GIG KARASEK
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MINIPLANT

Separation of challenging substances with a high-performance stand-alone unit

www.gigkarasek.com

Short-path Evaporator MINIPLANT

Thermal separation of challenging substances with a high-performance stand-alone unit.

The short-path evaporator MINIPLANT is a compact, versatile unit with the same functionality as a system in industrial scale. It is ideal for on-site testing at the customer's location, as well as for the distillative purification of challenging substances and the recovery of valuable materials.

Core component: Short-path evaporator

The MINIPLANT is equipped with a POWERMOL 25 short-path evaporator. The integrated condenser minimizes the distance between the evaporation and condensation areas, enabling particularly gentle evaporation under fine vacuum conditions (1 to 0.01 mbar absolute). This makes the short-path evaporator an innovative advancement of the thin-film evaporator.

Functional principle

The feed material is continuously supplied to the POWERMOL 25, evenly distributed along the heated evaporator wall, and guided downward.

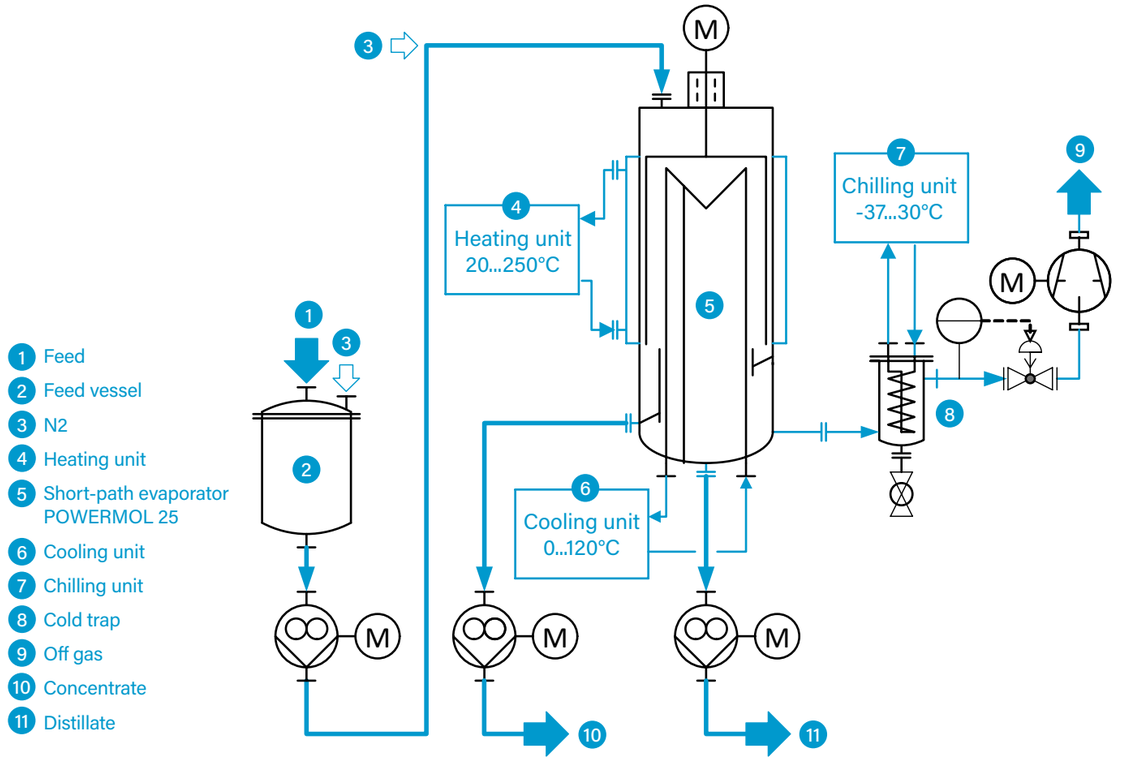
Low-boiling components evaporate, condense on the internal condenser, and are discharged as distillate, while higher-boiling components are removed as concentrate.

Both distillate and concentrate are transferred to collection containers via gear pumps, while non-condensed vapors and inert gases are directed into the vacuum system. A droplet separator prevents the carryover of heavy-boiling components.

Watch our MINIPLANT video!

Would you like to learn more about our short-path evaporators? Watch our video!

