UIC

# **Pioneer**
# in Short Path Distillation

# UIC – a leading **global supplier**

UIC GmbH, a 100% subsidiary VTA Verfahrenstechnische Anlagen GmbH & Co. KG, is a leading global supplier of systems and components for the gentle distillation of liquid mixtures in both rough and fine vacuum – in the fields of Short Path Distillation and Thin Film Evaporation.

We provide the highest standard of systems engineering in the field of vacuum engineering and process engineering. We can draw on decades of experience in this sector: many engineering innovations in the field of vacuum distillation and a wide range of important milestones in implementing innovative and complex system concepts are closely linked to us.

**1952** Initial development of Short Path Distillation at Leybold (Cologne)

**1972** Merger with Hochvakuum-Heraeus generates Leybold-Heraeus; Relocation of SPD division to Hanau

**1989** UIC Inc. (USA) aquires SPD division; foundation of UIC GmbH

**1993** Certification according to ISO 9001

**1998** Acquisition of UIC GmbH by Karl Griesser Apparatebau

**2000** Management buy-out of UIC GmbH

**2002** Adoption of ISO 9001:2000

**2008** Acquisition of UIC GmbH by BDI BioDiesel International AG

**2014** 25th anniversary of UIC and substantial expansion of the UIC premises with a new office building & construction hall; introduction of a new corporate design

**2015** Modernisation and extention of R&D and Process Development Center doubling its capacity

**2016** Acquisition of UIC GmbH by VTA Verfahrenstechnische Anlagen GmbH & Co. KG

**2018**

# 10 FACTS ABOUT US

**1** MORE THAN **2000 PLANTS** WORLDWIDE

**2** **EXCELLENCE** MADE IN GERMANY

**3** **TAILOR-MADE** TURN-KEY PLANTS

**4** **PLANT DESIGN,** ENGINEERING AND CONSTRUCTION

**5** **ULTRAMODERN** IN-HOUSE PROCESS DEVELOPMENT CENTER

**6** 65 YEARS OF **EXPERIENCE**

**7** **EXPERT IN** SHORT PATH DISTILLATION

**8** **15.000** DOCUMENTED **CUSTOMER TRIALS**

**9** **THIN FILM** EVAPORATION

**10** **WORLDWIDE** ON-SITE SUPPORT

# our solutions **for your requirements**

## LABORATORY PLANTS

UIC laboratory plants are preferably used in research and development laboratories where they are applied in a wide range of distillation tasks. They are of a modular structure and enable flexible adjustments. We do offer lab plants sizes in the range of 100 grams per hour up to 10 kilograms per hour.

Core components of all our lab plants are made of borosilicate glass, resistant to corrosive media. Our lab plants are heated by thermal oil. Maximum evaporation temperatures achievable are between 250° C and 350 °C. Minimum pressures of 0.001 mbar can be achieved depending on the vacuum system selected.

**Your benefits:**

- UIC lab plants can be quickly started up and are easy to operate
- UIC lab plants can be quickly dismantled and cleaned – this ensures short setup times
- Glass system enables direct observation of the distillation process

## PILOT PLANTS

Process development/optimization, sample production, and product development are areas of application for UIC pilot plants. They can also be used for optimizing production plants. This way, critical operating parameters can be identified and optimized, increasing efficiency parallel to the production process is easily feasible.

The pilot plant series by UIC includes both mini plants with approx. 3–9 kilograms per hour throughput up to small production plants with 30 kilograms per hour.

**Individual or modular system?**

Depending on the customer requirements, UIC pilot plants and laboratory units can be modularly put together. Shortest delivery times and flexible adjustments thanks to module expansion are main advantages of this modular system. Of course, we also deliver tailor-made pilot plants on request.

**Your benefits:**

- UIC pilot plants are extremely well-suited for scale-up processes

## INDUSTRIAL PLANTS

Industrial-scale plants of UIC are manufactured individually according to customer requirements. Our scope ranges from small plants (e.g. for pharmaceutical or cosmetic industry) to very large installations with over 100 m² evaporation surface and flows of several tons per hour (e.g. in the food sector or polymer industry).

**Turn-key plants**

Our scope of supply is based on your specific requirements and ranges from individual components all the way to turn-key plants. This includes main vessels, heat exchangers, vacuum system, piping, instrumentation and PLC system. We offer the full package: engineering, design, construction and assembly of your plant. Commissioning is provided by our own staff – worldwide.

