APPLICATION *stories*

Excellence in evaporation with Hei-VOLUME Distimatic

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research made easy

Content

Excellence in evaporation with Hei-VOLUME Distimatic

What do researchers in the agricultural sector, the dairy industry, nuclear power plants, car manufacturers, and gin distilleries have in common? They all work with rotary evaporators with an automatic module that takes over the job of filling and emptying the system.

This automation offers the following advantages:

- **It increases the daily throughput**
- **It decreases running costs**
- **It saves time and makes better use of personnel**

To show you the wide variety of possible applications for the Hei-VOLUME Distimatic automatic modules, we have put together the most exciting applications of our customers for you in this booklet.

Enjoy discovering the possibilities!

Concentration of animal manure for cost optimization

Farms often generate more manure than the farm can spread on its own fields. That is why liquid manure is often transported for kilometers to other companies, where it is spread or destroyed. This incurs enormous costs and the environment is also polluted by the emissions from the vehicles.

Research is being conducted to reduce both factors by concentrating the liquid manure with a rotary evaporator. Part of the water is withdrawn – this reduces the volume to be transported – and at the same time the nutrient content in the concentrate increases.

For this purpose, a university from South Korea* first tested the Distimatic Benchtop Integration Package 24/7 for the distillation of up to 1.4 liters of water per hour. In the meantime the customer has acquired a Hei-VAP Industrial Distimatic System in order to multiply its throughput.

DISTIMATIC BENCHTOP INTEGRATION PAKET 24/7

- **Entry model to distill up to 33.6 liters of water per day**
- **The automatic module automatically takes over the dosing of the medium and transfers the distilled water and the liquid manure concentrate into any container**
- **Particularly space-saving**

HEI-VAP INDUSTRIAL R WITH HEI-VOLUME DISTIMATIC

- **Distill up to 105 liters of water per day**
- **The automatic module automatically takes over the dosing of the medium and transfers the distilled water and the liquid manure concentrate into any container.**
- **Extremely efficient**

* Anonymized on customer request

APPLICATION *story 2*

Concentration of water samples

Radionuclides and heavy metals are routinely analysed in surface and groundwater, drinking water and other types of water. This is often used for monitoring nuclear power plants. For this purpose, large amounts of water must be concentrated in order to make it possible to detect the residues. The use of a fully automatic large-scale rotary evaporator makes this step particularly efficient and time-saving by operating it overnight.

The analysis laboratory of a German nuclear power plant* has replaced its manual rotary evaporator system with the Distimatic Industrial Platinum 8 package. With a rate of 4.6 liters of water per hour, the required amount of 70 liters per day can be efficiently processed. In addition, the automated system saves one working hour per day.

DISTIMATIC INDUSTRIAL PLATINUM 8 PACKAGE

- **Process up to 110 liters of water per day with a high-performance glassware**
- **The automatic module takes over the additional dosing of water independently**
- **Save daily working hours and noticeably increase efficiency**

* Anonymized on customer request

Concentration for lactose crystallization

Lactose (milk sugar) is one of the most important by-products of cow's milk. Lactose is used as a filler or fat binder in the food industry, and as a filler, binder and adsorbent in the pharmaceutical industry.

In the production of lactose, the whey is first clarified by the dairy and the cream is separated. Fat and proteins are removed from the whey and the milk permeate obtained in this way is then concentrated to a dry matter of 60 % until 70 % using a rotary evaporator. The lactose is then crystallized from this dry matter.

A dairy from Bavaria* uses a Distimatic Industrial Platinum 8 package and works in TIME mode to control the process exactly below the crystallization limit. In addition, a special rotary flask with sample connection was manufactured for the customer to enable sampling during the process.

DISTIMATIC INDUSTRIAL PLATINUM 8 PACKAGE

- **Control processes particularly precisely with the TIME mode**
- **The automatic module automatically takes over the additional dosage of the milk permeate into the rotary flask**
- **As a customized solution with sample connection on the rotary flask**

* Anonymized on customer request

APPLICATION *story 4*

Cleaning of wastewater in nuclear power plants

A large amount of wastewater is produced in nuclear power plants. This contains low-radioactive impurities in very high dilution. In order to reduce both the high disposal costs and the amount of waste, the radioactive water is concentrated using large-scale rotary evaporators. In this way, a large proportion of the water can be recovered and only the concentrates have to be disposed of.

A nuclear power plant in Northern Germany* operates with several Distimatic Industrial Platinum 8 packages. This results in a distillation rate of up to 4.4 liters of water per hour per system.

