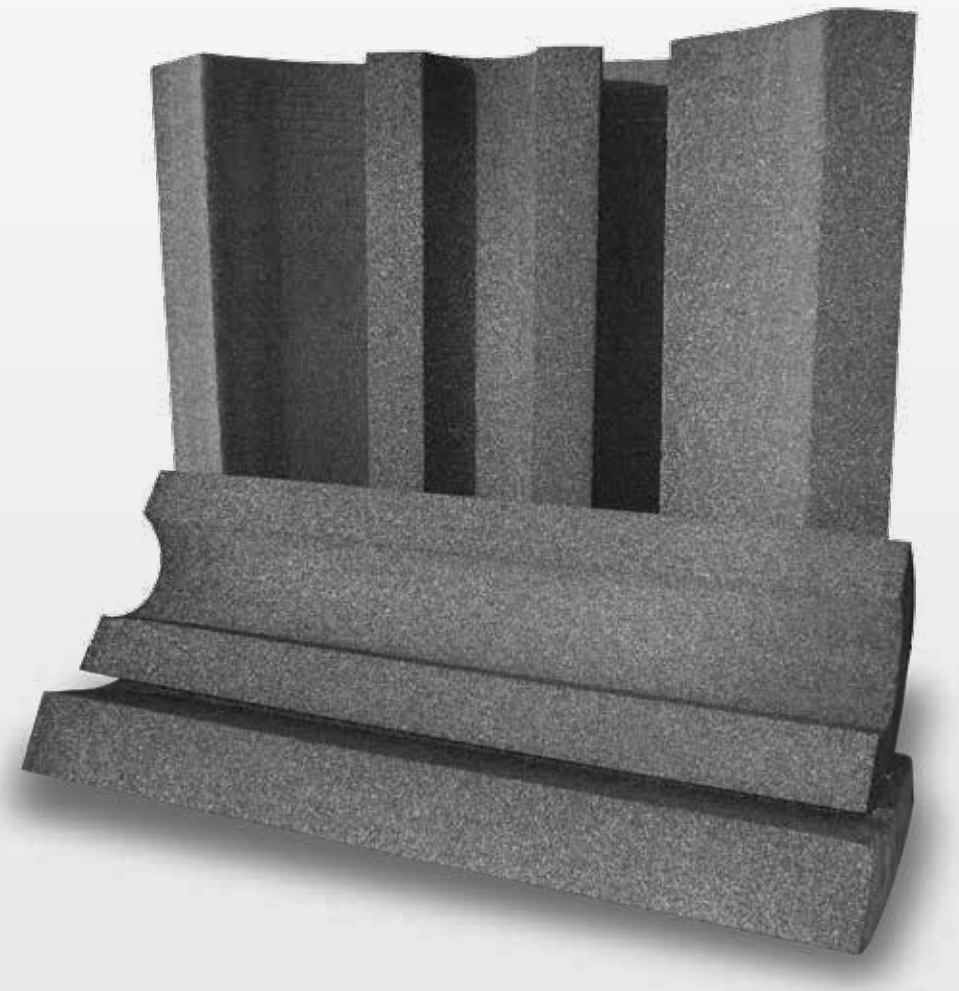
FOAMGLAS® INSULATION FABRICATION GUIDELINES

FOAMGLAS®

Pittsburgh Corning

FOR PIPE SECTIONS, QUARTERS, SEGMENTS AND LAGS



Manufacturing guidelines for FOAMGLAS® fabricated ware.
The purpose of this document is to establish consistent guidelines for transforming FOAMGLAS® block insulation into prefabricated sections/ shells and segments to facilitate the manufacturing of the best-quality fabricated components so that optimal overall system performance may be achieved.

Fabrication
Pipe sections shall be fabricated from the minimum quantity of pieces so that the total quantity of joints will be minimized, and through joints avoided, where feasible.

Joint definitions
The correct preparation and finishing of joints between pieces of FOAMGLAS® insulation during fabrication and field installation is critical.
There are two categories of joints:
- Non-through joints: joints which run in a continuous straight line without coming into contact with the inner face (bore) of the FOAMGLAS® insulation. These are the preferred type of joint. See Figure 1
- Through joints: joints which start at the outside face of the FOAMGLAS® insulation and run to the inner face/bore. See Figure 1

There are three types of joints to consider:
- Bond Joints: Factory-made adhesive joints between FOAMGLAS® blocks used to create a billet for fabricating.
- Fabrication Joints: Factory-made adhesive joints to assemble separate component parts after cutting. These are always through joints.
- Field Joints: Adhesive joints where prefabricated FOAMGLAS® insulation pieces are brought together during field/site installation. These are always through joints.

Joint adhesives
Adhesive selection when fabricating is important. For applications with temperature -292°F (-180°C) ≤ T ≤ 250°F (120°C), a low-permeability adhesive shall be used. A hot asphalt adhesive (specification D132, type II, III, IV), or suitable low-permeability alternative (≤ 0.01 perm-in (0.015 ng/Pa s m)) that has been approved by Pittsburgh Corning Technical Services shall be used.

