General Work Instructions for Using LINIT U-Profile Glass

Status: September 2003

I. Preliminary remark

In the general construction approval for LINIT U-Profile Glass No. Z-70.4-44, work instructions of the manufacturer are required under point 4 'Regulations for the execution of work'. These are submitted as follows. It is, however, also pointed out that prior to contract solicitation, prior to ordering the material and prior to commencing installation work the user must acquire information on the latest updates regarding possible alterations or new features from our website www.lamberts.info.

We specifically point out that only those installation contractors are to work with U-profile glass who are declared professional glazing enterprises (e.g. registered glazing specialists *[Meisterbetriebe]* and who employ trained specialist staff with appropriate professional training in glazing work who can provide proof of many years of experience in the handing of glass. Installation contractors who make mistakes in the course of the preliminary clarification work and in the fitting of U-profile glass, because of inadequate professional skills, cannot claim that some details - which are required for a correct implementation of glazing work and which are usually taught within the framework of a proper specialist glazer training - are not specified again in detail below. With the explanations given in the following we are assuming that the contractor carrying out the installation work is a declared glazing specialist.

Upon receiving an order we furthermore assume in particular that the installation contractor who orders glass from us or through our customers employs appropriately trained specialist staff, as mentioned above, for the correct execution of the glazing work. We are not, however, committed to check this.

The user must always observe that although a general construction approval for LINIT U-Profile glass exists, this does not automatically mean that all LINIT U-Profile glass types are generally approved for construction; furthermore, not every form of construction and use is automatically covered by this approval.

The user must check well in advance, during the design stage, that the LINIT glass type selected meets the technical requirements of the general construction approval and is manufactured accordingly (see www.lamberts.info - > Product program) and/or that the design, the dimensioning and use, as well as the combination of different building materials to be used, are in compliance with the general construction approval (see Point 3.1.-3.3). Beyond this, the customer must clarify with the relevant building authorities whether an individual approval has to be acquired for the project.

In the event of an order we assume that the project has been clarified by the customer with regard both to its project-specific requirements and its compliance with building-law regulations. If, for example, based on an individual approval, special requirements apply to our products, we are to be informed of this well in advance, but at the latest before placing the order.

Work instructions of Glasfabrik Lamberts are first and foremost the requirements specified by the German Institute for Construction Engineering (Deutsches Institut für Bautechnik DIBt Berlin) in the **General Construction Approval No. Z-70.4-44**.

Furthermore, the requirements of the **Technische Richtlinie No. 7/1991 'Verglasen mit Profilbauglass' des Instituts des Deutschen Glaserhandwerk** für Verglasungstechnik und Fensterbau (Technical Regulation on glazing with U-profile glass of the Institute of the German Glazer Trade for glazing and window construction work) in Hadamar (65589 Hadamar 1 – An der Glasfachchule 6) are to be correspondingly observed, as far as these concern the concrete project requirements. Point 5.1.2 on the type selection and determination of the U-profile glass length, which is no longer state-of-the-art, is definitely not to be observed any more.

It is also to be taken into account with the Technical Regulation No. 7/1991 that in the standard glazing on page 26/27 LINIT U-Profile glass is only to be fitted in combination with padded U-profiles along the entire flange, to avoid glass-to-glass contact. Furthermore, any follow-up and/or renewed DIN standards in this context are, of course, to be implemented analogously.

The additional installation instructions given below are given on the basis of the General Terms and Conditions and the Technical Delivery Terms of Glasfabrik Lamberts and must be checked by the glazing contractor with regard to their meeting the requirements of the project and the requirements of the building law in force. Responsibility regarding the suitability of LINIT glazing and verification thereof lies with the user alone.
As the project-specific requirements regarding material and execution of work usually vary significantly from project to project, necessitating individual solutions, the following instructions can only be seen as a minimum requirement for the installation work and performance, and they must be supplemented or amended in the respective individual case by the fitter, corresponding to the individual project-specific requirements and any adapted single-case building regulations.
As Glasfabrik Lamberts does not offer a complete glazing system, but rather LINIT U-Profile glass and aluminium frame profiles as building materials which are processed by the user on the site to form a complete unit in combination with many other building materials of other manufacturers, any form of guarantee or liability is ruled out. It is recommended that the user acquire information from the other manufacturers well in advance, prior to commencing the project, on which of their products are suitable for the respective intended use and how these are to be used in detail. This applies in particular to the use of fastening means and sealing material.

