



Column Components

Introduction

Like their pipeline counterparts, borosilicate glass column components find universal application throughout the world's chemical, pharmaceutical, food and drink and allied industries where the advantages of using glass as a basis for the construction of complete process systems has long been recognised:

- With almost universal resistance to corrosion, a long service life is guaranteed and maintenance is kept to a minimum.
- Their transparency permits constant visual monitoring of the process at all times.
- Being inert, the risk of contamination is negligible.
- Smooth surfaces allow easy cleaning and sterilization and prevent the build-up of solids on the inner walls.

In many unit operations such as reaction, extraction and absorption, the transparency factor of glass column components is a particular advantage. As an example, colour changes in reaction processes are easily monitored, droplet separation in extraction processes can be observed unhindered and constant visual monitoring of hydraulic performance in packed columns is possible.

Column components are available from DN 80 to DN 1000 with a smaller range of precision bore components available from DN 25 to DN 150 for specific applications where close internal tolerances are essential.

The complete range of column components is described on the following pages. All column components have standard flat buttress end connections. Further details of these are provided in Section 1 – *Technical Information*.

For standard flat buttress end connections from DN 15 to DN 150, it is possible to achieve a 3° deflection in the joint by using a flexible gasket. Details of these and all other couplings and gaskets can be found in Section 9 – *Couplings*.

DN refers to the nominal bore. Unless otherwise stated, all dimensions are given in mm.

For permissible operating conditions, **unless otherwise stated in the individual descriptions**, please see Section 1 – *Technical Information*.

The majority of column components can be either CORWRAPPED or CORCOATED and these are identified by a bold blue line at the foot of each appropriate page. Full details of both CORWRAP and CORCOAT can be found in Section 1 – *Technical Information*. For CORWRAP items, add a suffix **C** to the standard catalogue reference. For CORCOAT items, add a suffix **L**. Therefore a CS 6/1000 becomes a CS 6/1000C or a CS6/1000L respectively.

For details of supporting equipment, please see Section 10 – *Structures*.

Column Components

Application of Internals Continued

In plate columns the boundary surface for mass transfer is created by the liquid phase flowing across the trays being penetrated by the gas or vapour rising from the plate below. The main distinctions here are between bubble cap trays and sieve trays. Plate columns have higher pressure drops than packed columns. To illustrate this, **Figure 3** on the previous page shows the pressure drop of the Bayer low-rise tray. The pressure drop of a tray is about the same as for 1 metre packing of 25mm ceramic saddles.

The suitability of internals to a particular process is really determined by the process conditions in each case. If a low pressure drop is required, then structured packings are the main ones to choose. In all other cases the permissible operating range of the various internals for a particular application is the determining factor. Packed and plate columns have different operating ranges as a result of the different type of boundary surface creation. The term 'operating range' here refers to the range of gas and liquid flows within which problem-free operation of the column is possible.

Figure 4 shows typical load characteristics of a packed column with the operating range shaded. This is mainly limited by the so-called upper load limit, designated by 'flooding', against higher flows. The lower load limit designated by minimum wetting stems from the requirements that the packing has to have an even film of liquid to achieve the desired separation. It can also be seen from **Figure 4** that it is possible to vary the gas throughput over a wide range. In individual cases, however, the achievable separation effect should be checked.

Plate columns have different operating characteristics. As the load characteristics in **Figure 5** show, several factors limiting the operating range have to be taken into consideration with this design. It must be emphasised in particular that turndown of the liquid load is much greater for the plate column.

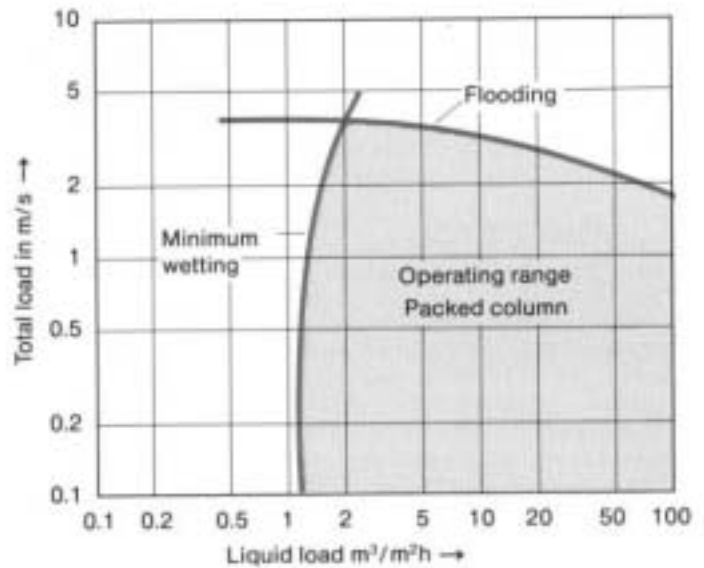


Figure 4 – Operating range of packed columns with 50 mm metal pall rings – see reference³.

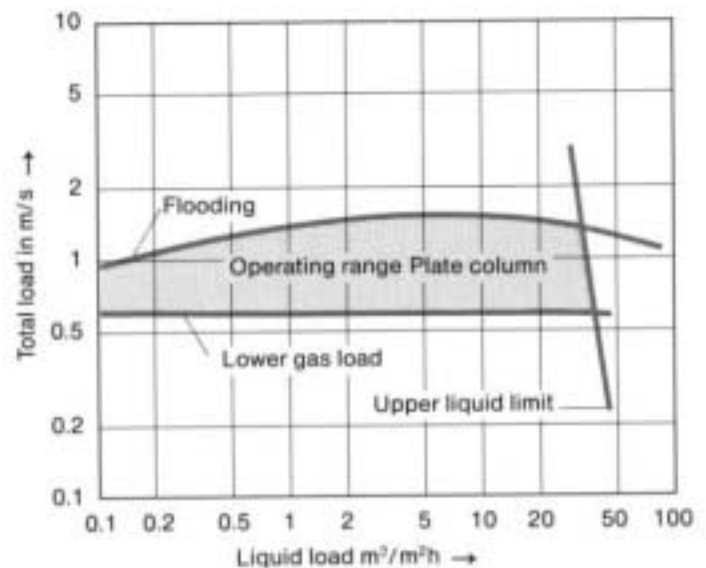


Figure 5 – Operating range of plate columns – see reference⁴.

References

³Molzahn, M., Schmidt, R.: Verfahrenstechnik 9 (1975) 388/395.

⁴Stichlmair, J.: Grundlagen der Dimensionierung des Gas/Flüssigkeitskontaktapparates Bodenkolonne. (Basic dimensioning principles for gas/liquid contact apparatus, plate column).

Verlag Chemie, Weinheim, New York, 1978.

Applications of Internals

Columns used for rectification, absorption and extraction processes can be fitted with many different internals such as packed beds, structured packing and sieve or bubble-cap trays. The typical operating characteristics, as well as the recommended and possible areas of application for each of these internals, are detailed in this section; the processes being limited to gas/liquid operations in the form of rectification and absorption processes.

