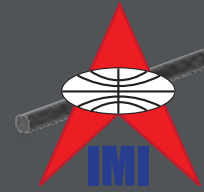




ASTIC INSULATION MATERIALS INDUSTRIES L.L.C.

DEFINING INDUSTRIAL SOLUTIONS





INTRODUCTION

ASTIC INSULATION MATERIALS INDUSTRIES LLC (AIMI) is registered as a Limited Liability Company setup in 2012 in DIP / 2, Dubai, UAE, to be conditioned under the laws of Emirates of Dubai, U.A.E to provide quality and prompt service.

AIMI is a locally registered Industrial Company, listed by the Ministry of Industries under License No.666246 (copy attached). The company is setup in Dubai Investment Park and is engaged into the activity of Insulation Manufacturing especially PIR, PUF, Phenolic Foam, Foamglas, Calcium Silicate etc.

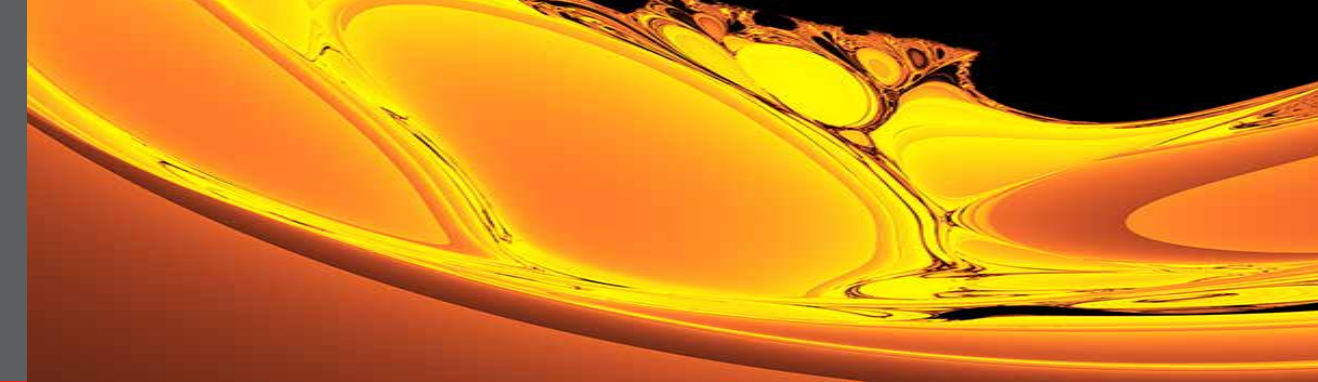
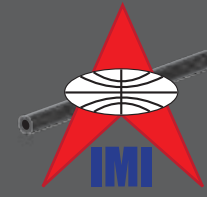
AIMI is specialized in manufacturing, fabrication, field fabrication and execution of insulation work. Preformed sections can be made available on all types of Rigid insulation for piping, fittings, flange & valves, boxes, vessels, equipments for Cellular Glass (FOAMGLAS® INSULATION) Polyisocyanurate Polyurethane (PIR/PUR), Phenolic Foam, Calcium Silicate which are widely used in Oil and Gas Industries. Petrochemical Industries, Power and Desalination plants and several other related industries. The same can be used for Commercial Buildings for district chillers, boilers piping and roofing where high specification is applied.

Above mentioned Insulation Materials are specified in the specifications for the above mentioned Industries and for projects in U.A.E. and all the Gulf countries, which led us to start our own production unit, with our own expertise specialist to meet the highest standard & market demands. AIMI is an approved source with the local Oil & Gas companies like Takreer Gasco, Borouge, DEWA, ADEWA & Dubai Municipality Central Laboratory.

We adhere to the highest standards by sourcing raw materials from globally well-known manufacturers such as Pittsburgh Corning for Foamglass and BASF, DOWCHEMICAL for Polyisocyanurate and Polyurethane.

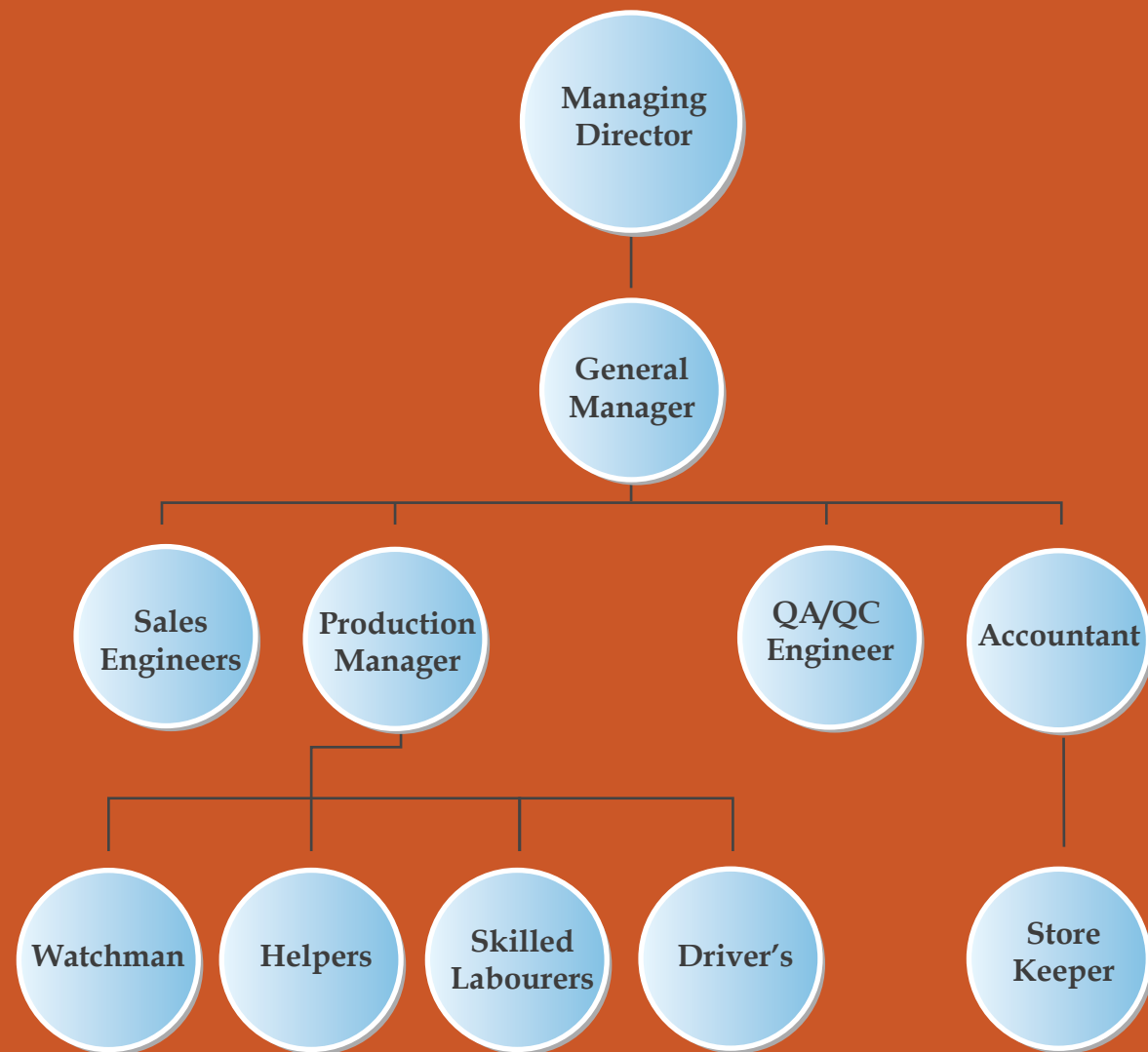
Our factory is equipped with the most up to date automated machines to make available insulation for Piping, Fittings, Elbows, Flanges, Valve Boxes and metal jacketing. Our main advantage is having a local facility in Dubai & capability to handle quick delivery to the Gulf region & Middle East with economical cost and can issue a GCC Certificate as local Manufacturer.





PRODUCTS OVERVIEW

COMPANY STRUCTURE



Our current workforce strength is 150 employees and growing

- > FOAMGLAS®
- > ALFA PIR POLYISOCYANURATE FOAM
- > ALFAPHEN
- > CALCIUM SILICATE
- > ROCKWOOL
- > CERAMIC BLANKET
- > FIBERGLASS INSULATIONS
- > JACKETING
- > HARD ACCESSORIES
- > WET ACCESSORIES





FOAMGLAS[®]

FOAMGLAS[®] INSULATION
PREFABRICATED AND PREASSEMBLED
PRODUCT RANGE



Overview

Prefabrication: tailor-made solutions	4
FOAMGLAS® prefabricated elements - general information	5
Piping	
PSH - Pipe half sections- single- & multi-layer configuration	6
PSQ - Pipe quarter sections - single- & multi-layer configuration	7
PSG - Curved pipe segments - single- & multi-layer configuration	8
Elbows - Bend insulation - single- & multi-layer configuration	9-10
T Pieces - T shaped intersections - single- & multi-layer configuration	11-12
Boxes - Flanges and valves - single- & multi-layer configuration	13-14
Pipe reducers - Conical & eccentric pipe reducers - single- & multi-layer configuration	15
Pipe caps - End covers - single- & multi-layer configuration	16
TMH/TMP - Termination pieces for piping	17
Victaulic elbows - Bend insulation, optimised for Victaulic fittings	18
Equipment	
TSG - Curved tank wall segments - single- & multi-layer configuration	19
TSGP - Pre-assembled curved tank wall segments - single- & multi-layer configuration	20
Vessel Head Segments - single- & multi-layer configuration	21
Vessel Head Segments - Pre-assembled, single- & multi-layer configuration	22
SHS - Spherical head segments - single- & multi-layer configuration	23
CSG - Segments for conical equipment - single- & multi-layer configuration	24
CSGP - Pre-assembled elements for conical equipment - single- & multi-layer configuration	25
Coatings - Pre-applied coatings	26-28
Example of our measurement sheet for FOAMGLAS® Boxes	29
Information on types, dimensions and standardizations	30-36
Selection of project references	37-39

Prefabrication: tailor-made solutions

Tailor-made FOAMGLAS® insulation delivered on site for time- and cost-savings.

