

GENERAL INFORMATION

Various adaptors and bellows are used for glass pipelines to form joints with other pipelines or with tubes. Especially for forming joints with fixed pipelines or in certain cases between glass pipes bellows are used to 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 hose adaptors
- 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" 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
- to reduce vibrations in apparatus.

Standard product bellows are delivered for connections 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.

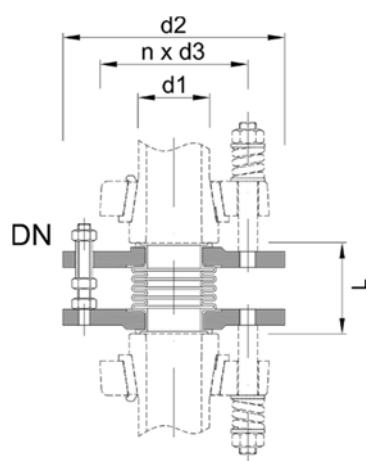
The mounting dimensions and approved flexibility $\pm \Delta L$ of the bellows are set up using bolt stops and spacer bushes. Angular deflections up to a maximum of $\pm 5^\circ$ are permitted. Adaptions to the bellows and the guiding and mounting of glass structural components during assembly should 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.

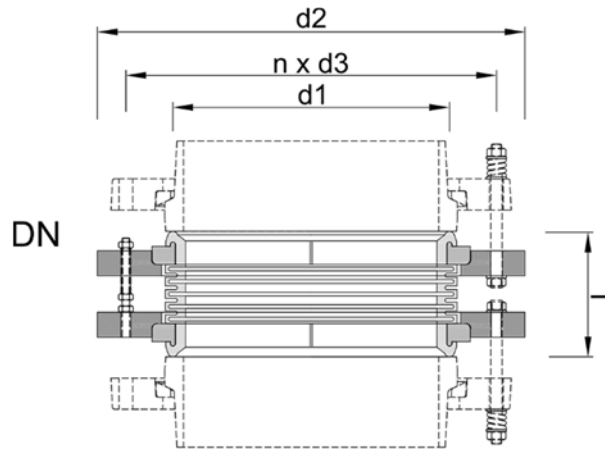
Product name:	Item no.	Example
Bellows, glass-glass, PF system:	CBG....-P	CBG 025-P
Bellows, glass-EN1092-1, PF system:	CBE....-P	CBE 025-P
Bellows, glass-ANSI, PF system:	CBA....-P	CBA 025-P
Bellows, glass-glass, PF system, conductive:	CBG....-P-M2	CBG 025-P-M2
Bellows, glass-glass, PF system, conductive, with FDA:	CBG....-P-M2-Z1	CBG 025-P-M2-Z1

BELLOWS FOR FLANGE CONNECTIONS GLASS-GLASS

Bellows for installing in glass pipelines in the PF system are delivered in accordance with the following representation and table. Type CAPG ...-P 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...-P bellows
for glass-glass (PF) connection,
up to DN 150



CBG...bellows
for glass-glass and glass-EN1092 connection,
DN 200 and over

Product name:

Bellows, glass-glass:

Bellows, glass-glass, stainless steel:

Bellows, glass-glass, bellow PTFE conductive:

Bellows, glass-glass, stainless, PTFE conductive:

Item no.