**Your benefits:**

- Less staff requirements during project implementation by extensive reduction of interfaces
- Reliability concerning costs and deadlines
- Safe functionality based on perfectly coordinated components

# process development center
## for customer trials

**We operate a Process Development Center in-house for the execution of feasibility studies and pilot tests, equipped with lab and pilot systems which can be individually configured for your specific needs and applications.**

### FEASIBILITY

- Our successful laboratory glass systems enable observation of product behavior (foaming, splashing, depositing, etc.) during distillation.
- Small product volumes (1–5 kg) suffice for such preliminary tests.
- Short Path Distillators and Thin Film Evaporators with optional Rectification are available for such feasibility studies.

### CONFIDENTIALITY

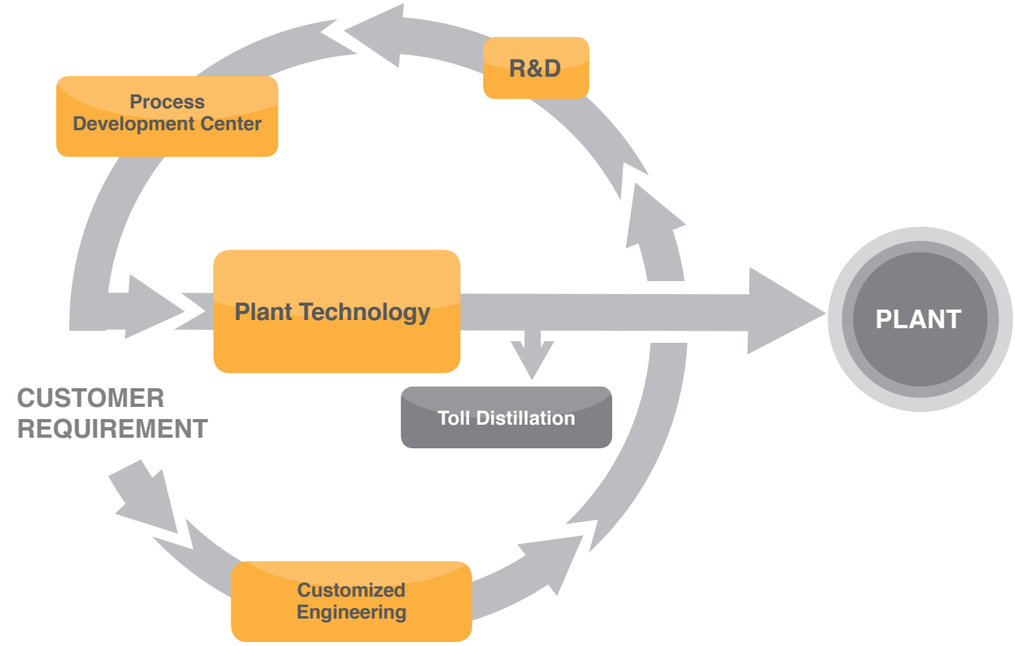
- As a reliable partner, we fully respect your sensitive product information.
- Customer trials welcome.
- Our Process Development Center provides the unique opportunity of executing tests to define customized process engineering parameters.

### LAYOUT PLANNING

- Various pilot plants are available to define and optimize subsequent process parameters.
- Best feed rates as well as achievable quality and yield of the subsequent large-scale plant can be determined here under genuine production conditions.
- We offer you a process guarantee for your customized system, based on our layout tests.

### YOUR BENEFITS

- **Maximum flexibility of our Process Development Center facilities**
- **Numerous combinations of various components**
- **Ideal solutions for your separation challenge.**




### CAT – CUSTOMER ADVANCED TECHNOLOGY

A team of experts with just one objective – to shorten the time from the original idea to the finished plant – is available to customers from pharmaceutical, polymer- and recycling industries. CAT – Customer Advanced Technology acts as a major catalyst here. During the process development, the customer will be supported by the CAT team.

First of all, process parameters and plant parameters are developed, starting with joint development of the basic process design, including the necessary research and tests involving UIC's in-house research and development department and technical facilities.

While the distillation equipment is being built based on these data, our CAT customer can already start marketing his new product: thanks to sample production by UIC via a toll distillation agreement.

This ensures no valuable time is lost in the market launch phase. As a result, new vacuum distillation products and processes can be developed quickly and cost efficiently.

# applications

## BIODIESEL

High quality BioDiesel Distillation is indispensable for biodiesel standards, in particular in the use of waste and contaminated fats. The major quantity of the biodiesel is distilled in a Falling Film Evaporator and a Rectification Column.