Due to the increasing demand for FOAMGLAS® insulation in custom-made elements, a special prefabrication plant in Klasterec (Czech Republic) was established, where fabricated elements are produced in accordance with our high quality standards.

Our FOAMGLAS® prefabricated elements are made out of FOAMGLAS® ONE™ insulation. The thermal properties are in this case the same as FOAMGLAS® ONE™ slabs (for more information about the properties of FOAMGLAS® ONE™ insulation, we refer to the respective datasheet). On request, FOAMGLAS® prefabricated elements can also be manufactured from other grades.

Advantages of prefabrication

- ✓ **Minimise the amount of on-site cutting** - Every FOAMGLAS® prefabricated element is delivered tailor-made for your specific project
- ✓ **Increase the speed of installation** - Our prefabricated elements can be installed straight out of the box.
- ✓ **Easy to fit** - FOAMGLAS® prefabricated elements are easy to install and manipulate with simple tools like a hand saw.
- ✓ **Removable for inspection** - FOAMGLAS® prefabricated elements can be easily removed for maintenance purposes.
- ✓ **Easier handling of large sections of insulation** - FOAMGLAS® prefabricated elements are packed in easy to handle quantities.
- ✓ **Virtually every size and shape is possible** - Our fabrication facility is flexible enough to handle special requests and large units.
- ✓ **Better installed quality** - FOAMGLAS® machine-made, prefabricated elements are more consistent and higher in quality compared to on-site manual cutted pieces.

Available component pieces

- Straight pieces for pipework
- Elbows
- T-pieces
- Reducers
- Termination pieces
- Valve fittings
- Flange fittings
- Equipment pieces
- Heads
- Conical pieces

Available factory-applied coatings:

- HTAA: High temperature anti-abrasive
- LTAA: Low temperature anti-abrasive
- Bituminous cell filler for outer layer
- PC® 700K: glass fiber mesh reinforced finish
- TEROSTAT PC® FRI
- PITTWRAP® B100 alubutyl vapor barrier jacketing



FOAMGLAS® prefabricated elements

General information

We provide tailor-made prefabricated insulation elements and in order to produce these to exact requirements, we need accurate information to be able to produce them accordingly.

Service temperature

For every element we need to know the service temperature. Depending on the service temperature, we adapt our manufacturing process to ensure the quality of every prefabricated element for the respective temperature range.

- o **T ≤ ambient:** we adhere our FOAMGLAS® prefabricated elements with hot bitumen.
- o **T > ambient and ≤ 120°C:** we adhere our FOAMGLAS® prefabricated elements with hot bitumen or high-temperature adhesive.
- o **T > 120°C:** we adhere our FOAMGLAS® prefabricated elements with high-temperature adhesive.
- o **T < -175°C:** we adhere our FOAMGLAS® prefabricated elements with high-temperature adhesive.

The additional data required is determined by the type of element throughout this document.

Anti-abrasive coating

Depending on the service conditions, an anti-abrasive coating can be applied to the inner surface of the FOAMGLAS® prefabricated elements. The possible site application of an anti-abrasive on site must be indicated with the order, since its application requires the internal diameter to be increased.

Dimensions

FOAMGLAS® prefabricated elements can be delivered in standard thicknesses of (25 – 30) – 40 – 50 – 60 – 70 – 80 – 90 – 100 and 120 mm. Other thicknesses are also available on request.

External coatings

Every FOAMGLAS® prefabricated element, regardless of type, can be delivered with a factory-applied external coating. We have a large range of coatings, each with their individual properties and purpose. For more information about their characteristics, please consult the respective product data sheets.

Traced piping

In case the inside insulation diameter is different from the pipe diameter, we manufacture in an oversize diameter to make sure the FOAMGLAS® insulation layer fits perfectly. In this case the pipe diameter must also be indicated in order that elbows may be formed to the correct radius.

ASTM regulations

All FOAMGLAS® prefabricated elements are produced to fully comply with ASTM C 1639 “Fabrication of Cellular Glass Pipe and Tubing Insulation”.

Important The prefabricated and pre-assembled elements contained herein belong to our standard product range. Other non-standard elements or special requests can be considered. Please consult us for more information.

Additional information, product data sheets and safety data sheets are available online:

<http://www.foamglas.com>

PSH

Pipe half sections for insulation of straight pipes

FOAMGLAS® insulation PSH is a prefabricated half section for the insulation of straight pipes in industrial and commercial pipe work. The shells are supplied tailor-made, allowing for fast and easy installation.

FOAMGLAS® insulation pipe half sections are available in sizes up to and including nominal pipe diameters of 10" (273 mm).

Mandatory data

To be able to produce tailor-made prefabricated elements, we need the following dimensions of the pipe to be insulated:

Pipe diameter In mm, inch or DN.
Straight length
Insulation thickness and number of layers
Service temperature

Tolerances

The following tolerances applied to FOAMGLAS® insulation PSH pieces ensure a normal free movement between the shells and the pipes to be insulated:

- Inside shell diameter: +1 to +3 mm
- Length: ± 2 mm
- Thickness: ± 2 mm

Standard length (SL)

Our half shells for pipe insulation are supplied in "Standard Lengths" of 600 mm. The length to be insulated is divided by 0.6 and rounded up to the half standard length, i.e. one half shell to be cut in two.

Example

Required length: 80.5m

Number of standard lengths: $80.5\text{m} : 0.6\text{ m/SL} = 134.16\text{ SL}$.

When rounding to the half standard lengths, we will obtain 134.5 standard length.

The furnished length will be: $134.5\text{ SL} \times 0.6\text{ m/SL} = 80.7\text{m}$.

This is equal to 269 PSH's.

Multi-layer configuration

Same specification as single-layer configuration.

Tolerances on inside diameter: +2 to +4 mm



PSQ

Pre-assembled pipe quarter sections for insulation of straight pipes

FOAMGLAS® insulation PSQ is a prefabricated quarter section for the insulation of straight pipes in industrial and commercial pipe work. The shells are supplied tailor-made, allowing for fast and easy installation.

FOAMGLAS® insulation pipe quarter sections are available for nominal pipe sizes above 10" (273 mm) up to and including 24" (610 mm).

On request, half sections (PSH) can also be delivered within this range.

Advantages:

- ✓ Number of segments to install is reduced by 50 - 75%
- ✓ Similar reduction of joints and optional joint-filler
- ✓ Optimised quality of the insulation (less field joints)
- ✓ Best condition for pre-applied outside coating

Mandatory data

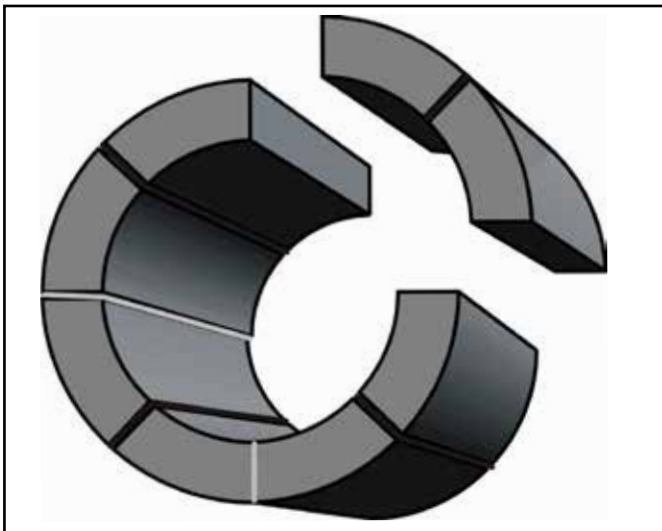
To be able to produce tailor-made prefabricated elements, we need the following dimensions of the pipe to be insulated:

Pipe diameter In mm, inch or DN.
Straight length
Insulation thickness and number of layers
Service temperature

Tolerances

The following tolerances applied to FOAMGLAS® PSQ ensure a normal free movement between the shells and the pipes to be insulated:

- Inside shell diameter: +1 to +3 mm
- Length: ± 2 mm
- Thickness: ± 2 mm



Standard length (SL)

Quarter shells for pipe insulation are supplied in "Standard Lengths" of 600 mm. The length to be insulated is divided by 0.6 to determine the number of Standard Lengths. This calculated number will be rounded up to the next half length.

Example

Required length: 80.5m
Number of standard lengths: $80.5\text{m} : 0.6\text{ m/SL} = 134.16\text{ SL}$.
When rounding to the half standard lengths, we will obtain 134.5 standard length.
The furnished length will be: $134.5\text{ SL} \times 0.6\text{ m/SL} = 80.7\text{m}$. **This is equal to 538 PSQ's.**

Multi-layer configuration

Same specification as single-layer configuration.

Tolerances on inside diameter: +2 to +4 mm



PSG

Curved segments for insulation of straight pipes

FOAMGLAS® insulation PSG is a prefabricated segment for the insulation of straight pipes in industrial and commercial pipe work. The segments are supplied tailor-made, allowing for fast and easy installation.

FOAMGLAS® insulation segments are available in sizes for nominal pipe diameters above 24" (610 mm). Segmented pipe insulation will be fabricated in equal widths in a way that the pipe circumference is covered without additional field cuts.

On request, quarter sections (PSQ) can also be delivered within this range.

