EVONIK INDUSTRIES

PLEXIGLAS® GS

Aquarium Glazing

PLEXIGLAS®
the original from Röhm

Evonik. Power to create.

PLEXIGLAS® GS Aquarium Glazing

Presentation of Material

PLEXIGLAS® is the world's first acrylic (= polymethyl methacrylate, PMMA). It has also been used for many years in building aquariums, enabling us to acquire good knowledge and experience in this sector. GS stands for cast solid sheets and blocks of PLEXIGLAS® (polymerized in cells consisting of two high-quality glass plates). The large-size blocks in "aquarium grade," tested in line with QPA, comply with an internal standard established for this application. The thickness tolerances are stated in the Sales Handbook.

Durability / Guarantee

PLEXIGLAS® shows excellent weather resistance. When employed for aquarium glazing, it is exposed to permanent hydrostatic pressure, but normally without natural erosion. Taking the influence of creep into account, this major load makes it possible to precisely determine the long-term physical behavior of the material. The general behavior of PLEXIGLAS® GS is described in "Product Description 221-1." The stress level is determined by predimensioning.

Compliance with Standards

PLEXIGLAS® GS sheets and blocks comply with ISO 7823-1 "Plastics – Poly(methyl methacrylate) sheets – Types, dimensions and characteristics – Part 1: Cast sheets." The manufacturing company is certified by TÜV Cert in line with DIN EN ISO 9001 (quality) and by Gerling Cert to DIN EN ISO 14001 (environmental compatibility). There is no general building inspectorate or aquarium approval for PMMA. Various specific approvals confirm its good behavior in the relevant areas (rigidity, impact strength, long-term mechanical behavior etc.).

Choice of Material Thickness

The choice of material thickness or the definition of the permissible water pressure is based on theoretical calculations and confirmed by practical tests.
On request, the thickness for a specific project can be determined and manufactured according to your instructions.
Predimensioning is performed using a simplified approach with adapted statical calculation formulae. This enables us to make an evaluation according to the maximum material stress (σ) and maximum deflection (f). We recommend that this be examined using FEM programs.
The basis for this calculation are:
elastic modulus = 3300 MPa; Poisson's ratio $\mu b = 0.37$; max. safety stress $\sigma_{permiss}$.
water side = 3 MPa, air side = 5 MPa.
Detailed calculations by a structural engineer are required to precisely determine the actual material stress at a given location. The joints bonded with the polymerization adhesives ACRIFIX® 2R0190 or ACRIFIX® 5R0194 call for special certification. In this case, the maximum safety stress should be ≤ 3 MPa.

Installation and Assembly

Our products are employed according to the valid building codes and the state of the art, bearing in mind the technical brochures which we provide.
In order to obtain optimum support of the glazing, the principle shown in our installation sketch should be observed. The support width should be at least 1 … 2 x d, depending on sheet thickness (d); the sawn edges should be beveled to an angle of 45° (milled down by approx. 5 mm).
The assembly accessories and sealants must be compatible with PMMA glazing, both:

- **physically** (insert a wide EPDM rubber gasket on the supporting structure etc) and
- **chemically** (do not use foams that include plasticizers, ensure that solvents in paints and sealants can flash off).

After installation, the glazing is sealed by means of an extrudable, compatible silicone rubber compound which should not be exposed to mechanical stress.

Fire Safety

Fire safety experts rate material properties according to various safety aspects. PLEXIGLAS® offers high safety potential.
PLEXIGLAS® burns almost without smoke, does not emit any acutely toxic smoke gases according to DIN 53436 and can be extinguished quickly and easily (e.g. by sprinklers).
Cast PLEXIGLAS® shows the following fire behavior:

- B2, without burning droplets to DIN 4102 (D)
- Class E, without burning droplets to DIN EN 13501 (EU)
- Class 3 to BS 476, Part 6+7 (GB)
- TP(b) to BS 2782, method 508 A (GB)
- The UL flammability is UL 94 HB (USA)
- CSE/RF2/75A and 3/77 Class 4 (I)
- NEN 3883 Class 3 (NL)

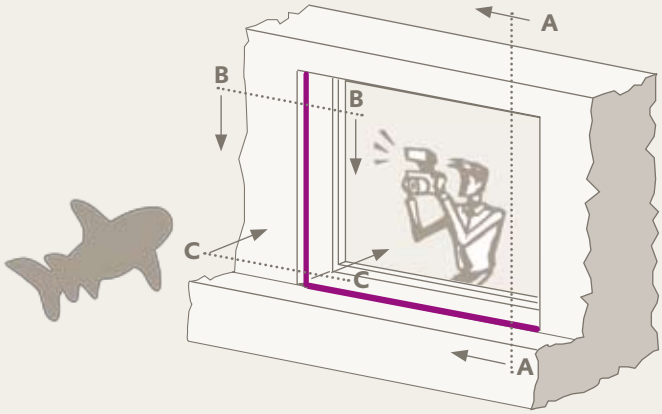
Technical Documentation

- 221-1 PLEXIGLAS® GS Basic Grades (physical properties)
- 211-2 Chemical Behavior of PLEXIGLAS®
- 312-1 Hints for Installing Solid Sheets (general glazing in buildings)