BIODIESEL BASED ON
> animal fats
> used cooking oils (UCOME)
> free fatty acids

PROCESSED MATERIALS
> pyrolysis oil
> glycerol

## FINE CHEMISTRY

The separation of reaction mixtures and the improved quality of synthetic products is a common challenge in fine chemistry which is often achieved using Short Path Distillation. Even complex and thermal sensitive molecules can generally be distilled under gentle conditions.

PROCESSED MATERIALS
> silicone oils
> lactic acid
> synthetic vitamins
> additives
> plasticizers
> UV stabilizers
> polyols

## FISH OIL

Many fish oils are significantly loaded with what are known as POPs (Persistent Organic Pollutants). This includes derivatives from the class of dioxins, furans, polychlorinated or polybrominated biphenyls (PBB, PCB), diphenyl ethers etc. The partly highly toxic chemical components can be extensively removed from the fish oil using Short Path Distillation.

PROCESSED MATERIALS
> fish oil
> fish oil ethyl esters
> omega-3-concentrates
> colesterol removal

## RECYCLING

Our Short Path Distillators and Thin Film Evaporators are used due to the low evaporation temperatures required. Other applications are the distillation of reusable materials from waste oils and the recovery of hydraulic oils.

PROCESSED MATERIALS
> lubricating oils
> used oils (waste oils)
> solvents
> base oils

## POLYMERS

Polymers are either synthesized directly from monomers using the interimstep of the prepolymer. The quality of monomers or prepolymers is of decisive importance for the properties of the polymer. These can often be produced with very high purity using single or dual stage Short Path Distillation.

PROCESSED MATERIALS
> polyurethanes
> epoxy resins
> acrylates
> polyethylene waxes
> polyglycolethers
> monomers & prepolymers

## FOOD

Foodstuffs often contain natural or synthetic additives to improve product characteristics. This includes, in addition to flavourings and sugar derivatives, different emulsifiers (monoglycerides and diglycerides), anti-oxidants and also physiologically active materials such as Ω-3 fatty acid derivatives or vitamins. These additives can often be purified by Short Path Distillation.

PROCESSED MATERIALS
> monoglycerides
> diglycerides
> oleoresins
> herb extracts
> sterols
> flavors
> sugar derivatives
> fruit concentrates

## OILS & FATS

Oils and fats include all triglycerides of plant and animal origin as well as the derivatives produced from these (downstream products). It is UIC's goal to assist and support you optimizing the value creation right at the source as most of these products can easily be produced in better qualities through Thin Film Evaporation or Short Path Distillation.

PROCESSED MATERIALS
> palm oil products
> free fatty acids
> tall oil sterols
> natural waxes
> tar
> essential oils
> squalene
> resin acids

## PHARMA

Our processes are often used in pharmaceutical related tasks or in the production of intermediates (API). To extract valuable substances, either as distillate or residue, the application of GMP standards is often required.

PROCESSED MATERIALS
> pharma intermediates (API)
> THC
> tocopherol, tocotrienol (vitamin E)
> carotene (vitamin A)
> alkaloid derivatives
> jasmine oils (cosmetics)
> fragrances (cosmetics)
> shea butter (cosmetics)

always one step

# ahead

**To ensure a smooth process during the project and to guarantee the quality of our plants, we provide every single step associated with the construction of the plants.**

## CERTIFICATION

- Certified pursuant to ISO 9001:2008
- Application of rules and standards according to European directives, such as AD2000 or DIN and EN norms
- Support on request of ASME (USA), JIS (Japan), MOM (Singapore) or Chinastamp
- Special directives, such as ATEX, GAMP or GMP are offered on request
- Fitting with various PLC systems (e.g. Siemens S7 (TIA), Allen Bradley, ABB). We can also provide process visualization, e.g. with WinCC (TIA)

## PLANT CONSTRUCTION

- Wide range of materials:. Standard material used is stainless steel (e.g. 1.4571, 1.4404, 1.4301, 1.4462). Special materials such as e.g. Hastelloy or Tantalum
- Support of steel structure and thermal insulation on request

## REMOTE SUPPORT

- Fitted with a remote control interface to ensure a swift response
- Regular servicing by our qualified staff to ensure an ideal condition of the plant
- Competent support via telephone, remote servicing or help on site

## UPGRADING REQUEST

- Support by retrofitting your system – whenever you want to distill new products or an extension of the production capacity

## AFTER SALES SERVICES

- Assembly and commissioning of your system
- Several thousand parts are always on stock – any other parts are provided within a very short time from our authorized suppliers
- Instruction and training for your staff within the scope of commissioning, servicing work or as separate sessions

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