

GENERAL INFORMATION

Various adaptors and bellows are used for glass pipelines to form joints with other pipelines or with tubes. Bellows are even provided for forming joints with main pipelines or sometimes between glass pipes and ensure a low-tension connection to the glass structural component.



The following standard adaptors and bellows are available:

- Bellows with glass-glass connection
- Bellows with glass--EN 1092-1 connection, PN10
- Bellows with glass-ANSI 150 connection
- Bellows with EN 1092-1 connections, PN40, for media connections

- Adaptors for tube connections
- Adaptors for Tri-Clamp couplings
- Adaptors for KAMLOK couplings
- Adaptors for milk pipe connections
- Adaptors for threaded media connections

In addition to the adaptors and bellows described in the following there are also numerous possible customer-specific adaptors. For example special glass adaptor pieces can be delivered for nominal diameters of 32, 65 and 125 (example of possible order PR 050/032-... as a transition piece from nominal diameters of 50 to nominal diameters of 32, please contact one of our specialist departments if you are interested).

The operating conditions included in chapter 10 "technical information" only apply for the standard flanges in PF and KF systems. If the specific operating conditions are not entered for the following structural components then please contact our specialist departments if needed.

BELLOWS

Bellows are used in systems with borosilicate glass 3.3 to

- balance out length differences and temperature-dependent length changes,
- to guarantee a tension-free connection to components mostly made of different materials and
- reduce vibrations in apparatus.

Standard product bellows are delivered for transitions from glass pipelines to counter flanges using a glass connector in accordance with EN 1092-1 and ANSI. The bellow flanges are manufactured from coated aluminium cast metal and from stainless steel.

The permitted operating conditions for bellows are included in chapter 10 and should be observed when fixing approved system operating conditions.

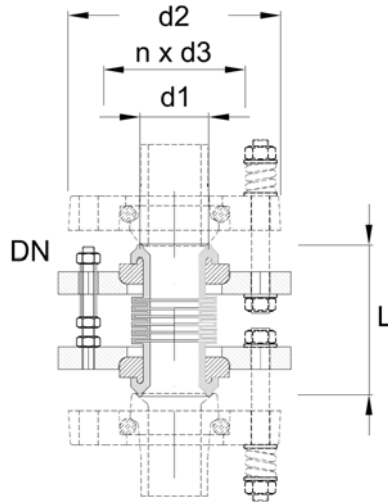
The mounting dimensions and approved flexibility $\pm \Delta L$ of the bellows are set up using bolt stops and spacer bushes. Angular deflections up to a maximum of $\pm 5^\circ$ are permitted. Adaptions to the bellows and the guiding and mounting of glass structural components during assembly should be carried out so that no unapproved forces are exerted on the pipeline system. You can receive more information from our specialists.

We can also deliver bellows for higher operating pressures as well as bellows made of conductive PTFE on request. Examples of orders are shown in the following.

Product name:	Item no.	Example
Bellows, glass-glass and glass-EN1092, KF system:	CBG....-K	CBG 025-K
Bellows, glass-ANSI, KF system:	CBA....-K	CBA 025-K
Bellows, glass-glass, KF system, conductive:	CBG....-K-M2	CBG 025-K-M2
Bellows, glass-glass, KF system, conductive, with FDA:	CBG....-K-M2-Z1	CBG 025-K-M2-Z1

BELLOWS FOR FLANGE CONNECTIONS GLASS-GLASS AND GLASS-EN1092-1

Bellows for installing in glass pipelines as well as for connecting to flanges in accordance with EN 1092-1, PN10 in the KF system are delivered in line with the following representation and table. Type CAPG ...-K adaptor couplings are needed to connect bellows to glass flanges and must be ordered separately. The bellows are designed with a sealing lip so that no additional sealing gaskets are needed for the connection. The bellows can also optionally be delivered with stainless steel clamp rings. Examples of such orders are also shown in the following table.