CBG....-P

CBG....-P-O1

CBG....-P-M2

CBG....-P-M2-O1

Example

CBG 025-P

CBG 025-P-O1

CBG 025-P-M2

CBG 025-P-M2-O1

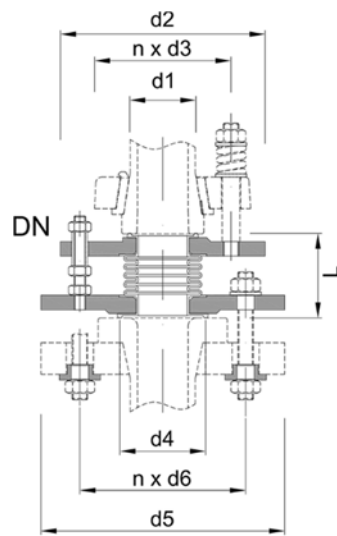
DN	L [mm]	d1 [mm]	d2 [mm]	n x d3 [mm]	Item no.	Item no. Connection coupling
15	35±5	Ø23	Ø80	Ø50, 3 x Ø7	CBG 015-P	CAPB 015-P
25	43±5	Ø34	Ø105	Ø70, 3 x Ø9	CBG 025-P	CAPB 025-P
40	52±5	Ø48	Ø125	Ø86, 3 x Ø9	CBG 040-P	CAPB 040-P
50	50±6	Ø61	Ø140	Ø98, 3 x Ø9	CBG 050-P	CAPB 050-P
80	68±6	Ø88	Ø190	Ø133, 6 x Ø9	CBG 080-P	CAPB 080-P
100	70±6	Ø121	Ø200	Ø178, 6 x Ø9	CBG 100-P	CAPB 100-P
150	73±6	Ø172	Ø280	Ø254, 6 x Ø9	CBG 150-P	CAPB 150-P
200	100±6	Ø220	Ø345	Ø295, 8 x Ø9	CBG 200	CAPB 200
300	100±6	Ø321	Ø460	Ø400, 12 x Ø9	CBG 300	CAPB 300

BELLOWS FOR FLANGE CONNECTIONS GLASS-EN 1092, PN 10

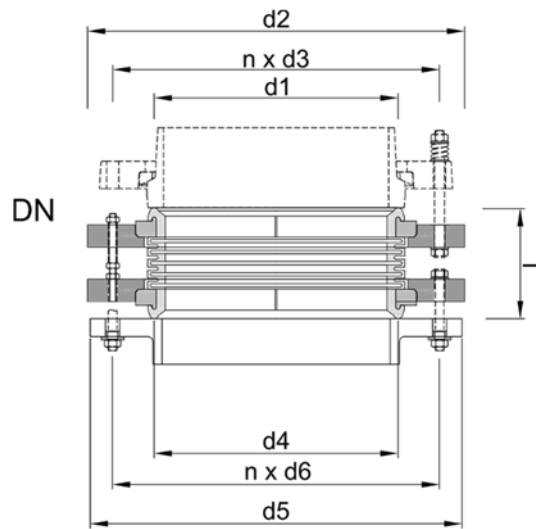
Bellows for connecting glass flanges to flanges in accordance with EN1092-1, PN 10, are available for the PF system in line with the following drawing and table. Reducing sleeves are delivered for the EN flange side of this variant in order to enable the use of the normal bolts for the assembly of glass apparatus and to balance out the bores which are normally larger.

The CB bellows can be used for glass-glass connections in flange transitions in accordance with EN 1092 for nominal diameters of 200 and over.

The contact surface should be paid attention to when connecting to the EN flange and, if needed, a type CGS... steel core gasket should be used to balance out greater sealing surface radii.



CBE...-P bellows
for glass-EN1092 connection
up to DN 150



CBE... bellows
for glass-EN1092 connection,
DN 200 and over

Product name:

Bellows, glass-EN1092:

Bellows, glass-EN1092, SS flanges:

Bellows, glass-EN1092, bellow PTFE conductive:

Bellows, glass-EN1092, SS flanges, PTFE conductive:

Item no.