Mandatory data

To be able to produce tailor-made prefabricated elements, we need the following dimensions of the pipe to be insulated:

Pipe diameter In mm, inch or DN.
Straight length
Insulation thickness and number of layers
Service temperature

Tolerances

The following tolerances applied to FOAMGLAS® PSG ensure a normal free movement between the segments and the pipelines to be insulated:

- Inside diameter: +1 to +3 mm
- Length: ± 2 mm
- Thickness: ± 2 mm
- Width: ± 2 mm

Standard length (SL)

FOAMGLAS® PSG prefabricated segments have a standard length of 600 mm. The length of the pipe to be insulated will be divided by 0.6 to determine the number of Standard Lengths. This calculated number will be rounded up to the next half length.

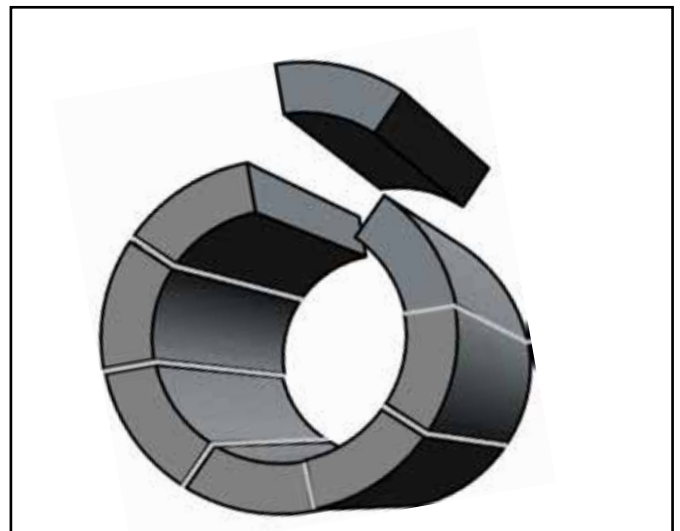
Number of segments per circumference

All FOAMGLAS® PSG prefabricated segments have an exterior width of maximum 225 mm and are supplied in equal widths. This determines the number of segments per SL.

Multi-layer configuration

Same specification as single-layer configuration.

Tolerances on inside diameter: +2 to +4 mm



Elbows

Bend insulation

FOAMGLAS® insulation elbows are prefabricated fittings for the insulation of elbows in industrial and commercial pipe work. The elbows are supplied tailor-made, allowing for fast and easy installation.

FOAMGLAS® insulation elbows are available in sizes for diameters up to and including 914 mm. FOAMGLAS® prefabricated elbows have a standard radius of curvature of $R = 1.5 D$ (type 3D) and can be supplied in the same thicknesses as sections and segments for straight pipes.

Mandatory data

To be able to produce tailor-made prefabricated elements, we need the following dimensions of the elbow to be insulated:

Pipe diameter In mm, inch or DN.
Service temperature
Insulation thickness
Desired angle
Radius (or elbow type)

Tolerances

The following tolerances applied to FOAMGLAS® prefabricated elbows ensure a normal free movement between the elbows and the piping to be insulated:

- Inside diameter :
 - o $< 273 \text{ mm}$: +1 to +3 mm
 - o $\geq 273 \text{ mm}$: +1 to +5 mm
 - o $\geq 500 \text{ mm}$: +2 to +8 mm
- Curvature radius :
 - o $< 273 \text{ mm}$: $\pm 3 \text{ mm}$
 - o $\geq 273 \text{ mm}$: $\pm 5 \text{ mm}$
 - o $\geq 500 \text{ mm}$: $\pm 10 \text{ mm}$
- Insulation thickness : $\pm 2 \text{ mm}$

Additional info (also see appendix 1.2)

1 Our standard radius of curvature is equal to one and a half diameter (1.5D). These elbows are also referred to as long radius or type 3D. (The rule $R = 1.5D$ applies to the nominal diameter in inches).

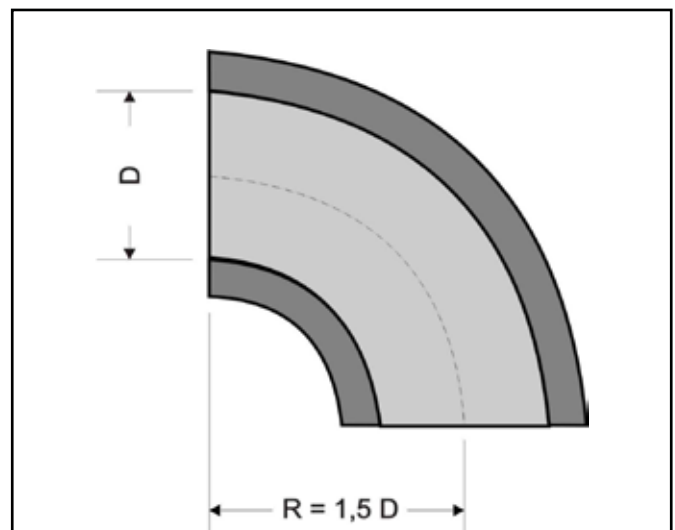
2 D is not the real diameter, but the nominal inch size. To convert to mm, nominal inch size should be multiplied by 25.4. Exception is made for small bore piping ($< 1''$): they usually have the same radius as a 1" elbow.

Example 1: pipe diameter = 60.3 mm, elbow 1.5D --> radius = $2 \times 25.4 \times 1.5 = 76.2 \text{ mm}$

Example 2: pipe diameter = 3/4", elbow 1.5D --> radius = $1 \times 25.4 \times 1.5 = 38.10 \text{ mm}$.

3 Elbows can be cut to a different radius of curvature.

4 In case the inside insulation diameter is different from the pipe diameter (e.g. traced pipe work or overfit insulation), both have to be submitted. We have to fabricate an oversize diameter, but the radius will be calculated as the following: nominal pipe size (inch) $\times 25.4 \text{ mm} \times 1.5$.



Elbows

Bend insulation, multi layer configuration

FOAMGLAS® insulation elbows are prefabricated fittings for the insulation of elbows in industrial and commercial pipe work. The elbows are supplied tailor-made, allowing for fast and easy installation.

FOAMGLAS® insulation elbows are available in sizes for diameters up to and including 914 mm. FOAMGLAS® prefabricated elbows have a standard radius of curvature of $R = 1.5 D$ (type 3D) and can be supplied in the same thicknesses as sections and segments for straight pipes.

Mandatory data

To be able to produce tailor-made prefabricated elements, we need the following dimensions of the elbow to be insulated:

Pipe diameter In mm, inch or DN.
Service temperature
Insulation thickness
Desired angle
Radius (or elbow type)

Tolerances

The following tolerances applied to FOAMGLAS® prefabricated elbows ensure a normal free movement between the elbows and the piping to be insulated:

- Inside diameter :
 - o $< 273 \text{ mm} : +2 \text{ to } +4 \text{ mm}$
 - o $\geq 273 \text{ mm} : +3 \text{ to } +5 \text{ mm}$
 - o $\geq 500 \text{ mm} : +6 \text{ to } +12 \text{ mm}$
- Curvature radius :
 - o $< 273 \text{ mm} : \pm 3 \text{ mm}$
 - o $\geq 273 \text{ mm} : \pm 5 \text{ mm}$
 - o $\geq 500 \text{ mm} : \pm 10 \text{ mm}$
- Insulation thickness : $\pm 2 \text{ mm}$

Specific for multi-layer elbows:

- Second layer is fabricated with 90° staggered longitudinal joint.
- Second layer will extend 75 mm at both ends. As such, staggering of circumferential joints is guaranteed.

Additional info (also see appendix 1.2)

1 Our standard radius of curvature is equal to one and a half diameter (1.5D). These elbows are also referred to as long radius or type 3D. (The rule $R = 1.5D$ applies to the nominal diameter in inches).

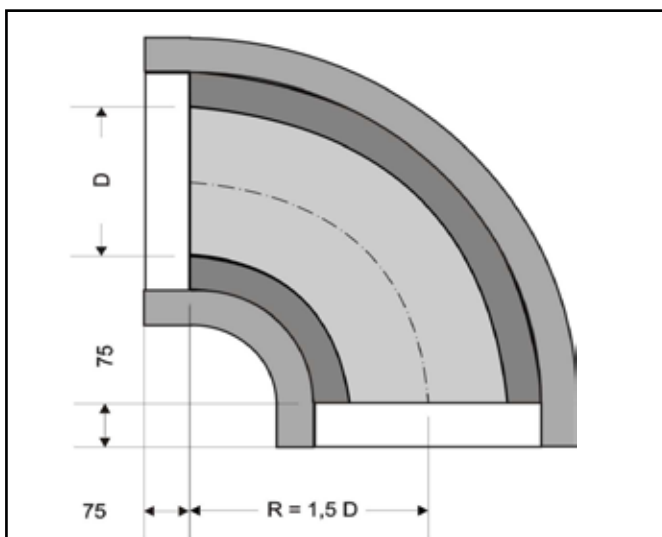
2 D is not the real diameter, but the nominal inch size. To convert to mm, nominal inch size should be multiplied by 25.4. Exception is made for small bore piping ($< 1''$): they usually have the same radius as a 1" elbow.

Example 1: pipe diameter = 60.3 mm, elbow 1.5D --> radius = $2 \times 25.4 \times 1.5 = 76.2 \text{ mm}$

Example 2: pipe diameter = 3/4", elbow 1.5D --> radius = $1 \times 25.4 \times 1.5 = 38.10 \text{ mm}$.

3 Elbows can be cut to a different radius of curvature.

4 In case the inside insulation diameter is different from the pipe diameter (e.g. traced pipe work or overfit insulation), both have to be submitted. We have to fabricate an oversize diameter, but the radius will be calculated as the following: nominal pipe size (inch) $\times 25.4 \times 1.5$.



T-Pieces

T-shaped insulation

FOAMGLAS® insulation T-pieces are designed to easily insulate intersections in industrial and commercial pipe work. The T-pieces are supplied tailor-made, allowing for fast and easy installation.