CBG...K bellows for glass-glass and glass-EN1092 connection, for grooved flange system

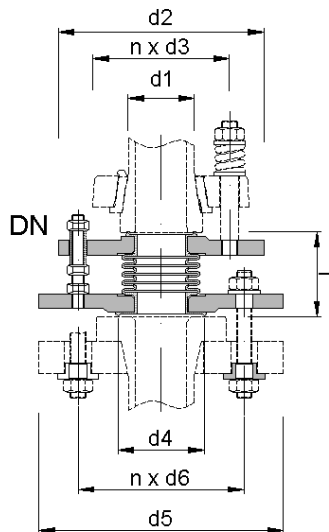
Product name: connection	Item no.	Example	Glass
Bellows, glass-glass:	CBG....-K	CBG 025-K	CAPG ...-K
Bellows, glass-glass, stainless steel:	CBG....-K-O1	CBG 025-K-O1	CAPG ...-K
Bellows, glass-glass, PTFE conductive:	CBG....-K-M2	CBG 025-K-M2	CAPG ...-K
Bellows, glass-glass, stainless steel, PTFE conductive: M2-O1	CAPG ...-K	CBG....-K-M2-O1	CBG 025-K-

DN	L [mm]	d1 [mm]	d2 [mm]	n x d3 [mm] [mm]	PF order no.
15	75±5	□23	□95	□50, 3 x □7	CBG 015-K
25	75±5	□34	□115	□85, 4 x □9	CBG 025-K
40	100±5	□51	□150	□110, 4 x □9	CBG 040-K
50	100±6	□63	□165	□125, 4 x □9	CBG 050-K
80	100±6	□96	□200	□160, 8 x □9	CBG 080-K
100	100±6	□116	□220	□180, 8 x □9	CBG 100-K
150	150±6	□169	□285	□240, 8 x □9	CBG 150-K
200	100±6	□220	□345	□295, 8 x □9	CB 200
300	100±6	□321	□460	□400, 12 x □9	CB 300

BELLOWS FOR FLANGE CONNECTIONS GLASS-ANSI 150 PSI

Bellows for connecting glass flanges to flanges in accordance with ANSI 150 psi are available for the PF system in line with the following drawing and table. Reducing sleeves for the ANSI flange side are delivered for this variant in order to enable use of the normal bolts for glass apparatus and to balance out the bores which are normally larger.

The contact surface should be observed when connecting to the ANSI flange and, if needed, a type CGS... steel core gasket should be built in to balance out greater sealing surface radii.



Type CBA...-K bellows for glass-ANSI connection, grooved flange system (KF)

Product name:	Item no.	Example	Glass connection
Bellows, glass-ANSI:	CBA....-K	CBA 025-K	CAPG ...-K
Bellows, glass-ANSI, stainless steel:	CBA....-K-O1	CBA 025-K-O1	CAPG ...-K
Bellows, glass-ANSI, PTFE conductive:	CBA....-K-M2	CBA 025-K-M2	CAPG ...-K
Bellows, glass-ANSI, stainless steel, PTFE conductive:	M2-O1	CBA....-K-M2-O1	CBA 025-K-
	CAPG ...-K		

