

## Aquarium Glazing

### PLEXIGLAS® GS

#### 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 (see CD-ROM on PLEXIGLAS®).

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 precise statical calculations.

#### 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.

The result for each thickness is stated in the tables or diagrams of our "Guidelines for Aquarium Partners".

**On request, the thickness for a specific project can be determined and manufactured according to your instructions.** Our calculation of the required sheet thickness under hydrostatic pressure (according to Girkmann / Czerny) allows evaluation according to the maximum material stress ( $\sigma$ ) and maximum deflection ( $f$ ). The basis for this calculation are: elastic modulus = 3300 MPa; Poisson's ratio  $\mu_b = 0.37$ ; max. safety stress  $\sigma_{\text{permiss. water side}} = 3 \text{ MPa}$ , 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® 190 or 194 call for special certification. In this case, the maximum safety stress should be  $\leq 3 \text{ MPa}$ .

#### 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 (see CD-ROM on PLEXIGLAS®). The support width should be at least  $1 \dots 2 \times d$ , depending on sheet thickness ( $d$ ); the sawn edges should be beveled to an angle of  $45^\circ$  (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 Rating

Cast PMMA is classed

- **B2**, with no burning droplets, to DIN 4102,
  - **M4** (no droplets) to NF 92500+,
  - **Class 3** to BS 476, Part 7,
  - **TP(b)** to BS 2782, Method 508 A;
- Its standard glow wire resistance is
- **IIIa or BH3** to DIN VDE 0304, Part 3, and
  - **750°C** (in France);
- The UL flammability is
- **UL 94 HB**.

## 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)
- CD-ROM "Technical Information 2001" on PLEXIGLAS®
- Guidelines for Aquarium Partners

Further specific topics, such as

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

are described in detail in our "Guidelines for Aquarium Partners".

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

**PLEXIGLAS®**

Der Partner für Ihre Projekte

The partner of your projects

Le partenaire de vos projets

**Degussa  
Business Unit Plexiglas**

**Röhm GmbH & Co. KG**

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

### Marketing:

Röhm GmbH & Co. KG  
Kirschenallee  
D-64293 Darmstadt  
T: +49 (0) 61 51-18-37 04  
F: +49 (0) 61 51-18-37 19  
Email: wolfgang.stuber@degussa.com  
www.plexiglas.de

Degussa France SNC  
Röhm Plexiglas  
Quartier Valmy  
32, place Ronde  
F-92035 Paris La Défense (France)  
T: + 33 (0) 1 71 00 47 32  
F: + 33 (0) 1 71 00 47 41  
Email: helmut.hilsmann@degussa.com

Our technical advice on the applications of our products is given without obligation. The buyer is responsible for their use and processing, and is also liable for observing any third-party rights. Technical data concerning our products are typical values. Subject to alteration.

® = registered trademark

**PLEXIGLAS and ACRIFIX**

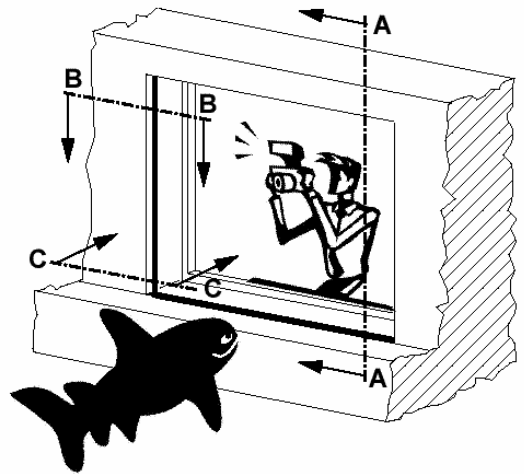
are registered trademarks of Röhm GmbH & Co. KG, Darmstadt, Germany.