Packed beds or structured packing are used to create the surface required for mass transfer by increasing the area of contact at the surface of the liquid when it flows over the internals as a film. Irregular packed beds have a relatively high pressure drop. **Figure 1** shows the pressure drop for ceramic saddles¹. A very significant reduction in pressure drop, particularly in regard to vacuum rectification, can be achieved by the introduction of structured packing. **Figure 2**, for example shows the pressure drop values for SULZER-KERAPAK². A clear reduction in pressure drop is discernible here.

References

¹Catalogue information provided by Vereinigte Füllkörperfabriken, Ransbach-Baumbach.

²Catalogue information from Gebr. Sulzer AG, Winterthur.

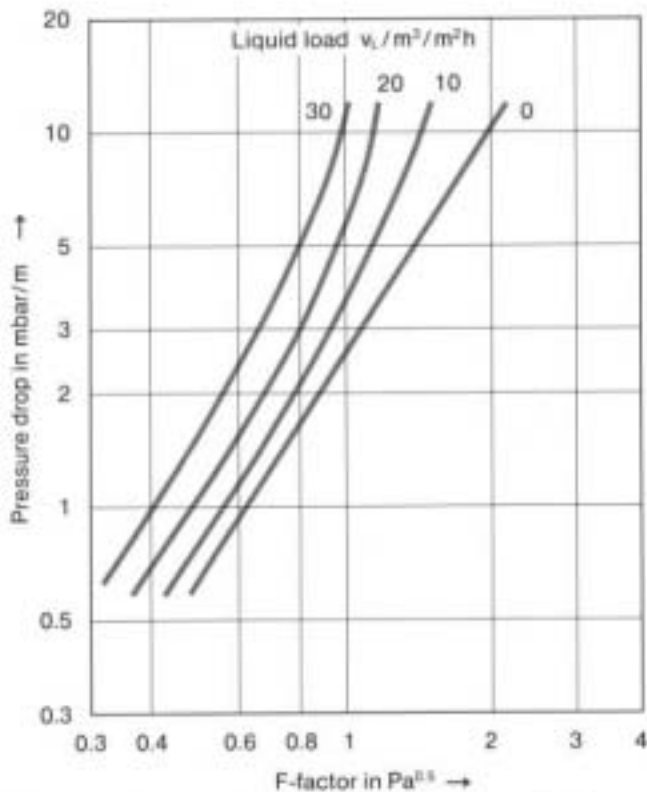


Figure 1 – Pressure drop using 25mm ceramic saddles¹.

F factor (gas load) = $W_0 \sqrt{P_g}$ where
 W_0 is the superficial gas velocity (m/s)
 P_g is the gas density (kg/m³)

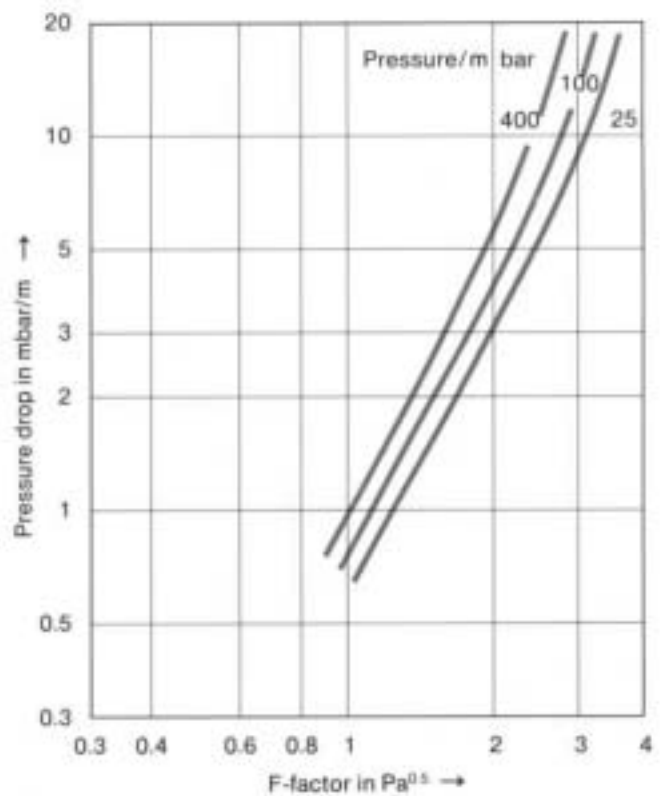


Figure 2 – Pressure drop using SULZER-KERAPAK².

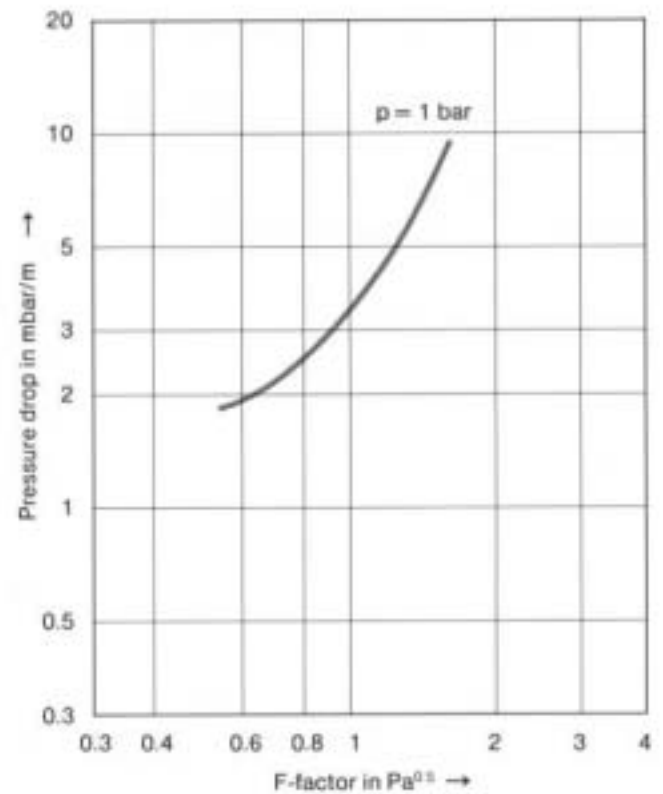


Figure 3 – Pressure drop of a Bayer low-rise plate without chimney, 50mm in diameter and with 21 slots, 16mm x 3mm.