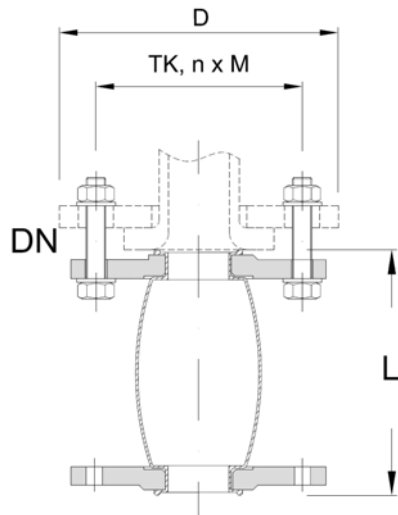
DN	L [mm]	d1 [mm]	d4 [mm]	n x d3	n x d6 [mm]	d2 [mm]	d5 [mm]	KF order no.
15	75±5	Ø23	Ø28	Ø50, 3 x Ø7	Ø60, 4 x Ø7	Ø80	Ø95	CBA 015-K
25	75±5	Ø34	Ø44	Ø85, 4 x Ø9	Ø79, 4 x Ø9	Ø105	Ø115	CBA 025-K
40	100±5	Ø51	Ø58	Ø110, 4 x Ø9	Ø98, 4 x Ø9	Ø125	Ø125	CBA 040-K
50	100±6	Ø63	Ø71	Ø125, 4 x Ø9	Ø121, 4 x Ø9	Ø140	Ø165	CBA 050-K
80	100±6	Ø96	Ø100	Ø160, 4 x Ø9	Ø152, 4 x Ø9	Ø190	Ø190	CBA 080-K
100	100±6	Ø116	Ø128	Ø180, 8 x Ø9	Ø190, 8 x Ø9	Ø200	Ø220	CBA 100-K
150	150±6	Ø169	Ø178	Ø240, 8 x Ø9	Ø241, 8 x Ø11	Ø280	Ø280	CBA 150-K
200	100±6	Ø220	Ø231	Ø295, 8 x Ø9	Ø298, 8 x Ø9	Ø345	Ø345	CBA 200
300	100±6	Ø321	Ø335	Ø400, 12 x Ø9	Ø432, 12 x Ø9	Ø460	Ø460	CBA 300

BELLOWS / COMPENSATORS FOR MEDIA CONNECTIONS IN ACCORDANCE WITH EN 1092, PN 10

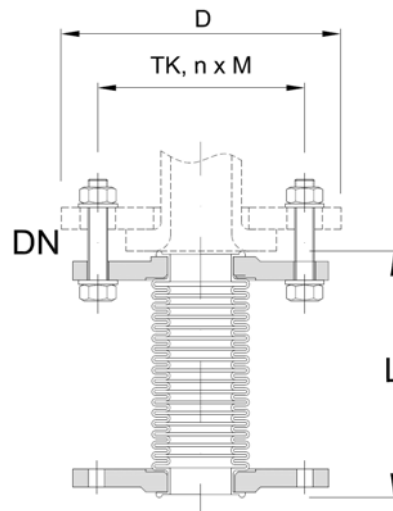
Bellows for connecting media pipelines (steam, condensation, heat transfer media, coolants) to stainless steel flanges are designed with two-sided connections to EN1092-1 flanges up to DN 150.

Standard bellows or compensators are available with galvanised steel clamp rings and EPDM bellows, which can be used in conditions of up to 10 bar and 80 °C. Alternatively, type CBM ...-O1 stainless steel bellows (1.4404) can be delivered, which can be used in conditions up to 16 barg and 200 °C.

The maximum angular displacement is a minimum of 5° in each case.



CBM... bellows
for EN 1092 - EN 1092 connection,
elastomeric bellows



CBM...-O1 bellows
for EN 1092 - EN 1092 connection,
stainless steel bellows

Product name:

Bellows, EN1092-EN1092:

Bellows, EN1092-EN1092, stainless steel:

Item no.

CBM....

