



Your Specialist for Ecological and economical products

Rotdornstraße 11, 16833 Karwese

Owner and CEO : Holger Heinicke

Founding of the company: in 2000

Activities of the company HeiPro:

- To 90%, we deal with vegetable oil - Technology
- 10% with other system solutions for diesel engines such as Preheating fuel to avoid refrigeration problems with diesel and biofuels



Vegetable oils as fuel

In principle applies:

All vegetable oils characterized by the following properties are suitable as fuel

These properties (with fixed limits see table) should hold the vegetable oil to use as fuel to be found.

| Properties / Ingredients | Units | Limits Min | Limits Max. | Testing |
|-----------------------------------|--------------------|------------|-------------|-------------------------------------|
| Density (15°C) | Kg/m ³ | 900 | 930 | DIN EN ISO 3675 DIN EN ISO 12185 |
| Flashpoint | °C | 220 | | DIN EN 22719 |
| Iodine number | g iod /100g | 100 | 120 | DIN 53241-1 |
| Sulfur content | mg/kg | | 20 | ASTM D5453-93 |
| Kinematic viscosity (40°C) | mm ² /s | | 38 | DIN EN ISO 3104 |

The table above limits are based on the quality standard for rape seed oil as fuel (Weihenstephaner standard 05/2000).

Variable properties of vegetable oils

Are the properties heavily by the quality of the production and processing (pressure / filtering) can be influenced. (See following table)

| Properties / Ingredients | Units | Limits Min. | Limits Max. | Testing |
|-----------------------------|----------|----------------|----------------|-----------------|
| Total pollution | mg/kg | | 25 | DIN EN 12662 |
| Neutralization number | mg KOH/g | | 2,0 | DIN EN ISO660 |
| Oxidation stability (110°C) | h | 5,0 | | ISO 6886 |
| Phosphorus | mg/kg | | 15 | ASTM D3231-99 |
| Ash content | Masse-% | | 0,01 | DIN EN ISO 6245 |
| Water content | Masse-% | | 0,075 | pr EN ISO 12937 |

The table above limits are based on the quality standard for rape seed oil as fuel (Weihenstephaner standard 05/2000).

Objectives of upgrading to an alternative fuel:

- Residue-free clean burning operation in all phases of the engine
- Nearly the same power consumption, and as in the diesel power

An important point to attain this result is:

That the fuel used as a vegetable the aforementioned properties, and their maximum values (see tables) are!

The 2 main differences between diesel and rapeseed oil: Viscosity and flashpoint

| Indicator | Diesel fuel | Rape seed oil | Differences between diesel and rape oil |
|---|-------------|---------------|--|
| Kin. Viscosity at 20°C (mm ² /s) | 3.08 | 78,7 | Approx. 25-fold higher viscosity at 20°C |
| Kin. Viscosity at 40°C (mm ² /s) | 3,2 | 33,1 | Approx. 25-fold higher viscosity at 40°C |
| Flashpoint | 68 | 240 | 172°C Higher ignition temperature |

How can these differences between diesel and vegetable oil aligned?

Viscosity

The viscosity of the fuel is very important, because you significantly for the safe and reliable operation of the injection is!
It influences the fuel supply, the system of injection (pump pressure), and the spray to the injection (clean combustion).

How can we make the viscosity of vegetable oil aligned?

Through a selective heating of the oil before it's in the injection arrives!

Flash point

The flashpoint of the fuel is very important because it is crucial for a clean combustion of the air / oil - mixture!
If the flash point is not reached, then there is an incomplete combustion and deposits in the engine and entry into Pöl of engine oil!

How are we the difference of 172 ° C?

On the one targeted by the preheating of the plant oil and the other by the injection of vegetable oil, until you reach the operating temperature of the injection and Combustion rooms!