Column Sections

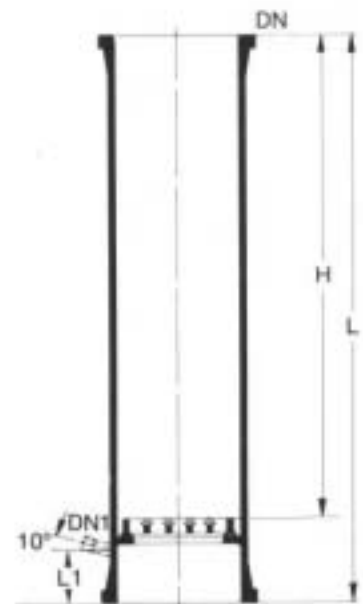
For building glass columns from DN 80 to DN 300, it is possible to use type **CS** or **CST** column sections with integral packing support shelf or type **PS** pipe sections (see Section 2 – *Pipeline Components*) in combination with support plates on page 6.4. From DN 450, only column sections are available and these have an integral support shelf.

All column sections are supplied complete with support. The packings must be ordered separately. On special request, a column section can be supplied without the packing support.

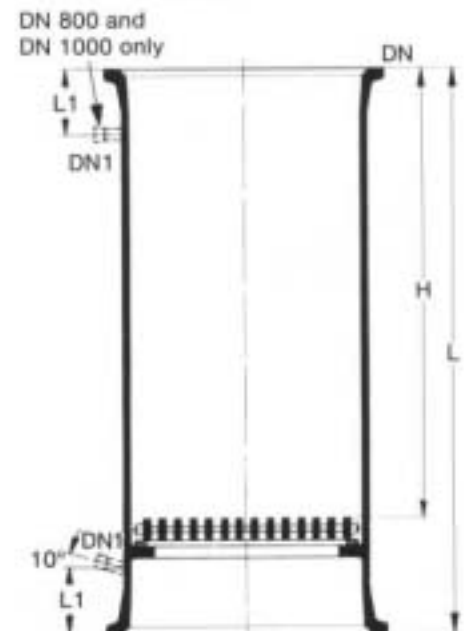
Column sections and pipe sections may be used for the construction of columns of all nominal bores provided that the weight of the packing and retained liquid does not exceed the load-bearing capacity of the support (see page 6.4).

For special column sections suitable for installing distribution plates, see page 6.10. For jacketed column sections, see page 6.16.

The design of the support requires the use of a minimum size of packing. For columns from DN 450 to DN 1000 this is achieved by placing two layers of larger raschig rings on top of the support. This packing must be ordered separately.



DN 80 to DN 300



DN 450 to DN 1000

DN	DN1	L	H	H ¹	L1	Catalogue reference	Catalogue ¹ reference
80	25	1000	900	850	80	CS 3/1000	CST 3/1000
100	25	1000	880	850	85	CS 4/1000	CST 4/1000
150	25	1000	845	845	100	CS 6/1000	CST 6/1000
225	25	1000	845	845	100	CS 9/1000	CST 9/1000
225	25	1500	1345	1345	100	CS 9/1500	CST 9/1500
300	25	1000	840	840	100	CS 12/1000	CST 12/1000
300	25	1500	1340	1340	100	CS 12/1500	CST 12/1500
450	25	1000	800	745	140	CS 450/1000	CST 450/1000
450	25	1500	1300	1245	140	CS 450/1500	CST 450/1500
600	25	1500	1245	1220	140	CS 600/1500	CST 600/1500
800	50	1500	1170	1170	250 ²	CS 800/1500	CST 800/1500
1000	50	1500	1150	1150	250 ²	CS 1000/1500	CST 1000/1500

¹Column section with thermometer branch

²For production reasons this thermometer branch cannot be positioned below the packing support.

DN ¹	Free cross-section			Packing		Packing on support		
	Column section (%)	Support LB/HD ² (%)	Support plate LBE ² (%)	Volume (l/m)	Minimum packing size (mm)	Stacked (l)	Random Packed (l)	Size
80	65	45	70	5	8	–	–	–
100	60	45	70	9	10	–	–	–
150	50	50	70	19	15	–	–	–
225	65	50	80	40	20	–	–	–
300	70	60	80	75	25	–	–	–
450	70	70	–	165	25	8	16	FC 50
600	75	70	–	295	40	28	–	FC 50
800	75	70	–	565	40	50	–	FC 50
1000	75	70	–	835	50	80	–	FC 50

¹Nominal bore of column

²For further details see page 6.4

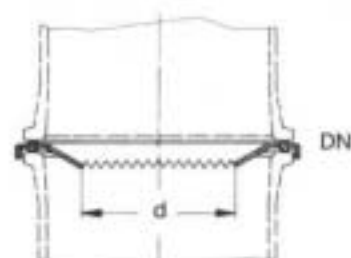
For CORWRAP items, add a suffix C to the standard catalogue reference. For CORCOAT items, add a suffix L.

PTFE Redistributors

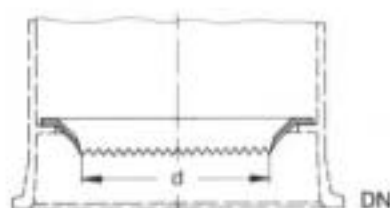
Type A PTFE redistributors are installed in the same way as gaskets between two flat buttress end faces and therefore when using them, no gasket is required. Type B redistributors are fitted on the column packing support shelf.

DN ¹	d	Type	Catalogue reference
40	28	A	TL 1.5
50	35	A	TL 2
80	55	A	TL 3
100	70	A	TL 4
150	105	A	TL 6
225	140	A	TL 9
300	200	A	TL 12
450	315	A	TL 450
600	420	A	TL 600 A
800	600	B	TL 800
1000	800	B	TL 1000

¹ DN is the nominal bore of the column



Type A



Type B

Packing Retainers

Packing retainers are installed above packed column sections to prevent any carry-over of column packing. They are installed in the same way as gaskets between two flat buttress end faces and therefore no gasket is required.

Packing retainers are manufactured from PTFE and tantalum for maximum resistance to corrosion. They cannot be used as packing supports.



DN ¹	L	Free cross-section (%)	Catalogue reference
80	5	80	CPC 3
100	5	90	CPC 4
150	7	90	CPC 6
225	7	95	CPC 9
300	4	85	CPC 12
450	4	90	CPC 450
600	5	95	CPC 600 A
800	7	95	CPC 800
1000	7	90	CPC 1000

¹ DN is the nominal bore of the column

Column Components

Column Sections with Plates

In the introduction to this section, it is noted that plate columns have many advantages for processes operating under normal pressure, especially if there is a low liquid load. This occurs mainly with rectifications with a low reflux ratio in the enriching section. However, this condition can also occur in the case of absorption where there is a high proportion of inert gas present and the product concentration required demands a low liquid flow, for example HCl absorption.

Column Sections with Stainless Steel Bubble-Cap Plates

While large-bore bubble-cap plates with a large number of bubble caps have been established for some time in production plants, smaller columns with only one bubble cap are a more recent innovation.

