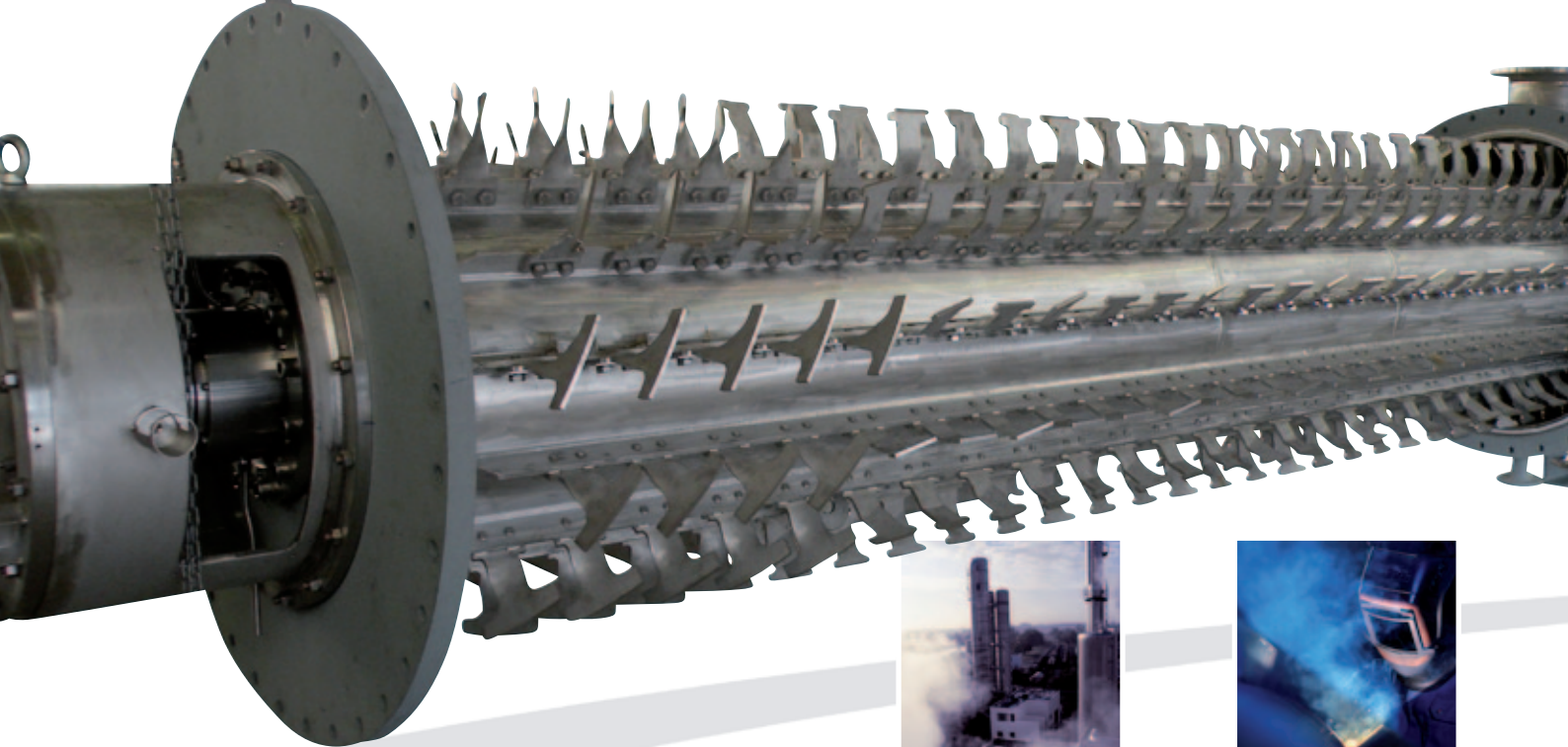


*Thin Film- and Short Path Technology*



## *Distillation at the highest level*

### *GIG Karasek Rotation Evaporator & Plant Construction*

GIG Karasek has established as an expert in separation technology, in particular in the field of distillation. Besides conventional evaporator types such as Falling Film Evaporators, we convince our customers with design and construction of gentle rotary evaporators to solve particularly complex distillation challenges.

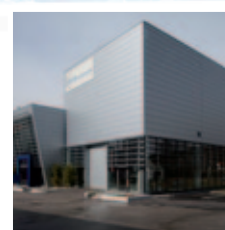
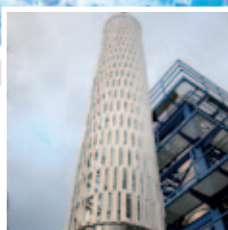
### *Tailor-made Expertise makes the difference*

The focus of our services is the development of individual systems, perfectly adapted to the conditions and customer requirements. This is the only way to secure the basic advantages of efficient distillation in production: depending on the customer to recover valuable materials, reduce energy costs and fulfill environmental requirements as efficiently as possible - or an intelligent combination of these priority objectives of modern industry. Years of experience, a special apparatus technology and clear structures are our advantages as an international renowned expert.