We furthermore recommend in particular, when working with U-profile glass, the observation or appropriate application of the following compendia, DIN specifications, regulations, ordinances etc. (without claim of completeness) as far as these are applicable:
Technische Richtlinie Nr. 17: 'Verglasen mit Mehrscheibenisolierglas' (Technical Regulation on glazing with multiple-layer insulating glass)
Technische Richtlinie Nr. 19: 'Überkopfverglasungen' (Overhead glazing)

GUV 56.3 Sicherheit bei Bau und Einrichtung 'Mehr Sicherheit bei Glasbruch', Edition Sept. 2003 (Public Sector Accident Insurers on safety in construction and installation work; Greater safety in the event of glass breakage)

DIN-Taschenbuch 71 (pocket book) 'Abdichtungsarbeiten' (sealing work)
DIN-Taschenbuch 78 'Beton- und Stahlbetonarbeiten' (concrete and reinforced concrete work)
DIN Taschenbuch 83 'Metallbauarbeiten Schlosserarbeiten' (metal construction work, locksmith work)
DIN Taschenbuch 93 ' Stahlbauarbeiten' (steel construction work)
DIN Taschenbuch 94 'Fassadenarbeiten' (facade work)
DIN Taschenbuch 99 'Verglasungsarbeiten' (glazing work)
DIN 18032: Hallen für Turnen und Spiele (sports halls)
DIN 18056: Fensterwände: Bemessung und Ausführung (window walls: dimensioning and execution of work)
DIN 18232: Rauch- und Wärmeabzugsanlagen (smoke and heat venting systems)
DIN 18357: Beschlagsarbeiten (fittings)
DIN 18360: Metallbauarbeiten (metal construction work)
DIN 18361: Verglasungsarbeiten (glazing work)
DIN 18364: Oberflächenschutz an Stahl und Leichtmetall (surface protection on steel and light metal)
DIN 18516-4: Außenwandbekleidungen, hinterlüftet (outer wall coverings, rear-ventilated)
DIN 18540: Abdichtung von Außenfugen und deren Ausbildung (sealing of outside joints and formation thereof)
DIN 185454-1/2/3, Part 1: Abdichtung von Verglasungen mit Dichtstoffen (sealing of glazing with sealants),
Part 2: Dichtstoffbezeichnungen Gruppe E (sealant designations Group E),
Part 3: Verglasungssysteme (glazing systems)
DIN 1055 and supplementary regulations:
Lastangaben im Hochbau (load specifications in building construction)
DIN 4102: Brandverhalten von Baustoffen und Bauteilen (fire behaviour of building materials and components)

DIN 4108 and attached sheet: Wärmeschutz im Hochbau und Wärmeschutzverordnung, 24.02.1982 (heat insulation in building construction and heat insulation ordinance)
Hamburgische Verordnung über Wärmeschutz bei Gebäuden, 06.10.1992 (Hamburg Ordinance on heat insulation in buildings)
Wärmeschutzverordnung vom 01.01.1995 (Ordinance on heat insulation)
DIN 4109: Schallschutz: Begriffe (Soundproofing: terms)
Arbeitsstättenverordnung – Arbeitsstättenrichtlinie, Edition 1976: 'Sichtverbindungen nach außen'. (Ordinance/Guideline on place of work – visibility to the outside)
VDI Richtlinie 2719: Schalldämmung von Fenstern und deren Zusatzeinrichtungen (Guideline on sound insulation of windows and auxiliary equipment)
DIN 4113: Aluminium in Hochbau (aluminium in building construction)
DIN 1249: Flachglas im Bauwesen, Profilbauglas – Begriff – Maße – Teil 5
Bundesverband der Unfallversicherungsträger der öffentlichen Hand – BAGUV – Edition 1992 (Flat glass in the building trade, U-profile glass – terms, dimensions Part 5 – Federal Association of Public Accident Insurers)
DIN EN 12020 Parts 1 and 2: Extruded precision U-profiles of alloys EN AW 6060 and EN AW 6063
DIN EN 573-4 Legierungen (Alloys)
DIN EN 755-3 Mechanische Eigenschaften (Mechanical properties)
DIN 17611 Anodisch oxidiertes Halbzeug aus Aluminium und Aluminium-Knetlegierungen, technische Lieferbedingungen (anodized semi-finished products made of aluminium and wrought aluminium alloys, technical delivery conditions)
DIN 1748: Strangpressprofile aus Aluminium (extruded aluminium profiles)
DIN 4766: Herstellverfahren der Rauheit von Oberflächen (production method of roughness of surfaces)
DIN 52460 Fugen und Glasabdichtungen – Begriffe (joints and glass sealing – terms)
DIN 58125: 'Schulbau' – bautechnische Anforderungen zur Verhütung von Unfällen (building of schools, requirements for prevention of accidents)

