

## Process Pumps for Rectification



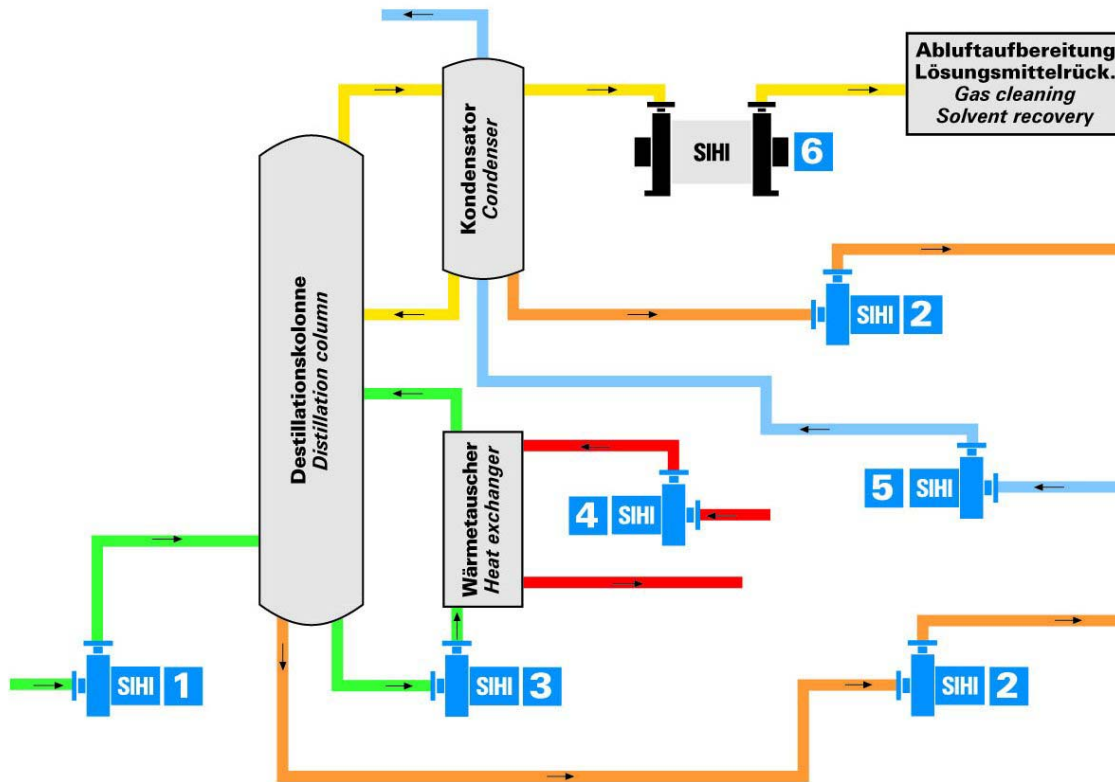
Rectification or counter flow distillation are processes used to separate mixtures made up of multiple components. Rectification is a thermal cutting-off process and is a further development of the distillation process.

The benefits of the rectification process is that it works continuously and in comparison to the distillation process the output is much higher due to the fact that the vapour is in contact with the liquid. This therefore causes the heavier boiling substances to condensate due to the fact that the released condensation heat from the lighter boiling substances in the liquid phase are evaporated.

The contact surface between the vapour and liquid phase is realised by internals (bell stages). If liquid mixtures are vaporised, the concentration of the individual substances are determined by the temperature and the pressure in the gas and liquid phase. Generally the amount of light boiling liquids in the gas phase is higher than in the liquid phase. At the first bottom, the gas flow from the evaporator meets the liquid flow from the second bottom. This gas flow will condensate and both liquid phases are mixed up.

The first half will evaporate and rise to the second bottom and the other half drains into the sump. Due to the chemical balance, more distillate is in the ascending vapour than in the condensate. At the second bottom, the back flow of the condensate and the ascending gas flow of the first bottom are mixed up. Also here the splitting up takes place in accordance to the chemical balance.