*Complex tasks require special process solutions:*

*GIG Karasek has devoted his concentrated expertise from process engineering and equipment development of highly specific Thin Film Evaporators and established them as an ideal solution for demanding applications in thermal separation technology.*



## Fields of application

### *Temperature Range:*

-196°C to 400°C

### *Vacuum:*

≥ 0,001 mbara

### *Feedamounts:*

10 kg/h to 2.500 kg/h (for one-piece package unit) to 10.000 kg/h (for multi-part skids, depending on application)

### *Viscosities:*

up to 10 Pas (in special cases up to 1000 Pas at operating temperature)

### *Performance:*

ATEX, GMP, API

### *Materials:*

Carbon steel, Hastelloy, titanium, stainless steel (1.4301, 1.4404, 1.4562, 1.4539)  
Available in multi-part units

## Applications

GIG Karasek has no conceptual and procedural limits with its extensive portfolio. With international experience from projects of various sizes we are able to develop suitable systems for new, unconventional areas of use, or to optimize existing solutions.

## Our Portfolio

Each of our products are manufactured in compliance with strictest quality guidelines and regular inspections in our company's own workshops.

- Thin Film Evaporator
- Short Path Evaporator
- Falling Film Evaporator
- Horizontal & Vertical Thin Film Dryer
- Forced Circulation Evaporator
- Tray columns
- Package Units

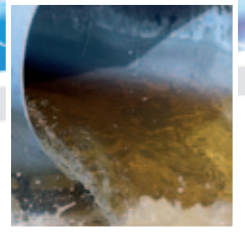
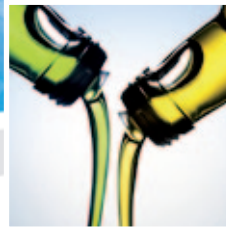
## Package Units

We create perfect systems and constructions depending on your requirements - competent, reliable, goal-oriented, cost-conscious, cooperative and proactive. Choose a partner who justifies your confidence. A project engineer will accompany you from consulting and planning to implementation of package units and unit parts as well as commissioning. Or, if desired, even with pure engineering services and optimization measures. Independently of the scope of services our goal is to upgrade your production with customized GIG Karasek solutions in terms of productivity improvement and process optimization. No challenge is too big us: Complex tasks spur us to become even better.



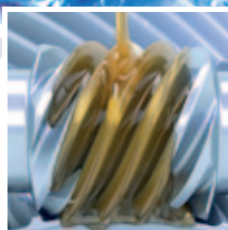
# Multifaceted Operations & Fields

- *Wastewater & Recycling*
- *Inorganic chemistry*
- *Biodiesel & alternative Fuels*
- *Food*
- *Oleochemicals*
- *Organic chemistry*
- *Petrochemistry*
- *Pharma*
- *Polymers & Plastics*
- *Starch*
- *Material recovery*
- *Pulp & Fiber*



## Operations

- Absorption
- Adsorption
- Deodorize
- Distill
- Degas
- Focus
- Crystallize
- React
- Rectify
- Strip
- Dry