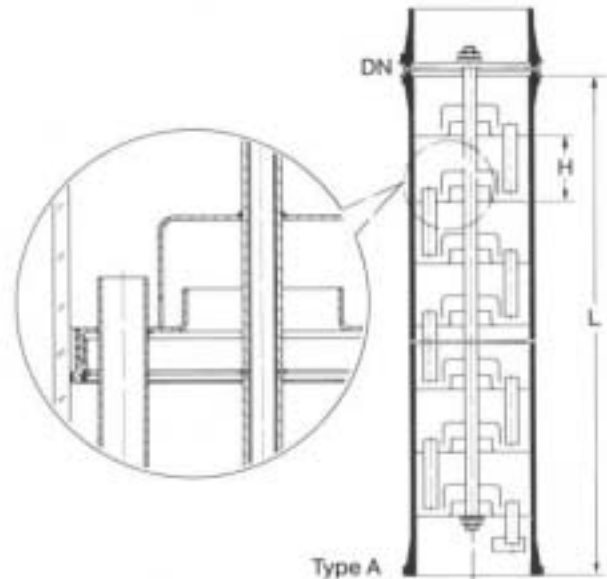
Through extensive research and development work, QVF has introduced a single bubble-cap design in a range of glass columns from DN 80 to DN 225 which offer several distinct advantages:

- high vapour and liquid loading capacity
- wide operating range
- small tray spacing
- consistently high level of efficiency

To achieve these advantages, QVF offers various plate designs. Our bubble-cap plate range with stainless steel internals includes plates with a single bubble-cap and also concentric double bubble-caps plates.

All of the standard bubble-cap plate designs are completely pre-assembled and integrally fitted into the glass columns so that their performance can be visually monitored at all times. The seal between the bubble-cap plates and the column is made with PTFE seals.

QVF offers two types of plate column. Bubble-cap columns are available up to DN 225 with internals manufactured from stainless steel and positioned in the glass section. For more highly corrosive applications, glass/PTFE versions are available from DN 150 to DN 600 where the plates can consist of sieve plates or bubble cap plates.



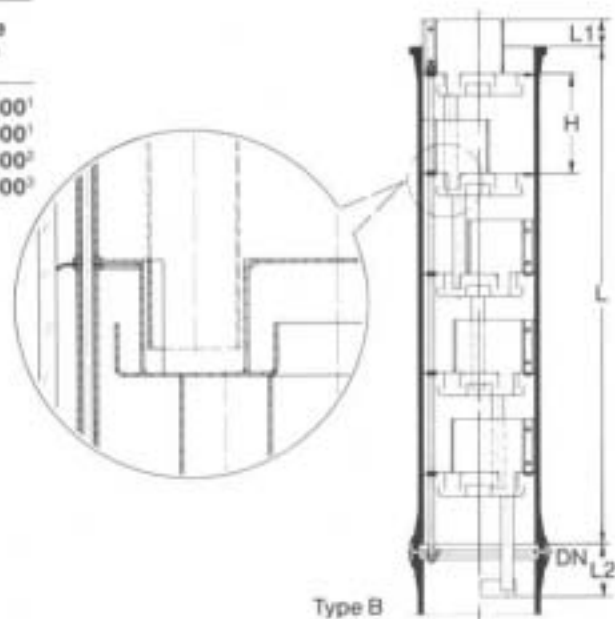
Type A

DN	L	L1	L2	H	Number of trays	Number of bubble-caps per plate	Type	Catalogue reference
80	1000	—	—	80	11	1	A	CSG 3/1000 ¹
100	1000	—	—	110	9	1	A	CSG 4/1000 ¹
150	1000	—	—	200	5	1	A	CSG 6/1000 ²
225	1000	50	35	200	5	2	B	CSG 9/1000 ³

¹With kidney-shaped single bubble-caps

²With circular single bubble-caps

³With concentric double bubble-caps



Type B

For CORWRAP items, add a suffix C to the standard catalogue reference. For CORCOAT items, add a suffix L.

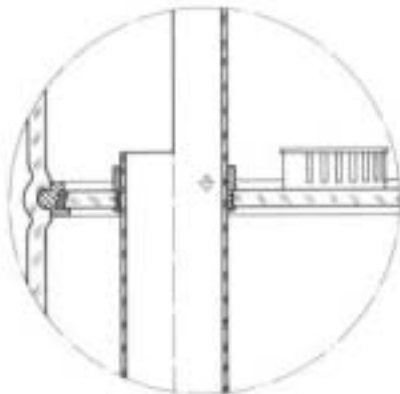
Column Sections with Glass Plates

QVF plate columns are unique in the way in which the plate is fixed into the column. The diagram below shows how this is achieved. A groove is rolled into the glass section and the glass plate is fixed in that groove by means of a PTFE ring. The fabrication process achieves a close dimensional tolerance and the glass plate and the PTFE ring are designed in such a way that an inter-locking fixing method is achieved.

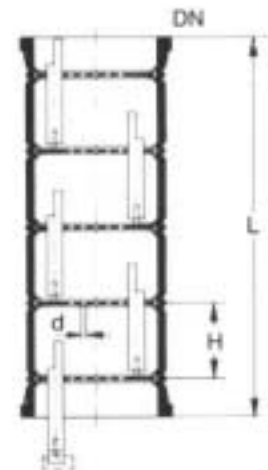
Standard plates are made of glass, but other options are possible.

For smaller nominal bores – DN 150 and DN 225 – we use sieve plates. For larger nominal bores, bubble-cap plates with PTFE or glass bubbles are more cost-effective. The Bayer bubble-cap, a thoroughly tried and tested design which generally does not have a riser and has very low pressure drop, is the one we prefer to use. Glass pipes are used as downcomers, with a diameter selected for the liquid loading for the particular application.

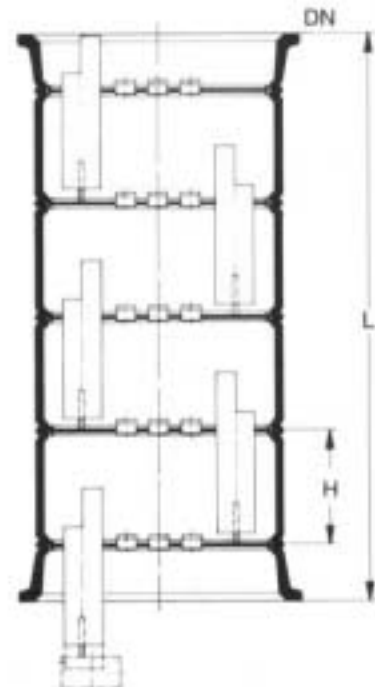
For scrubbers which are downstream from batch processes, bubble-caps with risers can be supplied. This ensures that the scrubbing liquid is retained on the plates when vapour flow is halted for a short period. However, a greater pressure drop is required for this type.



Sealing of the glass plates in the column section



Type A



Type B

DN	L	H	Number of plates	Relative free cross-section (%)	Number of bubble-caps per tray	Type	Catalogue ¹ reference
150	1000	200	5	5.2	—	A	BC 6/1000
225	1000	200	5	7.5	—	A	BC 9/1000
300	1000	250	4	7	5	B ²	BC 12/1000
450	1500	300	5	8.2	13	B	BC 450/1500
600	1500	375	4	8.5	24	B	BC 600/1500

¹The column section at the base of the column needs a different downcomer arrangement and should be specified by adding a suffix **A** to the catalogue reference. Therefore a BC 6/1000 becomes a BCA 6/1000.

