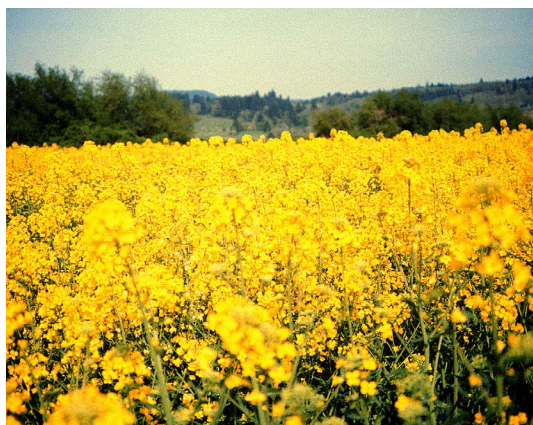
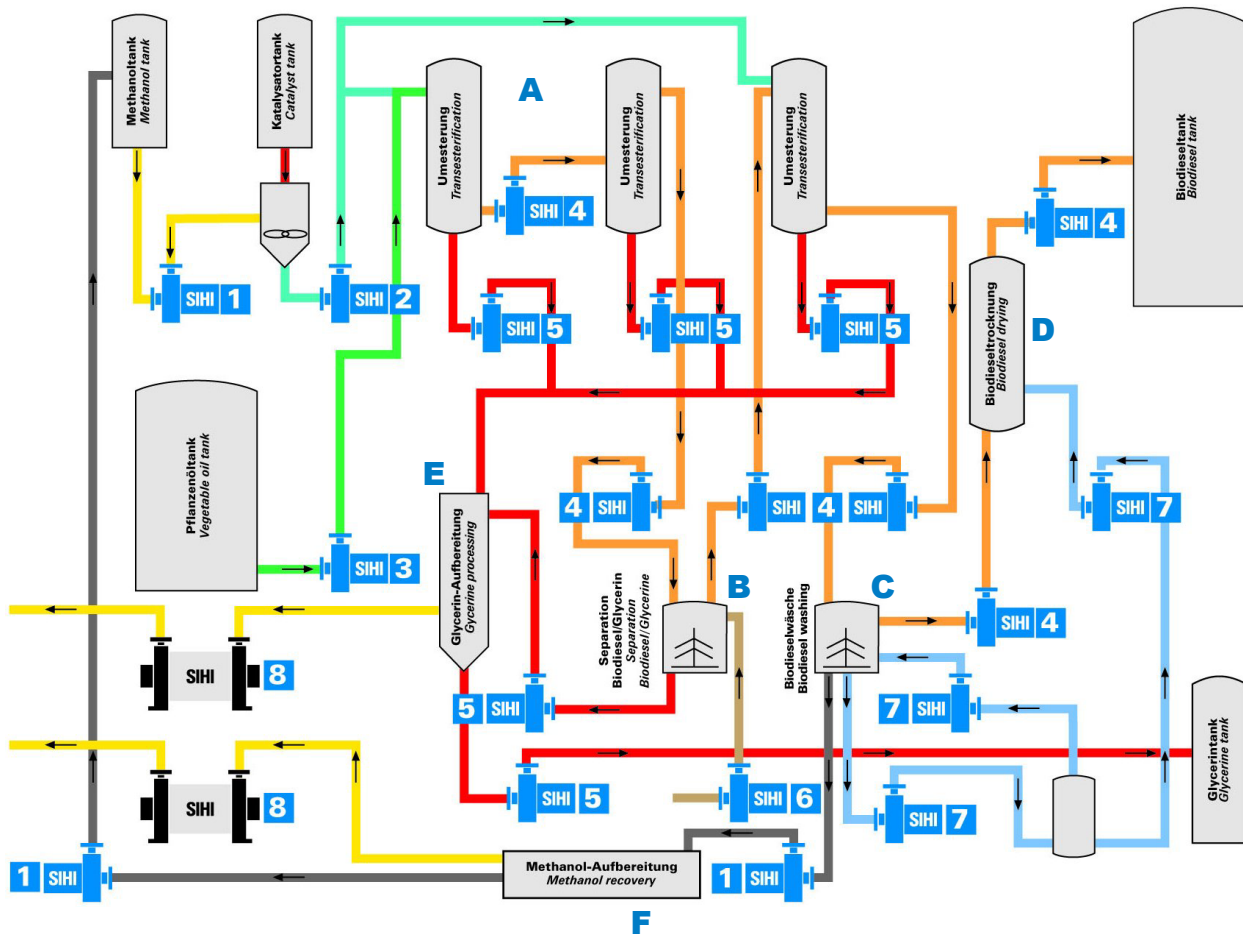


Process Pumps for Biodiesel Production



In principle all edible oils and fats – vegetable and animal – can be transformed to biodiesel. For fuel-specific properties, pretreated oils from rapeseeds and sunflower seeds are preferred in Europe, but others like soya oil, palm and palm kernel oil, coconut oil, cottonseed oil and animal fats are applicable. Transesterification is based on the chemical reaction of triglycerides with methanol to form methylesters (biodiesel) and glycerine in the presence of an alkaline catalyst. This reaction is effected in a two-stage mixer-settler unit. Transesterification takes place in the mixing section, while the subsequent settling section allows for the separation of methylesters as the light phase from glycerine water as the heavy phase. A subsequent countercurrent washing step for the methylester removes minute by-product components and gives a biodiesel “ready for use” after the final drying step. The surplus methanol contained in the glycerine water is removed in a rectification column, which yields methanol in a condition and purity ready for use as a recycle stream to the process. For further glycerine water purification additional steps of chemical treatment, evaporation, distillation and bleaching may follow optionally to achieve pharmaceutical-grade or technical-grade glycerine.