FOAMGLAS® insulation can be prefabricated in equal, as well as unequal T-pieces (of which $\text{Ø1} \neq \text{Ø2}$).

Mandatory data

To be able to produce tailor-made prefabricated elements, we need the following dimensions of the T piece to be insulated:

Pipe diameter 1 In mm, inch or DN.
Pipe diameter 2 In mm, inch or DN.
Insulation thickness
Service temperature

Tolerances

The following tolerances applied to FOAMGLAS® prefabricated T pieces ensure a normal free movement between the T pieces and the piping to be insulated:

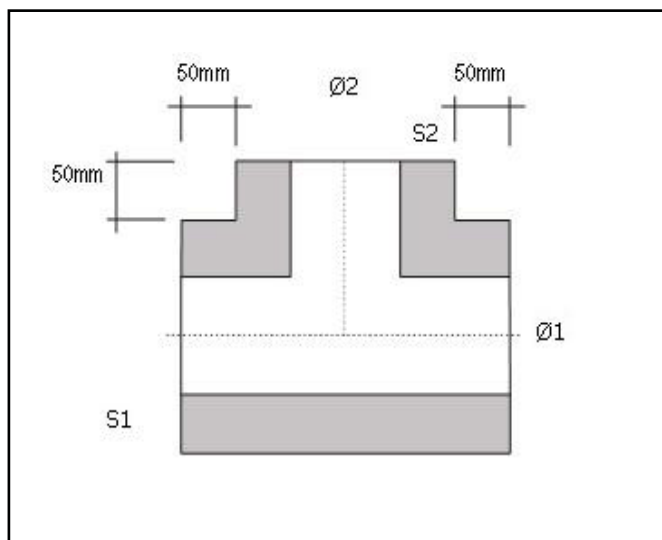
- Inside shell diameter: +1 to +3 mm
- Length: ± 2 mm
- Thickness: ± 2 mm

Additional info

1 Our prefabricated T pieces are delivered with an inner corner fitting a welded Tee (see fabrication design in the middle of this page). In case of fabricated (radiused) T pieces, it may be necessary to abrade the inner side to make them fit completely.

2 We don't fabricate T pieces for angles other than 90°.

Alternative: We can also provide T Boxes for the insulation of pipe work intersections. See respective sheet for full details.



T-pieces

T-shaped insulation, Multi-layer configuration

FOAMGLAS® insulation T-pieces are designed to easily insulate intersections in industrial and commercial pipe work. The T-pieces are supplied tailor-made, allowing for fast and easy installation.

FOAMGLAS® insulation can be prefabricated in equal, as well as unequal T-pieces (of which $\text{Ø1} \neq \text{Ø2}$).

Mandatory data

To be able to produce tailor-made prefabricated elements, we need the following dimensions of the T piece to be insulated:

Pipe diameter 1 In mm, inch or DN.
Pipe diameter 2 In mm, inch or DN.
Insulation thickness and number of layers
Service temperature

Tolerances

The following tolerances applied to FOAMGLAS® prefabricated T pieces ensure a normal free movement between the T pieces and the piping to be insulated:

- Inside shell diameter: +2 to +4 mm
- Length: ± 2 mm
- Thickness: ± 2 mm

Additional info

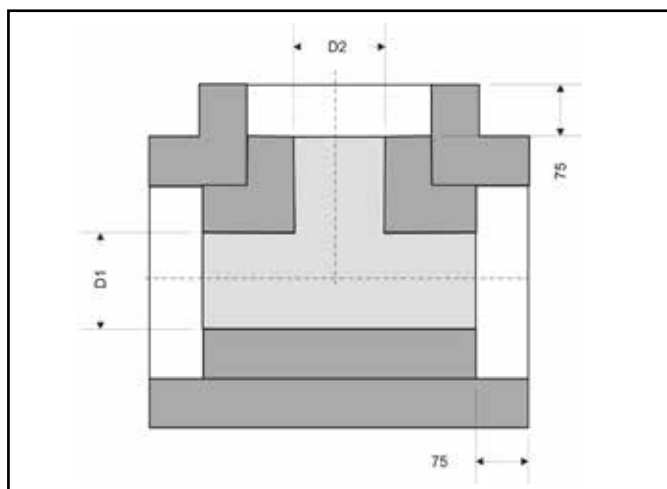
1 Our prefabricated T pieces are delivered with an inner corner fitting a welded Tee (see fabrication design in the middle of this page). In case of fabricated (radiused) T pieces, it may be necessary to abrade the inner side to make them fit completely.

2 We don't fabricate T pieces for angles other than 90°.

Alternative: We can also provide multi-layer T Boxes for the insulation of pipe work intersections. See respective sheet for full details.

Specific for multi-layer T pieces:

- Second layer is fabricated with 90° staggered longitudinal joint.
- Second layer will extend 75 mm at both ends. As such, staggering of circumferential joints is guaranteed.
- The first layer is supplied in 3 pieces, the supplementary layers in two pieces.
- Depending on the size, the number of pieces can be variable



Boxes

Flange and valve insulation, multi-layer configuration

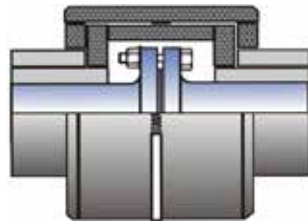
FOAMGLAS® insulation prefabricated boxes are designed to insulate valves and flanges in industrial and commercial pipe work. The boxes are supplied tailor-made, allowing for fast and easy installation.

FOAMGLAS® insulation can be prefabricated in boxes for practically all dimensions. The only limitation is the ability to transport and handle it safely at the job site. If a fabricated box turns out to be too large to transport in one piece, it can be delivered in multiple sections and reassembling can be performed on site.

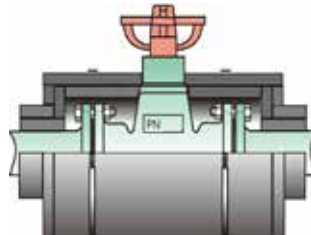
We have three standardized multi layer boxes in our product range:

See appendix 1.4 and 1.5 for information on types, dimensions and standardizations

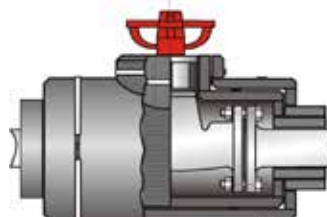
- 1 Double-layer F box:** F-Type Box: flange cover.



- 2 Double-layer V Box:** V-Type Box: valve cover.



- 3 Double-layer T box:** T-Type Box: Valve cover with extended insulation of the valve stem.



Pipe reducers

Insulation for pipe reducers

FOAMGLAS® insulation pipe reducers are designed to easily insulate pipes of which the diameter changes in industrial and commercial pipe work. The pipe reducers are supplied tailor-made, allowing for fast and easy installation. By using prefabricated pipe reducers, the amount of on-site cutting and fitting is reduced to a minimum as cutting sections/segments is no longer necessary.

Mandatory data

To be able to produce tailor-made prefabricated elements, we need the following dimensions of the pipe reducer to be insulated:

Pipe diameter 1 In mm, inch or DN.
Pipe diameter 2 In mm, inch or DN.
Insulation thickness
Service temperature
Concentric or eccentric type

Tolerances

The following tolerances applied to FOAMGLAS® prefabricated pipe reducers ensure a normal free movement between the pipe reducers and the piping to be insulated:

- Inside shell diameter: +1 to +3 mm
- Length: ± 2 mm
- Thickness: ± 2 mm



concentric pipe reducer



Additional info

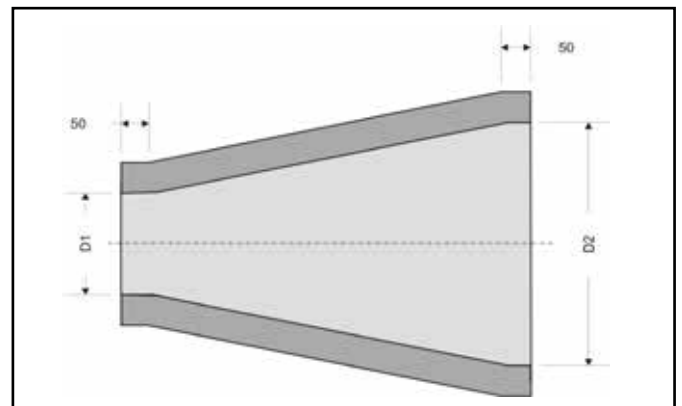
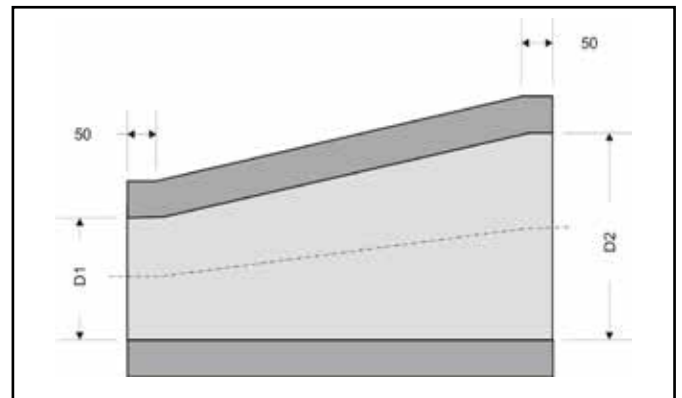
1. At both sides of the reducer, a length of straight pipe insulation will be included. This insulation piece will extend 50 mm either side of both fitting welds
2. For the dimensioning of the reducer itself, the applicable ANSI standards will apply.

see appendix 1.3 for standardized dimensions

Specific for multi-layer pipe reducers:

- Second layer is fabricated with staggered longitudinal joint.
- Second layer will extend 75 mm at both ends. As such, staggering of circumferential joints is guaranteed.