²Buttress end as for type A.

For CORWRAP items, add a suffix C to the standard catalogue reference. For CORCOAT items, add a suffix L.

Column Components

Column Feed Pipes

Column feed pipes are designed for applications in which there is need to introduce the process liquid at a single point. They are usually installed via a type **PTU** unequal tee piece (see section 2 of this catalogue – *Pipeline Components*) and have a fused-in distribution tube which directs the fluid down onto the centre of the column packing.

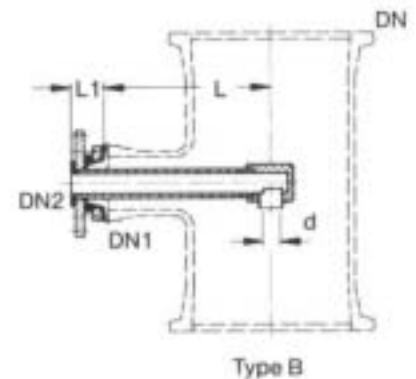
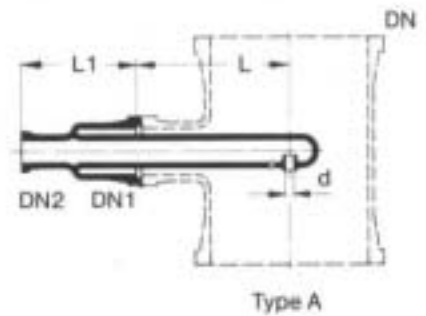
Column feed pipes for columns up to DN 600 are manufactured from borosilicate glass. Their DN 800 and DN 1000 counterparts adopt a steel/PTFE design.

DN ¹	DN1	DN2	d	L	L1	Type	Catalogue reference
80	40	25	13	100	115	A	FP 3
100	40	25	13	125	115	A	FP 4
150	40	25	13	150	115	A	FP 6
225	40	25	13	185	115	A	FP 9
300	40	25	13	230	115	A	FP 12
450	80	40	25	320	150	A ²	FP 450
600	150	50	40	450	200	A ²	FP 600
800	150 ³	80 ³	50	575	60	B	FP 800
1000	150 ³	80 ³	65	675	60	B	FP 1000

¹Nominal bore of column

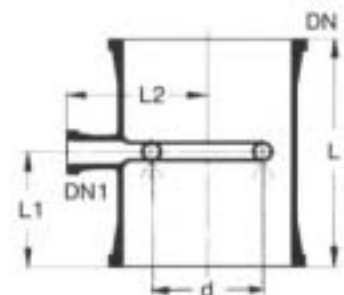
²Buttress end as for type B

³PCD to Corning standards



Spray Feed Sections

DN	DN1	d	L	L1	L2	Hole ϕ	Number of holes	Catalogue reference
100	25	40	250	125	110	2	20	FR 4
150	25	70	250	125	150	2	27	FR 6
225	25	70	250	125	170	2	27	FR 9
300	25	100	300	150	220	3	30	FR 12

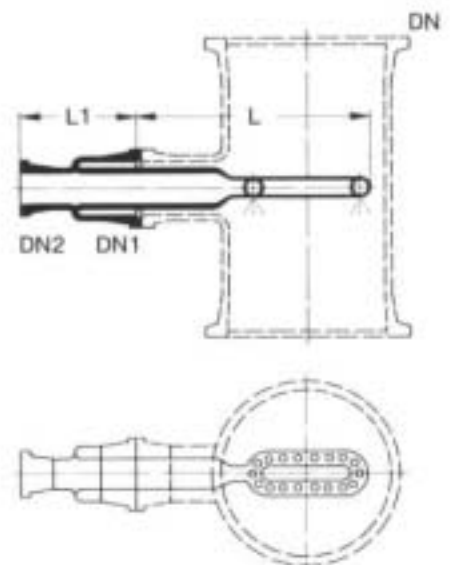


Spray Feed Pipes

Like column feed pipes, spray feed pipes are usually installed via a type **PTU** unequal tee piece (see Section 2 of this catalogue – *Pipeline Components*).

DN ¹	DN1	DN2	L	L1	Hole ϕ	Number of holes	Catalogue reference
450	150	50	500	200	3	40	FD 450
600	150	50	630	200	3	60	FD 600

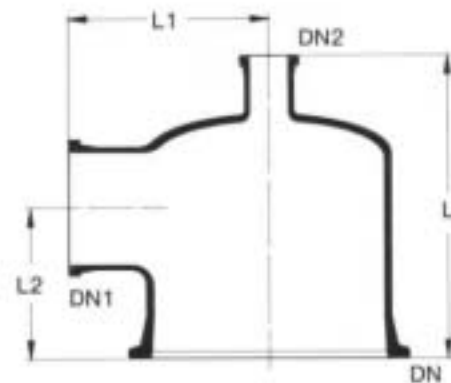
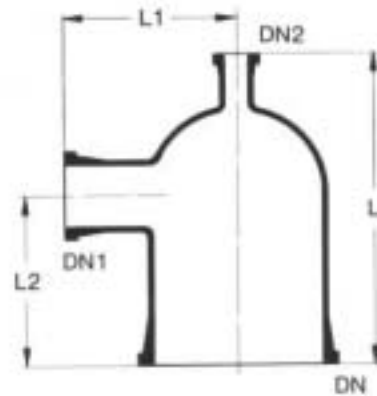
¹Nominal bore of column



For CORWRAP items, add a suffix C to the standard catalogue reference. For CORCOAT items, add a suffix L.

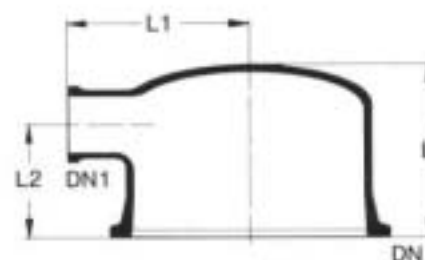
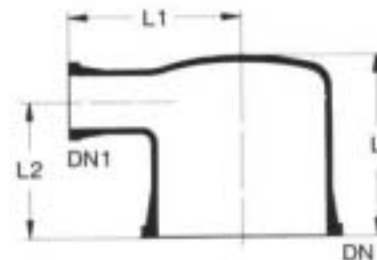
Column Adaptors

DN	DN1	DN2	L	L1	L2	Catalogue reference
80	40	25	180	110	90	CA 3/1.5/1
100	50	25	230	125	125	CA 4/2/1
150	50	25	240	150	125	CA 6/2/1
150	80	25	255	165	125	CA 6/3/1
225	50	40	330	190	150	CA 9/2/1.5
225	80	40	405	205	230	CA 9/3/1.5
225	150	40	405	265	230	CA 9/6/1.5
300	50	40	380	230	190	CA 12/2/1.5
300	80	40	430	240	230	CA 12/3/1.5
300	150	40	430	305	230	CA 12/6/1.5
450	150	50	550	380	300	CA 450/6/2
450	225	50	760	405	380	CA 450/9/2
600	150	50	660	450	300	CA 600/6/2
600	300	100	800	525	400	CA 600/12/4
800	300	150	1250	650	500	CA 800/12/6
1000	300	225	1300	750	500	CA 1000/12/9



Column Adaptors – Flat Top

DN	DN1	L	L1	L2	Catalogue reference
150	40	155	165	110	FH 6/1.5
225	40	165	200	120	FH 9/1.5
300	40	190	240	140	FH 12/1.5
450	40	285	300	175	FH 450/1.5



For CORWRAP items, add a suffix C to the standard catalogue reference. For CORCOAT items, add a suffix L.

