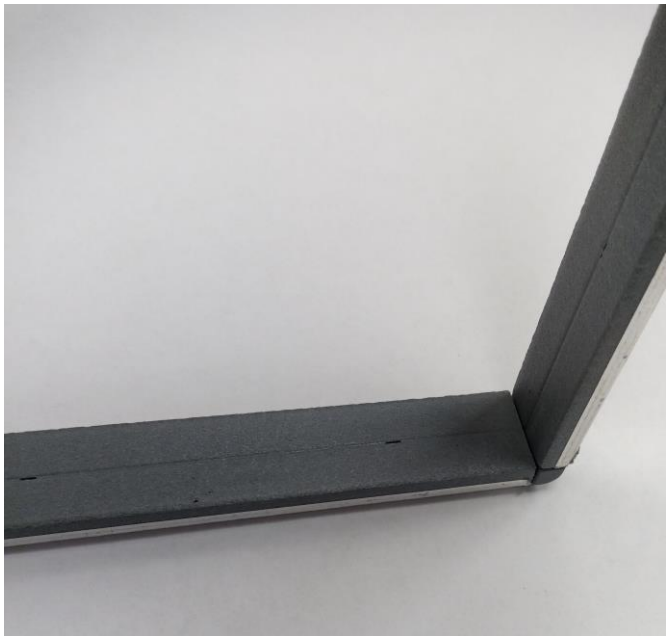




10. Corner view of the cutted spacers

The Swisspacer spacer

Spacers with a dimension of one side longer than 2000 mm are not bend, but cut.
Shaped spacers need to be cut if the dimension of one side is longer than 1500 mm.



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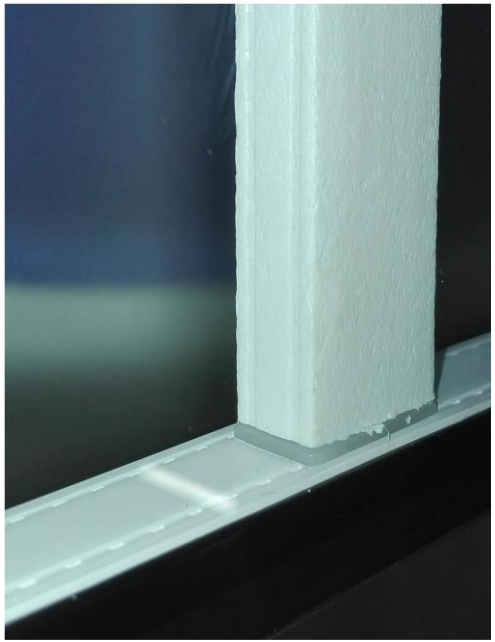
11. Surface color and texture of spacers and shprosens/duplexes

The spacers and shprosens/duplexes surface texture and/or color shade **may vary**, even if the color code of the spacer and shprosen/duplexe is the same.
It depends on the viewing angle, the lighting, the type of glass or the way it was processed (e.g. tempered glass).