Short-path evaporator MINIPLANT for the distillative purification and recovery of valuable materials © GIG Karasek



Functional principle of the MINIPLANT © GIG Karasek

Main components	
Short-path evaporator	POWERMOL with 0.25 m² heating surface, follow-up wiper, -1...+0.5 bar, 0...250 °C single-acting mechanical seal, internal condenser
Cold trap	With internal U-tube bundle
Feed vessel	25 liters, electrical trace heating for temperature control
Feed-, destillate-, concentrate pump	Gear pump with magnetic coupling
Vacuum pump	Two-stage rotary vane pump, incl. equipment and oil separator
Heating - evaporator	+20 ... +250 °C; max. 7,5 kW heating output at +250 °C
Cooling - evaporator	0 ..... +120 °C; max. 5,5 kW cooling output at +100 °C
Freezing - cold trap	-37 ... +30 °C; max. 2,7 kW cooling output at -20 °C
All parts in contact with medium in 1.4571 or similar. Note: All units are air-cooled, no water connection for operation needed!	

Technical specifications of the main components of the short-path evaporator MINIPLANT © GIG Karasek

Gentle evaporation

... of temperature-sensitive, explosion-hazardous, and highly viscous media

With the short-path evaporator MINIPLANT, nearly all application areas of a thin-film evaporator can be covered.

Thermally sensitive substances

The system is specifically designed for the efficient evaporation of thermally sensitive products. Thanks to the short residence time of the medium in the evaporator, its thermal load is minimized. The system can generate a fine vacuum, making it ideal for distillation under extremely low-pressure conditions in the range of 0.01 to 1,000 mbar (absolute).

The MINIPLANT is therefore perfectly suited for processing challenging media such as fatty acids or for the distillation of high-boiling components like biodiesel or waste oil.

Explosion-hazardous media

The system is specifically designed for handling explosion-hazardous media and meets the requirements of the ATEX Directive 2014/34/EU. Both the process chamber and the surrounding environment are certified according to ATEX II 3/3 G Ex T3 Gc X, ensuring safe operation.

High-viscosity substances

The MINIPLANT effortlessly processes high-viscosity substances with viscosities of up to 2,000 mPas.

Application examples: biodiesel and waste oil © AdobeStock

Analyzing a sample in the GIG Karasek Technical Center © GIG Karasek

APPLICATION AREAS

- Distillative purification of temperature-sensitive, high-viscosity, and explosion-hazardous media
- Recovery of valuable materials

Read more about our projects in the GIG Karasek Insights!

Flexibility and maximum efficiency

Meaningful testing and small-scale production at the location of your choice

With the MINIPLANT plant operators have the opportunity to conduct meaningful trials directly at their production site or in their in-house research center. The processes are continuously replicated on a small scale – a key advantage over laboratory experiments, which are based on batch operation.

At the same time, the system allows for the cost-effective and rapid production of sample products or small batches of a specific substance.

Flexible location thanks to plug-and-play

The MINIPLANT is easy to maneuver and requires only a standard power connection (400 V, 50 Hz, 25 kW) for operation. The use of air-cooled cooling units eliminates the need for an external water connection, as the system independently generates the required cooling.

Reliable and flexible operation

The evaporator design prevents fouling during operation. The rotor's wiper blades continuously sweep just above the heating wall, mechanically cleaning the heating surface. This ensures a consistently stable and reliable operational performance.

Flow rates, heating power, and rotor speed can be individually adjusted in single-stage processes – an essential requirement for achieving optimal operating conditions.

For precise control and analysis, all process data is continuously recorded and available at any time for viewing and export. Additionally, the MINIPLANT can be equipped with state-of-the-art IIoT features.

Cost-efficient: Purchase or leasing

The standardized MINIPLANT design enables the implementation of a compact turnkey system at attractive conditions. Additionally, GIG Karasek offers flexible leasing models, providing further financial benefits.

APPLICATION EXAMPLES

- Biodiesel
- Waste oil
- Silicone oil
- Fatty acids

© GIG Karasek

System performance in detail

Correlation with product properties, pressure, and temperature parameters

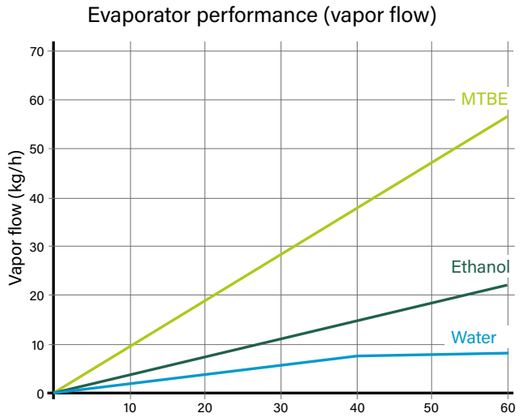
The performance of the MINIPLANT is largely influenced by the properties of the processed substance (e.g. specific evaporation enthalpy, viscosity, etc.) as well as the set pressure and temperature parameters, and therefore varies.