Column Components

Columns with Distribution Trays

For larger nominal bore columns, particularly when packed with a random packing, we recommend using special liquid distributors for product feed and the re-distribution of the liquid phase at intervals. These ensure that optimum mass transfer conditions are achieved.

For liquid redistribution trays, special column sections with three branches are available. These are detailed

below. For distribution trays (which are detailed on page 6.12) special feed sections are available which are installed above the packed column. Again, these are detailed on page 6.12 together with information on special inlet feed pipes.

The suspension of the distribution trays at three points with variable height allows accurate alignment, even after the complete column has been installed.

Column Sections for Liquid Re-distribution Trays

These special column sections are designed specifically for use with type **FV** liquid re-distribution trays shown on page 6.11. They are supplied complete with packing support and with optional thermometer branch. On special request, a column section can be supplied without the packing support.

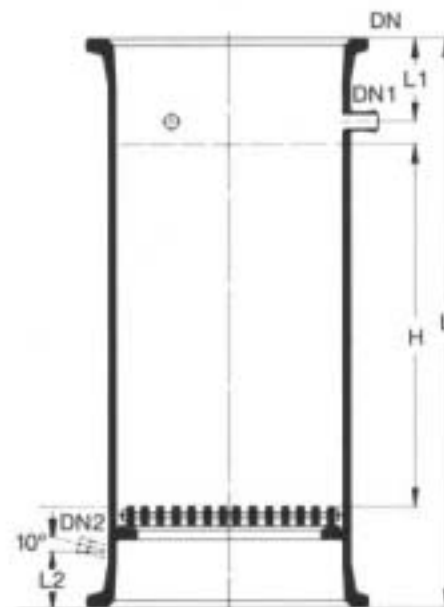
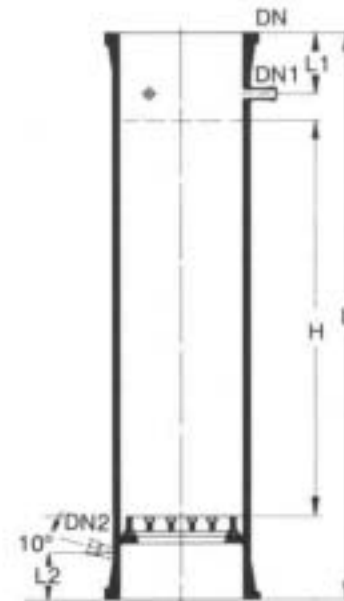
DN	L	DN1	DN2 ¹	L1	L2	H ²	Catalogue reference	Catalogue ¹ reference
225	1500	25	25	110	100	1170	CSV 9/1500	CSTV 9/1500
300	1500	25	25	160	100	1130	CSV 12/1500	CSTV 12/1500
450	1500	40	25	150	140	1110 ³	CSV 450/1500	CSTV 450/1500
600	1500	40	25	220	140	965 ⁴	CSV 600/1500	CSTV 600/1500

¹With thermometer branch

²For packing details see pages 6.3 and 6.4

³1035 for CSTV

⁴940 for CSTV



For CORWRAP items, add a suffix C to the standard catalogue reference. For CORCOAT items, add a suffix L.

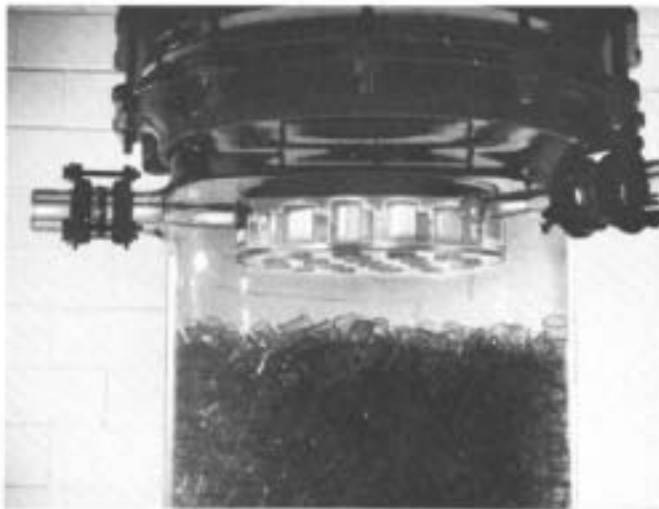
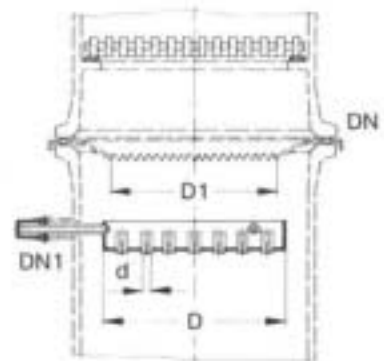
Liquid Re-distribution Trays

When used below a PTFE re-distributor – see page 6.5 – these glass/PTFE distribution trays (licensed from Hoechst AG) ensure return of the liquid from the edge of the column and optimum re-distribution. They are installed in type **CSV** or **CSTV** column sections detailed on the previous page.

The complete item comprises the tray, support fingers and couplings and gaskets to fix them into position.

DN ¹	DN1	D	D1	d	Number d	Catalogue reference
225	25	165	140	18	9	FV 9
300	25	230	200	18	19	FV 12
450	40	345	315	28	19	FV 450
600	40	470	420	28	37	FV 600

¹Nominal bore of column



Glass/PTFE re-distribution trays

Column Components

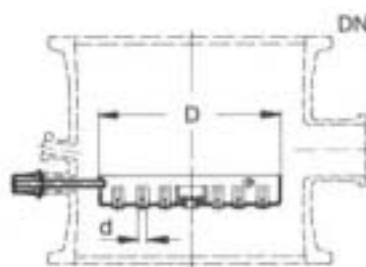
Distribution Trays for Liquid Feed

These glass/PTFE distribution trays (licensed from Hoechst AG), together with type **FVP** inlet feed pipes detailed below are installed via type **FVZ** feed sections. They provide an even initial distribution over the column cross-section.