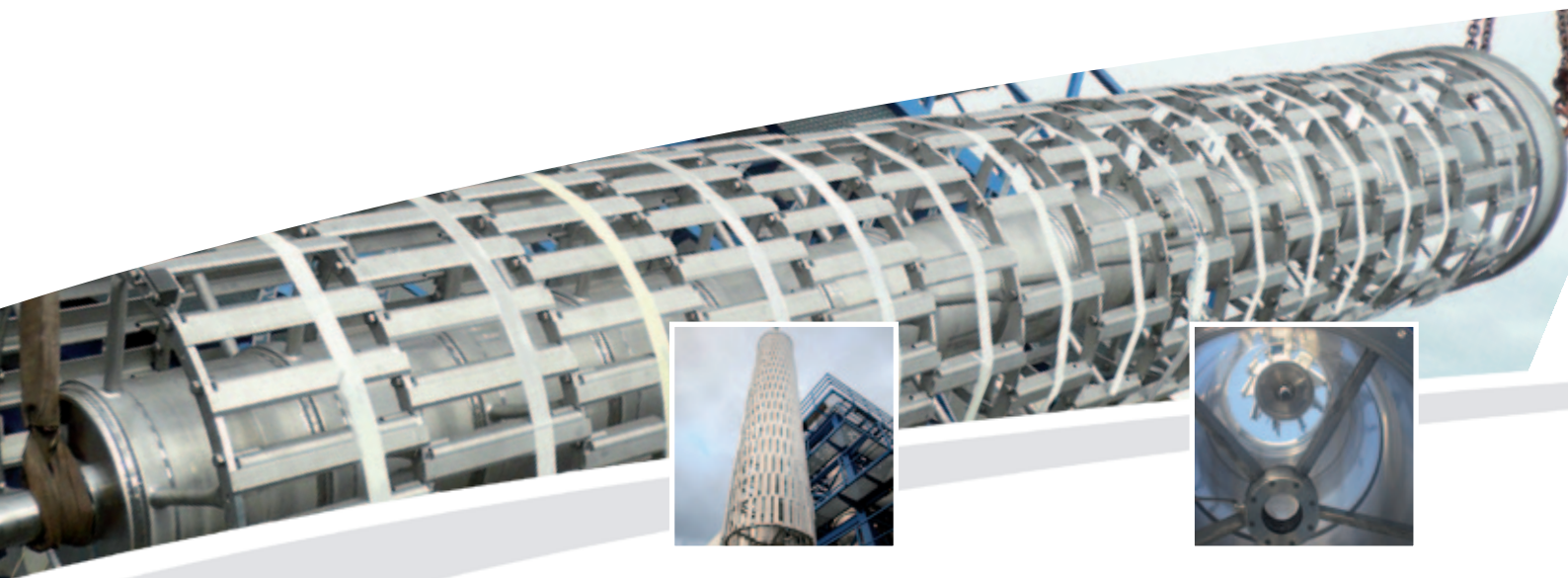


## Product solutions from A-Z

- |                           |                           |                             |                             |
|---------------------------|---------------------------|-----------------------------|-----------------------------|
| - Acetic acid             | - Fatty                   | - Magnesium chloride        | - Sodium sulphate           |
| - Acetone-water           | - Fatty acids derivatives | - Magnesiumbisulfite liquor | - Solvent                   |
| - Acids                   | - Fatty alcohols          | - Maltose                   | - Sorbitol                  |
| - Acrylic acid            | - Fermentation broth      | - Mash                      | - Soy Protein               |
| - Additives               | - Fiber Solutions         | - Methylene chloride        | - Special Sugar             |
| - Alcoholic solvents      | - Fish oil                | - Monoethylene glycol       | - Spices                    |
| - Aluminas                | - Flavors                 | - Monoglyceride             | - Spinning bath solutions   |
| - Amino acid              | - Formalin                | - Nitric                    | - Starch sugar              |
| - Ammonia solution        | - Fructose                | - Oil emulsion              | - Strength                  |
| - Antibiotics             | - Fuel Additives          | - Oxalate                   | - Sulfate                   |
| - Biodiesel               | - Ferment Leach           | - Palm oil                  | - Sulfite liquor            |
| - Bioethanol              | - Glucose                 | - Paraffin wax              | - Sulfuric                  |
| - Biomass                 | - Glycerin                | - Pectins                   | - Sweeteners                |
| - Black liquor            | - Glycol                  | - Phenol                    | - Tall                      |
| - Butyl                   | - Hexamine                | - Phosphoric acid           | - Tartaric acid derivatives |
| - Calciumchloridesolution | - Hexanol                 | - Polyethylene glycol       | - Tea extract               |
| - Caprolactam             | - Hydrochloric acid       | - Polylactides              | - Toluene                   |
| - Citric acid             | - Industrial sludge       | - Polyols                   | - Trichlorethylene          |
| - Coal Slurry             | - Isoamyl alcohol         | - Polyurethane              | - Triglycerides             |
| - Dextrose                | - Isocyanate              | - Propylamine               | - Vinasses                  |
| - Dichlorobenzene         | - Isopropanol             | - Proteins                  | - Vitamins                  |
| - Diglycerides            | - Lactic acid             | - Saccharides               | - Waste oil / lubricant     |
| - Emulsions               | - Lactose                 | - Saline                    | - Waxes                     |
| - Epoxy resin             | - Landfill leachate       | - Seasoning                 | - Zinc chloride             |
| - Essential oils          | - Lecithin                | - Sewage sludge             | - Waste water               |
| - Ethylene                | - Liquor                  | - Sodium chloride           | - etc.                      |
| - Ethylene chloride       | - Lysine                  | - Sodium hydroxide          |                             |

*You have another  
challenge for us?*

Our experts are with individual consulting  
and new solutions at your disposal!



# *Thin Film Evaporator*

## *Special solutions for demanding tasks*

The Thin Film Evaporator made of high quality materials provides the highest performance and allows even to separate sensitive products in small quantities.

Depending on the manufacturing and product requirements, we develop for each of our clients tailor-made distillation modules. Their heartpiece - individually selected evaporators with perfectly matching rotor types.