**Technical advice :**

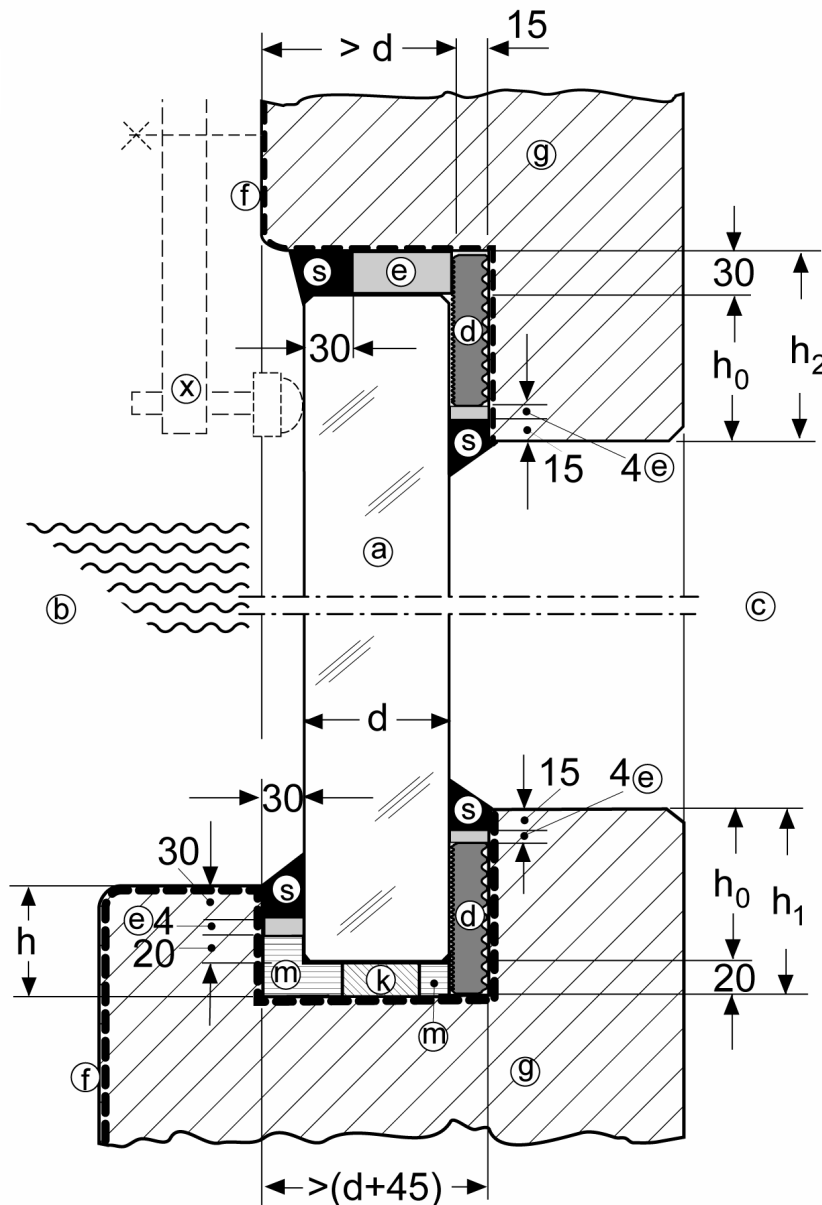
# Aquarium Wall Glazing: Recommended Installation Details for PLEXIGLAS® GS Blocks

- 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 (see "Guidelines for Aquarium Partners").

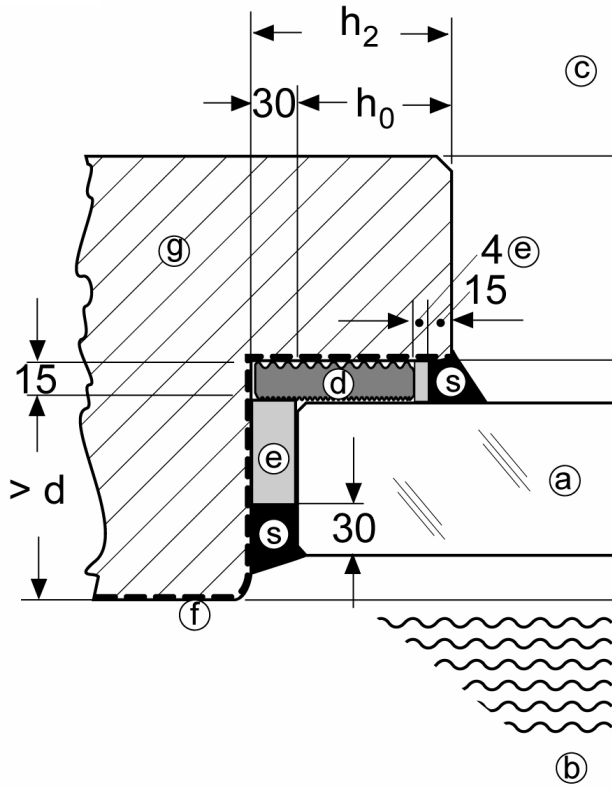
- ⓐ PLEXIGLAS® GS
- ⓑ Water side
- ⓒ Visitor (air) side
- ⓓ Rubber stop gasket
- ⓔ Gap-filling PE foam
- ⓕ Epoxy coating
- ⓖ Reinforced concrete supporting structure
- ⓗ Shim for alignment (rigid plastic)
- ⓓ Floor leveling compound
- ⓕ Silicone rubber sealing section
- ⓗ Fixing device for installation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