as well as additional standards wherever required. Recommendations of the Institut für Fenstertechnik e.V. Rosenheim as well as the Aluminium-Zentrale Düsseldorf are to be observed, e.g. Leaflet A5 'Cleaning of Aluminium in the building trade'.
Guidelines for the design and implementation of roofs with sealing – flat roof guidelines – prepared and published by the Zentralverband des Deutschen Dachdeckerhandwerks – Fachverband Dach-, Wand- und Abdichtungstechnik – e.V. and Bundesfachabteilung Bauwerksabdichtung im Hauptverband der Deutschen Bauindustrie e.V., Edition 1982 as well as Technical Regulations of the Roofer Trade, published by the Zentralverband des Deutschen Dachdeckerhandwerks e.V. and requirements of the Gemeindeunfallversicherungsverband (Public Sector Accident Insurers).

With regard to the binding character of DIN standards it should be pointed out that usually these are not legally binding as a law – this is something frequently misunderstood. To clarify this point we refer to the Bulletin 'Merkblatt für das Handwerk, Normen und Recht", (bulletin for crafts and trades, standards and law) of May 1978, published by DIN, which states that: DIN standards are free for anyone to use. Those persons using these standards are to ensure the correct application thereof in each specific case.
DIN standards are not the only source of judgement but rather one source of judgement for technically correct behaviour as a rule. It is also to be observed that DIN standards can only take into account the technology existing at the time of the respective publication.
No person can avoid responsibility for his/her own action through the application of DIN standards. Insofar, each person acts at his/her own risk. Liability of the DIN Deutsches Institut für Normung e.V. and those involved in the preparation of the DIN standards is excluded.
Any person encountering incorrectness or the possibility of an incorrect interpretation when applying a DIN standard is requested to inform the DIN of this without delay, to enable the removal of any shortcomings.

DIN DEUTSCHES INSTITUT FÜR NORMUNG e.V. (German Institute for Industrial Standards)
Burggrafenstraße 4-10, DE-10787 Berlin.
The user is to check all recommended materials for suitability for the case in question as well as for suitability in accordance with building law regulations.

II Installation instructions

1. Preliminary planning

1.1 Preparation in the design phase

In the design phase of a project, the installation contractor shall clarify well in advance of the actual installation whether or not individual approval has to be obtained for the selected LINIT type (see also www.lamberts.info ->Product program). The same applies to the design, dimensioning and planned use of the LINIT U-Profile glass in the project-specific combination with other building materials.

We point out once again, explicitly, that only installation contractors are to work with U-profile glass who are declared glazing specialists (e.g. registered glazing specialists *[Gläsermeisterbetriebe}]* and who have declared specialist staff who can verify correct specialist training in the field of glazing and many years of experience in the handling of glass.

Installation contractors who make mistakes in the preliminary clarification work and in the installation of U-profile glass, these being based on the lack of professional suitability, cannot claim that details belonging to the professional execution of glazing work are not repeated hereinafter in specific detail. We assume in the following explanations that the installation contractor is a declared glazing specialist with trained and qualified professional staff. We furthermore explicitly assume when accepting orders that the companies ordering glass from us employ suitably trained staff for the correct execution of the glazing work. We are not, however, committed to check that this is the case.

1.2 Preparation for installation

Well in advance of commencing the installation work, the contractor carrying out the work must check once again that the substructure can bear the expected or specified loads. Frame structures are not designed to take up loads from the building. No loads from the building are to be transferred to LINIT U-profile glass. The substructure must be sufficiently rigid and stable. It is to be anchored for the loads occurring in compliance with the technical building regulations. U-profile glass is not to be used to reinforce the frame structure!

2. Frame installation

2.1 Frame materials

The frame structure can be of wood or aluminium. When using the respective materials the installation contractor must check that these meet the requirements of the project or the respective building-law requirements.