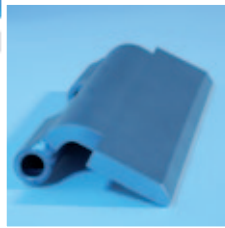
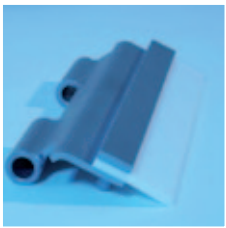
## *Function*

The Thin Film Evaporator consists of a cylindrical, with mechanical precision machined heating surface with external heating and an internal rotor. The mixture is spread on the apparatus head lying rotating distribution system on the circumference and flows the externally with steam or thermaloil heated/external) wall down. In this case, a uniform distribution and a liquid film is produced mechanically by a wiping element. Vortex forms with highly turbulent heat transfer zones, which provide in addition to the achieved good heat transfer for a constant renewal of the heating surface-contacting product on the wiper blades. The result is a gentle evaporation process, which ensures the product quality through shortest possible contact to the heating element and thus under minimized thermal pressure.



## *For each task the matching rotor type*

We have a variety of different rotor - and wiper types. Through individual consultation we will find the perfect solution for your application.



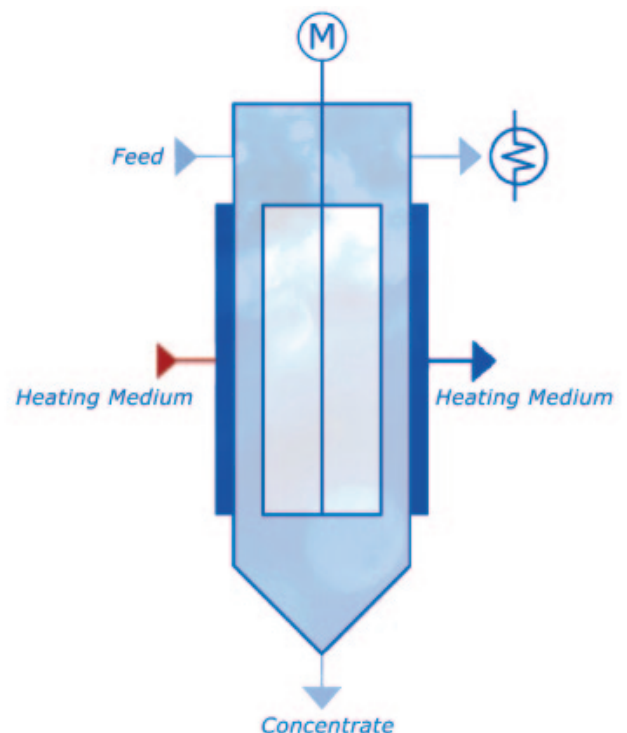
## *Advantages*

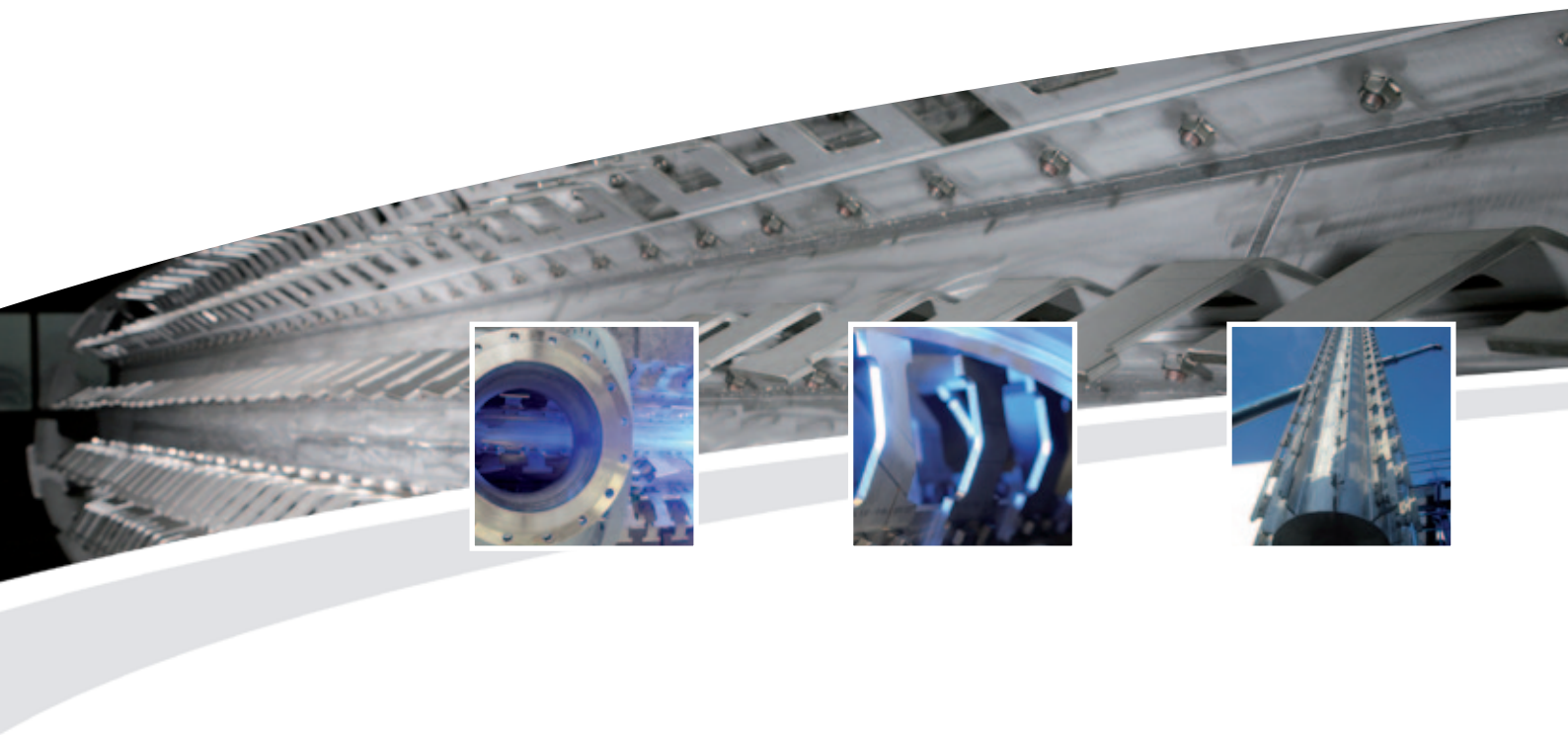
- Individual selection and adjustment of the optimum rotor type
- High evaporation rates
- Short residence time of the product
- Gentle evaporation
- Good heat transfer even with highly viscous or heavily polluted media
- No additional lubrication required
- Reduced maintenance
- Shorter downtime and assembly time for maintenance / inspection
- No corrosion by using suitable materials