CBM....-O1

Example

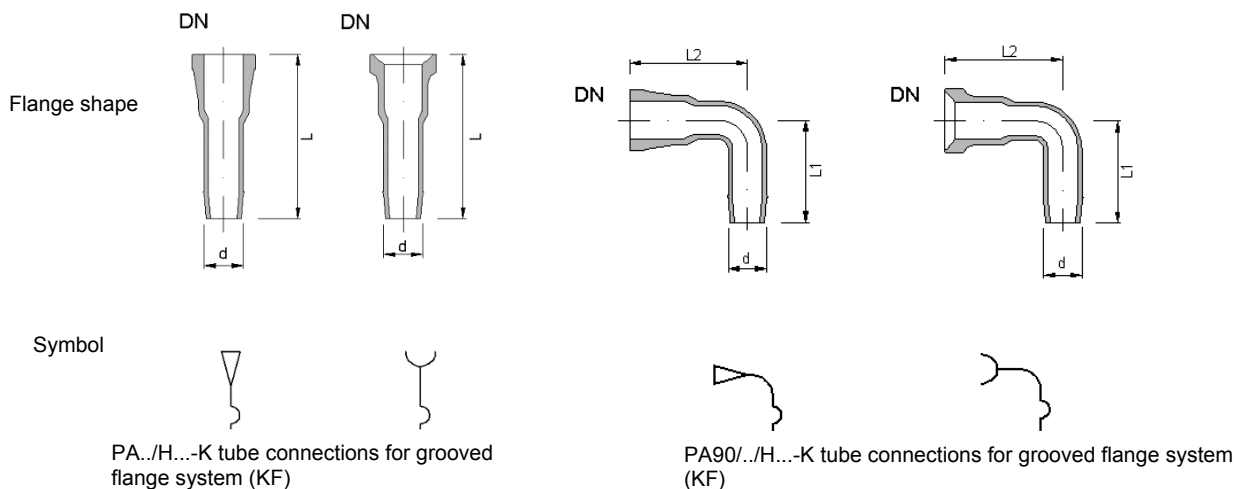
CBM 025

CBM 025-O1

DN	L [mm]	D [mm]	TK [mm]	n x M [mm]	Order no. Standard/ Galvanised elastomeric	L [mm]	Order no. Stainless steel
15		□95	□65	4 x □14		108±8,5	CBM 015-01
25	100+20/-10	□115	□85	4 x □14	CBM 025	125±13	CBM 025-01
40	125+35/-10	□150	□110	4 x □18	CBM 040	135±15	CBM 040-01
50	125+35/-10	□165	□125	4 x □18	CBM 050	155±18	CBM 050-01
80	150+40/-10	□200	□160	8 x □20	CBM 080	175±23	CBM 080-01
100	150+40/-10	□220	□180	8 x □20	CBM 100	180±23	CBM 100-01
150	150+40/-10	□285	□240	8 x □22	CBM 150	230±25	CBM 150-01

ADAPTOR WITH TUBE CONNECTION

Tube connections are used to empty or connect plug-in tubes. Tube connections are available in straight and 90° designs for various tube inside diameters



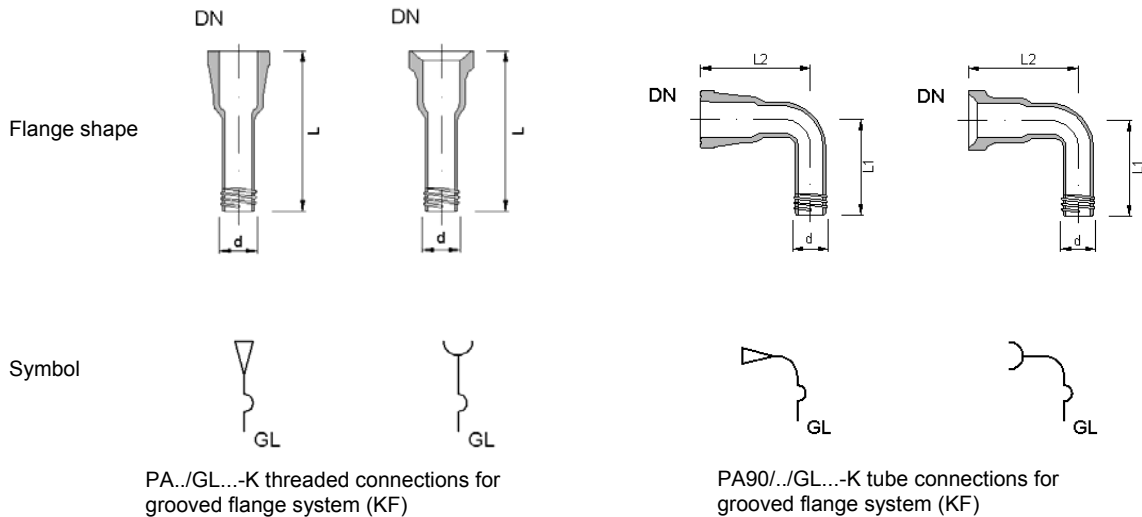
When using tube connections it should be ensured that no unapproved turning moment occurs due to the tube connection (i.e. due to the mounting of the tubes) and the tubes are fitted with a clamp to the glass adaptor.