2.2. Frame material and surface

Our aluminium frame profiles are currently manufactured in compliance with the following standards:
DIN EN 12020-2 Tolerances
DIN EN 12020-1 Technical delivery terms
DIN EN 573-4 Alloys
DIN EN 755-2 Mechanical properties
DIN 17611 Eloxal

To ensure maximum durability and suitability the materials and especially their surfaces are to be treated in advance in compliance with the valid DIN standards and recommendations of the Aluminium Zentrale e.V. Düsseldorf ('Reinigen von Aluminium im Bauwesen' - cleaning of aluminium in the building trade - of the latest edition), and in compliance with the recommendations of the technical associations and possibly of the respective manufacturers.

2.3. Fixing of frame to structure: General preliminary remark

The frame must be fastened observing the valid standards (especially DIN 18360, on metal construction work and locksmith work and DIN 18540 Part 1, on the sealing of outer wall joints in buildings using joint-sealing compound, structural design of the joints, or their follow-up standards) and Technical Regulations in compliance with the current technology, taking into consideration the movements of part of the structure and all requirements from the structural analysis (sufficient dimensioning) as well as with the aid of appropriate materials.
After levelling out uneven areas of the connecting surfaces the frame must be professionally connected to the part of the structure. It must take up the stress from the glazing and transfer it to the part of the structure. The fastening elements must be secure, durable and rust-free, whereby the requirements from the structural analysis must be taken into account. The fastening means suitable for the respective project are to be applied as specified by the manufacturer to an appropriate number of fixing points determined in the structural analysis. The frame is to be professionally and durably sealed to the building structure, as specified by the manufacturer of the sealing material, in compliance with the project requirements. The possibility of damage through subsidence or through dimensional alterations to building openings is also to be examined and resolved if necessary. Under no circumstances are forces to be transferred from the frame to the U-profile glass.
If large temperature differences are to be expected because of the climate, or if moist air is trapped during installation, condensate may develop.
For this reason an adequate number of vapour pressure equalisation openings (one for each length of glass, usually underneath the flange) are to be provided on-site in the bottom frame profile, corresponding to the project-specific requirements. These openings allow a controlled discharge of condensate. If necessary, suitable filters are also to be applied to the drainage holes to prevent insects and/or pollutants from entering.

2.4 Interaction with other materials

Fastening means are not to cause harmful interaction with the frame material, e.g. contact corrosion. It is for this reason that particularly aluminium and steel are not to come into contact with each other. These materials must be separated in a professional and permanent manner using appropriate means (e.g. plastic plates etc.).
Connecting means for aluminium frames may be of aluminium if they meet the requirements defined in the structural analysis and those of the project.

2.5 Fixing of frame to structure

To avoid damage to the glazing and to the part of the structure the draining of condensate must be ensured (see also DIN 18361 on glazing work, Section 3.9). Particularly the bottom frame is to be designed in such a way that any collection of dripping water can be drained away in a controlled manner.

The frame of the wall made of U-profile glass is to be securely fastened to the surrounding elements. Fastenings are to be designed in such a way that in the event of temperature fluctuations the elements can expand and contract without hindrance.

The fixing is to be carried out using suitable fastening means with construction approval. The fixing of the upper frame profiles which are thermally separated at the side is carried out in staggered arrangement. The bottom thermally separated frame profiles are fixed in the centre using a 35 mm insulated shim.

The frame profiles HSP 60 + HSP 83 are to be fastened in the centre. Shims are to be placed between the frame and the fastening means. Closure of this area must be air- and water-tight.

The spacing of the fixing points for the frame profiles depends on the wind stress, the length of the glass and the respective fastening materials
selected by the user, and must be determined for the individual case. A spacing of 300 mm, however, is under no circumstances to be exceeded.

A sealing must be applied over the whole area between aluminium frame and the part of the structure (e.g. sealing strip, sealing cord).

Upper corners can be butt-jointed or mitred. The bottom corners should always be butt-jointed. The corner joints are to be closed using suitable sealing strips in a permanent, durable, water-tight manner.

Butt and expansion joints are to be formed between the aluminium profiles corresponding to the local conditions. In the dimensioning of the expansion joints the temperature fluctuations at the project throughout the year are to be given adequate consideration on-site (also in connection with the selected surface coating, among other things). Expansion joints are to be connected with suitable expansion-joint thrust pieces and are to be sealed in a permanent durable manner with sealing material or sealing strips.