## *Applications*

Our Thin Film Evaporators can be used both, for concentration and for purification of recyclables. Exactly tailored to your needs, the devices are particularly suitable for the following performance areas:

- Concentrating of temperature-sensitive products
- Concentrating of viscous media
- Concentrating of structurally media
- Distilling off low boilers from recyclables
- Purification by distillation of products from value-boiling components
- Mass transfer through the thin, constantly renewed film
- Special applications such as e.g.: reboiler for rectification
- Drying





## *Thin Film Dryer*

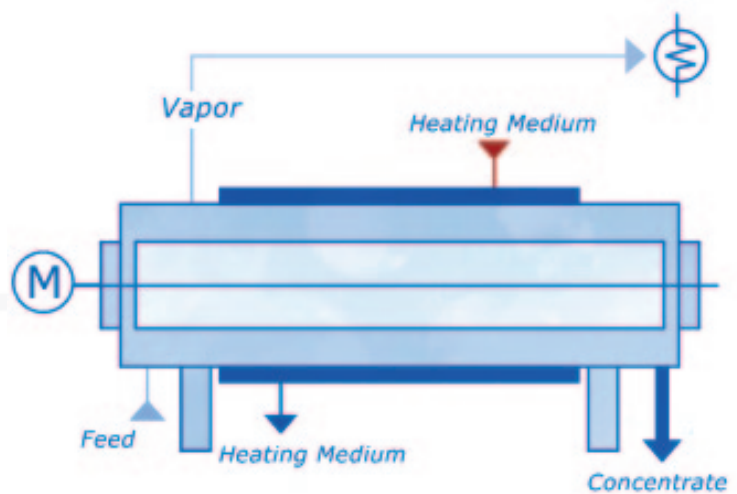
*Reliable solutions for  
solids load-currents to  
pourable products*

Also in the field of drying GIG Karasek provides a wide range of conventional dryer technologies. Get these systems in heat-sensitive products to their limits, the successful Thin Film Evaporator principle ensures gentle processes. Based on their wealth of experience and knowledge of the separation technology, our experts realize powerful vertical and horizontal Thin Film Dryer, convincing both economically and process technology. For individual results, tailored and at market not available, our technical center provides the ideal R&D environment to cover incoming tests etc..





## Horizontal Thin Film Dryer



## Advantages

- Minimal loss of valuable product
- Product protection and purity
- Gentle evaporation by short residence and permanent product turnover
- No deposits on the heating surfaces by mechanical cleaning
- Reduced maintenance through clever design in storage and the mechanical seal

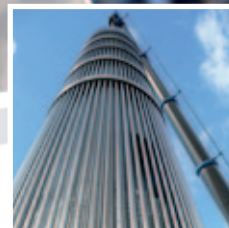
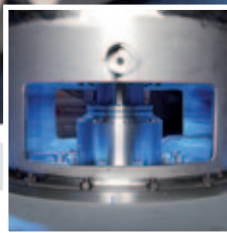
## Applications

The Thin Film Dryer is mainly used in the chemical, pharmaceutical and in the foodstuffs industry. Products such as:

- Chemical products (preproducts and intermediates)
- Sludges (process sludge, industrial sludge and municipal sludge)
- suspensions
- pastes
- Moisture solids
- Saline solutions
- Products of fatty acid industry

## Function

The product is distributed continuously over the entire circumference of the heating wall. Using special wiper elements the wall contact is renewed constantly and the product stream simultaneously transported. The blades do not touch the heating mantle, but prevented crusting or clogging of the heating surface by massively built, arranged with defined gap wiper elements. These wiper design allows liquid feedstock through to powdered dry up. The various units can be used both individually and in combination, and the operator can thus benefit from the advantages of different types of evaporators.



