BIODIESEL FILTRATION SOLUTIONS

Efficient and reliable filtration solutions for the biofuel industry
Typical Biodiesel Filtration Process

1. Preparation of biofuel feedstock
   - Hot full pressing
   - Crude oil filter (M/S)
   - Degumming & Refining
   - Bleaching
   - Bleaching Filter (M/H/S/P)
   - Pre-treatment
   - Pre-treatment Filter (M/S)
   - Transesterification
   - Methyl Ester (Biodiesel)
   - Haze/Sterols filter (M/S/P)
   - Biodiesel fuel

2. Animal fats/Waste oil
   - Cold full pressing
   - Crude oil filter (M/S/P)
   - Mix with conventional crude direct conversion
   - Purified glycerine
   - Biodiesel fuel mix ready
   - Pure vegetable oil fuel

Symbols:
- Green = Filter Solution
- M = Main Filtration
- S = Safety filtration
- P = Polishing Filtration
- H = Heel Filtration
Introduction to biodiesel filtration

In most biodiesel industries processes feedstocks and produced biodiesel need to be treated. High quality and cleanliness of both the feedstock and the product are required for as low as possible production costs.

Biodiesel production presents unique filtration challenges. The quality of incoming feedstocks used in biodiesel production can vary widely.

The used feedstocks are:

- **Crude vegetable oils**: palm oil, rapeseed oil, sunflower oil and cotton seed oil
- **Animal fats**: tallow, chicken fat and yellow grease.
- **Waste oils**: used cooking oils

Converting inconsistent feedstocks to high quality pure renewable fuels, that meet ASTM standards, requires extensive filtration expertise to apply the appropriate technologies in the biodiesel filtration process.

Filtration is involved in many refining steps like degumming, winterization, bleaching and deodorization to remove or to reduce the contaminants present in the feedstocks. Filtration is also used to remove sterols and haze after the production of biodiesel.

Reducing and removing impurities lead to lowering the amount of reactants and increasing the efficiency of the produced biodiesel. This is why filtration is the key separation step to minimize production costs in biodiesel production and to meet the regulations requirements for using biodiesel in diesel engines.

Our extensive product range can be utilized for all processes in the biodiesel production. *amafilter - LFC Lochem* offers solutions for different requirements of individual manufacturers, offering efficiency together with reliability which allow the manufacturer to minimize the biodiesel production costs and to get a consistent product quality.

Main applications

*amafilter - LFC Lochem* provides filtration solutions to biodiesel manufacturers depending on the feedstock and the requirements of the customer. For the following applications we provide:

- Filtration of incoming feedstocks such as cold and hot pressed oils and crude rendered fats to remove plastics and other coarse particles before the conversion process.
- Filtration of clay, carbon and silica absorbents from refined oil, to remove gums, proteins, sulphur and phosphorus.
- Filtration of crude biodiesel to remove haze and sterols.
- Filtration of glycerine to remove solids or activated carbon.
- Filtration of final product.
Advantages

amafilter - LFC Lochem (Filtration Group Process Systems) can provide a complete analysis of the processes in your plant. We can recommend the correct filtration technology and products to meet your requirements in order to deliver a consistent product quality.

Cricketfilter®

The unique Cricketfilter® technology can be used for the removal of plastics like polyethylene from animal fats and waste oil in order to pre-treat the feedstocks for the production of biodiesel.

The Cricketfilter® is a closed filtration system and can be fully automated. The Cricketfilter® produces consistent filtrate clarity. Elements are mounted on internal filtrate manifolds. Cake release by back pulsing with air is done for each manifold individually, which results in an effective back pulse. No additional liquid is needed. This results in minimizing of production costs,

Advantages of a standard filtration process

- Long filtration time = bigger filtration volume
- Short regeneration time = higher production efficiency
- Consistent filtrate purity = no additional purification steps required
- Automation possibility = less man power required

During the short regeneration time the filter medium is cleaned intensively.

The filter element spacing and the filter cloth are selected to suit the filtration needs of the application.

The Cricketfilters® are standard equipped with a cover lift assembly.

The Cricketfilter® itself has no rotating parts, keeping maintenance requirements to a minimum which results in less recalls and lower maintenance expenses.

The Cricketfilter® can be used for bleaching of the feedstocks before starting the biodiesel production. It can also be used for active carbon treatment of the produced glycerine during the biodiesel production process.