For applications with temperature T > 250°F (120°C) a gypsum based adhesive such as US Gypsum's Hydrocal® B11, PC® HTAA, or a suitable alternative adhesive that has been approved by Pittsburgh Corning Technical Services, shall be used.

For applications with temperature T ≤ -292°F (-180°C) an inorganic adhesive such as US Gypsum's Hydrocal® B11 or PC® HTAA shall be used.

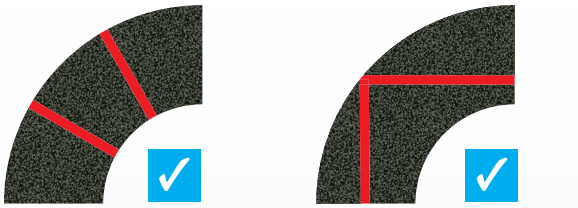
Bond or fabrication adhesive shall cover 100% of mating surfaces, and bond or fabrication joints shall not exceed 1/16 in. (1.6 mm) width. There shall be no visible voids in the adhered joint. The joint adhesive shall be as level with the surface as possible and shall not be recessed into or extend from the surface of the fabricated piece by more than 1/32 in. (0.8 mm).

Joint requirements
All joints must be a tight fit prior to bonding, to ensure that there are no discontinuities which could compromise system performance. If necessary, insulation pieces shall be hand rubbed together before adhesive is applied.

Fabricated and bonded layers of FOAMGLAS® insulation shall not be each less than ½ in. (12.7 mm) thick after final cutting. See figure 3.

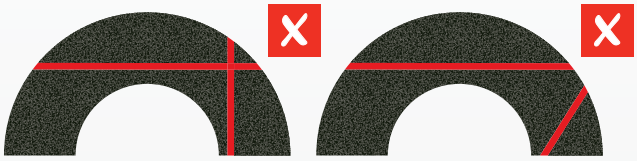
Bond joints shall approach other bond joints at 90° angles, must be a minimum of 1 in. (25 mm) long and shall not cross. See figures 1 & 2.

Figure 1: Through and non-through joints



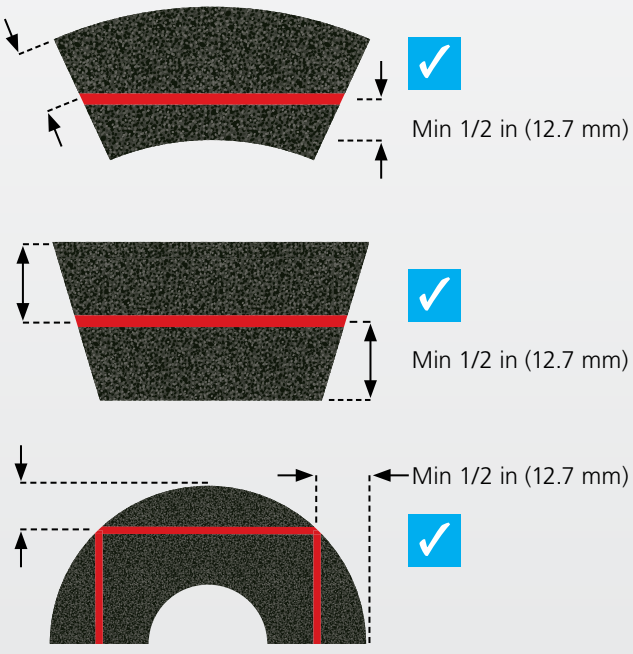
Through fabrication joints | Non-through bond joints

Figure 2: Unacceptable bond-joint orientations



Joints must not cross | Joints shall approach other bond joints at 90° angles.

Figure 3: Acceptable joint positions



Dimensional tolerances
FOAMGLAS® pipe insulation shall be of minimum length 23.5 in. (597mm).

The maximum tolerance on the length of pipe insulation within an individual order lot shall be ± 1/4 in. (6.4 mm) from the length agreed between fabricator and client.

When banded in place, all longitudinal joints shall close to within 1/16 in. (1.6 mm) along the entire length of the joint. The ends of pipe sections shall be finished perpendicular to the axis of the section so that when stood on end on a flat surface, the longitudinal joint shall not exceed 1/8 in. (3.2 mm) maximum width over a 24 in. (610 mm) length.

The axial longitudinal joint opening for quarter sections, pipe segments and flat beveled lags shall not exceed 1/16 in. (1.6 mm) along the full depth of the joint. See Figure 4.

The maximum internal diameter of pipe sections for NPS < 2 in. (60.3 mm OD) shall match the pipe true outside diameter with a tolerance of +5/64 in. (+ 2.0 mm) including bore coating.

The minimum internal diameter of pipe sections for NPS < 2 in. (60.3 mm OD) shall match the pipe true outside diameter with a tolerance of +1/48 in. (+ 0.5 mm).