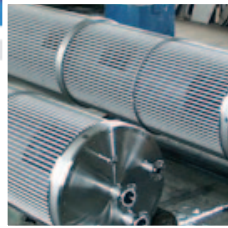
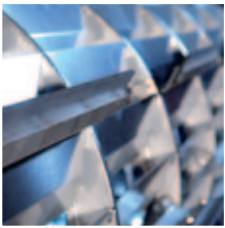
## *Short Path Evaporator*

*Powerpackage for uni-  
versal fields of applica-  
tion*

The GIG Karasek Short Path Evaporator offers a particularly wide range of services in sparse evaporation technology for delicate fabrics. The spectrum of special apparatus reaches from high evaporation to fine vacuum distillation at pressures up to 0.001 mbar. It is based on the same powerful principle as that of the Thin Film Evaporator. The subtle difference lies in the built-in capacitor of Short Path Evaporator, which leads to an even shorter and more gentle evaporation process and greatly minimizes the path of the vapors to the condenser.

## *For each task the matching rotor type*

We have a variety of different rotor - and wiper types. Through individual consultation we will find the perfect solution for your application.



## *Advantages*

- Low pressure loss despite high exhaust steam rate
- Gentle evaporation and therefore suitable for the purification by distillation of many substances that would conventionally not be separated by thermal processes.
- High boiler does not reach the capacitor through efficient drift eliminators
- Through special devices it is possible to draw several distillate fractions and thus to obtain more varied product qualities

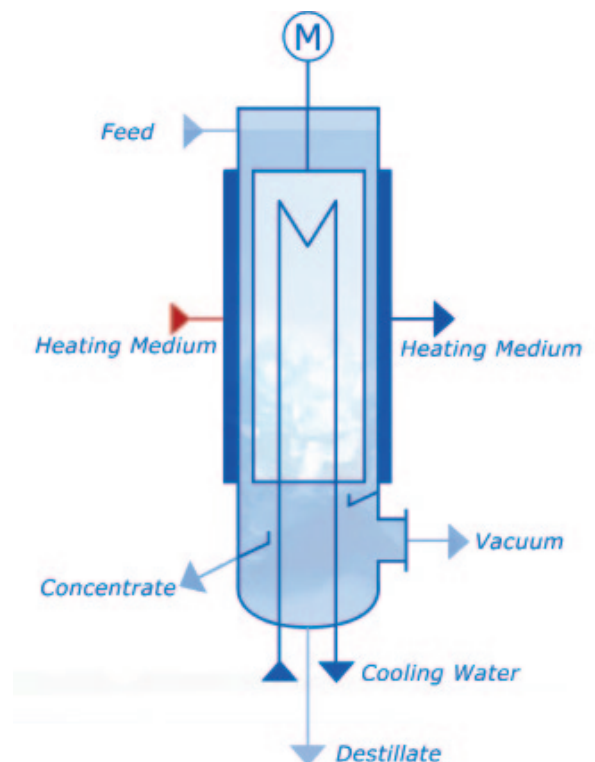
## *Applications*

Short Path Evaporators are used mainly for distilling low-viscosity products:

- Separating extracts
- Extraction of fatty acids, derivatives or sparingly volatile aroma and flavor materials
- Distilling of vitamins

## *Function*

The Short Path Evaporator works on the same principle as the high-performance Thin Film Evaporator. The difference is that it has an integrated capacitor. This makes the path of the vapors to the condenser extremely short.







## *Pilot Plants / Technical Center*

### *Leading because of innovation*

Get to know and convince yourself from new methods of innovative approaches: Our technical team will initiate you into the secrets of pioneering process technology or developed new process steps as tailor-made special solution explicitly for your challenges. Only long-term and sustainably managed research and innovation provides the necessary results in order to optimize the processes of our customers in the future.

- Laboratory tests
- Pilot tests
- Test reports including Scale Up

### *Extensive testing with our own test infrastructure*

To realize every customers requirement - from the individual apparatus to complete systems - the GIG Karasek Technical Center was launched. An extensive infrastructure with all GIG Karasek systems is available for trials purposes. Under perfect adapted conditions your own sample materials meaningful laboratory and pilot tests can be subjected by our proven specialists.


### *Full data transparency and availability*

... are prerequisites for GIG Karasek:

Our systems work with SPS and you receive after your attempts, all data in the form of a comprehensive test report for your further use.