The complete item comprises the tray, support fingers and couplings and gaskets to fix them into position.

DN ¹	D	d	Number d	Catalogue reference
225	165	18	8	FVE 9
300	230	18	18	FVE 12
450	345	28	18	FVE 450
600	468	28	36	FVE 600

¹Nominal bore of column

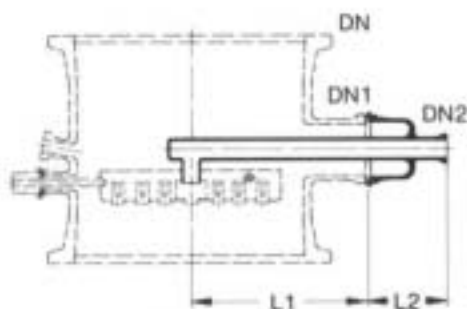


Inlet Feed Pipes for Feed Sections

These feed pipes are designed specifically for use with the distribution trays detailed above. The column feed pipes detailed on page 6.8 cannot be used in conjunction with these items.

DN ¹	DN1	DN2	L1	L2	Catalogue reference
225	80	25	210	150	FVP 9
300	80	25	240	150	FVP 12
450	80	40	320	150	FVP 450
600	150	50	450	200	FVP 600

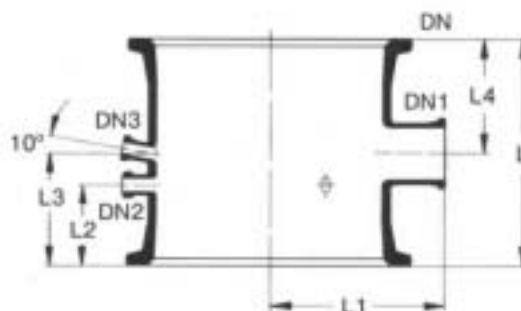
¹Nominal bore of column



Feed Sections for Distribution Trays

Distribution plates for liquid feed (see above) together with inlet feed pipes, are installed via these special feed sections. They are basically unequal tee pieces with three additional branches for installing the distribution plates and a branch for a thermometer.

DN	DN1	DN2	DN3	L	L1	L2	L3	L4	Catalogue reference
225	80	25	25	300	210	110	150	150	FVZ 9
300	80	25	25	400	240	160	210	200	FVZ 12
450	80	40	25	400	320	135	210	200	FVZ 450
600	150	40	25	600	450	220	300	300	FVZ 600



For CORWRAP items, add a suffix C to the standard catalogue reference. For CORCOAT items, add a suffix L.

Reflux Separators – Manually Operated

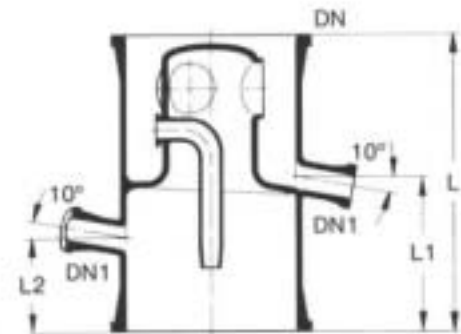
In these units, the reflux is adjusted by means of a valve on the outlet connection. When the valve is fully open the divider is set to total distillate off-take, since the reflux pipe is higher than the outlet connection. By regulating the valve, the reflux ratio can be continuously adjusted up to total reflux.

A specific reflux ratio cannot be set.

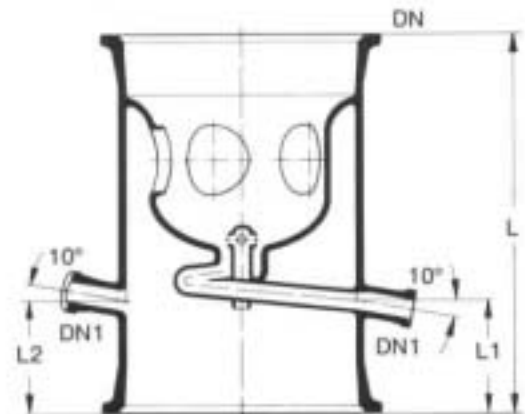
DN	DN1	L	L1	L2	Type	Catalogue reference
80	25	190	115	82	A	RDA 3
100	25	255	145	95	A	RDA 4
150	25	255	145	100	A	RDA 6
225	25	380	150	115	A	RDA 9
300	25	380	150	110	A	RDA 12
450	40	610	275	150	A	RDA 450
600	40	1000	300	300	B	RDA 600

Flow Data

Catalogue reference	Minimum free cross-section for vapours (cm ²)	Maximum distillate volume in relation to water at 20°C (l/h)
RDA 3	10	300
RDA 4	20	475
RDA 6	40	700
RDA 9	150	900
RDA 12	170	1100
RDA 450	670	1500
RDA 600	1100	4000



Type A

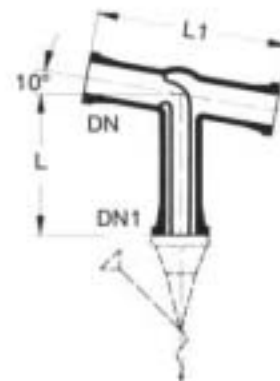


Type B

Liquid Seals

Liquid seals are fitted on the off-take branch of reflux separators to prevent vapours passing directly to the after-coolers and receivers.

DN	DN1	L	L1	Catalogue reference
25	25	160	205	LS 1
40	25	315	305	LS 1.5



For CORWRAP items, add a suffix C to the standard catalogue reference. For CORCOAT items, add a suffix L.

Column Components

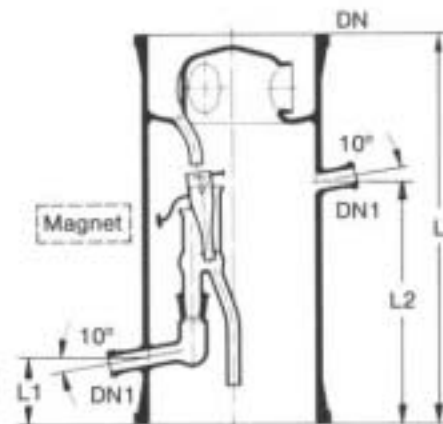
Reflux Separators – Automatically Operated

In applications where there is need for the reflux to be at a fixed value, then it is advisable to fit an electro-magnetically or pneumatically operated reflux separator in conjunction with a timer. Automatically controlled reflux separators are detailed below. Timers can be found in section 8 of this catalogue – *Measurement & Control*.

Reflux Separators – Magnetically Operated

This type of reflux separator uses a swinging funnel mechanism. The funnel, which has a soft iron core sealed into it, is operated magnetically from outside the column so that the condensate can be removed from the column and reflux returned to the column in correct ratio. Activation of the electro-magnet moves the funnel into the off-take position.