The maximum internal diameter of pipe sections for NPS ≥ 2 in. (60.3 mm OD) shall match the pipe true outside diameter plus a tolerance of + 1/8 in. (3.2 mm) including bore coating.

The minimum internal diameter of pipe sections for NPS ≥ 2 in. (60.3 mm OD) shall match the pipe true outside diameter with a tolerance of +1/24 in. (+ 1.0 mm).

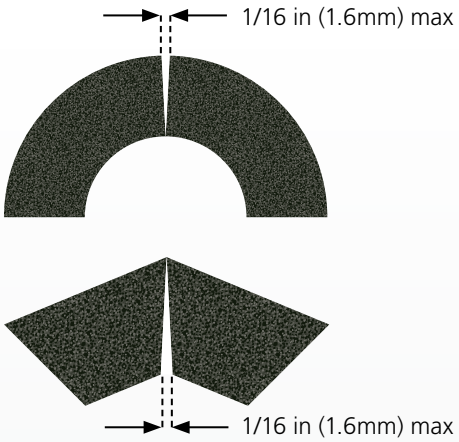
Outer surface coatings shall be considered to be additional to specified thickness tolerances.

Fabricated materials shall be free from any visible defects which could potentially affect system performance. Packaging shall be of sufficient quality to minimize risk of damage during material handling/transport.

Coatings and Finishes
The application of bore coatings shall not change the bore tolerance requirements. Bore tolerances shall be measured and evaluated inclusive of the bore coating thickness. External coatings and finishes shall be considered additional to the specified thickness tolerances.

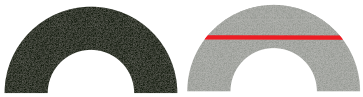
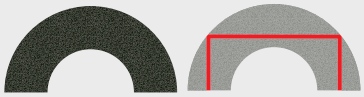
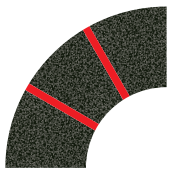
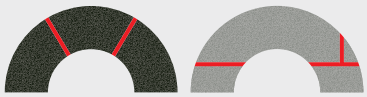
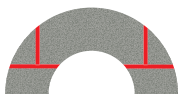
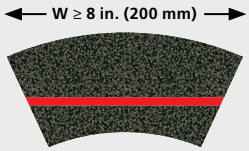
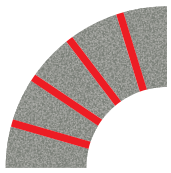
Layering
When multiple layers of insulation are required, all layers of insulation must be specified/ordered together to ensure proper fit/nesting.

Figure 4 Axial Joints



ACCEPTABLE FOAMGLAS® SECTION PROFILES AND JOINTING

The following section profiles and joint positions are for use in FOAMGLAS® insulation systems.

		PIPE SIZE	PROFILE	ACCEPTABLE JOINTS	PROFILE	BOND OR FABRICATION JOINTS	THROUGH JOINTS
STANDARD PROFILE		NPS ≤ 6 in. (OD ≤ 168.3 mm)		 Preferred	PIPE SECTION HALF PSH	MAX 1 JOINT PER HALF SECTION*	NONE
		6 in. < NPS ≤ 10 IN. (168.3 mm < OD ≤ 273 mm)		 Preferred	PIPE SECTION HALF PSH	MAX 3 JOINTS PER HALF SECTION*	
	APPLICATION DEPENDENT	10 in. < NPS ≤ 24 in. 273 mm < OD ≤ 609.6 mm			PIPE SECTION QUARTER PSQ**	MAX 2 JOINTS PER QUARTER SECTION	MAX 2 JOINTS PER QUARTER SECTION
		10 in. < NPS < 18 in. (273 mm < OD < 457 mm)		 Segmented method Mulligan method	PIPE SECTION HALF PSH	MAX 3 JOINTS PER HALF SECTION	MAX 2 JOINTS PER HALF SECTION
		18 in. ≤ NPS ≤ 24 in. (457 mm ≤ OD ≤ 609.6 mm)		 Mulligan method	PIPE SECTION HALF PSH	MAX 4 JOINTS PER HALF SECTION	MAX 2 JOINTS PER HALF SECTION
SEGMENTAL PROFILE		24 in.< NPS ≤ 36 in. (609.6 mm < OD ≤ 914.4 mm)		 W ≥ 8 in. (200 mm) All segments equal size, W, to make complete ring	CURVED SIDEWALL PIPE SEGMENTS PSG	MAX 1 JOINT PER SEGMENT	NONE
LARGE ELEMENT PROFILE					PIPE SECTION QUARTER PSQ	MAX 4 JOINTS PER QUARTER SECTION	MAX 4 JOINTS PER QUARTER SECTION

***No joints permitted unless largest available block size requires use of joint.**

**ASTM C1639:10a requires 10 in < NPS ≤ 12 in (273 mm < OD ≤ 323.9 mm) to be the PSH option.

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