The essential areas of our business activities are

- Process Simulation
- Experimental Procedure
- Cleaning of the system
- Detailed test report
- Attempt accompanied by GIG Karasek process engineer
- Sample quantities



*„GIG Karasek develops technology for the world of tomorrow. To meet every customer's needs and different requirements, our experts realize tailor-made process solutions that can be flexibly adapted to the most individual specifications.“*



### *High quality service, flexible care*

Under perfect adapted conditions your own sample materials can be subjected to proven specialists in meaningful laboratory and pilot tests. All systems are designed for great flexibility, interconnected with each other and, as required for a variety of tasks can be configured and combined. High quality of service accompanies all services at the GIG Karasek Technical Center: We respond flexibly to your wishes and our experts will accompany you from concept to key issues such as investment decisions.

Our testing team consecrates the secrets of pioneering process technology. Only long-term and sustainably managed research and innovation provides the necessary results in order to optimize the processes of our customers in the future.

### *Available Systems*

- Thin Film Evaporator
- Short Path Evaporator
- Falling Film Evaporator
- Forced Circulation Evaporator
- Plate Molecular Evaporator
- Thin Film Dryer  
(Vertical and horizontal)
- Rectification column
- Laboratory glass-flash Evaporator
- Rotovap, batch distillery
- Miniplants

### *Optimization of operating data and systems*

As efficient basis for the development of individual devices to complete systems, the GIG Karasek Technical Center was launched, which can now point to hundreds of successful trials. Thanks to its extensive test infrastructure and the expertise of highly experienced staff optimizing operational data as well as systems are in focus.

### *Main Components*

- Feed tank
- Preheater
- Flash container
- Capacitor
- Discharge pump and weighing tank for residue and distillate
- Vacuum pump with cold trap
- Degasser
- Cold trap for dry ice or liquid nitrogen filling
- Setter
- Circulation pump
- Demister
- Concentrate measuring container
- Distillate measuring tank
- Feed pump
- Radiator, boiler
- Circulation
- Packings, mass transfer trays
- Mobile operator control and monitoring panel

All systems in EX version and able to interconnect them.



## *Research & Development*

### *Customer-oriented R&D for the separation technology of the future*

Expertise and know-how provide the basis of our services. Our Technical Center provides the technological lead for long term performance systems. On the basis of intensive trials, simulations and the development of new approaches, we generate the necessary input for your customized solution. In our Technical Center the entire evaporation process can be carried out by the thin solution through to the bone-dry residue.

### *Advice and support from the beginning*

Experimental projects with GIG Karasek start already early, to accompany and advise you from the beginning:

Before the test, careful planning and the simulation of the concentration or distillation process in pilot scale takes place in cooperation with the customer.

The necessary for the scale-up process data are determined here. Because of many years of experience and methods operations can be carried out in excess of the scale-up factor 2000.

- Pre - Experiments in the laboratory
- Experiment accompanied by process engineer
- Pilot-scale trials
- Determination of the optimal process parameters and performance limits
- Plant optimization
- Preparation of product samples, small quantities, sample quantities
- Test report
- Design of large systems (scale-up)



# GIG Karasek

## Our Portfolio

### Evaporation Technology

- Falling film evaporator
- Forced Circulation evaporator
- Optimization, conversions and expansion
- Detection of possible energy-saving potential

### Thin Film-/Short Path Technology

- Evaporation technology
  - Thin Film Evaporator
  - Short Path Evaporator
- Drying
  - Horizontal Thin Film Dryer
  - Vertical Thin Film Dryer
- Evaporation plants

### Special Process Equipment

- Special constructions including performance guarantees
- Processing of special materials
- Heat exchangers, columns, tanks, reactors
- Pharmaceutical containers and vessels, fermenters, tanks with and without agitator

### Our Service

- Advice and analysis of problems and development of new technologies
- Creation of profitability and feasibility studies
- Conducting laboratory pilot tests
- Procedural process design  
incl. EMSR
- Full implementation including:
  - Basic & Detail Engineering
  - Own production, including heating and cooling units
  - Qualification for the entire project management
  - Delivery and apparatus, pipeline and EMSR installation
  - Commissioning and personnel training
  - Maintenance, service and performance guarantee

### Approvals and Standards

For all information regarding our approvals, certificates, etc., please visit our website.

[www.gigkarasek.com](http://www.gigkarasek.com).