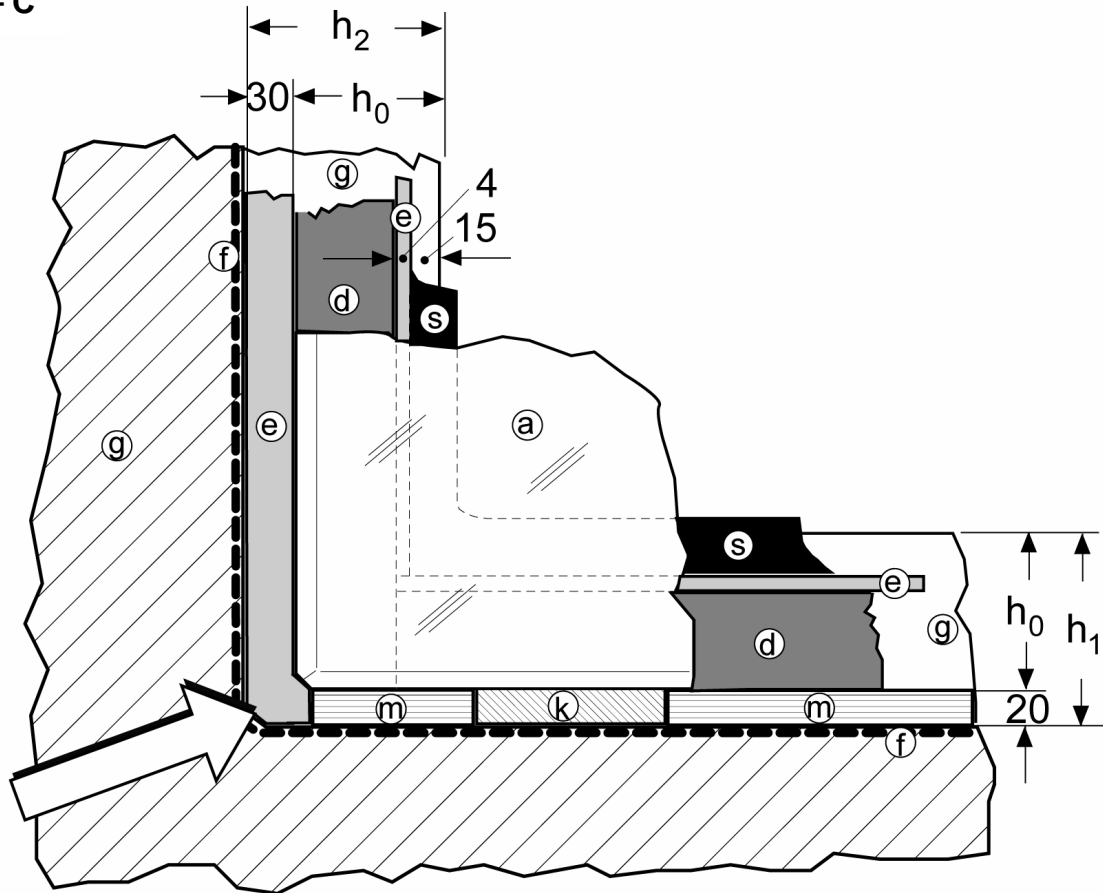
Section A – A



**Section B – B**



**Section C – C**



$\tilde{n}$  = PE foam  $e$  fills the whole width of the bottom corners  
 ( floor leveling compound  $m$  stops at the vertical edge of the PLEXIGLAS® block).