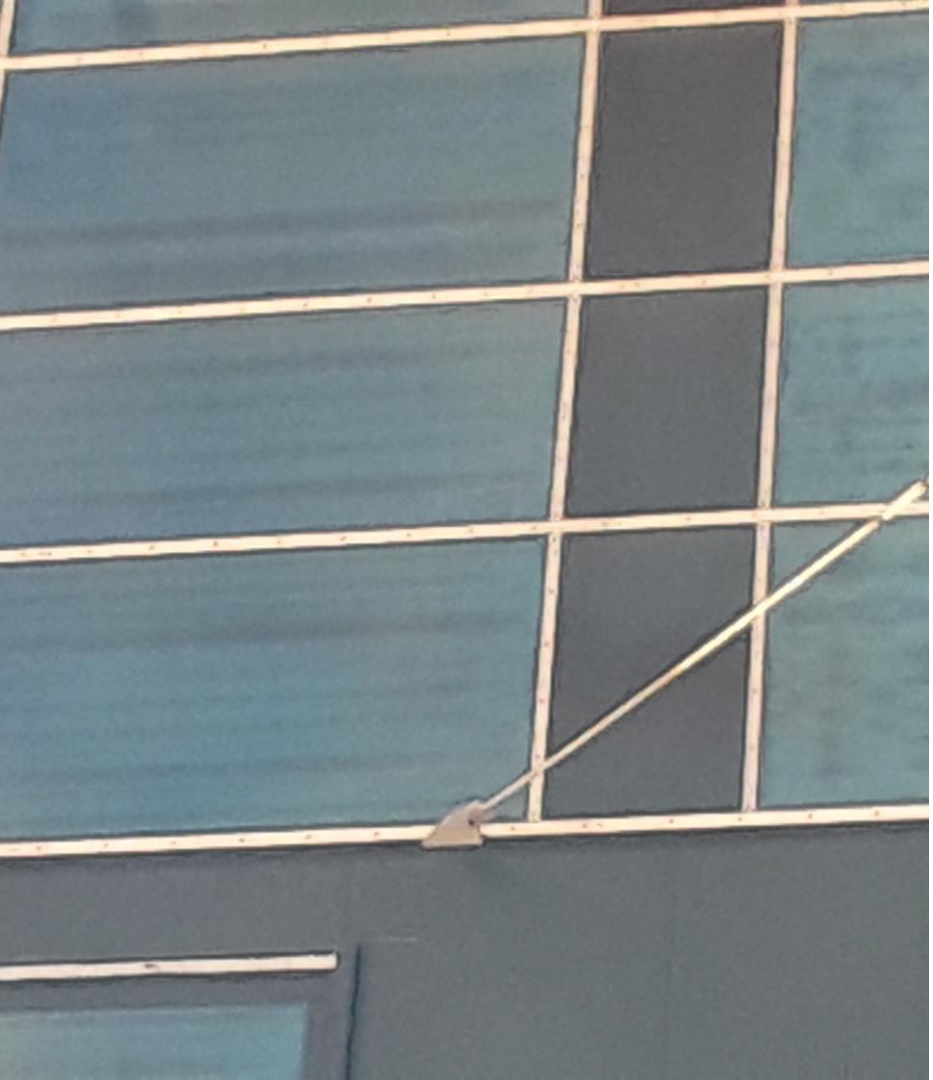
Differences in color shades



Texture differences.

This is not a defect.

The buyer must order a test sample of the product, before ordering IGU with shprosens/duplexes .



12. Anisotropy

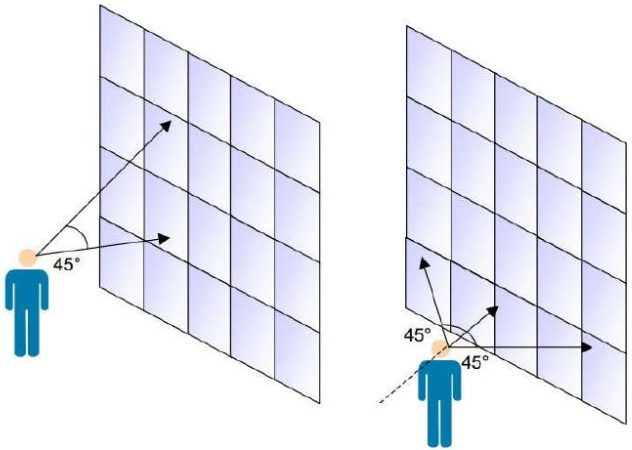
The phenomenon typical for the tempered glass due to the internal stresses that occur during the tempering process.

Due to anisotropy, dark circles or stripes may appear, which vary depending on the viewing angle if the glass is exposed to polarized light or viewed through polarized glasses.
Polarized light is a part of the normal daylight. The degree of polarization depends on the weather conditions and the position of the sun.
The effect of double refraction is more pronounced when looking at the glass at a sharp angle.

Anisotropy is typical for insulated glass units (IGU).

This is not a defect.