Further specific topics, such as

- **Quality Criteria**
- **Fabricating and Installation Conditions**
- **Conditions for Use**
- **Advice on Cleaning and Care**

are compiled or defined as required for specific projects.

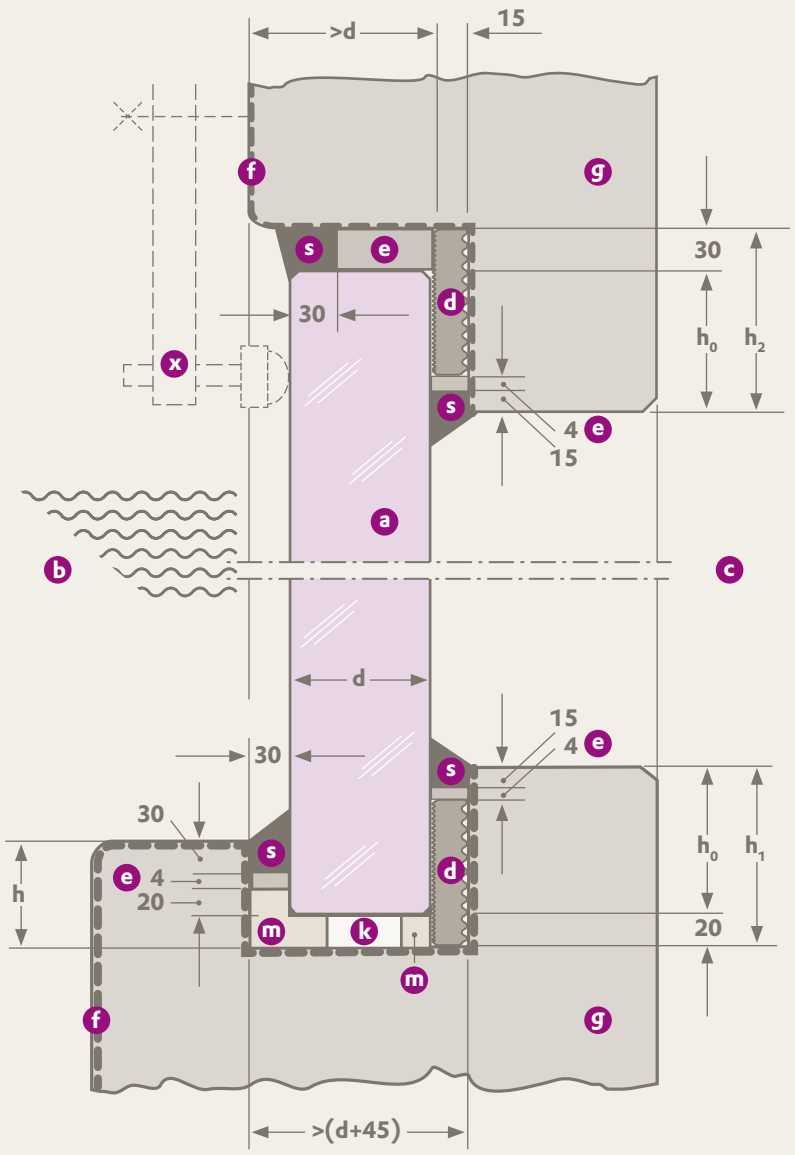


Aquarium Wall Glazing: Recommended Installation Details for PLEXIGLAS® GS Blocks

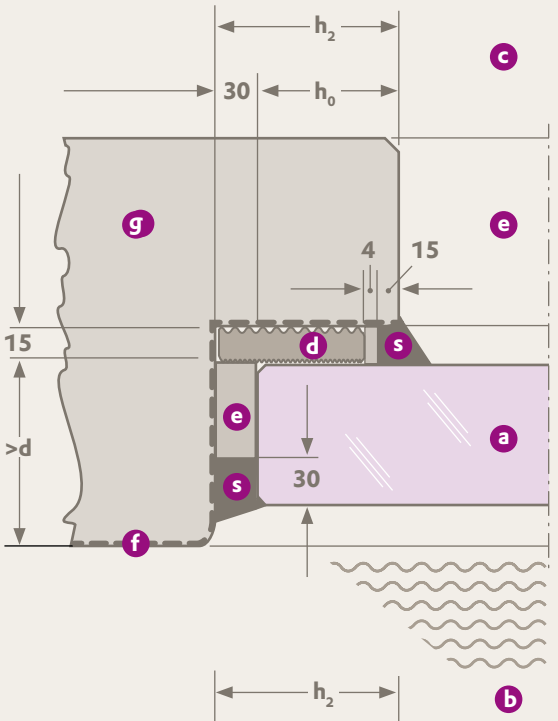
- The supporting structure (reinforced concrete or steel girder construction) has to be dimensioned according to the structural engineer's specifications; our schematic drawing is not applicable.
- The given section drawings are valid for rectangular panels symmetrically supported along 4 edges; they may vary slightly depending on the dimensions and alignment of the PLEXIGLAS® GS blocks.
- All items are to be resistant to water and compatible with PMMA.
- The dimensions in mm are given as recommendations.

Our Technical Service will be glad to answer any specific questions you may have in this context.