# Process Pumps for Rectification



## An overview of the various Process Pumps

- 1 Feed pumps**

The feed pumps transfer the liquid to the distillation vessel. The requirements for the different feed pumps vary depending on the distillation volume and the substance properties.
- 2 Discharge pumps**

The discharge pumps transfer the product from the sump to other stages in the process or into tanks where it is stored. Depending on the properties of the product in the sump and the availability of by-products the design requirements of the discharge pumps vary.
- 3 Circulation pumps**



















To increase the efficiency of the process condensate liquid flows in the opposite direction to the vapour. These pumps are used for the corresponding recirculation.
- 4 Heat transfer pumps**

Rectification processes function using temperatures that are higher than the ambient temperature. This heating process is needed to avoid for example, the polymerisation of the distillate. To deliver the heat around the process, circulation pumps are installed in the main pipework and hot oil is used as the heat transfer medium.
- 5 Cooling water pumps**

At the head of the distillation column the product is drawn off and liquefied in a condenser. Centrifugal pumps transfer the cooling water and their capacity is dependant on the size of the distillation vessel and the amount of heat that needs to be dissipated.
- 6 Vacuum pumps**

Vacuum is used for the distillation process of temperature sensitive medium and high boiling medium. Separation therefore takes place at lower temperatures and cracking is therefore avoided. For this process, dry running vacuum pumps or liquid ring vacuum pumps are used and the liquid ring vacuum pumps are generally run within a closed service liquid circuit.

# Innovative Solutions from Sterling SIHI

Process pumps	Pump types	Pump execution		
1 Feed pumps	Chemical process pumps Type CBS, CBM, CBE, CBT		Capacity: max. 2200 m <sup>3</sup> /h Shaft sealing: mechanical seal, mag drive Materials: nodular iron, stainless steel, special materials on request	
	Side channel pumps Type CEH		Capacity: max. 35 m <sup>3</sup> /h Shaft sealing: mechanical seal, mag drive Materials: nodular iron, stainless steel	
2 Discharge pumps	Chemical process pumps Type CBS, CBM, CBE, CBT		Capacity: max. 2200 m <sup>3</sup> /h Shaft sealing: mechanical seal, mag drive Materials: nodular iron, stainless steel, special materials on request	
3 Circulation pumps	Chemical process pumps Type CBS, CBM, CBE, CBT		Capacity: max. 2200 m <sup>3</sup> /h Shaft sealing: mechanical seal, mag drive Materials: nodular iron, stainless steel, special materials on request	
4 Heat transfer pumps	Hot oil pumps Type ZTK, ZTN		Capacity: max. 1000 m <sup>3</sup> /h Shaft sealing: mechanical seal, mag drive Materials: nodular iron, stainless steel	
5 Cooling water pumps	Chemical process pumps Type CBS, CBM, CBE, CBT		Capacity: max. 2200 m <sup>3</sup> /h Shaft sealing: mechanical seal, mag drive Materials: nodular iron, stainless steel, special materials on request	
	Industrial pumps Typ ZLN		Capacity: max. 1800 m <sup>3</sup> /h Shaft sealing: mechanical seal Materials: grey cast iron, stainless steel	
6 Vacuum pumps	Liquid ring vacuum pumps Type LPHX/LPH		Capacity: max. 10700 m <sup>3</sup> /h Shaft sealing: stuffing box, mechanical seal Materials: grey cast iron, stainless steel	
	Dry running vacuum pumps Type SIHI <sup>dry</sup>		Capacity: max. 1000 m <sup>3</sup> /h Suction pressure: > 0.001 mbar abs Materials: nodular iron / steel	