CBE....-P

CBE....-P-O1

CBE....-P-M2

CBE....-P-M2-O1

Example

CBE 025-P

CBE 025-P-O1

CBE 025-P-M2

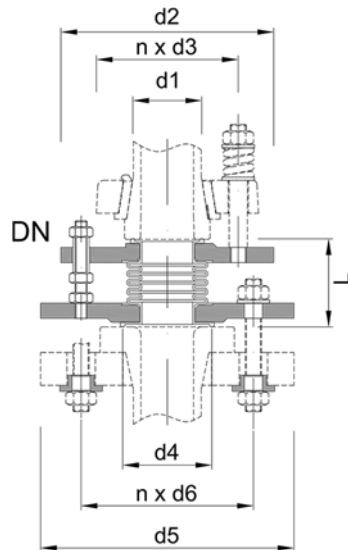
CBE 025-P-M2-O1

DN	L [mm]	d1 [mm]	d4 [mm]	n x d3 [mm]	n x d6 [mm]	d2 [mm]	d5 [mm]	Item no.
15	35±5	∅23	∅28	∅50, 3 x M6	∅65, 4 x ∅7	∅80	∅95	CBE 015-P
25	43±5	∅34	∅44	∅70, 3 x M8	∅85, 4 x ∅9	∅105	∅115	CBE 025-P
40	52±5	∅48	∅58	∅86, 3 x M8	∅110, 4 x ∅9	∅125	∅125	CBE 040-P
50	50±6	∅61	∅71	∅98, 3 x M8	∅125, 4 x ∅9	∅140	∅165	CBE 050-P
80	68±6	∅88	∅100	∅133, 6 x M8	∅160, 8 x ∅9	∅190	∅190	CBE 080-P
100	70±6	∅121	∅128	∅178, 6 x M8	∅180, 8 x ∅9	∅200	∅220	CBE 100-P
150	73±6	∅172	∅178	∅254, 6 x M8	∅240, 8 x ∅9	∅280	∅285	CBE 150-P
200	100±6	∅220	∅220	∅295, 8 x ∅9	∅295, 8 x ∅9	∅345	∅345	CBE 200
300	100±6	∅321	∅321	∅400, 12 x ∅9	∅400, 12 x ∅9	∅460	∅460	CBE 300

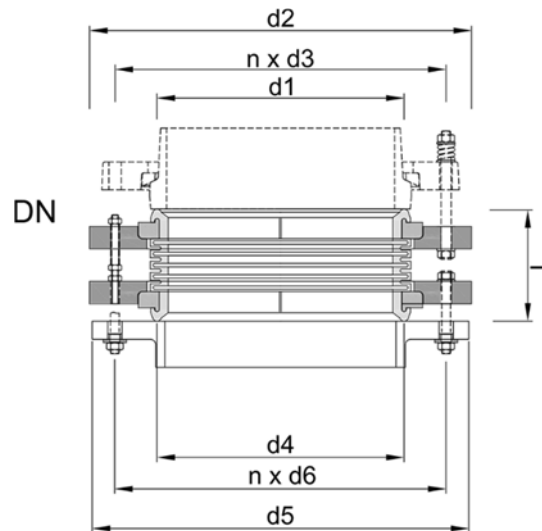
BELLOWS FOR FLANGE CONNECTIONS GLASS-ANSI 150 PSI

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 paid attention to when connecting to the ANSI flange and, if needed, a type CGS... steel core gasket should be used to balance out greater sealing surface radii.



Type CBA...-P bellows for glass-ANSI connection, up to DN 150



CBA...bellows for glass-ANSI connection, DN 200 and over

Product name:

Bellows, glass-ANSI:

Bellows, glass-ANSI, SS flanges:

Bellows, glass-ANSI, bellow PTFE conductive:

Bellows, glass-ANSI, SS flanges, PTFE conductive:

Item no.

CBA....-P

CBA....-P-O1

CBA....-P-M2

CBA....-P-M2-O1

Example

CBA 025-P

CBA 025-P-O1

CBA 025-P-M2

CBA 025-P-M2-O1

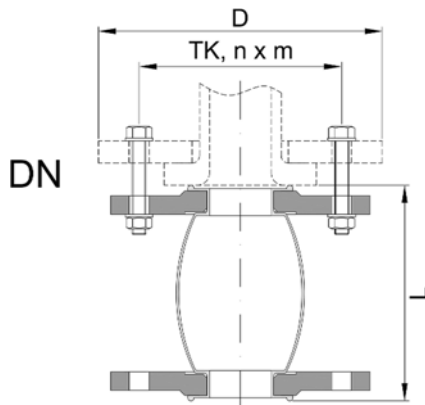
DN	L [mm]	d1 [mm]	d4 [mm]	n x d3	n x d6 [mm]	d2 [mm]	d5 [mm]	Item no.
15	35±5	∅23	∅28	∅50, 3 x ∅7	∅60, 3 x ∅7	∅80	∅95	CBA 015-P
25	43±5	∅34	∅44	∅70, 3 x ∅9	∅79, 3 x ∅9	∅105	∅115	CBA 025-P
40	52±5	∅48	∅58	∅86, 3 x ∅9	∅98, 3 x ∅9	∅125	∅125	CBA 040-P
50	50±6	∅61	∅71	∅98, 3 x ∅9	∅121, 3 x ∅9	∅140	∅165	CBA 050-P
80	68±6	∅88	∅100	∅133, 6 x ∅9	∅152, 3 x ∅9	∅190	∅190	CBA 080-P
100	70±6	∅121	∅128	∅178, 6 x ∅9	∅190, 3 x ∅9	∅200	∅220	CBA 100-P
150	73±6	∅172	∅178	∅254, 6 x ∅9	∅241, 3 x ∅9	∅280	∅280	CBA 150-P
200	100±6	∅220	∅231	∅295, 8 x ∅9	∅298, 3 x ∅9	∅345	∅345	CBA 200
300	100±6	∅321	∅335	∅400, 12 x ∅9	∅432, 3 x ∅9	∅460	∅460	CBA 300