Through the special design of the short-path evaporator with an integrated condenser and optimized geometry, the pressure loss between the evaporator and condenser is significantly reduced. This enables a high evaporation rate, even when operating under extremely fine vacuum conditions.

Influencing factor: evaporation enthalpy

Products with high evaporation enthalpy, such as water, require a significant amount of energy for evaporation. In such cases, the available energy becomes the limiting factor for the evaporator's performance.

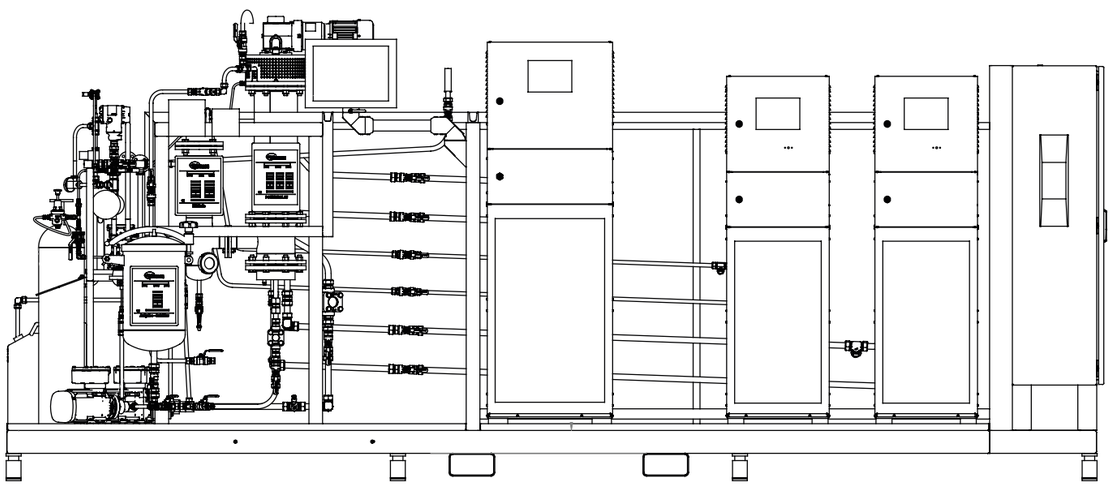
In contrast, substances with lower evaporation enthalpy, such as methyl ether or ethanol, require significantly less energy for evaporation, resulting in a much higher evaporation performance.



Theoretical evaporator performance as a function of heating temperature © GIG Karasek

Product	Feed	Vapor
MTBE	≤ 55	35
Ethanol	≤ 25	15
Water	≤ 15	10

Nominal performance in kg/h for the examples methyl tert-butyl ether (MTBE), ethanol (EtOH), and water © GIG Karasek



Short-path evaporator MINIPLANT system type: SPE025-U © GIG Karasek

Would you like to learn more? Schedule a non-binding consultation today!

ADVANTAGES

- Meaningful trials at a location of your choice
- Cost-effective and rapid production of small quantities/sample products
- Gentle evaporation of temperature-sensitive, high-viscosity, and explosion-hazardous media
- Plug-and-play principle
- High performance and reliable operation
- Optimizable for specific conditions
- Continuous data analysis

Short-path evaporator MINIPLANT © GIG Karasek

GIG KARASEK
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We develop ◆ efficient ◆ competent ◆ cooperative ◆ proactive ◆ goal-oriented ◆ reliable customized process solutions and systems according to your requirements.

Regardless of the scope of services, our aim is to optimize your production facilities with tailor-made solutions in terms of product quality and processes. Where other companies reach their limits, we find ways to process your material flows by combining various process steps that have been developed over decades. A high level of expertise and personal all-round service make GIG Karasek your reliable partner for unique challenges.

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Hersteller zertifiziert TÜV SÜD EN 1090-1 EN ISO 3834-2

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