Eccentric pipe reducer



Pipe end caps

Insulation for pipe end caps

FOAMGLAS® insulation pipe end caps are designed to easily insulate the end points of in industrial and commercial pipe work. The pipe end caps are supplied tailor-made, allowing for fast and easy installation. By using prefabricated pipe end caps, the amount of on-site cutting and fitting is reduced to a minimum.

Mandatory data

To be able to produce tailor-made prefabricated elements, we need the following dimensions of the pipe end cap to be insulated:

Pipe diameter In mm, inch or DN.

Insulation thickness and number of layers

Service temperature

Tolerances

The following tolerances applied to FOAMGLAS® prefabricated pipe end caps ensure a normal free movement between the end caps and the object to be insulated.

- Inside shell diameter: +1 to +3 mm
- Length: ± 2 mm
- Thickness: ± 2 mm

Additional info

1. Prefabricated end cap insulation will have flat ends. This reduces fabrication costs and simplifies multiple layer systems.

2. For the dimensioning of the end cap itself, the applicable ANSI standards will apply.

3. The total length of the end cap will be:

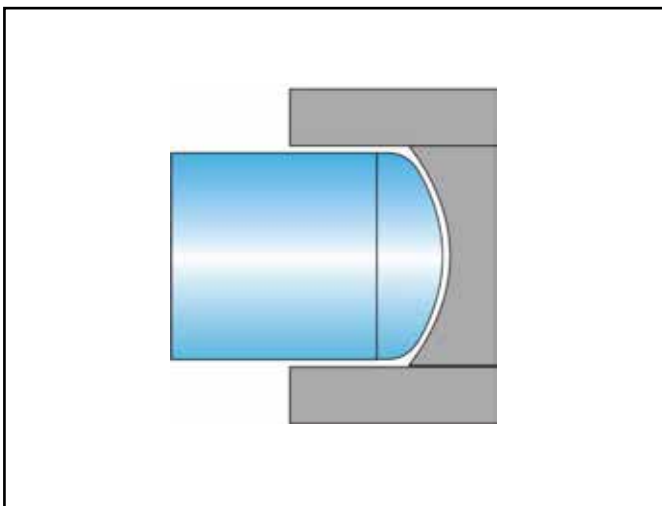
Diameters $\leq 10''$: 300 mm

Diameters $> 10''$: 600 mm

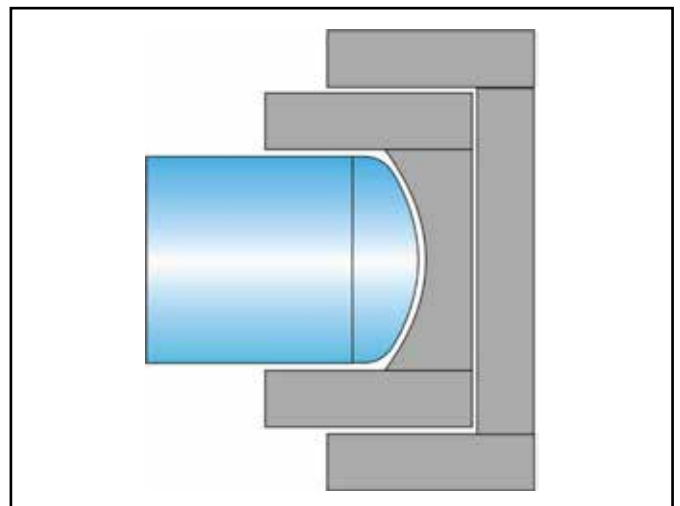
Specific for multi-layer end caps:

- Second layer is fabricated with staggered longitudinal joint.
- Circumferential joints will be staggered as per typical drawing.
- Tolerances on inside diameter of 2nd layer: +2 to +4 mm

Single-layer end cap



Double-layer end cap



Victaulic elbows

Bend insulation, optimised for Victaulic fittings

FOAMGLAS® insulation victaulic elbows are prefabricated fittings designed for the insulation of elbows in industrial and commercial pipe work that are equipped with mechanical pipe joining systems. The elbows are supplied tailor-made, allowing for fast and easy installation.

FOAMGLAS® insulation elbows are available in sizes for diameters up to and including 914 mm. FOAMGLAS® prefabricated elbows have a standard radius of curvature of $R = 1.5 D$ (type 3D) and can be supplied in the same thicknesses as sections and segments for straight pipes.

Mandatory data

To be able to produce tailor-made prefabricated elements, we need the following dimensions of the bend to be insulated:

Pipe diameter In mm, inch or DN.
Angle and radius
Coupling dimensions or type
Insulation thickness
Service temperature

Tolerances

The following tolerances applied to FOAMGLAS® prefabricated Victaulic elbows ensure a normal free movement between the elbows and the piping to be insulated:

- Inside diameter :
 - o < 273 mm : +1 to +3 mm
 - o ≥ 273 mm : +1 to +5 mm
 - o ≥ 500 mm : +2 to +8 mm
- Curvature radius :
 - o < 273 mm : ± 3 mm
 - o ≥ 273 mm : ± 5 mm
 - o ≥ 500 mm : ± 10 mm
- Insulation thickness : ± 2 mm

Additional info

In order to provide a clear overview, we have standardized prefabricated Victaulic elbows. See table below for all possibilities.

DN	Diameter mm	FOAMGLAS® Thickness mm
50	60	25
65	76	25
80	89	25
100	114	25
125	140	30
150	168	30
200	219	40

Multi-layer configuration

Additional layers of FOAMGLAS® insulation will be normal FOAMGLAS® elbows as described in the respective sheet for this element.



TSG

Curved segments for vessels and tanks

FOAMGLAS® insulation TSG is a prefabricated segment designed for the insulation of large diameter pipes and cylindrical tank walls. The segments are supplied tailor-made allowing for fast installation and are suitable for insulating all kind of tank wall surfaces.

FOAMGLAS® insulation TSG segments are available in sizes for diameters above 914 mm.

Mandatory data

To be able to produce tailor-made prefabricated elements, we need following dimensions of the tank to be insulated:

Exterior tank diameter
Insulation thickness and number of layers
Length of cylindrical part to be insulated
Service temperature

Tolerances

The following tolerances applied to FOAMGLAS® TSG ensure a normal free movement between the segments and the equipment to be insulated:

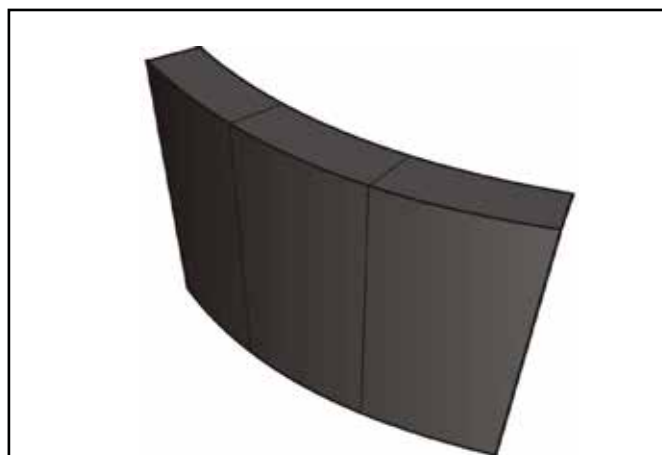
- Inside diameter: +1 to +3 mm
- Length: ± 2 mm
- Width: ± 2 mm
- Thickness: ± 2 mm

Additional info

Size of delivered segments:

For diameters up to 1999 mm → segments of 600 mm long and approximately 220 mm wide

For diameters 2000 mm and above → segments of 600 mm long and approximately 445 mm wide



TSGP

Pre-assembled curved segments for vessels and tanks

FOAMGLAS® insulation TSGP are preassembled TSG segments designed for the insulation of large diameter pipes and cylindrical tank walls. Multiple FOAMGLAS® TSG segments, whether being single- or multi-layered, can be preassembled in our production unit to create large sections for the insulation of equipment and tank walls. This is possible for practically all dimensions, the only limitations are transport and the ability to handle it safely on the job site.

Using preassembled TSGP segments reduces the amount of on-site fitting and glueing which results in faster installation times.

Multi-layer configuration

Additional layers can be adhered on top of each other in a cross pattern. As such, staggering of all joints is guaranteed.

Advantages:

- ✓ Number of segments to install is reduced by 50 - 75%
- ✓ Similar reduction of joints and optional joint-filler
- ✓ Optimised quality of the insulation (less field joints)
- ✓ Best condition for pre-applied outside coating



Vessel heads

Vessel head segments

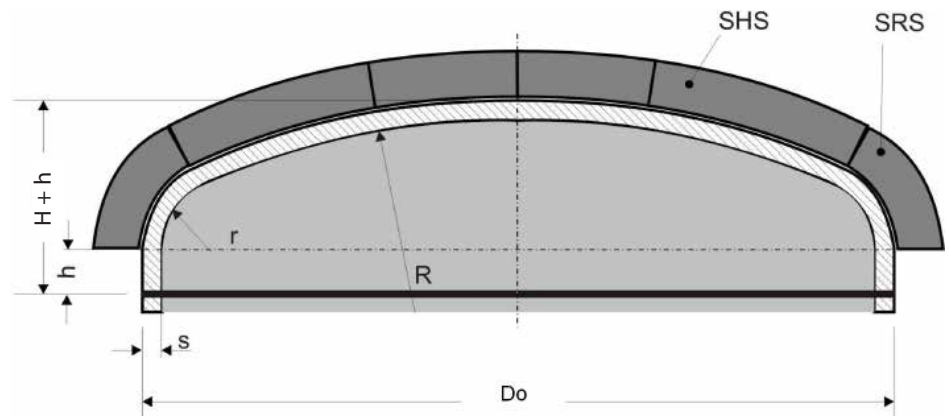
FOAMGLAS® vessel head segments are prefabricated segments designed for the insulation of vessel heads. The segments are supplied tailor-made allowing for fast installation and can be fabricated to fit all of the common types of vessel heads.