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

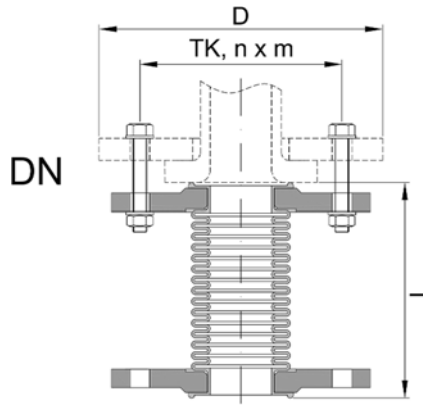
Bellows for connecting media pipelines (steam, condensation, heat transfer media, coolants) to stainless steel flanges are designed with two-sided connections to EN1092-1 flanges up to DN 150.

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

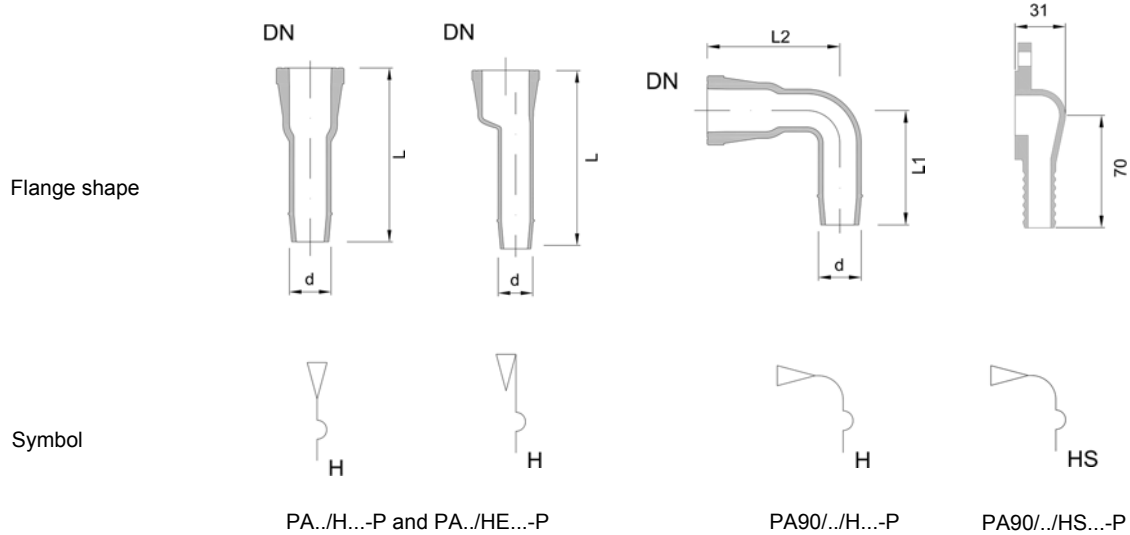
CBM 025

CBM 025-O1

DN	L [mm]	D [mm]	TK [mm]	n x M [mm]	Item no. Steel/galv./elastomer	L [mm]	Item no. Stainless steel
15		Ø95	Ø65	4 x Ø14		108±8,5	CBM 015-O1
25	100+20/-10	Ø115	Ø85	4 x Ø14	CBM 025	125±13	CBM 025-O1
40	125+35/-10	Ø150	Ø110	4 x Ø18	CBM 040	135±15	CBM 040-O1
50	125+35/-10	Ø165	Ø125	4 x Ø18	CBM 050	155±18	CBM 050-O1
80	150+40/-10	Ø200	Ø160	8 x Ø20	CBM 080	175±23	CBM 080-O1
100	150+40/-10	Ø220	Ø180	8 x Ø20	CBM 100	180±23	CBM 100-O1
150	150+40/-10	Ø285	Ø240	8 x Ø22	CBM 150	230±25	CBM 150-O1