The filtration rates depend on the filtration temperatures, the content of impurities and the type of bleaching earth or active carbon used.

Learn more
www.filtration.group/cricketfilter
**Consumables in biodiesel applications**

Filtration Group Process Systems supplies disposable consumables like filter bags, cartridges and filter sheets. Housings for these disposable consumables are also supplied. The consumables are usually used as safety filters (filter bags) or polishing filters (cartridges) after the filtration systems. The housings conform to PED 2014/68/EU category II / III.

Filtration Group Process Systems also supplies consumables with a wide range of sizes, micron ratings and efficiencies which are required to obtain the required quality. Filtration Group also supplies spare parts and services for its products.

---

**Pressure Leaf Filters**

The pressure leaf filter is a closed filtration system and can be fully automated which results in less man power.

The regeneration time between the filtration cycles is short and which reduces the downtime.

The pressure leaf filter itself has no rotating parts, keeping maintenance to a minimum resulting in lower maintenance expenses and in less recalls.

---

**Vertical Pressure Leaf Filter**

A vertical pressure leaf filter is recommended for the filtration of crude vegetable oil. The filtration rate depends on the type of oil and the pressing method (hot pressed oil or cold pressed oil).

---

**Horizontal Pressure Leaf Filter**

Some of the biodiesel feedstocks contain impurities like waxes and gums. A winterization process is applied to separate this type of impurities. During the winterization process the impurities solidify and can be separated by filtration.

amafilter – LFC Lochem supplies horizontal pressure leaf filters with retractable shells or bundles as a solution, because waxes and gums are hard to dispose of.

Horizontal or vertical pressure leaf filters with dry discharge can be used for the removal of sterols and haze of the crude biodiesel

---

Learn more

www.filtration.group/productportfolio
Optimization
In a 2 day test observations are made to optimize the filtration process on:

- The correct filter type
- The correct filter aid
- The correct dosing
- The correct filter cloth or drain cloth

Process Engineering Package (PEP)
With our Process Engineering Package (PEP) amafilter – LFC Lochem provides you with all relevant information to your specific filtering process.

Programmed control system
Control your filtration system with a fully programmed control system designed by amafilter – LFC Lochem.

This service can be supplied with several days on site support.

Software upgrade/optimization
If a control system is installed on your filter system then amafilter – LFC Lochem can upgrade / optimize it when required.

Skid
If you are looking for a turn-key solution, we can offer a total solution for your filtration challenge.

Commissioning
We offer on-site support during the commissioning of your filter so you can start using your system immediately. amafilter – LFC Lochem can also provide an initial process optimization.

Research & Development Partnership
If an entirely new filtration process must be developed we can do it for you.

Sample screening
With half a day of testing you will get an impression if your liquid feed can be filtered with one of our filtration solutions. The sample screening consists of a screening. For a very competitive price you will receive lots of data on your feed to make a decision on your next steps towards your ideal filtration process.

Laboratory test
In a 2 day test all important parameters are being determined for a fairly accurate sizing your future Filtration Group filter system. This test is being completed with an extensive report. A follow-up plan can be discussed for Pilot filter installation.

Rescreen and repair services
amafilter – LFC Lochem offers the best in filter leaf rescreen and repair services for your used or damaged pressure leaf filter screens. Our state of the art manufacturing center and dedicated and experienced craftsmen in the Netherlands allows for the inspection, rescreen, repair or replacement of our 5 ply screens available in the marketplace today.

amafilter - LFC Lochem relies on its in-depth understanding of a customer’s process and liquid filtration requirements to deliver comprehensive filtration solutions. Consumables (ongoing) service and customized engineered systems to optimize the customer’s process.

amafilter – LFC Lochem has developed a broad range of technologies and has leading application expertise in the specific process filtration markets.
Active since the 1930’s and now part of Filtration Group’s Industrial Technologies division, amafilter® and LFC Lochem® key activity is the design and manufacturing of filter installations aimed at separating solids from liquids. These filter systems are sold and serviced worldwide. Filtration Group Process Systems provides an extensive product range for your filtration challenges. Our assortment of products and services ranges from fully operational plug-and-play filtration systems to components such as filter bags, filter cartridges, filter housings and spare parts.

