

## ***Guidelines for the handling of multi-pane insulating glass units***

***Focusing on transport, storage and installation***

# Guidelines for the handling of multi-pane insulating glass

## 0.0 Introduction

A multi-pane insulating glass unit consists of least two glass panes which are joined to one another by means of an edge bond which hermetically seals off the enclosed space between the panes from the environment.

A multi-pane insulating glass unit is a fully assembled component for use in the building trade with continuous linear support on at least two sides [1]; [2].

The manufacturer of the window or facade is generally responsible for the functional capability of his product when it is used as intended.

These guidelines assume that transportation, storage and installation are conducted out by skilled persons only.

## 1.0 Scope

These guidelines apply to:

- Transport
- Storage
- Installation

for the use of multi-pane insulating glass units in accordance with EN 1279.

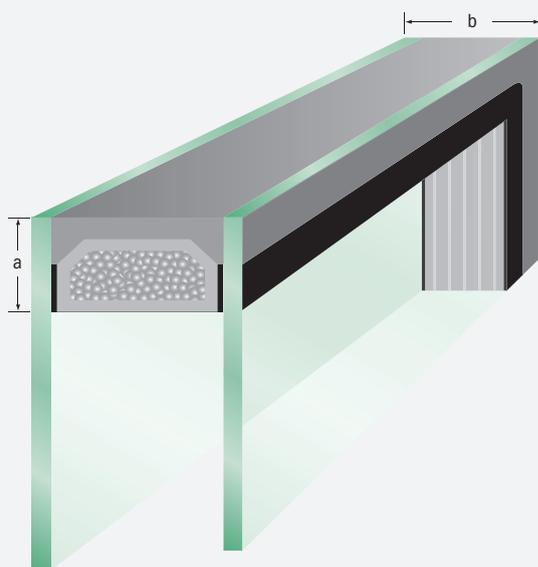
These guidelines describe the measures required to maintain the tightness or functional capability of the edge bond in the long term. Structural-physical functions, mechanical properties, fittings in the space between the panes, optical characteristics and glass breakage are not subject of these guidelines. These guidelines are legally binding when the multi-pane insulating glass unit manufacturer or contractual partner refers to them in the general conditions of business or agrees to them in the individual case. They do not replace standards, established technical regulations or statutory requirements relating to the use of multi-pane insulating glass units. Some important technical information sources are listed at the end of these guidelines.

## 2.0 Basic requirements

The edge bond must not be damaged. Its protection is absolutely essential for maintaining its functionality. All damaging influences must be avoided. This applies to storage, transport and installation from the day of delivery.

**Damaging influences may include:**

- lasting build-up of water on the edge bond
- UV radiation
- unplanned mechanical stresses
- incompatible materials
- extreme temperatures.



(Figure 1)

(Figure 1)

The area 'a' (lateral covering of the glass edge on the weather side) is the height from the edge of the glass to the vision area of the insulating glass unit.

Regardless of the requirements specified in standards for the glazing channel, natural daylight must be prevented from acting on the areas 'a' or 'b' in the installed state. If necessary, the multi-pane insulating glass unit must be ordered with a 'UV-resistant edge bond' or the edge bond must be protected against UV radiation.

### 3.0 Transport, storage and handling

Transportation is usually carried out using racks or crates.

#### 3.1 Transport on racks

Glass panes must be secured on the racks for transportation. In doing so, the securing device must not exert inadmissible pressure on the panes.

#### 3.2 Transport with crates

In the case of lightweight crates which are not designed for the effects of static or dynamic loading, a careful check must be carried out in each case as to how the crates can be handled or how transport ropes, for example, can be used.

Glass panes may only be stored or set down vertically on suitable racks or fixtures. When several panes are stacked, spacers (e.g. paper inlays, intermediate pads, stacking shims) are required. As a general principle, multi-pane insulating glass units must be protected against damaging chemical or physical effects on site.

Multi-pane insulating glass units outdoors must be protected against prolonged exposure to moisture or sunlight by means of a suitable full-size cover.