Product name:	Item no.	Example
Tube connection, glass, straight, KF system:	PA DN/H..d-K	PA 25/H16-K
Tube connection, glass, 90°, KF system:	PA 90/DN/H..d-K	PA 90/25/H16-K

DN	□d	L	Tube adaptor, straight			Tube adaptor, 90° angled	
			L1	L2	Item no.	Item no.	
-	[mm]	[mm]	[mm]	[mm]	KF system	KF system	
15	16	110	60	60	PA 15/H16-K	PA 90/15/H16-K	
15	20	70	60	60	PA 15/H20-K	PA 90/15/H20-K	
25	20	90	60	80	PA 25/H20-K	PA 90/25/H20-K	
25	26	110	70	80	PA 25/H26-K	PA 90/25/H26-K	
40	26	100			PA 40/H26-K		
40	42	110			PA 40/H42-K		

GL THREADED ADAPTOR

GL threaded adaptors are mostly used to empty tubes or as a clamp coupling for tubes or components like thermometers. GL threaded adaptors are available in straight and 90° designs for various GL threads. The standard GL threads used are the GL threads 18 and 25.



When connecting to GL threaded adaptors it should be ensured that no unapproved bending moment occurs.

Product name:	Item no.	Example
GL adaptor, straight, PF system:	PA DN/GL...-K	PA 25/GL18-K
GL adaptor, 90°, PF system:	PA 90/DN/GL...-K	PA 90/25/GL18-K

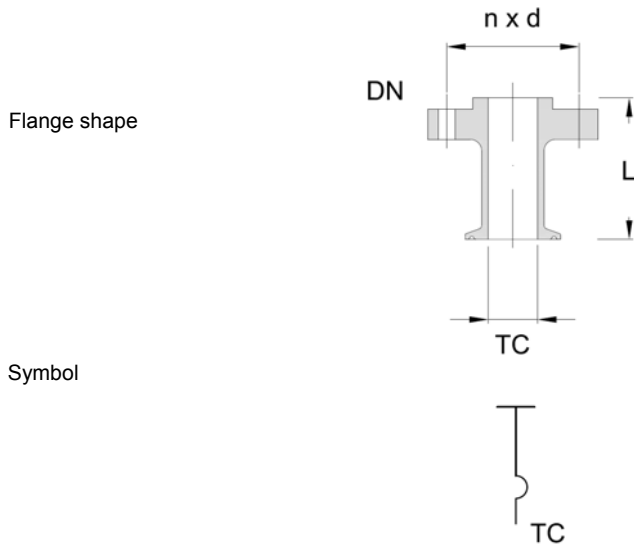
DN	GL	L [mm]	L1 [mm]	L2 [mm]	Tube adaptor, straight		Tube adaptor, 90° angled	
					Item no. KF system	Item no. KF system	Item no. KF system	Item no. KF system
15	GL18	110	60	60	PA 15/GL18-K	PA 90/15/GL18-K		
15	GL25	70	60	80	PA 15/GL25-K	PA 90/15/GL25-K		
25	GL18	90	60	80	PA 25/GL18-K	PA 90/25/GL18-K		
25	GL25	110	70	80	PA 25/GL25-K	PA 90/25/GL25-K		
40	GL18	90	60	80	PA 40/GL18-K	PA 90/40/GL18-K		
40	GL25	110	70	80	PA 40/GL25-K	PA 90/40/GL25-K		

ADAPTORS WITH TRICLAMP PTFE CONNECTION

Adaptors with TriClamp connections are manufactured from PTFE.

The adaptor has a flange in accordance with EN 1092-1, PN10 for nominal diameters of 25 and over to connect to the relevant glass flange. A standard sealing gasket and CAPG...-K transition coupling are therefore necessary to form a joint with the PF glass flange.