1930 amafilter®

In the 1930’s Mr. L. Benjamins started a company in the Netherlands which sold filtration consumables and parts.

After WW2 Mr. L. Benjamins and his son started importing and not much later the manufacturing of ‘Niagara filters’ branded as “Amsterdamse Machine- en Apparatenfabriek” (amafilter®). The main products were vertical pressure blades for the food & beverage industry. Soon after amafilter started exporting it’s products worldwide.

Due to rapid growth amafilter® moved from Amsterdam to Alkmaar. The new location in Alkmaar expanded multiple times to offer more production capacity. In those years many filter types were developed. Many filters were added to the amafilter scope of products.

The amafilter® brand is a well established name in the global market for solid-liquid filtration serving customers worldwide.

1979 LFC Lochem®

In 1979, three employees of Machine Factory Arnhem in the Netherlands started their own company to manufacture pressure leaf filters and named the company “Liquid Filtration Consultants” or “LFC Lochem®”.

The company quickly gained an outstanding reputation as an innovative engineering and manufacturing company that specialized in liquid filtration technology.

Over the years, LFC Lochem® developed and perfected many filtration products. This resulted in a high quality, comprehensive standard range for widely diverging industries.

LFC Lochem® has an excellent reputation in the field of filtration technology and on its ability to quickly respond to specific customer requests.

LFC Lochem® joined forces with amafilter when both companies were joined together in Amafiltegrroup together with Eurofiltré (France), Vanpipe (UK) and Falban Filtri (Italy) and Nowata (USA).

2016 Filtration Group®

The Amafiltegroug was acquired by MAHLE in 2008 and merged together with its filtration division.

In 2016 MAHLE industrial filtration was acquired by Filtration Group. With Filtration Group the amafilter® and LFC Lochem® brands returned under the umbrella of “Filtration Group Process Systems”.

7200 employees in 26 countries and 107 locations strive together to make the world safer, healthier and more productive.

In various manufacturing plants Filtration Group Process Systems designs, engineers and manufactures various filters like pressure leaf filters, plug-and-play filtration systems, consumables and parts that meet the highest level of quality standards.

Filtration Group® offers a combined experience in filtration of over 500 year.
Filtration Group Process Systems facilities & offices

The Netherlands
Filtration Group BV Process Systems
amafilter® - LFC Lochem®
Hanzeweg 21
7241 CS Lochem
Phone: +31 573 297 777
info@filtration.group
www.ama-lfc.com

Germany
Filtration Group BV Process Systems
amafilter® - LFC Lochem®
Poststr. 34A
40784 Langenfeld
Phone: +49 2173 39965 750
fglangenfeld@filtrationgroup.com
www.ama-lfc.com

France
Filtration Group SAS Process Systems
amafilter® - LFC Lochem®
16, rue de l’Estelé BP 40175 - Silic
94563 Rungis Cedex
Phone: +33 (0) 1 14 5 12 05 30
emails.generiques@filtrationgroup.com
www.ama-lfc.com

United Kingdom
Filtration Group Ltd Process Systems
amafilter® - LFC Lochem®
Emperor Court Emperor Way,
Crewe Business Park, Crewe CW1 6BD
Phone: +44 1270 503400
fgluksales@filtrationgroup.com
www.ama-lfc.com

Czech Republic
Filtration Group s.r.o. Process Systems
amafilter® - LFC Lochem®
Heydukova 321
38601 Strakonice
Phone: +42 0383 372 209
fima.info.cz@filtrationgroup.com
www.ama-lfc.com

Poland
Filtration Group Sp.z.o.o. Process Systems
amafilter® - LFC Lochem®
ul. Brochowska 21-23, lokal 5
52-019 Wroclaw
Phone: +48 71 33 71 888
biuro@filtrationgroup.com
www.ama-lfc.com

Hungary
Filtration Group Kft Process Systems
amafilter® - LFC Lochem®
Batthyany ier 4
68B Kisber
Phone: +36 34 354 012
fm.info.hu@filtrationgroup.com
www.ama-lfc.com

North America
Filtration Group BV Process Systems
amafilter® - LFC Lochem®
Hanzeweg 21
7241 CS Lochem
Phone: +31 573 297 777
info@filtration.group
www.ama-lfc.com

Together we are making the world safer, healthier and more productive