RECTIFICATION UNIT IN MINIPLANT-TECHNOLOGY TYPE DEK

STANDARD APPARATUS FOR CONTINUOUS OPERATION

M105E.2

GENERAL

This continuously operated Miniplant rectification unit type DEK is used for small-scale production and for process development. Throughputs from 0,1 to 20 kg/h can be achieved. The separation efficiency is a function of the column type and the throughput.

The advantages of this rectification unit are:

- The cost considering basic version with product receivers is equipped with all necessary components for a well controlled and reproducible process.
- The unit can be operated at bottom temperatures of 200°C and pressures up to 1bar abs.. The vacuum generation system can be connected without exchanging any existing components.
- The unit can be totally discharged.
- All materials coming in contacts with the product are either made of borosilicate glass type 3.3 or PTFE, enabling the handling of even chemically aggressive substances.
- All glass parts are equipped with the robust QVF flat end safety flanges.
- The measuring and control technology is also a modular system. Hence, the standard unit may be gradually upgraded from a manually operated system to a fully automatic one.

CONSTRUCTION

The rectification unit DEK consists of the parts indicated in figure 1.

The mixture to be separated is pumped out of the graduated feed receiver by means of a PTFE- membrane pump through a temperature controlled feed heater, which is heated with a quartz rod immersion heater and dosed into the column. The feed rate can be adjusted via the frequency and stroke length of the membrane pump.

The power input controlled evaporation of the mixture within the column is carried out by a minimum volume circulation evaporator with quartz rod immersion heaters. The level within the evaporator is kept constant by means of an overflow outlet. The bottom product flows through a cooler and a graduated Anschütz-Thiele receiver into the final bottom product receiver.

The standard columns are filled with Raschig rings and isolated with silvered high vacuum jackets.

Reproducible reflux ratios can be realised by the electronically controlled liquid divider which is also high vacuum jacketed.

The condenser is inclined in order to reduce the construction height.

The distillate flows into the final receiver via a siphon, a distillate cooler and an Anschütz-Thiele receiver.