ADAPTORS WITH HOSE CONNECTION

Hose adaptors are used for draining or to connect attachable hoses. Hose adaptors are available in straight, eccentric and 90° designs for various hose inside diameters. 90 ° hose adaptors are also available in a stainless steel version.



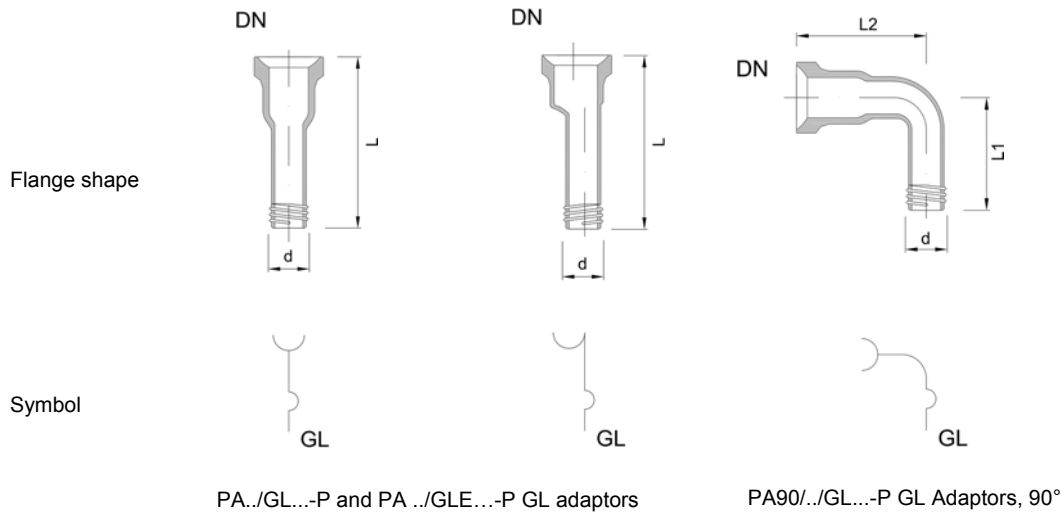
When using hose adaptors it should be ensured that no unapproved turning moment occurs due to the hose adaptor (i.e. due to the mounting of the hoses) and the hoses are fitted with a clamp to the glass adaptor.

Product name:	Item no.	Example
Hose adaptor, glass, straight, PF system:	PA DN/H...-P	PA 25/H16-P
Hose adaptor, glass, eccentric, PF system:	PA DN/HE...-P	PA 25/HE16-P
Hose adaptor, glass, 90°, PF system:	PA 90/DN/H...-P	PA 90/25/H16-P
Hose adaptor, stainless steel, 90°, PF system:	PA 90/DN/HS...-P	PA 90/25/HS20-P

DN	Ød	L	L1	L2	straight	eccentric	90° angled	stainless steel
					Hose adaptors	Hose adaptors	Hose adaptors	Hose adaptors
-	-	[mm]	[mm]	[mm]	Item no.	Item no.	Item no.	Item no.
15	16	110	60	60	PA 15/H16-K	PA 15/HE16-K	PA 90/15/H16-K	-
15	20	70	60	60	PA 15/H20-K	-	PA 90/15/H20-K	-
25	16	90	60	80	PA 25/H16-K	PA 25/HE16-K	-	-
25	20	90	60	80	PA 25/H20-K	PA 25/HE20-K	PA 90/25/H20-K	PA 90/25/HS20-K
25	26	110	70	80	PA 25/H26-K	-	PA 90/25/H26-K	-
40	26	100			PA 40/H26-K	PA 40/HE26-K	-	-
40	42	110			PA 40/H42-K	-	-	-

ADAPTORS WITH GL THREAD

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



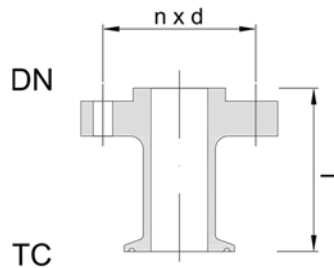
When connecting to GL thread adaptors it should be ensured that no unapproved bending moment occurs.