Bottom frame profiles with windowsill are to be provided with the lateral window-sill end profile (FB-A) and professionally sealed to the part of the structure. Windowsill expansion joints are to be designed according to the existing expansion joints and provided with the corresponding expansion-joint thrust pieces. Windowsills that are applied subsequently are to be shortened to the basic profile in the area of insertion, depending on the overhang, in order to ensure an adequate slope. The fixing and sealing of the windowsills is carried out using appropriate bolts and rivets on the basic profile.

In order to permanently protect a connection joint against the penetration of moisture and to meet the increased requirements regarding heat insulation, it is not sufficient to merely seal the joint on the outside against wind and driving rain. To provide the required air-tightness and to prevent damage through damp, additional sealing on the inside is absolutely essential.

For structural glazing with U-profile glass in rooms with increased chemical load or humidity (e.g. dairies, swimming baths, breweries, car-wash facilities, paint-shops etc.) special consultation must be held with the manufacturer of the sealing agent. A specially designed frame construction may possibly also be required.

3. Delivery and storage of LINIT U-profile Glass

LINIT U-profile glass is delivered in glass lengths from 100 cm to a max. length of 700 cm (depending on the type of glass). Two lengths of glass are laid together and several of these pairs of glass lengths are bundled together using plastic strapping and are delivered in foil packing.

Package content with LINIT U-Profile Glass:
Glass type: P 50, P 33, P 26, P 23: in packages of 10 or 20 lengths of glass
Glass type: P 33/60/7, P 26/60/7: in packages of 8 or 14 lengths of glass

3.1 Delivery of LINIT U-Profile Glass

The LINIT U-Profile glass packages are loaded onto the truck loading area and stacked one on top of the other and adjacent to each other. Hard foam boards are arranged between and beneath the individual glass packages. Beneath the individual glass packages the hard foam base only covers approx. 2/3 of the loading surface. In the centre of the glass packages there is an area left open to facilitate effortless unloading of the packages using a LINIT loading fork.

Unloading using a fork-lift truck is only possible when a double polystyrene base is loaded in addition (this involving additional costs). Should this be planned by the customer, our sales personnel must be informed well in advance of loading (one week in advance at the latest).
Loading forks or forks of the fork-lift truck must be fitted with an appropriate padding material (e.g. felt or rubber) in order to avoid glass breakage.

3.2 Storage of LINIT U-Profile Glass

The glass packages must be stored on a flat, firm base.
The bearing capacity of the floor must be checked in advance. This applies in particular when several glass packages are stored one on top of the other and when, in the case of glass storage at the construction site, the glass packages are stored on roofs or ceilings. Hard foam boards are suitable as a base or intermediate layer.

Individual lengths of glass can be stored against walls in upright position when an appropriately designed support is provided to avoid damage to the edges, and the load capacity of the wall is not exceeded. These regulations also apply to short-term storage on-site.

To avoid excessive contamination during transportation LINIT U-Profile glass is delivered with a protective foil sheeting for transportation purposes. This foil sheeting is not suitable for long-term storage and does not protect against damp. It must be removed immediately by the customer upon arrival of the glass on the site to avoid any harmful interaction, such as glass corrosion, of the packing material with the glass as a result of climatic conditions and other ambient conditions.

LINIT U-Profile glass is to be stored in dry and ventilated rooms with minimum temperature fluctuation and it must be protected against damp as well as rain and snow during the storage period.

When storing several glass packages one on top of the other attention must be paid that glass breakage does not occur as a result of the increasing force resulting from the weight!

For safety reasons the following LINIT U-Profile glass types should not be stored one on top of the other in more layers than specified in the list below:

Glass type : P 23/60/7, P 26/60/7, P 23: max. 5 glass packages one on top of the other
Glass type: P 33/60/7, P 33: max. 5 glass packages one on top of the other
Glass type: P 50: max. 3 glass packages one on top of the other

When transporting U-profile glass it is essential that the package cannot slip off the loading fork. This is attained by a slight backward inclination of the fork so that the package sits more snugly on the back of the fork. An anti-slip coating on the fork prong contributes towards a secure hold. It must also be ensured that the packages are tied up and that no individual parts can fall out.

4. Cutting LINIT U-Profile Glass

In the processing of glass the valid accident-prevention regulations and recommendations of the statutory accident-prevention and insurance institution for the industry (Berufsgenossenschaft) must be strictly observed. Protective equipment must be worn at all times to avoid injuries.