FOAMGLAS® insulation can be prefabricated in vessel head segments for diameters from 750 mm up to 5000 mm and even larger..

Mandatory data

To be able to produce tailor-made prefabricated elements, we need the following dimensions of the tank head to be insulated:

Outer shell diameter = D_o
Large radius = R
Small radius = r
Thickness of vessel head = s



H: Head height from tangent line

h: Distance between tangent line and weld line

Thus, we produce a prefabricated head based on following figures:

The large radius, being $R + s$

The small radius, being $r + s$

Example: HEH-type head with D_o of 1000 mm and head thickness of 20 mm. FOAMGLAS® insulation thickness of 60 mm. Delivered prefabricated head will be as following: diameter = 1000 | $R = 1020$ | $r = 120$ | $d = 60$

See appendix 1.1 for more information

Tolerances

The following tolerances applied to FOAMGLAS® vessel head segments ensure a normal free movement between shells and the vessel head to be insulated:

- Curvature: ± 5 mm
- Length: ± 2 mm
- Width: ± 2 mm
- Thickness: ± 2 mm

Additional info

A tailor made FOAMGLAS® vessel head consists of different types of segments.

It is possible to choose our pre-assembled heads (see following page for more information). If not, you will obtain tailor-made separate segments which need to be installed.

Vessel heads

Preassembled vessel head

Multiple FOAMGLAS® vessel head segments, regardless of being single or multi-layered, can be adhered in our production unit to create a completely preassembled vessel head.

Advantages:

Minimise the amount of on-site cutting

Every FOAMGLAS® prefabricated element is delivered tailor-made for your project which has a positive effect on the labour cost.

Increase the speed of installation

Directly fit the FOAMGLAS® prefabricated elements around the tank. This decreases the installation times making shutdowns more effective and cost-efficient.

Easily removable for inspection

FOAMGLAS® prefabricated elements can easily be removed and reinstalled for maintenance purposes.

Easier handling of large sections of insulation

FOAMGLAS® prefabricated elements are packed in easy to handle quantities.

Better installed quality

FOAMGLAS® prefabricated elements are machine made and have a constant quality across the range.

Pre-assembling of vessel heads is possible for practically all dimensions. The only limitations are transport and the ability to handle it safely on the job site. If a prefabricated vessel head turns out to be too large to transport in one piece, we will deliver it in multiple sections and reassembling has to be done on site.

Multi-layer configuration

The second layer of FOAMGLAS® prefabricated head insulation cannot be of the same type as the first layer. E.g.: HEH first layer + HEH second layer will never fit.

The solution is to mention the head type and give complete data for the first layer. We will calculate the correct radii based on these figures and our experience.

Example: HEH-type head with OD of 1000 mm and head thickness of 20 mm. FOAMGLAS® insulation thickness of 60 mm (first layer) + 50 mm (second layer).

The second layer will have: diameter = 1120 | R = 1080 | r = 180 | d = 50

See appendix 1.1 for more information



SHS

Spherical head segments

FOAMGLAS® insulation SHS segments are prefabricated spherical head segment designed for the insulation of spheres and other spherical shaped equipment. The segments are supplied tailor-made allowing for fast installation and are suitable for insulating all kind of spherical tanks and industrial equipment.

FOAMGLAS® insulation can be prefabricated in spherical head segments for diameters from 950 mm up to 20 000 mm. There are two types of types of SHS, depending on the diameter:

- Segments of 295 x 295 mm for diameters smaller than 1800 mm
- Segments of 295 x 445 mm for diameters of 1800 mm and up

Mandatory data

To be able to produce tailor-made prefabricated elements, we need the following dimensions of the sphere to be insulated:

Exterior object radius
Insulation thickness and number of layers
Service temperature

Tolerances

The following tolerances applied to FOAMGLAS® SHS ensure a normal free movement between the segments and the equipment to be insulated:

- Curvature: ± 5 mm
- Length: ± 2 mm
- Width: ± 2 mm
- Thickness: ± 2 mm

Multi-layer configuration

Same specification as single-layer configuration.



CSG

Segments for conical equipment

FOAMGLAS® insulation CSG segments are prefabricated segments designed for the insulation of conical vessel ends or conical transition parts. The segments are supplied tailor-made allowing for fast installation and are suitable for insulating all kind of conical industrial equipment.

FOAMGLAS® insulation can be prefabricated in radiused conical segments for diameters from 450 mm up to 4000 mm (CSGR) and in flat conical segments for diameters above 4000 mm (CSGF).

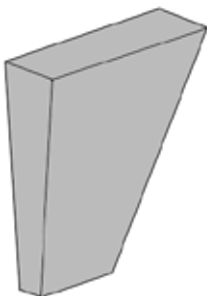
- CSGR (radiused): Diameters < 4000mm
- CSGF (flat): Diameters ≥ 4000mm

Mandatory data

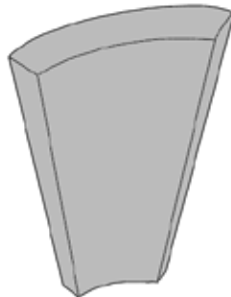
To be able to produce tailor-made prefabricated elements, we need following dimensions of the tank to be insulated:

Large diameter
Small diameter
Angle(s) if not concentric
Straight height or length
Insulation thickness and number of layers
Service temperature

CSGF



CSGR



Tolerances

The following tolerances applied to FOAMGLAS® CSG ensure a normal free movement between segments and the equipment to be insulated:

- Inside diameter: +1 to +3 mm
- Length: ± 2 mm
- Width: ± 2 mm
- Thickness: ± 2 mm

Additional info

1. The length of the conical segments is 450 mm.
2. The width is variable with a maximum of 295 mm. It is calculated in order to allow a ringwise application of the segments without additional adjusting.

Multi-layer configuration

Same specification as single-layer configuration.



CSGP

Pre-assembled elements for conical equipment

FOAMGLAS® insulation preassembled trapezoidal parts are designed for the insulation of trapezoidal shaped equipment in industrial pipework. The conical elements are supplied tailor-made, allowing for fast and easy installation.

FOAMGLAS® insulation can be prefabricated in trapezoidal parts for practically all dimensions. The only limitation is the ability to transport and handle it safely to the job site. If a preassembled trapezoidal part turns out to be too large to transport in one piece, it can be delivered in multiple sections and reassembling has to be done on-site.

Mandatory data

To be able to produce tailor-made prefabricated elements, we need the following dimensions of the pipe reducer to be insulated:

Large diameter
Small diameter
Angle(s) if not concentric
Straight height or length
Insulation thickness and number of layers
Service temperature

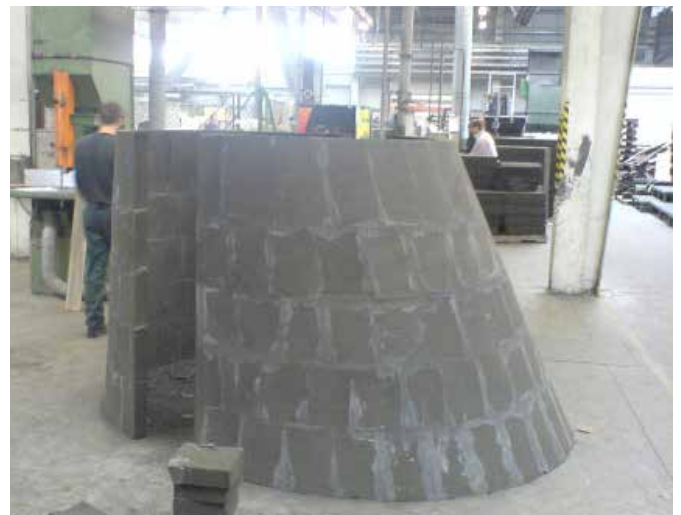
Multi layer configuration

Same specification as single-layer configuration.

Tolerances

The following tolerances applied to FOAMGLAS® preassembled trapezoidal parts ensure a normal free movement between the parts and the equipment to be insulated:

- Inside diameter: +1 to +5 mm
- Length: ± 2 mm
- Thickness: ± 2 mm



Coatings

Pre-applied coatings

Why pre-applied coatings?

Through years of experience with our accessory products, we have the necessary know-how to apply these at our production units. This experience enables us to produce pre-applied FOAMGLAS® insulation in the most optimized circumstances.

Advantages

- Simpler pre-coated systems
- Less accessory materials on site
- Prefabrication = quicker installation
- Wide temperature range
- CUI prevention

Inside coatings



Anti abrasive coating

The anti abrasive coating is applied to the inside of the FOAMGLAS® prefabricated element. It reduces abrasion from vibrating piping or equipment. It has strong adhesive qualities through a wide temperature range.

Both a Low Temperature Anti Abrasive (LTAA) and a High Temperature Anti Abrasive (HTAA) is available. Depending on the service temperature, either of these is used:

LTAA: temperature range of -180°C to +130 °C

HTAA: temperature range of -268°C to +430°C



PC® 700K

PC® 700K is a combination of a two-component inorganic mortar and a glass cloth reinforcement to protect the FOAMGLAS® insulation system to suffer from thermal cracking.

It is ideal when the temperatures are very low, very high, or when they cycle rapidly.

Temperature range: -196°C to +400°C

Coatings

Pre-applied coatings

Outside coatings



Terostat PC® FRI

Terostat PC® FRI is a vapor/ weather barrier coating and sealant/adhesive especially formulated for use with FOAMGLAS® insulation in the low to moderate temperature range.

Field application consists of sealing the section joints with the same TEROSTAT PC® FRI which acts as a highly flexible sealant and adhesive. TEROSTAT PC® FRI provides a clean look and a flexible but strong protection.