In order to form joints with the TriClamp flange stainless steel clamp rings and the relevant TriClamp sealing gasket – made out of FEP with a viton core – can also be delivered. For more information on this you can contact our specialist department.



PA../TC.. TriClamp connections for grooved flange system (KF)

Product name:

TC adaptor, straight:

TC adaptor, straight, conducts electricity:

Item no.

PA DN/TC..

PA DN/TC..-M2

Example

PA 25/TC25

PA 25/TC25-M2

DN	□TC	L [mm]	n x d [mm]	TC-adaptor, straight ¹⁾ Item number
15	TC15	75	□50, 3 x □7	PA 15/TC15
25	TC25	75	□85, 4 x □9	PA 25/TC25
40	TC40	75	□110, 4 x □9	PA 40/TC40
50	TC50	75	□125, 4 x □9	PA 50/TC50



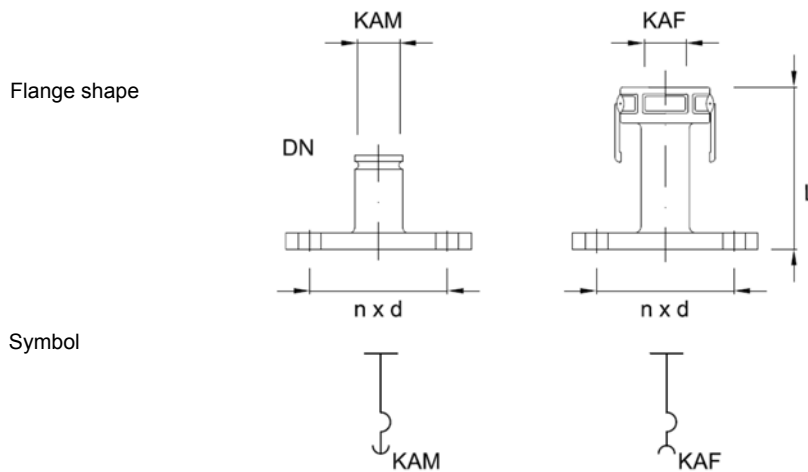
1) A CAPG...-K type transition coupling is needed to connect the adaptor to the KF system on the glass side for nominal diameters of 25 and over

ADAPTORS WITH KAMLOK CONNECTION, LINED WITH ETFE

Standard adaptors with KAMLOK connection are designed with an ETFE lining.

The adaptor has a flange connection in accordance with EN 1092-1, PN10 so that a standard sealing gasket and transition coupling are all that are needed to form a joint with the glass flange.

The KAMLOK adaptor connection is available as an adaptor connection (M) and as a fitting (F). The KAMLOK connection can also optionally be ordered with a blind cap and chain (option -O2).



PA../KAM...-P and PA../KAF...-P KAMLOK connections for flat safety flange (PF)

Product name:	Item no.	Example
KAMLOK adaptor, straight, adaptor:	PA DN/KAM..	PA 25/KAM25
KAMLOK adaptor, straight, fitting:	PA DN/KAF..	PA 25/KAF25
KAMLOK adaptor, fitting, conductive:	PA DN/KAF...-M2	PA 25/KAF25-M2
KAMLOK adaptor, fitting, conductive, with FDA certificate:	PA DN/KAF...-M2-Z1	PA 25/KAF25-M2-Z1