LINIT U-Profile glass can be cut on a firm and flat base using a glass cutter specially designed for U-profile glass (e.g. Silberschnitt made by the company Bohle) and a cutting fluid. The cutting fluid is applied with a soft cloth or brush directly on the line of the cut.

As moisture has a negative impact on the notch radius of the cutter wheel, damp U-profile glass must always be dried prior to cutting.

The LINIT U-Profile glass, which is laid tension-free on a firm and flat base, can be cut using a glass cutter specially designed for U-profile glass and using a cutting fluid. The cut is carried out on the non-ornamented inner side.
The area of the cut must be clean. As moisture has a negative impact on the notch radius of the cutter wheel, damp U-profile glass must always be dried prior to cutting. The cutting is carried out using a U-profile glass template.

The cutting fluid is applied with a soft cloth or brush directly on the line of the cut.

The cut is carried out by applying even pressure, in one go, starting at the upper edge of a flange, across the web to the upper end of the opposite flange.

The cut is then tapped using an appropriate tool. There are several ways to do this:

1. By tapping the web from the centre to the left and right out to the flange, then tapping the flange and breaking the glass.
2. By tapping the web in both edge areas, then tapping both flanges and breaking the glass.

Longitudinal cuts are carried out under the same conditions with the aid of a cutting guide. The glass is broken by placing a glass-cutter wood shaft under the end of the cut and by applying an even pressure.

The implementation of the cut determines the appearance of the cut edge. If the cut is a good one the edge fracture is clear, showing only little destruction at the cut edge.
A poor cut shows a rough and splintered edge fracture because the cutting notch continues to the inside of the glass in the form of fissures. Poor cutting edges and irregularly oriented facets must always be edge-treated by the customer to avoid subsequent breakage.

Prior to transporting a length of U-profile glass it must be checked for stability by carefully subjecting it to a short and cautious wobbling movement!

5. Edge treatment

When processing glass the valid accident-prevention regulations and recommendations of the statutory accident-prevention and insurance institution for the industry (Berufsgenossenschaft) must be strictly observed. Protective equipment must be worn at all times to avoid injuries.

With LINIT U-Profile glass with longitudinal wire, the projecting wire ends must be removed, the edges given professional edge-treatment using suitable tools and the cut edge sealed.
Glass edges which have not been cut cleanly and irregularly oriented facets must be edge-treated by the customer. Edge-treatment of the glass by the customer is strongly recommended for all glass types.

6. Use of LINIT mounting profiles as well as bearing blocks

When using LINIT holding and mounting profiles as well as bearing blocks made by other manufacturers the regulations of the general construction approval No. Z-70.4-44 must be strictly observed.
For double- and single-layer installation the LINIT mounting profiles for the bottom LINIT frame and for the upper LINIT frame are to be cut on site in such a way (short pieces) that they can be inserted centrally and with appropriate spacing between the flanges of a length of U-profile glass. The max. temperature resistance of the mounting profiles is 60°C. This is to be observed in particular for glazing, e.g. projecting facades of a building, where higher temperature loads are to be expected.

Mounting profiles and bearing blocks must permanently transfer the weight of the U-profile glass to the bottom frame structure. They must be designed in such a way as not to obstruct the vapour-pressure equalisation in the frame.

The mounting profiles or bearing blocks must be installed prior to installing the glass.
When installing with bearing blocks additional sealing measures must be taken in compliance with the instructions of the sealant manufacturer (e.g. adhesion of preformed strips and the use of round cords etc.).

7. Inserting LINIT U-Profile Glass

When processing glass the valid accident-prevention regulations and recommendations of the statutory accident-prevention and insurance institution for the industry (Berufsgenossenschaft) must be strictly observed. Protective equipment must be worn at all times to avoid injuries.

LINIT U-Profile glass is usually installed manually, hand-held suckers being the most effective form of aid.

In order to counteract the biggest hazard, which is when the lengths of U-profile glass break into pieces, the following rules on behaviour should be observed at all times.

The construction site and especially the place of installation are to be safeguarded in such a way that people passing by are not endangered at any time.

U-profile glass is installed in a slide-in procedure, and is first inserted into the upper LINIT aluminium frame. Adequate control must be ensured, especially when inserting longer lengths of U-profile glass. When lifting and adjusting the U-profile glass in the mounting profiles or bearing blocks no hard tools are to be used – only tools made of hardwood or wear-resistant plastic material. The lengths of U-profile glass are not to be released or freed from the glass suckers until they have been adequately secured!