Temperature range: -50°C to +120°C

Advantages:

- Joint-free, continuous coating
- Strong & flexible coating/adhesive
- Wide temperature range
- CUI preventive system
- Solvent free
- Reduced installation time



Bituminous cell filler

The Bituminous cell filler is specially formulated for use with FOAMGLAS® insulation in the low to moderate temperature range. It 'fills' the open cells on the surface to protect the unique cell structure of FOAMGLAS® insulation.

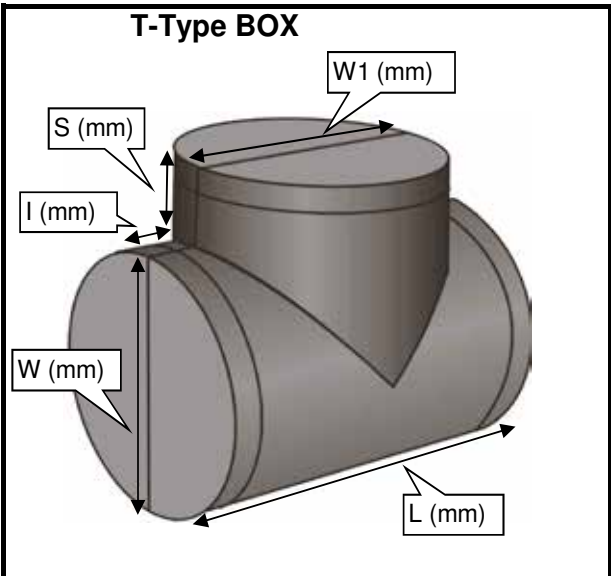
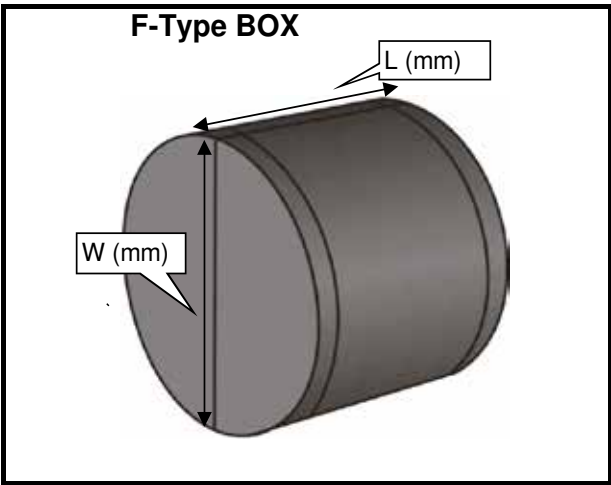
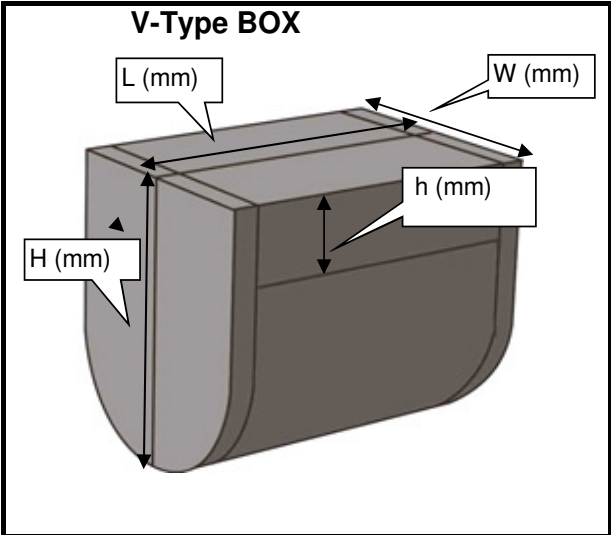


PITTWRAP® B100 foil

This Alubutyl foil is a versatile foil with outstanding vapour barrier and weatherproof properties. It is strengthened by PET foil to withstand cracks and leaks.

Measurement sheet - FOAMGLAS® Boxes

ALL DIMENSIONS ARE OUTSIDE BOX !



CLIENT:

ORDER :

ITEM NR:

BOX TYPE **V or F or T**

END COVERS **YES** if complete
NO if none
 or give **number** (pcs)

INSULATION THICKNESS (mm)
 + mm

Temperature ≤ +120°C Indicate maximum
 > +120°C operating temperature

DIMENSIONS (mm) **Outside** outer BOX !

L	<input type="text"/>	
W	<input type="text"/>	
H	<input type="text"/>	> V-Box only
h	<input type="text"/>	> V-Box (optional)
S	<input type="text"/>	> T-Box only
I	<input type="text"/>	> T-Box (optional)
W1	<input type="text"/>	> T-Box, only if ≠ W

Dimensions in capital letters are obligatory,
 small letters only if applicable.

QUANTITY pieces

PRE-APPLIED COATINGS

- LTAA
- HTAA
- BIT. CF
- ASJ FOIL
- PC® 700K
- PITTWRAP® B100
- TEROSTAT PC® FRI

Inside Box

Outside Box

Page:

Appendix - Information on types, dimensions and standardizations

1.1 Vessel heads

Designation	ENG	Torispherical head	Ellipsoidal head
	DE	Klöpferboden	Korbbogenboden
	FR	Fond GRC	Fond KBB
	PCE	HEH	HKH
Fabrication standards	DE	DIN 28011	DIN 28013
	FR	NFE 81-102	
	INT		
Large radius	R =	Do	0.8 x Do
Small radius	r =	0.1 x Do	0.154 x Do

Designation	ENG	Elliptical head 1.9:1	Elliptical head 2:1
	DE	Elliptischer Boden 1.9:1	Elliptischer Boden 2:1
	FR	Fond elliptique 1.9:1	Fond elliptique 2:1
Fabrication standards	DE		
	FR	NFE 81-103	
	INT		ASME VIII Div.1
Large radius	R =	0.8621 x Di	0.9045 x Di
Small radius	r =	0.1855 x Di	0.1727 x Di

Designation	ENG	Spherical head; boiler end	Dished head; tank end
	DE	Flachgewölbter Boden	Gewölbter Tankboden
	FR	Fond PRC	Fond MRC
Fabrication standards	DE		DIN 6608/6616
	FR	NFE 81-101	NFE 81-104
	INT		EN 12285-1
Large radius	R =	1.0 - 1.5 x Do	Do
Small radius	r =	30mm - 50mm	Do/30

Designation	ENG	Curved disc	Hemispherical head
	DE	Gewölbte Scheibe	Halbsphärischen Boden
	FR	Calotte sphérique	Fond hémisphérique
Fabrication standards	DE		
	FR		
	INT		
Large radius	R =	0.8 - 1.5 x Do	0.5 x Do
Small radius	r =	0	0

Appendix - Information on types, dimensions and standardizations

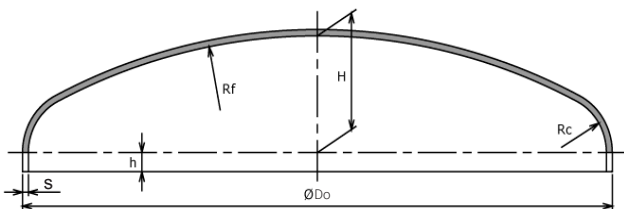
1.1 Vessel heads

Notes (Not valid for the hemispherical head type)

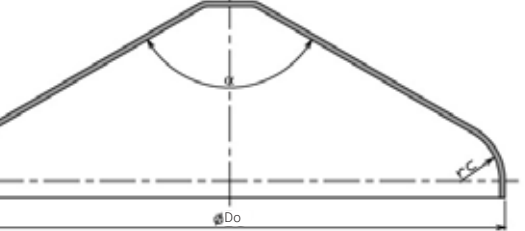
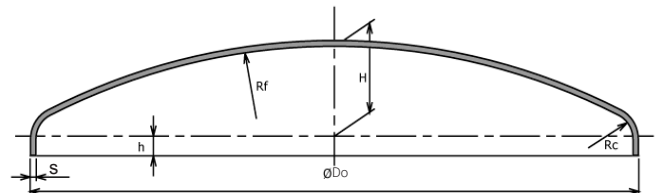
1. The details above are tankbuilders' information. These R- and r-values are defined as inside radiuses. For our fabrication we have to add the steel thickness
 $R_{fab} = R + s$
 $R_{fab} = r + s$
2. The second layer in a double-layer system can never be one of the types above. Specify simply as second layer and it will be fabricated as fitting upon the first layer or calculate D_o and radiuses starting from the first layer.

Thanks to decades of experience and specialised calculation programmes, we are able to produce fitted FOAMGLAS® insulation for every type of vessel head, regardless being standardized or custom, typical or combined.