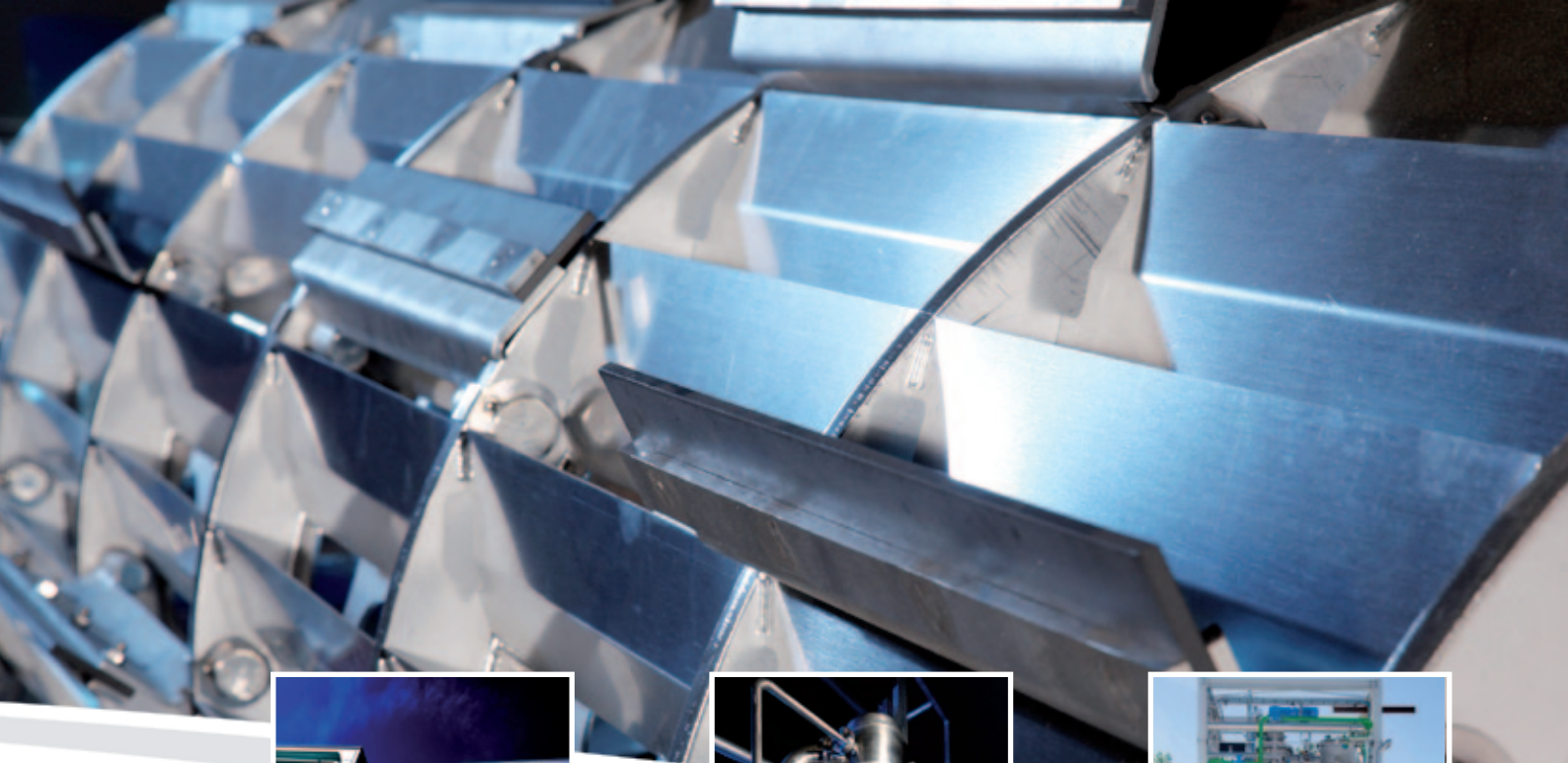
## Highest Quality is our Standard!

### Equipment for the world of tomorrow.

We are your first contact for demanding process solutions and plant projects. For decades, we support our international customers in the fields: chemical, paper & pulp, food and pharmaceutical industries. Our specialty of expertise are in the fields of distillation, evaporation and drying. We also manufacture according to customer requirements and needs special process equipment for different procedural applications. With our own laboratory / technical center we offer our customers full service support. Because of our laboratory we remain constantly on the pulse of time and develop new technologies.

### Our Edge - Experts with experience and manufacturing expertise

We know what industrial production processes benefit and create custom (Complete-)solutions from A to Z, which are tailored to the specific customer requirements. We offer our customers our expertise in consulting, lab and pilot testing, planning, engineering, production and commissioning of functional units or complete process steps for the most diverse applications. We support independent in complete systems from the scope of the project as well as in the sustainable optimization, conversions and extensions.



Where traditional methods reach their limits, the GIG Karasek Thin Film- / Short Path Technology is used: For very temperature sensitive products our proven experts develop solutions to specific problems, tailored to your requirements and in this individual form. A high efficiency and personal all-round service from a single source make GIG Karasek especially for special solutions a reliable partner.

Contact us

## *Thin Film-/ Short Path Technology*

GIG Karasek GmbH  
A-2640 Gloggnitz-Stuppach  
Neusiedlerstrasse 15-19  
AUSTRIA

Tel.: +43 / 2662 / 42780  
Fax: +43 / 2662 / 42824

[dsv@gigkarasek.at](mailto:dsv@gigkarasek.at)  
[www.gigkarasek.com](http://www.gigkarasek.com)