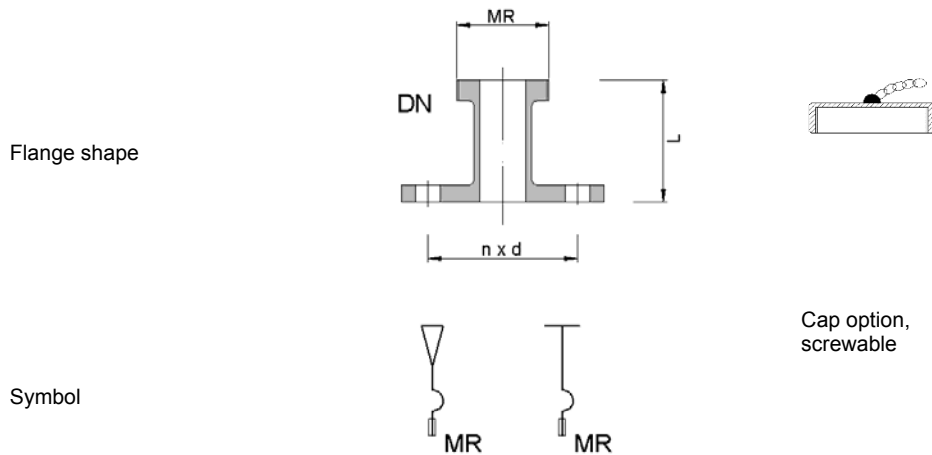
KAMLOK adaptor, straight ¹⁾				
DN	□KA	L [mm]	n x d [mm]	Item number
25	KA 1"	75	□85, 4 x □9	PA 25/KAM25 PA 25/KAF25
40	KA 1 ½"	75	□110, 4 x □9	PA 40/KAM40 PA 40/KAF40
50	KA 2"	75	□125, 4 x □9	PA 50/KAM50 PA 50/KAF50

1) A CAPG...-K type transition coupling is needed to connect the adaptor to the KF system on the glass side for nominal diameters of 25 and over

ADAPTORS WITH THREADED MILK PIPE, LINED WITH ETFE

Standard adaptors with threaded milk pipe are available in designs lined with ETFE. The adaptor has a flange connection in accordance with EN 1092-1, PN10 so that a standard sealing gasket and transition coupling are all that are needed to form a joint with the glass flange. The adaptor with threaded milk pipe can also optionally be ordered with a blind cap and chain (option -O2).

When connecting the adaptor to glass structural components it must be ensured that forces are decoupled, particularly those produced when pulling with a milk pipe wrench.



PA../MR...-P milk pipe connections for flat safety flange (PF)

Product name:	Item no.	Example
Milk pipe adaptor, straight:	PA DN/MR..	PA 25/MR25
Milk pipe adaptor, straight, with screw cap:	PA DN/MR...-O2	PA 25/MR25-O2
Milk pipe adaptor, straight, conductive:	PA DN/MR...-M2	PA 25/MR25-M2
Milk pipe adaptor, straight, conductive, with FDA certificate:		PA DN/MR...-M2-Z1 PA 25/MR25-M2-Z1

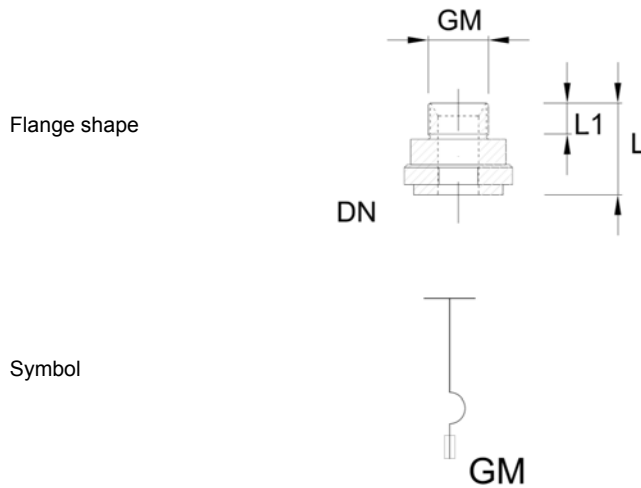
DN	MG	L [mm]	n x d [mm]	milk pipe adaptor, straight ¹⁾ Item no.
25	1"	100	□85, 4 x □14	PA 25/MR25-P
40	1 ½"	100	□110, 4 x □18	PA 40/MR40-P
50	2"	100	□125, 4 x □18	PA 50/MR50-P



1) A CAPG...-K type transition coupling is needed to connect the adaptor to the KF system on the glass side for nominal diameters of 25 and over

ADAPTORS FOR THREADED MEDIA CONNECTIONS, STAINLESS STEEL

Threaded tubes are often used to connect pipelines or tubes with temperature valves in glass structural components. In order to connect the tubes, threaded media adaptors made of stainless steel are available.