... Liquid pumps, vacuum pumps and complete vacuum systems ... from one source



# Addresses

## Europe

- Sterling Fluid Systems (Austria)**  
**Wien**  
Tel.: +43 (0)1 680 050  
Fax: +43 (0)1 680 0521  
Email: sales\_austria@sterlingsihi.de
- Sterling Fluid Systems (France)**  
**Trappes**  
Tel.: +33 (0)1 34 823 900  
Fax: +33 (0)1 34 823 961  
Email: sterlingsihi@easynet.fr
- Sterling Fluid Systems (Hungary)**  
**Veszprem**  
Tel.: +36 (0)88 406 633  
Fax: +36 (0)88 406 635  
Email: sales\_hungary@sterlingsihi.de
- Sterling Fluid Systems (Polaska)**  
**Warszawa**  
Tel.: +48 (0)22 335 2480/81  
Fax: +48 (0)22 335 2482  
Email: sterling@sterling.pl
- Sterling Fluid Systems (Spain)**  
**Madrid**  
Tel.: +34 91 709 1310  
Fax: +34 91 715 9700  
Email: minsas@stnet.es
- Sterling Fluid Systems (Belgium)**  
**Groot-Bijgaarden**  
Tel.: +32 (0)2 481 7711  
Fax: +32 (0)2 481 7737  
Email: sales@sterlingfluidsystems.be
- Sterling SIHI (Germany)**  
**Itzehoe**  
Tel.: +49 (0)4821 771 01  
Fax: +49 (0)4821 771 274  
Email: sales@sterlingsihi.de
- Sterling Fluid Systems (Italy)**  
**Monza, Milan**  
Tel.: +39 (0)39 282 41  
Fax: +39 (0)39 282 4220  
Email: sterlingitaly@sidro.it
- Sterling Fluid Systems (Romania)**  
**Bucuresti**  
Tel.: +40 (0)21 610 7188  
Fax: +40 (0)21 210 8287  
Email: sales\_romania@sterlingsihi.de
- Sterling Fluid Systems (UK)**  
**Altrincham/Cheshire**  
Tel.: +44 (0)161 928 6371  
Fax: +44 (0)161 925 2129  
Email: uksales@sterlingfluid.com
- Sterling Fluid Systems (Czech Rep.)**  
**Olomouc**  
Tel.: +420 587 433 651  
Fax: +420 587 433 653  
Email: sterling@sterling.cz
- Sterling Fluid Systems (Greece)**  
**Athens**  
Tel.: +30 (0)210 957 0783  
Fax: +30 (0)210 956 8121  
Email: sales\_greece@sterlingsihi.de
- Sterling Fluid Systems (Netherlands)**  
**Beverwijk**  
Tel.: +31 (0)251 263 232  
Fax: +31 (0)251 226 309  
Email: info@sihi.nl
- Sterling Fluid Systems (Schweiz)**  
**Schaffhausen**  
Tel.: +41 (0)52 644 0606  
Fax: +41 (0)52 644 0616  
Email: info@sterling.ch

## Americas

- SIHI Pumps (USA)**  
**Grand Island**  
Tel.: (1) 716 773 6450  
Fax: (1) 716 773 2330  
Email: mail@sihi.com
- SIHI Pumps (Canada)**  
**Guelph**  
Tel.: (1) 519 824 4600  
Fax: (1) 519 824 7250  
Email: mail@sihi.com
- SIHI (Peru)**  
**Lima**  
Tel.: +51 1 421 7411  
Fax: +51 1 421 7413  
Email: sihiperu@infonegocio.net.pe
- SIHI (Chile)**  
**Santiago**  
Tel.: +56 2 756 5900  
Fax: +56 2 756 5990  
Email: ventas@sihichile.cl
- Sterling Fluid Systems (Colombia)**  
**Bogota, D.C.**  
Tel.: +57 1 364 9264  
Fax: +57 1 364 9262  
Email: info@sihi.com.co

## Asia

- Sterling Fluid Systems (Singapore)**  
**Singapore**  
Tel.: (65) 656 283 00  
Fax: (65) 656 283 08  
Email: info.singapore@sterlingasia.com
- Sterling Fluid Systems (Australia)**  
**Bayswater**  
Tel.: (61) 397 201 500  
Fax: (61) 397 204 076  
Email: info@sihipumps.com.au
- Sterling Fluid Systems (China)**  
**Shanghai**  
Tel.: (8621) 621 880 68  
Fax: (8621) 621 780 86  
Email: info.china@sterlingasia.com
- Sterling Fluid Systems (Malaysia)**  
**Selangor Darul Ehsan**  
Tel.: (60) 358 850 331  
Fax: (60) 358 850 337  
Email: info.malaysia@sterlingasia.com
- Sterling Fluid Systems (Thailand)**  
**Bangkok**  
Tel.: (66-2) 319 2567  
Fax: (66-2) 319 2573/4  
Email: sfsthai@sterlingthai.co.th
- Sterling Fluid Systems (Taiwan)**  
**Taipei**  
Tel.: (886) 286 312 138  
Fax: (886) 286 312 184  
Email: info.taiwan@sterlingasia.com