For two-layer installation intermediate layers, e.g. padded profiles P1 and P2, are to be applied (with proper adhensives) permanent along flanges in order to avoid glass-to-glass contact, as specified in the general construction approval No. Z-70.4-44.

8. Sealing of joints

The following remarks are non-binding minimum requirements which must be independently checked for suitability by the installation contractor, based on the project-specific requirements and requirements of building law. The installation contractor must always acquire information from the manufacturer of the sealants and sealing material well in advance of commencement of work, concerning suitable sealing means for the respective application and information on how the respective joints are to be implemented in order to ensure a professional permanent sealing and performance of the joints. Sealing should be carried out shortly after fitting the frame profiles or after inserting the lengths of glass in order to prevent the penetration of dirt or moisture into the space between the layers of glass.

Mounting profiles, preformed strips, round cords and sealants between glass and frame and between glass and glass must maintain their properties in the relevant temperature range and must be resistant to atmospheric influences.
They must be compatible in compliance with the terms given in the DIN 52460 on the testing of materials for joint and glass sealing in buildings.
As specified in this standard they are not to cause any harmful interaction with other specified components they come into contact with, with other sealants or with building materials.
They must adhere to the materials within the relevant temperature range in such a way that – allowing for the permissible expansion – they can take up the movement between different materials without rupturing or breaking away.

Preformed strips

The width of the preformed strip is not to fall short of 10 mm at all connecting surfaces between glass and frame. The thickness of the preformed strips is not to fall short of 3 mm.
Expediently, the preformed strip between the glass surfaces and the frame is to be self-adhesive and have a rectangular cross section.
The preformed strip is to be stuck on in such a way that an adhesive surface of at least 5 mm remains both on the frame and on the glass for the sealant that keeps its elasticity. The thickness of the sealant applied is to be at least 3 mm.

Round cords
The joint that is left open after inserting the lengths of U-profile glass, between the lengths of glass and the frame, is sealed by packing in an appropriately dimensioned round cord. The selected diameter of the round cord is to be 3 to 5 mm larger than the joint spacing between glass and frame.

Sealants
In accordance with the general construction approval for LINIT U-Profile glass No. Z-70.4-44 regarding the sealing, sealants in accordance with DIN 18545 Part 2 on the sealing of glazing with sealants, Group E, are to be used between the lengths of U-profile glass.
The width of the joint between the lengths of U-profile glass is not to fall short of 2 mm – measured at the narrowest place – according to this approval (see also Attachment 3 of the same).
The penetration depth of the sealant in the joint is not to fall short of 8 mm on the outside of the glazing. The installation contractor must, however, check whether the project in question may possibly require a larger dimensioning of the joints or additional measures.

In the event of single-layer glazing it is expedient, in addition to the sealing of the joint from the web side, to also seal the joint from the flange side, in order to prevent dirt deposits between the glass flanges.

In the event of multi-layered glazing the inner and outer joints must be sealed!

Sealants between lengths of U-profile glass and frame

For sealing purposes sealants in accordance with DIN 18545 Part 2, Group E are to be used. The thickness of the sealant applied between glass and frame is not to fall short of 3 mm – measured at the narrowest place. An adhesive area of at least 5 mm in width is to be ensured both on the frame and on the glass for the application of sealant that keeps its elasticity.
To avoid long-term impact of water on the sealant surface, the latter is to be bevelled in an outward and downward direction.

Glazing aids
Pre-treatment agents (cleaning agent, adhesive cleaning agent, primer, blocker) must meet the requirements specified in DIN 18545-3 on the sealing of glazing with sealant-glazing systems.

If effective joint sealing is a prerequisite for more favourable permissible stresses in compliance with the general construction approval No. Z-70.4-44 Table 4, or if the lengths of glass are inclined by more than 3° to the vertical, these must be checked at regular intervals by the installation contractor and repaired if necessary. An appropriate maintenance frequency is to be proposed by the installation contractor according to the project requirements, in coordination with the sealant manufacturer, and this frequency is to be defined with the owner.

Non-sealed single-layer glazing which is not made of safety glass (e.g. tempered glass) is generally not recommended by us, because if the glass breaks it is inevitable that dangerous large pieces of glass will fall!

9. Other notes on installation

9.1 Insertion depth

The glass insertion depth must be chosen in such a way to secure long-term stability of the U-profile glazing.
Minimum insertion depth with vertical installation:
In the bottom frame at least 12 mm
In the upper frame at least 20 mm.