Product name:	Item no.	Example
GL adaptor, straight, PF system:	PA DN/GL...-P	PA 25/GL18-P
GL-Adapter, eccentric, PF system:	PA DN/GLE...-P	PA 25/GLE18-P
GL adaptor, 90°, PF system:	PA 90/DN/GL...-P	PA 90/25/GL18-P

DN	ØGL	L	L1	L2	Item no. GL adaptors straight	Item no. GL adaptors eccentric	Item no. GL adaptors 90° angled
-	-	[mm]	[mm]	[mm]			
15	GL18	70	60	60	PA 15/GL18-P	PA 15/GLE18-P	PA 90/15/GL18-P
15	GL25	110	60	80	PA 15/GL25-P	-	PA 90/15/GL25-P
25	GL18	90	60	80	PA 25/GL18-P	PA 25/GLE18-P	PA 90/25/GL18-P
25	GL25	110	70	80	PA 25/GL25-P	-	PA 90/25/GL25-P
40	GL18	90	60	80	PA 40/GL18-P	PA 40/GLE18-P	PA 90/40/GL18-P
40	GL25	110	70	80	PA 40/GL25-P	-	PA 90/40/GL25-P

ADAPTORS WITH TRICLAMP-PTFE CONNECTION

Adaptors with TriClamp connections according DIN 32676 are manufactured from PTFE.
 For connection to the glass flange, the adaptor has the pitch circle diameter of the standard flange connection.
 A standard sealing gasket type CGR... is 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 you can contact our specialist department.



PA../TC../P TriClamp connection

Product name:	Item no.	Example
TC adaptor, straight:	PA DN/TC../P	PA 25/TC25-P
TC adaptor, straight, conductive:	PA DN/TC../P-M1	PA 25/TC25-P-M1

DN	TC	L [mm]	n x d [mm]	Item no. TC-adaptor ¹⁾
15	TC15	75	∅50, 3 x ∅7	PA 15/TC15-P
25	TC25	75	∅85, 4 x ∅9	PA 25/TC25-P
40	TC40	75	∅110, 4 x ∅9	PA 40/TC40-P
50	TC50	75	∅125, 4 x ∅9	PA 50/TC50-P

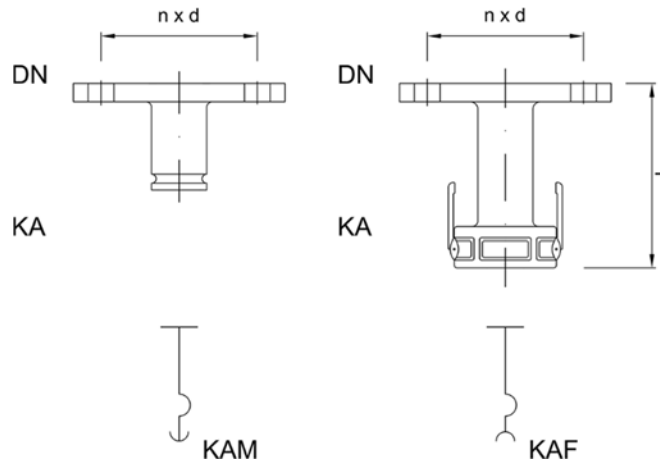


ADAPTORS WITH KAMLOK CONNECTION, LINED WITH ETFE

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 CGR and transition coupling CAPE 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.. and PA../KAF.. KAMLOK connections

Product name:	Item no.	Example
KAMLOK adaptor, straight, adaptor:	PA DN/KAM..	PA 25/KAM25
KAMLOK adaptor, straight, fitting:	PA DN/KAM..	PA 25/KAM25
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