PA../GM..-P adaptor for media connections for flat safety flange (PF)

Product name:	Item no.	Example
Media adaptor, straight:	PA DN/GM..-K	PA 25/GM30x1.5-K
Media adaptor, straight, conductive, material certificate:	PA DN/GM..-K-Z2	PA 25/GM30x1.5-K-Z2

				Media adaptor, straight ¹⁾
DN	GM	L	L1	Item no.
-	-	[mm]	[mm]	KF system

Flange shape

25	M30x1,5	45	15	PA 25/GM30x1,5-K
40	M30x1,5	50	15	PA 40/GM30x1,5-K
50	M30x1,5	50	15	PA 50/GM30x1,5-K

1) A CAPG...-K type transition coupling is needed to connect the adaptor to the KF system on the glass side for nominal diameters of 25 and over. In addition, a CFP ...-K clamp ring is needed as a loose flange for the adaptor.

ADAPTOR AND BELLOW OPTIONS

For adaptors and bellows the following options can be chosen in addition to the standard structural components. Each option chosen must be entered at the end of the item number. Several options can be chosen and they are presented as far as possible in alphabetical order. In the following table you will find examples of item numbering for additional options.

Product name:	Item number	Examples
Tube connection, straight, 16 mm diameter:	PA DN/H(D)-K	PA 25/H16-K
Tube connection, straight, with coating:	PP DN/H(D)-K-C1	PP 100/0150-K-C1
Tube connection, straight, with material certificate:	PP DN/H(D)-K-Z2	PP 100/0150-K-Z2
Tube connection, straight, coated, material certificate:	PP DN/H(D)-K-C1-Z2	PP 100/0150-K-C1-Z2

You can choose from the following options:

OPTION C – COATING / GLASS TYPE

The standard component is made of borosilicate glass 3.3 without coating

C1 = coating, non-conductive

C2 = coating, non-conductive, for high temperatures and chemical resistance

C3 = coating, conductive

C4 = amber glass based on borosilicate glass 3.3

C5 = quartz glass

OPTION F – FLANGE TYPE

The standard component is made of borosilicate glass 3.3 with the flange type according to the article code

The following flange connectors can generally be selected for glass structural components

F1 = KF flanges, type KF../1

F2 = KF flanges, type KF../2

F3 = KF flanges, type KF../3

F4 = PF flanges, type PF

F5 = Tube connection 16 mm

F6 = Tube connection 26 mm

F7 = GL-thread GL 18

F7 = GL-thread GL 25

F9 = NS 29/32

F9 = NS 45/40

All other combinations of the flange types F1 to F4 can be added as optional extras.

OPTION L – SPECIAL LENGTHS

The fittings can also be manufactured in special lengths in many cases. Please enter your preferred length according to the list of options and our specialist department will then check if this is possible.

L □□□□ = special length L of fitting in mm, e.g. L0235 for 235 mm length

OPTION M – MATERIAL / PTFE-DESIGN

The standard design is in white PTFE, non-conductive and with no material certificate.

M1 = PTFE conductive

M2 = PTFE conductive with earthing

OPTION O – SPECIAL OPTIONS

The following options are offered for certain structural components.

O1 = stainless steel rings (can only be selected for bellows)

O2 = with blind cap and chain (only for KAMLOK adaptor and threaded milk pipe)

OPTION Z – CERTIFICATES

Standard deliveries do not come with certificates.

The following certificates can optionally be delivered with your order.

Z1 = FDA material certificate¹⁾

Z2 = material certificate 2.2

Z3 = Certificate for Technical Guidelines on Air Quality Control (TA-Luft)

1) FDA material certificates can be delivered for product-side structural components containing PTFE.