The electro-magnet (shown dotted) and timer should be ordered separately. Details can be found in section 8 of this catalogue – *Measurement & Control*.



DN	DN1	L	L1	L2	Catalogue reference
80	25	380	75	75	RHM 3
100	25	455	90	90	RHM 4
150	25	455	90	90	RHM 6
225	25	560	100	100	RHM 9
300	25	685	140	430	RHM 12

Flow Data

Catalogue reference	Minimum free cross-section for vapours (cm ²)	Maximum distillate volume in relation to water at 20°C (l/h)
RHM 3	10	90
RHM 4	20	180
RHM 6	40	300
RHM 9	150	525
RHM 12	170	675

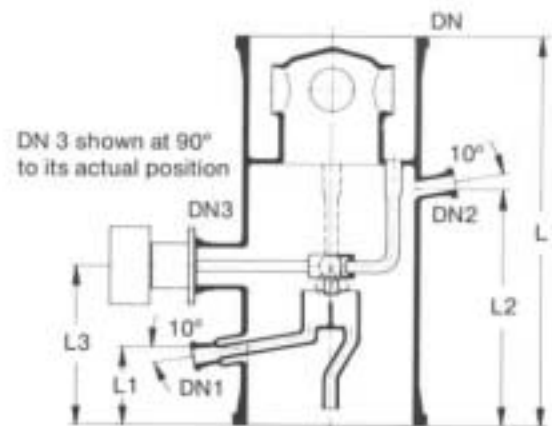
For CORWRAP items, add a suffix C to the standard catalogue reference. For CORCOAT items, add a suffix L.

Reflux Separators – Pneumatically Operated

This version is recommended for higher distillate volumes. It has a distribution cup, above which a swivel arm, operated from outside via a pneumatic actuator unit (adjustable swing angle), is positioned. In the one position all of the distillate flows back into the column. In the other position it is discharged.

The swivel arm of the standard version is sealed by means of a single-acting mechanical seal. On request a double-acting mechanical seal or a drive with a magnetic coupling is available.

Each unit is supplied complete with actuator (signal pressure 5 to 8 bar.g). The timer (see Section 8 – *Measurement & Control*) as well as any additionally required electrically-activated valves for the control air must be ordered separately.



DN	DN1	DN2	DN3	L	L1	L2	L3	Catalogue reference
225	25	25	80	560	100	100	250	RHP 9
300	25	25	80	685	140	430	280	RHP 12
450	40	40	100	915	165	305	365	RHP 450
600	50	40	100	1000	200	200	400	RHP 600

Flow Data

Catalogue reference	Minimum free cross-section for vapours (cm ²)	Maximum distillate volume in relation to water at 20°C (l/h)
RHP 9	150	800
RHP 12	270	1400
RHP 450	680	3200
RHP 600	1100	5700

The following standard spares are available for these items:

- Glass body
- Glass rotating arm
- PTFE lip seal
- Actuator assembly
- Mechanical seal
- Ceramic seal plate

Column Components

Jacketed Column Sections

Jacketed column sections are used primarily for distillation columns where they are required to operate adiabatically. With extraction and reaction columns, heat can be added or removed using an external jacket.

All column sections are usually supplied complete with support. The packings must be ordered separately. On special request, a column section can be supplied without the packing support.

Further information on the operating conditions for jacketed components can be found in section 1 of this catalogue – *Technical Information*.

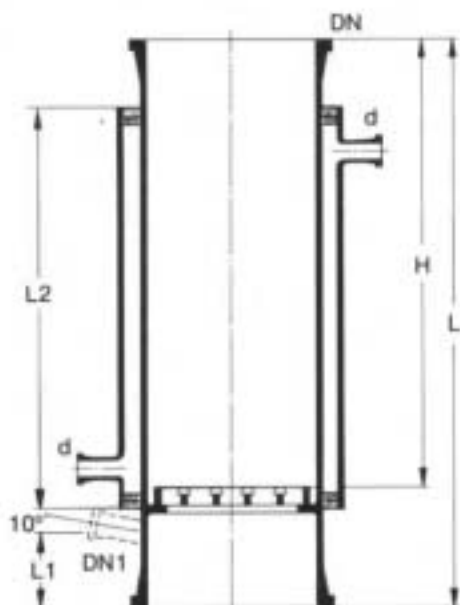
DN	DN1	d ¹	L	L1	L2	L2 ²	H	Catalogue reference	Catalogue ² reference
80	25	18 ⁴	1000	80	880	820	900 ³	DCS 3/1000	DCT 3/1000
100	25	18 ⁴	1000	85	840	790	880 ³	DCS 4/1000	DCT 4/1000
150	25	18 ⁴	1000	100	840	770	845	DCS 6/1000	DCT 6/1000
225	25	25	1000	100	740	720	845	DCS 9/1000	DCT 9/1000
225	25	25	1500	100	1240	1220	1345	DCS 9/1500	DCT 9/1500
300	25	25	1000	100	740	720	840	DCS 12/1000	DCT 12/1000
300	25	25	1500	100	1240	1220	1340	DCS 12/1500	DCT 12/1500

¹Diameter of connections on jacket

²With thermometer branch

³850 for DCT

⁴Hose connectors – d is the bore of the mating hose



Precision Bore Pipe Sections

Precision bore pipe sections are used in applications where the internal diameter of the column – for example, in the case of small bubble-cap columns or sieve-plate columns with edge seals – may only vary between very strict tolerances.

L1 is the approximate length of the range within which the stated tolerances are maintained. The diameter outside this range, however, is never smaller than the minimum diameter shown.

DN	D	L	L1	Catalogue reference
25	25.4 ± 0.05	1000	900	PPS 1/1000
40	38.0 ± 0.05	1000	890	PPS 1.5/1000
50	47.3 ± 0.06	1000	880	PPS 2/1000
80	72.45 ± 0.08	1000	870	PPS 3/1000
100	100.4 ± 0.1	1000	840	PPS 4/1000
150	152.4 ± 0.23	1000	820	PPS 6/1000



For CORWRAP items, add a suffix C to the standard catalogue reference. For CORCOAT items, add a suffix L.

Insulating Jackets

Insulating jackets have been specifically designed for use with our range of column sections. They are easy to fit with the insulating jacket being placed around the column section and tightened with clips. All insulating jackets have an opening for thermometer branches. The insulating layer is approximately 60mm thick.

DN	D	L	L1	Catalogue reference
80	210	1000	830	IM 3
100	235	1000	810	IM 4
150	285	1000	800	IM 6
225	350	1000	790	IM 9/1000
225	350	1500	1290	IM 9/1500
300	435	1000	780	IM 12/1000
300	435	1500	1280	IM 12/1500
450	585	1000	750	IM 450/1000
450	585	1500	1250	IM 450/1500
600	740	1500	1100	IM 600
800	940	1500	1100	IM 800
1000	1160	1500	1100	IM 1000