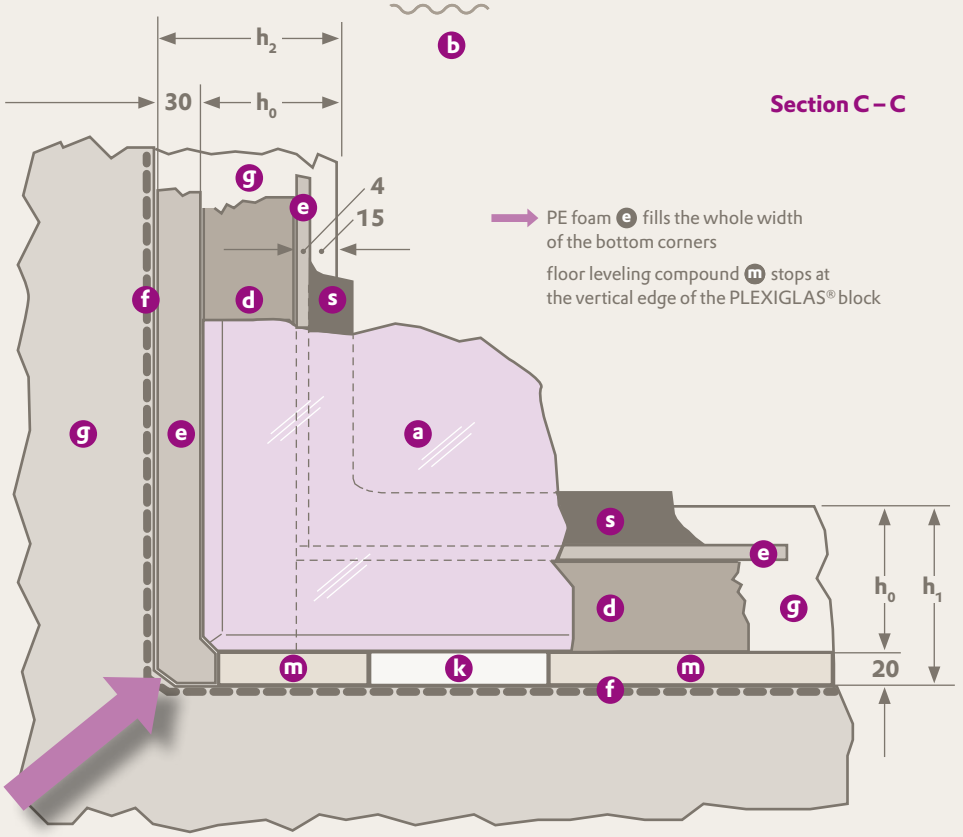
Section A – A



Section B – B



Section C – C



PE foam (e) fills the whole width of the bottom corners

floor leveling compound (m) stops at the vertical edge of the PLEXIGLAS® block

- (a) PLEXIGLAS® GS
- (b) Water side
- (c) Visitor (air) side
- (d) EPDM gasket
- (e) Gap-filling PE foam
- (f) Epoxy coating
- (g) Reinforced concrete supporting structure
- (k) Shim for alignment (rigid plastic)
- (m) Floor leveling compound
- (s) Silicone rubber sealing section
- (x) Fixing device for installation and security

® = registered trademark

PLEXIGLAS and ACRIFIX are registered trademarks of Evonik Röhm GmbH, Darmstadt, Germany.

Certified to DIN EN ISO 9001 (Quality) and DIN EN ISO 14001 (Environment)

Business Unit
Performance Polymers

Evonik Röhm GmbH
Kirschenallee
64293 Darmstadt
Germany

info@plexiglas.net
www.plexiglas.net
www.evonik.com

Evonik. Power to create.

422-3/1009/en