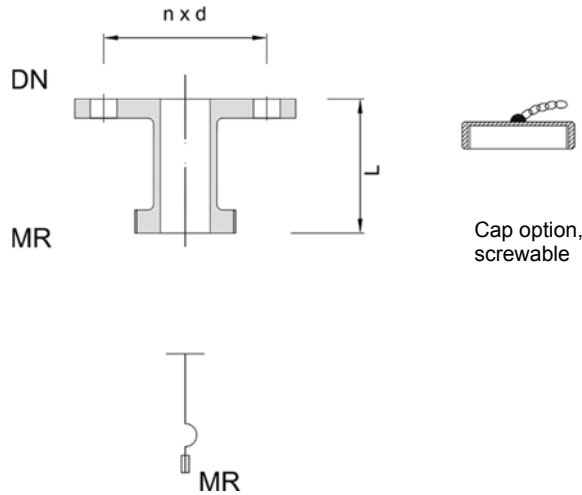
DN	KA	L [mm]	n x d [mm]	Item no. KAMLOK adaptor, male ¹⁾	Item no. KAMLOK adaptor, female ¹⁾
25	1"	75	Ø85, 4 x Ø9	PA 25/KAM25	PA 25/KAF25
40	1 ½"	75	Ø110, 4 x Ø9	PA 40/KAM40	PA 40/KAF40
50	2"	75	Ø125, 4 x Ø9	PA 50/KAM50	PA 50/KAF50

1) A CAPE...-P type transition coupling is needed to connect the adaptor to the PF system on the glass side

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.. milk pipe connection

Product name:

Milk pipe adaptor, straight:

Milk pipe adaptor, straight, with screw cap:

Milk pipe adaptor, straight, conductive:

Milk pipe adaptor, straight, conductive, with FDA cert.:

Item no.

PA DN/MR..

PA DN/MR..-O2

PA DN/MR..-M2

PA DN/MR..-M2-Z1

Example

PA 25/MR25

PA 25/MR25-O2

PA 25/MR25-M2

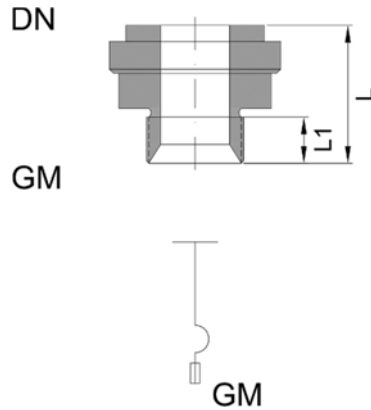
PA 25/MR25-M2-Z1

DN	MR	L [mm]	n x d [mm]	Item no. Milk pipe adaptor ¹⁾
25	1"	100	Ø85, 4 x Ø14	PA 25/MR25
40	1 ½"	100	Ø110, 4 x Ø18	PA 40/MR40
50	2"	100	Ø125, 4 x Ø18	PA 50/MR50

1) A CAPE...-P type transition coupling is needed to connect the adaptors to the PF system on the glass side.

ADAPTORS FOR THREADED MEDIA CONNECTIONS, STAINLESS STEEL

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



PA../GM.. adaptors for media connections

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

DN	GM	L	L1	Item no.
-	-	[mm]	[mm]	Media adaptor ¹⁾
25	M30x1,5	45	15	PA 25/GM30x1,5
40	M30x1,5	50	15	PA 40/GM30x1,5
50	M30x1,5	50	15	PA 50/GM30x1,5



1) A CAPE...-P type transition coupling is needed to connect the adaptors to the PF system and a CFP ...-K clamp ring is needed for the adaptor itself.

ADAPTOR AND BELLOWS 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
Hose adaptor, straight, 16 mm diameter:	PA DN/H(D)-P	PA 25/H16-P
Hose adaptor, straight, with coating:	PA DN/H(D)-P-C1	PA 25/H16-P-C1
Hose adaptor, straight, with material certificate:	PA DN/H(D)-P-Z2	PA 25/H16-P-Z2
Hose adaptor, straight, coated, material certificate:	PA DN/H(D)-P-C1-Z2	PA 25/H16-P-C1-Z2

The following options can be selected:

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 = Hose adaptor 16 mm

F6 = Hose adaptor 26 mm

F7 = GL-thread GL 18

F8 = 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.