### 4.0 Installation

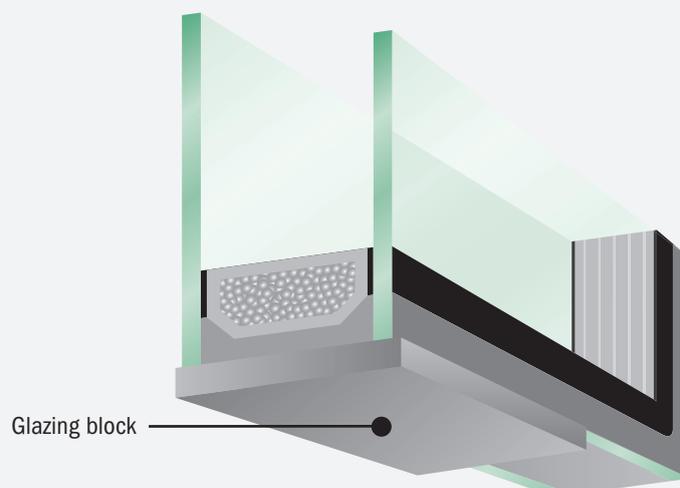
Every glass element supplied must be checked for damage before it is installed. Damaged elements must not be used. Multi-pane insulating glass units are usually frame-filling elements, i.e. they do not have a load bearing function. Their own weight and the external loads acting upon them must be transferred to the frame or the glass-retaining structure.

Alternative glazing systems, such as point-type fixing systems or glued systems, are not covered by these guidelines. Other requirements may be imposed on these with regard to the edge bond design.

### 5.0 Blocking

The glazing block is the interface between glass and frame. The blocking technique is explained in [3].

Blocking is intended to guarantee a free glass/rebate clearance for maintaining the vapour pressure equalization (long-term condensation), ventilation and if necessary draining. As a general rule, suitable glazing blocks or blocking bridges must be used when installing multi-pane insulating glass units. All panes of a multi-pane insulating glass unit must be provided with blocks in accordance with accepted engineering practice [3]. The arrangement, materials, size and shape are defined in guidelines [3] or in information provided by the block manufacturer. Blocks can be made from suitable wood, suitable plastic or other suitable materials; they must have adequate and permanent compressive strength and must not cause the edges of the glass to chip. Blocks must not change their properties or those of the multi-pane insulating glass unit in a manner which is detrimental to their function within the period of use due to the sealants and adhesives used or due to moisture, extreme temperatures or other influences.



(Figure 2)

## 6.0 Mechanical stresses

Dynamic and continuous loads resulting from wind, snow, crowd pressures etc. act on the multi-pane insulating glass unit when it is installed. These loads are passed to the supporting section (frame), which causes the supporting section and the edge of the glass to bend.

This bending leads to shear forces in the edge bond of the multi-pane insulating glass unit. The following limitations must be observed to avoid endangering the long-term sealing effect of the edge bond:

The deflection of the multi-pane insulating glass unit edge bond perpendicular to the plane of the sheet at one edge must not be more than 1/200th of the length of the glass edge at maximum load, and not more than 15 mm. The frame must be adequately sized for this.

## 7.0 Glass rebate, sealing and vapour pressure equalization

Glazing systems which separate the glass rebate from the room climate have stood the test of time. For Central European conditions, the glass rebate should be ventilated on the weather side. An exchange of air from the room side with that in the glass rebate must be largely avoided.

## 8.0 Standards, directives, regulations (in their currently applicable version)

- [1] TRAV – Technical Regulations for the Use of Accident-Proof Glazing, DIBt Berlin
- [2] TRLV – Technical Regulations for Glazing with Linear Support, DIBt Berlin
- [3] Technical Directive No. 3 of the Institute of Glazing, Hadamar
- [4] Technical Directive No. 17 of the

Institute of Glazing, Hadamar

- [5] EN 1279-5, Glass in building, Insulating glass units, Evaluation of conformity
- [6] DIN 18545-1, Glazing with sealants; rebates; requirements; Glazing with sealants
- [7] DIN 18545-3, Glazing with sealants; rebates; glazing systems
- [8] Loading groups for window glazing, ift Directive VE 06/01
- [9] Guidelines for assessing the visual quality of glass for building, Bundesverband Flachglas, Troisdorf
- [10] Bulletin on the 'Cleaning of glass', Bundesverband Flachglas, Troisdorf

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