Biodiesel Production Process



Process steps

- A Transesterification**
Before transesterification the methanol is mixed with the catalyst. Oil and methanol then react in several stages to FAME (fatty acid methyl ester).
- B Separating biodiesel/glycerine**
By neutralization the watery phase is separated from the organic phase. The watery phase is pumped to the glycerine processing.
- C Biodiesel washing**
Biodiesel is washed with water several times in order to remove traces of methanol, sulfuric acid, catalyst and glycerine.
- D Biodiesel drying**
During the drying step the rest of the water is removed by distillation. Water-free biodiesel then is pumped to the storage tank.
- E Glycerine processing**
Glycerine is purified by evaporation and distillation in order to achieve the required qualities.
- F Methanol recovery**
The methanol inside the wash water is recovered by distillation, and is then pumped back into the methanol storage tank.

Innovative Solutions from Sterling SIHI

Process Pumps for	Pump types	Pump execution
1 Methanol	Centrifugal pump Typee CBE	 Capacity: max. 650 m³/h Shaft sealing: mag drive Material: grey cast iron, stainless steel Ex-proof: yes
2 Edible oil	Centrifugal pump Type ZLN	 Capacity: max. 1800 m³/h Shaft sealing: single mechanical seal Material: grey cast iron, stainless steel Ex-proof: yes
3 Methanol/ catalyst- mixture	Centrifugal pump Type CBE	 Capacity: max. 650 m³/h Shaft sealing: mag drive Material: grey cast iron, stainless steel Ex-proof: yes
4 Biodiesel	Centrifugal pump Type CBE	 Capacity: max. 650 m³/h Shaft sealing: mag drive Material: grey cast iron, stainless steel Ex-proof: yes
	Centrifugal pump Type ZLN	 Capacity: max. 1800 m³/h Shaft sealing: single mechanical seal Material: grey cast iron, stainless steel Ex-proof: yes
5 Glycerine/ water- mixture	Side-channel pump Type CEH	 Capacity: max. 35 m³/h Shaft sealing: single mechanical seal Material: grey cast iron, stainless steel Ex-proof: yes
	Centrifugal pump Type CBS	 Capacity: max. 650 m³/h Shaft sealing: single mechanical seal Material: grey cast iron, stainless steel Ex-proof: yes
	Centrifugal pump Type ZLN	 Capacity: max. 1800 m³/h Shaft sealing: single mechanical seal Material: grey cast iron, stainless steel Ex-proof: yes
6 Sulfuric acid	Centrifugal pump Type CLE/CLM	 Capacity: max. 120 m³/h Shaft sealing: mag drive Material: PTFE lined Ex-proof: yes
7 Water/ methanol- mixture	Centrifugal pump Type ZLN	 Capacity: max. 1800 m³/h Shaft sealing: single mechanical seal Material: grey cast iron, stainless steel Ex-proof: yes
8 Distillation	Liquid ring vacuum pump Type LPHX/LPH	 Capacity: max. 1000 m³/h Shaft sealing: single mechanical seal Material: grey cast iron, stainless steel Ex-proof: yes
	Liquid ring vacuum pump in compact design Type LEM	 Capacity: max. 470 m³/h Shaft sealing: single mechanical seal Material: grey cast iron, stainless steel Ex-proof: yes
	Complete vacuum systems Type PL	 Capacity: max. 1000 m³/h Shaft sealing: single mechanical seal Material: grey cast iron, stainless steel Ex-proof: yes



... 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 (Polska)
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: minsa@stnet.es

SIHI Pumps (USA)
Grand Island
Tel.: (1) 716 773 6450
Fax: (1) 716 773 2330
Email: mail@sihi.com

SIHI (Peru)
Lima
Tel.: +51 1 421 7411
Fax: +51 1 421 7413
Email: sihiperu@infonegocio.net.pe

Sterling Fluid Systems (Singapore)
Singapore
Tel.: (65) 656 283 00
Fax: (65) 656 283 08
Email: info.singapore@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 (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

Sterling Fluid Systems (Colombia)
Bogota, D.C.
Tel.: +57 1 364 9264
Fax: +57 1 364 9262
Email: info@sihi.com.co

Americas
SIHI Pumps (Canada)
Guelph
Tel.: (1) 519 824 4600
Fax: (1) 519 824 7250
Email: mail@sihi.com

SIHI (Chile)
Santiago
Tel.: +56 2 756 5900
Fax: +56 2 756 5990
Email: ventas@sihichile.cl

Asia
SIHI (Australia)
Bayswater
Tel.: (61) 397 201 500
Fax: (61) 397 204 076
Email: info@sihipumps.com.au

Sterling Fluid Systems (Thailand)
Bangkok
Tel.: (66-2) 319 2567
Fax: (66-2) 319 2573/4
Email: sfsthai@sterlingthai.co.th

Sterling Fluid Systems (China)
Shanghai
Tel.: (8621) 621 880 68
Fax: (8621) 621 780 86
Email: info.china@sterlingasia.com

Sterling Fluid Systems (Taiwan)
Taipei
Tel.: (886) 286 312 138
Fax: (886) 286 312 184
Email: info.taiwan@sterlingasia.com