To the above differences between vegetable oil and diesel offset, only the two-tank system with preheating of the plant oil into question because:

- Only when two tank system is a gentle cold starting the engine on diesel fuel is possible!
- Through targeted preheating, the viscosity and the flash point of the diesel and plant oil will be aligned!
- Switching between vegetable oil and diesel is only when the injection, the combustion-rooms and the required temperature (to compensate for the viscosity and the flash-point) have achieved!
- Only a change between the fuels, depending on the load condition of the engine (eg TDI in the city's dealings with diesel and vegetable oil outside the city) is possible!

Vegetable oil tank

Diesel fuel

**Shift unit, electr. Heater
With a thermostatic control and
Heat exchangers, and control electronics for
Diesel quick rinse and warning
Plant in stopping mode!**

DIESEL ENGINE
The Conversion kit is suitable for:
• cars with Rows injection pump or Bosch injection pump or Bosch license injektion pumps
(Pump-nozzle and common rail systems only with special adjustment!)
• trucks, buses, agricultural tractors, combine harvesters, stationary engines, etc. ...
With Bosch injection pump or Bosch license and PLD / PD / Common Rail - Systems

- Gentle engine start using two-tank system
- Performance and consumption equal to the diesel power
- Controlled heating of the plant oil
- No entry of vegetable oil in the diesel tank
- TUV tested Kraftstoffvorwärmung with ABE
- reusable by changing the car
- Diesel using is further possible



Operating unit in the cockpit

Cold start with a diesel engine, and upon reaching the operating temperature is in the vegetable mode is automatically switched to vegetable oil. Operating conditions are indicated by LEDs! If the engine for more than 1 hour off for about 5 minutes before stopping, you have to switch to diesel mode

Conversion of diesel engines with a consumption up to 15 litres / 100km, and 8mm fuel line diameter and 12Volt operating voltage:



Conversion kit without tax: 502,21 Euro

VW Passat with pump-nozzle engine built in 2005



Conversion of diesel engines with a consumption of 30 litres / 100km, and 10 - 13mm fuel line diameter and 12Volt operating voltage

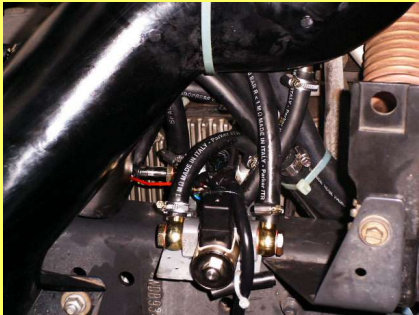
Agriculture traktor Fendt Vario 714



Conversion kit without tax: 1062,18 Euro

Conversion of diesel engines with a consumption of 30 litres / 100km, and 10 - 13mm fuel line diameter and 24-volt operating voltage

Truck MB Actros 1844



Conversion kit without tax 1184,03 Euro

**Conversion of diesel engines with a consumption of 30 litres / 100km,
and 13mm fuel line diameter and 24-volt operating voltage**

Stationary engine: MAN 12 Cylinders with 700 HP



Conversion kit without tax: 1518,48 Euro

Components of Conversion Kit

All major components are included:

- Electrical switching unit (switching to the gas, rinse / ventilation) and an integrated heater (diesel-Therm)
- Control electronics (diesel - quick rinse, warning when off on vegetable oil)
- Heat exchanger for water / oil circuit
- Fuel lines
- Fuel filter
- Cockpit panel for Pöl / diesel with LED's all operating conditions signal mode in vegetable oil
- Relay
- Complete Manufactured cable set with relay sockets, plugs and fuses
- Suspension fuse with a fuse 16
- various small material (hose clamps ,.....)
- Detailed installation manual
- TUV - Opinion and ABE



The selection of the Conversion kit after maximum fuel consumption, the fuel line diameter and the operating voltage (12/24 volts)!

Further information about our over 7000 references and also the answers to the most frequently asked questions (FAQ), visit our website at:

www.heipro.com

For further questions to:

- detailed bids for the retrofitting your vehicles
- further technical details

- we offer other services (eg spot assembly, or supply of vegetable oil)
- and other products offered by us (esp. engine oils, Diesel preheating systems etc.),

for further informations : Contact us ! at the below address and phone and fax numbers we will be available!

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