

# SEPARATION COLUMNS IN MINIPLANT TECHNOLOGY



## COMPONENTS FOR OUR STANDARD UNITS

M102E.2

### GENERAL

The consequent size reduction of the component parts, which is characteristic for our modular Miniplant-Technology, allows the handling at small quantities of substances. The ratio of surface area to volume of the components becomes, however, disadvantageous in comparison to pilot and large-scale production plants. In order to achieve nevertheless reliable results for process scale-up, out of trials in small-scale units, the reduction of heat loss through all component parts is very eminent. Consequently, the standard columns for Miniplant Units are equipped with a highly effective isolation which keeps the heat loss to a minimum.

For process development and scale-up methods structured packings and bubble-cap tray columns are advantageously used, since numerous data and simple physical theories for efficiency calculations are available. The efficiency in case of bubble-cap tray columns, for example, is constant over a comparatively wide range of column loads.

When handling corrosive or dirt containing substances, packings are an alternative to structured packings because they can be made of inert materials and be cleaned or respectively replaced at reasonable costs.

The achievable separation efficiency with each separation column depends on the given liquid mixture, throughput and pressure. Therefore, the data stated in table 1 is not absolute values. This data should only serve for comparison of different separation columns and this facilitate the selection of the appropriate column.

The columns operate at pressures up to 1 bar abs. and at temperatures up to 200°C.

### CONSTRUCTION

For our standard units we use packed columns only of version A and C (see figure 1). The bare of the flange is equal to the bare of the column, i.e. they can be used either for structured packings or packings. The effective filling height is 510 resp. 1020 mm.

Besides packed columns, bubble-cap tray columns are available, which are manufactured as standard with 5 or 10 trays.

All columns have decisive advantages:

- They are equipped with a silvered high vacuum jacket (10<sup>-6</sup> mbar) and internal expansion bellows. The isolation jacket is sealed at the faces of both flat end safety flanges reducing the heat loss in this section to a minimum as well.

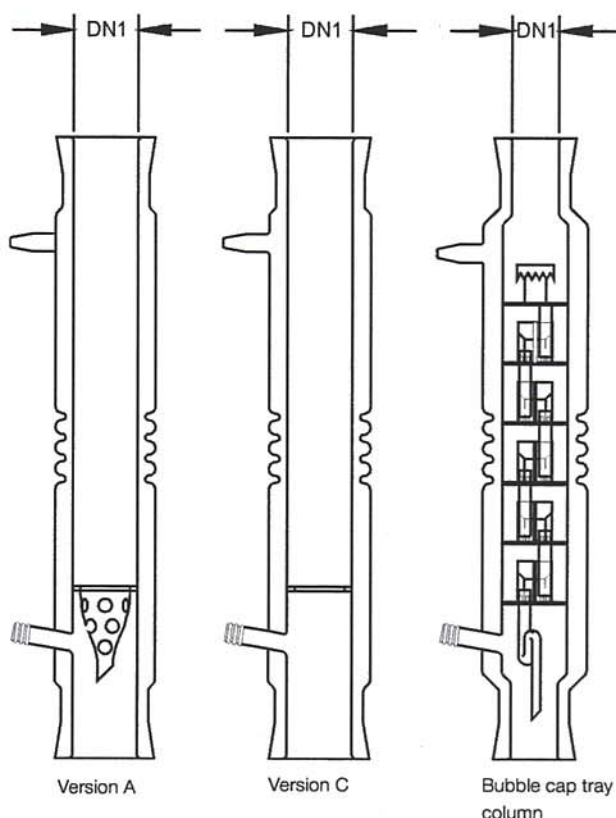


Figure 1: Separation columns

- The silvered high vacuum jacket has two opposite sight strips, enabling the observation of the distillation process inside the columns.
- An inclined neck at the lower end of the column serves for temperature measuring by means of a Pt-100 resistance thermometer.

### ADDITIONAL EQUIPMENT

In case of unfavourable operating conditions e.g. high temperature, low throughput and vacuum operation especially in columns with a small diameter, it may be necessary to additionally isolate the columns or to equip the volume with a compensation heating in order to reduce the temperature gradient.

The columns can be provided with packing retainers in order to avoid the carry-over of packing material by mistake. PTFE re-distributors minimise the undesired liquid flow along the inner column wall.

Selection of optional equipment:

- PTFE packing retainers
- PTFE re-distributors
- Additional isolation, compensation heating

Selection of optional equipment:

- Additional temperature measuring and sampling nozzle
- External expansion bellows
- Other packings
- Oldershaw sieve tray columns

## OPTIONAL EQUIPMENT

Besides the herein mentioned columns used for our standardised Miniplant units and those described in our catalogue "Miniplant Technology", section "Column Components", specially customised columns are produced upon request. Beside the packings listed in table 1 most other packings are available as well upon request.

## TECHNICAL DATA <sup>1)</sup>

Nominal width of column DN 1	Characteristics	Unit	Packings			Structured packings				Trays
			glass Raschig rings	glass Wilson spirals	wire-mesh rings	Sulzer EX	Sulzer DX	Sulzer CY	Sulzer BX	Bubble cap tray
30	Dimensions	mm	3 x 3	3 x 3	3 x 3	30 x 55	30 x 55	30 x 160	-/-	30
	Max. separation efficiency	$n_t / m$ $n_t / n$	18	25	40	45	25	12	-/-	0,9
	Pressure drop	mbar / m mbar / n	12	10	8	2	1	1	-/-	1,2
	Order No. suffix	-	<b>FC 3</b>	<b>FWS 3</b>	<b>FMR 3</b>	<b>PEX 1,2</b>	<b>PDX 1,2</b>	<b>PCY 1,2</b>	-/-	<b>BCT</b>
50	Dimensions	mm	6 x 6	4x 4	6 x 6	50 x 55	50 x 55	50 x 160	50 x 170	50
	Max. separation efficiency	$n_t / m$ $n_t / n$	15	20	30	45	25	12	6	0,9
	Pressure drop	mbar / m mbar / n	12	10	7	2	1	1	1	1,5
	Order No. suffix	-	<b>FC 6</b>	<b>FWS 6</b>	<b>FMR 6</b>	<b>PEX 2</b>	<b>PDX 2</b>	<b>PCY 2</b>	<b>PBX 2</b>	<b>BCT</b>
80	Dimensions	mm	8 x 8	7 x 7	8 x 8	80 x 55	80 x 55	80 x 160	80 x 170	80
	Max. separation efficiency	$n_t / m$ $n_t / n$	10	16	22	45	25	12	6	0,9
	Pressure drop	mbar / m mbar / n	10	8	6	2	1	1	1	1,7
	Order No. suffix	-	<b>FC 8</b>	<b>FWS 7</b>	<b>FMR 8</b>	<b>PEX 3</b>	<b>PDX 3</b>	<b>PCY 3</b>	<b>PBX 3</b>	<b>BCT</b>

<sup>1)</sup> Other versions are available upon request

<sup>2)</sup> The length and the diameter of the column is determined by the standard unit

**QVF GROUP**

Hauptsitz  
QVF ENGINEERING GMBH  
Postfach 33 69  
D-55023 Mainz  
Hattenbergstraße 36  
D-55122 Mainz  
Tel.: (+49) 0 61 31/ 97 04-0  
Fax: (+49) 0 61 31/ 97 04-500  
E-mail: mail@qvf.de  
Internet: www.qvf.com

Member of

**De Dietrich**  
**PROCESS SYSTEMS**  
www.dedietrich.com