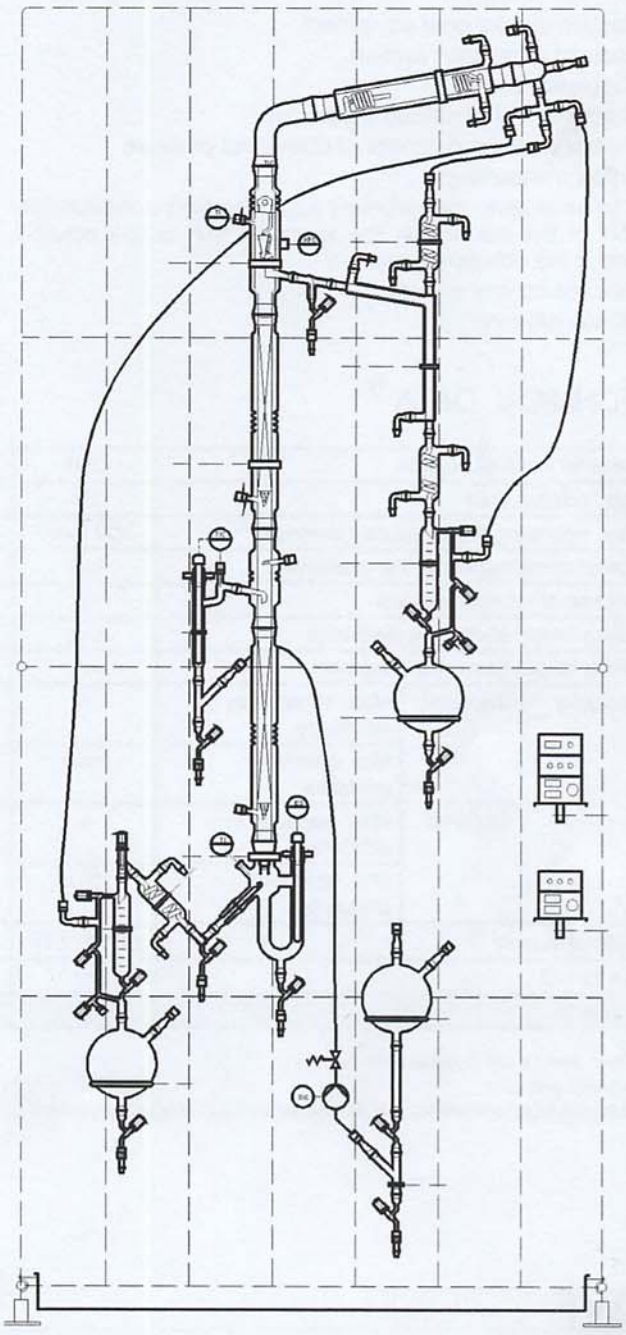


Figure 1: Rectification Unit DEK

The bottom, head and feed temperatures are constantly measured and displayed. The flow rate of the distillate and bottom product can be measured by the graduated Anschütz-Thiele receiver.

The entire unit is mounted in a free-standing structure made of ¾" galvanised tubes and has a additionally incorporated safety pan made of stainless steel.

ADDITIONAL EQUIPMENT

The standard unit (figure 1) can be operated at atmospheric pressure without any additional equipment. Due to its modular construction the unit may be easily and manifold upgraded. Hence, additional control and vacuum equipment is available and may easily be added to the existing standard unit.

Should the unit be automatically controlled, the control devices of the standard unit can be connected to a process control system. The handling of the unit and the data acquisition may be simplified by the use of a PC-visualisation.

Selection of additional equipment:

- Vacuum generation system
- Circulation cooler
- Measurement of cooling water flow
- Measurement and control of differential pressure
- Reflux measurement
- Additional temperature points e.g. in the feed transition section of the column, in the lower section of the column, above the condenser etc.
- Process control system
- PC visualisation

OPTIONAL EQUIPMENT

Contrary to the additional equipment the optional equipment replaces parts of the standard unit.

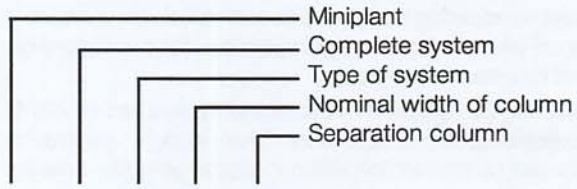
The extension with optional equipment as falling-film evaporator, phase separator, vapour divider etc. is almost unlimited and permits solutions totally different to those proveded by the standard unit, which we would be pleased elaborate with you.

Selection of optional equipment:

- Other column packings and structured packings
- Bubble-cap tray columns
- Sieve-tray columns
- Horizontal evaporators
- Falling-film evaporators
- Thin-film evaporators
- Phase separators
- Continuous product withdrawal out of the vacuum
- Receivers and lines with tempering jackets
- Mounting structure made of ¾" stainless steel tubes

CODE FOR ORDER NUMBERS

(see technical data and product information "separation columns")



TECHNICAL DATA [1]

Nominal width of column			DN1	30	50	80
Max. column load			l/h	7	20	40
Max. operating temperature / pressure [2]			°C / mbar	200 / 1000		
Power consumption of the evaporator			kW	1	2	3
Volume of product vessels			l	5	10	20
Filling height above the feed-inlet			mm	510	1020	1020
Filling height below the feed-inlet			mm	510	510	1020
Capacity	Standard	Max. separation efficiency	n_t	18	22	20
		Min. operating pressure	mbar	12	18	20
	Optional	Max. separation efficiency	n_t	80	70	75
		Min. operating pressure	mbar	2	3	4
Voltage supply [3]			V / Hz / W	230 / 50 / 2000	230 / 50 / 3000	230 / 50 / 4000
H x W x D			m	4,0 x 0,75 x 1,5	4,5 x 0,75 x 2,0	5,25 x 0,75 x 2,0
Order No.				**M-SY/ DEK 30 FC3**	**M-SY/ DEK 50 FC 6**	**M-SY/ DEK 80 FC 8**

[1] Other versions are available upon request
[2] Absolute pressure
[3] Voltage supply for standard unit without additional or optional equipment

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8/01 OK Mini5E.2, Subject to change