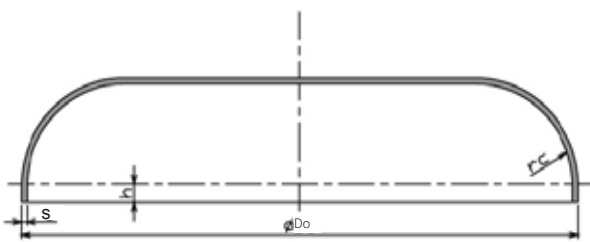
FOAMGLAS® prefabricated elements that we deliver can be:



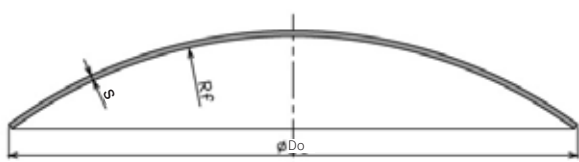
Elliptical heads: SHS segments + SRS segments



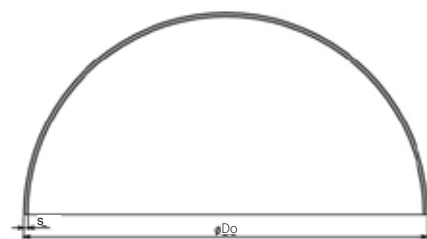
Conical heads: SRS + CSG segments



flat heads: SRS segments + FOAMGLAS® slabs



Dished heads: SHS segments



Hemispherical heads: SHS segments

Appendix - Information on types, dimensions and standardizations

1.2 Elbows

Elbow radiuses according to ANSI B16.9

Diameter			ANSI B16.9	ANSI B16.28
DN	inch	mm	Long radius R= 1,5 D	Short radius R= 1,0 D
15	0,5	21	38	
20	0,75	27	38	
25	1	34	38	25
32	1,25	42	48	32
40	1,5	48	57	38
50	2	60	76	51
65	2,5	76	95	64
80	3	89	114	76
	3,5	102	133	89
100	4	114	152	102
		127	172	114
125	5	140	191	127
150	6	168	229	152
200	8	219	305	203
250	10	273	381	254
300	12	324	457	305
350	14	356	533	356
400	16	406	610	406
450	18	457	686	457
500	20	508	762	508
550	22	559	838	559
600	24	610	914	610
650	26	660	991	
700	28	711	1067	
750	30	762	1143	
800	32	813	1219	
900	36	914	1372	

Appendix - Information on types, dimensions and standardizations

1.3 Reducers

Concentric and eccentric reducers according to ANSI B16.9

DN	Inch	mm	Length (mm)
20 x 15	0,75 x 0,5	27 x 21	38
20 x 10	0,75 x 3/8	27 x 17	
25 x 20	1 x 0,75	34 x 27	51
25 x 15	1 x 0,5	34 x 21	
32 x 25	1,25 x 1	42 x 34	51
32 x 20	1,25 x 0,75	42 x 27	
32 x 15	1,25 x 0,5	42 x 21	
40 x 32	1,5 x 1,25	48 x 42	64
40 x 25	1,5 x 1	48 x 34	
40 x 20	1,5 x 0,75	48 x 27	
40 x 15	1,5 x 0,5	48 x 21	
50 x 40	2 x 1,5	60 x 48	76
50 x 32	2 x 1,25	60 x 42	
50 x 25	2 x 1	60 x 34	
50 x 20	2 x 0,75	60 x 27	
65 x 50	2,5 x 2	76 x 60	89
65 x 40	2,5 x 1,5	76 x 48	
65 x 32	2,5 x 1,25	76 x 42	
65 x 25	2,5 x 1	76 x 34	
80 x 65	3 x 2,5	89 x 76	89
80 x 50	3 x 2	89 x 60	
80 x 40	3 x 1,5	89 x 48	
80 x 32	3 x 1,25	89 x 42	
90 x 80	3,5 x 3	102 x 89	102
90 x 65	3,5 x 2,5	102 x 76	
90 x 50	3,5 x 2	102 x 60	
90 x 40	3,5 x 1,5	102 x 48	
90 x 32	3,5 x 1,25	102 x 42	

DN	Inch	mm	Length (mm)
100 x 90	4 x 3,5	114 x 102	102
100 x 80	4 x 3	114 x 89	
100 x 65	4 x 2,5	114 x 76	
100 x 50	4 x 2	114 x 60	
100 x 40	4 x 1,5	114 x 48	
125 x 100	5 x 4	140 x 114	127
125 x 90	5 x 3,5	140 x 102	
125 x 80	5 x 3	140 x 89	
125 x 65	5 x 2,5	140 x 76	
125 x 50	5 x 2	140 x 76	140
150 x 125	6 x 5	168 x 140	
150 x 100	6 x 4	168 x 114	
150 x 90	6 x 3,5	168 x 102	
150 x 80	6 x 3	168 x 89	
150 x 65	6 x 2,5	168 x 76	152
200 x 150	8 x 6	219 x 168	
200 x 125	8 x 5	219 x 140	
200 x 100	8 x 4	219 x 114	
200 x 90	8 x 3,5	219 x 102	178
250 x 200	10 x 8	273 x 219	
250 x 150	10 x 6	273 x 168	
250 x 125	10 x 5	273 x 140	
250 x 100	10 x 4	273 x 114	

Appendix - Information on types, dimensions and standardizations

1.3 Reducers

Concentric and eccentric reducers according to ANSI B16.9

DN	Inch	mm	Length (mm)
300 x 250	12 x 10	324 x 273	203
300 x 200	12 x 8	324 x 219	
300 x 150	12 x 6	324 x 168	
300 x 125	12 x 5	324 x 140	
350 x 300	14 x 12	356 x 324	330
350 x 250	14 x 10	356 x 273	
350 x 200	14 x 8	356 x 219	
350 x 150	14 x 6	356 x 168	
400 x 350	16 x 14	406 x 356	356
400 x 300	16 x 12	406 x 324	
400 x 250	16 x 10	406 x 273	
400 x 200	16 x 8	406 x 219	
450 x 400	18 x 16	457 x 406	381
450 x 350	18 x 14	457 x 356	
450 x 300	18 x 12	457 x 324	
450 x 250	18 x 10	457 x 273	
500 x 450	20 x 18	508 x 457	508
500 x 400	20 x 16	508 x 406	
500 x 350	20 x 14	508 x 356	
500 x 300	20 x 12	508 x 324	
550 x 500	22 x 20	559 x 508	508
550 x 450	22 x 18	559 x 457	
550 x 400	22 x 16	559 x 406	
550 x 350	22 x 14	559 x 356	
600 x 550	24 x 22	610 x 559	508
600 x 500	24 x 20	610 x 508	
600 x 450	24 x 18	610 x 457	
600 x 400	24 x 16	610 x 406	

DN	Inch	mm	Length (mm)
650 x 600	26 x 24	660 x 610	610
650 x 500	26 x 22	660 x 559	
650 x 450	26 x 20	660 x 508	
650 x 400	26 x 18	660 x 457	
700 x 650	28 x 26	711 x 660	
700 x 600	28 x 24	711 x 610	610
700 x 550	28 x 22	711 x 559	
700 x 500	28 x 20	711 x 508	
750 x 700	30 x 28	762 x 711	
750 x 650	30 x 26	762 x 660	610
750 x 550	30 x 24	762 x 610	
750 x 500	30 x 22	762 x 559	
800 x 750	32 x 30	813 x 762	
800 x 700	32 x 28	813 x 711	610
800 x 650	32 x 26	813 x 660	
800 x 600	32 x 24	813 x 610	
850 x 800	34 x 32	864 x 813	
850 x 750	34 x 30	864 x 762	610
850 x 700	34 x 28	864 x 711	
850 x 650	34 x 26	864 x 660	
900 x 850	36 x 34	914 x 864	
900 x 800	36 x 32	914 x 813	610
900 x 750	36 x 30	914 x 762	
900 x 700	36 x 28	914 x 711	
900 x 650	36 x 26	914 x 660	

Appendix - Information on types, dimensions and standardizations

1.4 Flanges

Diameter			Class 150		Class 300	
DN	inch	mm	Diam. mm	Length mm	Diam. mm	Length mm
15	0.5	21	89	48	96	53
20	0.75	27	99	53	118	57
25	1	34	108	56	124	62
32	1.25	42	118	57	134	65
40	1.5	48	127	62	156	69
50	2	60	153	64	165	70
65	2.5	76	178	70	191	77
80	3	89	191	70	210	80
100	4	114	229	76	254	86
125	5	140	254	89	280	99
150	6	168	280	89	318	99
200	8	219	343	102	381	112
250	10	273	407	102	445	118
300	12	324	483	114	521	131
350	14	356	534	127	585	143
400	16	406	597	127	648	146
450	18	457	635	140	712	159
500	20	508	699	145	775	162
600	24	610	813	152	915	169

Diameter			Class 600		Class 900	
DN	inch	mm	Diam. mm	Length mm	Diam. mm	Length mm
15	0.5	21	95	59	121	67
20	0.75	27	118	63	130	76
25	1	34	124	68	149	79
40	1.5	48	156	76	178	89
50	2	60	165	79	216	108
80	3	89	210	89	242	108
100	4	114	273	108	292	121
150	6	168	356	124	381	146
200	8	219	419	140	470	168
250	10	273	508	159	546	190
300	12	324	559	162	610	206
350	14	356	603	171	642	219
400	16	406	686	184	705	222
450	18	457	743	190	788	235
500	20	508	813	197	857	254
600	24	610	940	209	1042	298

Appendix - Information on types, dimensions and standardizations

1.5 Valves

Diameter			Class 150		Class 300	
DN	inch	mm	Diam. mm	Length mm	Diam. mm	Length mm
40	1.5	48	127	178	156	203
50	2	60	153	191	165	232
65	2.5	76	178	203	191	257
80	3	89	191	216	210	298
100	4	114	229	241	254	321
125	5	140	254	267	280	397
150	6	168	280	279	318	419
200	8	219	343	305	381	435
250	10	273	407	343	445	473
300	12	324	483	368	521	518
350	14	356	534	394	585	778
400	16	406	597	419	648	854
450	18	457	635	445	711	930
500	20	508	699	470	775	1010
600	24	610	813	521	915	1114

Diameter			Class 600		Class 900	
DN	inch	mm	Diam. mm	Length mm	Diam. mm	Length mm
40	1.5	48	156	240	178	303
50	2	60	165	295	216	371
80	3	89	210	359	242	384
100	4	114	273	435	292	460
150	6	168	356	562	381	613
200	8	219	419	663	470	740
250	10	273	508	790	546	841
300	12	324	559	841	610	968
350	14	356	603	892	642	1038
400	16	406	686	994	705	1140
450	18	457	743	1095	788	1232
500	20	508	813	1200	857	
600	24	610	940	1406	1042	