

Glass Walls for Flood Protection

1. General

Glass constructions may only be used in flood protection in exceptional cases. Glass is a brittle material. It cannot compensate load peaks through plastification. Once the tension stress reaches the weakest spot of the glass pane, cracks form very rapidly and render the element useless.

In Germany, the use of glass is governed by the „Technical Rules for the Use of Glazing with Linear Supports“ (TRLV 9-98) and the „Technical Rules for the Use of Failproof Glazing“.

These rules do not deal with the application of glass as a construction element, however. There are no general rules for the application of glass in flood protection, and also no construction permits.

Therefore, approval must be obtained from the senior construction authority prior to using glass in flood protection systems. If no public concerns are involved, glass can be freely used for private purposes.



2. Technical Regulations and Guidelines

- Technical Rules for the Use of Glazing with Linear Supports (TRLV), version 09.1998
- Technical Rules for the Use of Failproof Glazing (TRAV), version 01.2003
- DIN 1249-10, Flat Glass, version 08.1990
- DIN 1249-12, Prestressed Glass, version 08.1990; EN 12150
- Bulletin issued by the Ministry of the Economy Baden-Wuerttemberg concerning the waiver of approval in individual cases for the use of specific, non-regulated glazing constructions
- Explanations to the Technical Rules for the Use of Glazing with Linear Supports, Bulletin DIBt 3/1999

3. Glass Types/Material Properties

The two types of glass used in glass constructions for flood protection are: float glass (rolled glass) or prestressed glass (PG). PG has a four to five times higher bending tensile strength than float glass. If it does break under excess strain, it disintegrates into blunt-edged, loosely connected crumbs that pose a much lesser risk of injury than the sharp-edged shards of float glass. PG is made from float glass by controlled heating to approx. 620° C and fast subsequent cooling. Individual panes are available on the market in strengths of 4, 5, 6, 8, 10, 12, 15 and 19 mm.

4. Glass Structures

In order to achieve the required load bearing capacity of the glass elements, the industry works with compound glass consisting of two or more glass panes with intermediate layers made of highly tear-resistant, transparent polyvinyl-butylal foils (PVB). The produced support panes can be additionally protected with so-called sacrificial panes. The term "compound glass" does not provide any information about the type of glass used. The thicker the compound glass, the higher the so-called greenish cast.



5. Frame Construction/Support Posts incl. Anchor Plate

The frame construction consists of extruded sections (material: AlMgSi) with wedged EPDM seal. The frame construction mounts the glass sides on two, three or four edges. The top edge is protected with a cover. The surrounded pane is kept floating by posts spaced in accordance with the total length of the glass element length (so-called steel braces). This way, the glass element including the frame is not subjected to strain in case the length of the foundation element is changed. This type of sealing and framing also allows the effortless exchange of single panes. The frame can be reused. For load dispersion to the foundation, the steel braces are connected to anchor plates embedded in concrete made of 1.4301. A so-called „Schubnogge“ may be placed at the center of the element depending on the element length and the load absorption.



6. Dimensions / Prices

Economic glass element dimensions result in lengths from 1.75 to 2.0 m and heights from 0.8 m to 1.0 m. The demanded load-bearing capacity is an essential selection parameter here. Prices for such glass elements including frame, assembly and planning range from approx. 1,000 €/m² up to 2,000 €/m². Decisive pricing factors are: load-bearing capacity, glass type, sacrificial pane, element size, installation situation, exchange efforts and special shapes.