Minimum glass insertion depth with horizontal installation in the lateral frames:
Minimum 20 mm.

9.2 Standard implementation planning

From the inside or outside, always starting on the left.
Insert first and second length together in the lateral frame, after applying padded profiles. Adjust the following lengths of glass with a spacing of at least 2 mm from each other. When doing so, always use padded profiles along the entire flange!
At the end of the window strip the outer last length is to be installed the last but one.
Particularly for double-layer installation, different types of functional glass, e.g. combination of Solex, 1.7 W, Azur or glass from different productions of the same glass type, possible dimensional tolerances must be taken into account during the installation (for example, by carrying out advance measurements and a different formation or dimensioning of joints).
Attention is also to be paid, prior to installation, to the coordination of glass colours and surface and sorting, especially with coated glass. The same applies to the use of glass from different production batches.

9.3 Special installations

9.3.1 Designs with steel fasteners (Sogankern)

In compliance with the general construction approval No. Z-70.4-44 intermediate supports are not to be applied statically, i.e. they are not to have any influence on the structural analysis for the length of glass, and require approval for each individual case. In addition to this, we specifically point out that point-to-point stress of this kind - on non-tempered glass, also and in particular in combination with possible additional thermal stress - will very likely lead to glass breakage, and we therefore basically advice against it.

9.3.2 Safety glass

Wired U-profile glass and non-tempered glass without wire is not safety glass. It does not offer sufficient traffic safety in compliance with EN 12600 and is not to be used in traffic areas and areas open to direct access (Technical Regulation of the German Glazer Trade, Paper 8 as well as the Central Federation of Public Sector Accident Insurers: GUV 56.3 Safety in Construction and Installations),
Tempered LINIT, on the other hand, is usually classified as safety glass, based on its fracture behaviour. Prior to using tempered LINIT U-Profile glass the customer must apply for an individual approval.

9.3.3 Fully glazed corners

The formation of fully glazed corners is only possible with whole U-profiles. Longitudinally cut lengths of glass (so-called L-profiles) are not to be used.
It is always to be observed that higher wind loads must be calculated for corner and edge areas. For this reason structural measures must possibly be taken in this area, observing the supplementary regulations to DIN 1055, Part 4, or the selection of glass types must be adapted to higher requirements, wherever possible.

9.3.4 Horizontally installed LINIT U-Profile glass

(see technical information sheet on horizontal installation)

9.3.5 Glazing of sports halls

Glazing with restricted ball-throw resistance in compliance with DIN 18032 Part 3, which is only to be installed as from a height of 2 m above the sports hall floor, is possible with LINIT P 23/60/7, P 26/60/7 and P 33/60/7 in double-layer standard glazing with the incorporation of padded profiles P 1 and P 2 up to a maximum glass length of 4,580 mm. Should this length not be possible owing to reasons concerning the structural analysis, the shorter glass length according to the structural analysis is to be used.
The current test certificate must be strictly observed during erection.

9.3.6 Longitudinal cuts

Should individual lengths of glass have to be cut in a longitudinal direction within a U-profile glass wall, the cut edges must be mounted throughout the length in mounting profiles for protection against wind stress (see general construction approval No. Z-70.4-44, Attachments 4 and 5).
For mounting longitudinal edges of lengths of glass which have been longitudinally cut, mounting profiles of PVC in accordance with Attachments 4 or 5 are to be used. As an alternative, suitable components made from other materials (e.g. plastic or wood) featuring the same or higher rigidity can also be used, provided that contact with glass is ruled out by using corresponding intermediate layers such as preformed strips and round cords (see Attachment 5).

The spacing of the fixing points of the lateral frame profile is under no circumstances to exceed 33 cm. The spacing can naturally, however, be less than this in compliance with requirements of the structural analysis, and depending on the fastening means to be used. The installation contractor must make enquiries with his supplier of fastening means as to which fastening means are to be applied and with which spacing distance for the specific project.

9.3.7 Diagonal cut

Only lengths of glass cut at right angles are to be installed or with a maximum deviation of 50°.

9.3.8 Drilled holes and cut-out sections

Drilled holes and cut-out sections (also notches) as well as subsequent material loss from the surface (e.g. through sandblasting) are only permissible within the scope of a special verification of the possible use (e.g. individual approval).