13. Glass color (tint) assessment in the object



The maximum viewing angle to the object facade assessing the differences of the glass tints in the object.

Glass color (tint) depends on:

1. the glass thickness, glass manufacturing process,
2. composition of the mixture of raw materials,
3. the constantly developing glass manufacture technology.

Differences in colors may occur after a certain time from the manufacture of insulated glass units (IGU). Glass color in the IGU‘s ordered additionally may differ even though they were ordered from the same manufacturer.

Differences in color in the selective glass coating are characteristic to standard IGU‘s in which thermal conductivity coefficient is U=1,1 [W/m2K]. When ordering the IGU‘s, it is recommended to change all the windows in the building at the same time or at least the windows located in the same wall. This way it is possible to avoid any irregular glass tints in the adjacent windows. Where one IGU must be changed for any reason, there is no guarantee that the glass color of the new IGU and any currently existing IGU‘s would be the same.

Assessment of any differences in the glass tints in the object is conducted solely from the object facade at an angle of no more than 45°. Assessment of the glass tint is rather subjective and depends on the assessment distance, angle, internal and external details on the object facade as well as on the assessor‘s eyes‘ „sensitivity“.

14. Practical examples of the differences in glass color (tint)

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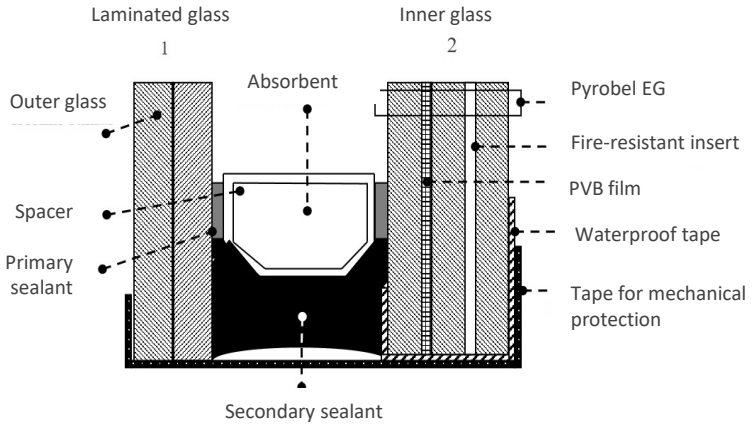
15. Fire-resistant glasses

Purpose and classes of fire-resistant glass/glass unit

The purpose of fire-resistant glass/glass unit is to contain flame, smoke, other combustion products and prevent heat from passing through for a certain period of time, which are divided into different classes:



An example of a fire-resistant IGU

1. *Class E*
   These glasses prevents the flame, smoke and other combustion products for a certain period of time, but does not prevent heat spread.
2. *Class EW*
   Higher-class glasses that prevents the flame, smoke, other combustion products and partially limiting the spread of heat.
   Thermal radiation must not exceed the set level – max 15 kW/m2.
3. *Class EI*
   High-class glass that prevents flame, smoke, other combustion products and does not transmit the heat. The temperature on the side of the glass opposite to the fire must not exceed 140°C during the specified period of time.
   The construction of these glasses ensures the efficient operation of the glass during a fire - when the tempered glass breaks, the anti-fire gel between the glasses starts working, absorbing the energy, which becomes opaque under the influnce ot temperature, thus creating a reliable barrier to the spread of fire.
4. *Class DH*
   A smoke barrier that prevents smoke from spreading inside the building.

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16. Changes in the glass coating of the insulated glass unit under the influence of heat

The color of enameled, painted single glass or the insulated glass unit glass(IGU), that has been taped (coated) with other materials or means, in certain areas changes when heating or other materials are installed behind the single glass/IGU too close, resulting in inadequate ventilation and excessive heat, which ultimately leads to:

- Depressurization of IGU;
- Inflammation of glass or IGU;
- Damage to the glass coating.

Distances must be determined on the basis of thermal energy according to specialist calculations. And the IGU itself the temperature should not exceed 60 degrees Celsius.

Areas of damage to the glass coating

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