DISTIMATIC INDUSTRIAL PLATINUM 8 PACKAGE

- **High-performance glass-ware set with riser tube for the best possible separation of impurities and water**
- **Processing of large quantities of wastewater through the automatic make-up in the evaporation flask**
- **Recover up to 105 liters of water per day safely and unattended in 24/7 operation**

* Anonymized on customer request

APPLICATION *story 5*

Sample preparation for the study of rainwater radioactivity

In order to find a connection between various global events and radioactivity in the atmosphere, rainwater is examined. Fluctuations over the course of the year are also recorded. The collected water is mixed with nitric acid and then concentrated with a large-scale rotary evaporator for further analysis.

A Bavarian institute for radiation research * is using a Distimatic Industrial Platinum 2 package for this purpose. The rainwater is collected in 40 liters canisters, mixed with the acid and processed automatically at a heating bath temperature of 80 °C. The result are 1 to 2 liters of concentrate. The throughput is approximately 300 litres per month.

DISTIMATIC INDUSTRIAL PLATINUM 2 PACKAGE

- **Glassware set with expansion vessel prevents foaming and splashing**
- **The automatic module automatically takes over the dosing of the medium and transfers condensate and residue into any container**
- **Highly resistant materials allow working with highly concentrated acids**

* Anonymized on customer request

APPLICATION *story 6*

Solvent recovery after chromatography

Substance separations for customers in the pharmaceutical, biochemistry and agrochemicals sectors are carried out in contract laboratories for chromatography. After the separation process, the chromatographic fractions are present at very high dilution. With the help of large-scale rotary evaporators, the solvent mixture is separated from the synthetic intermediates and active ingredients contained therein.

A French contract laboratory * for enantioselective chromatography processes the large amounts of elution with several Distimatic Industrial Platinum 8 packages. The solvents processed include acetonitrile, heptane, methanol, ethanol, propanol, and acetone. The throughput per system is 22 to 33 liters per day, 5 days a week in day and night operation.

DISTIMATIC INDUSTRIAL PLATINUM 8 PACKAGE

- **High performance glass-ware set for highest throughput**
- **High resistance and FDA conformity of all media-contacting materials allow the processing of a wide range of media**
- **Safe and unattended — work efficiently around the clock**

* Anonymized on customer request

APPLICATION *story 7*

Recycling solvents for cleaning

Laboratory and production equipment is often rinsed with acetone, ethanol or isopropanol after their use. The contaminated solvent is often collected in canisters as a liquid waste. In this way, large quantities accumulate every week, which must be properly stored until removal and then disposed of for a fee.

Not only does the removal of the solvents used for cleaning have an impact on costs and space, but also their purchase and storage. In addition, such handling of solvents is not environmentally friendly.

The investment in an automated rotary evaporator system for recycling these solvents provides a remedy here. For example, a South German company* that manufactures pharmaceuticals and medical products has purchased the Distimatic Industrial Platinum 8 package. The acetone used for rinsing is separated from the impurities, including silicone oil, so that it can be reused as a cleaning agent. With a distillation rate of up to 25.5 l per hour, the purified solvent is quickly available again.

DISTIMATIC INDUSTRIAL PLATINUM 8 PACKAGE

- **High performance glass-ware set, especially suitable for solvents used for cleaning**
- **Work more efficiently by cleaning up the flushing solvents overnight**
- **Exchange or filling of the feed vessel is possible at any time during operation**

* Anonymized on customer request

APPLICATION *story 8*

Greater sustainability through the recycling of cleaning fluid in the automotive industry

Before measuring and testing test engines and prototypes in automotive manufacturing, the workpieces are cleaned. This cleaning process produces several liters of contaminated cleaning fluid every day. Recycling these fluids for reuse not only pays off in terms of production sustainability, but also leads to long-term cost savings.

To recycle the cleaning fluid, one German car manufacturer* uses the Distimatic Platinum 5 Package. The automatic module allows any quantity of the cleaning fluid, however large, to be distilled with minimal effort.

In the car manufacturer's plant, batches of 30 liters each are distilled in this way at a very high evaporation rate, with only a 2 % loss of cleaning agent for every 10 liters. The Hei-VOLUME Distimatic is operated in TIME MODE to ensure low losses and the fastest possible distillation at the same time. Once the process is complete, the recycled cleaning liquid is left in the collecting vessel, with the dirt particles remaining in the evaporation flask in the form of residues.

DISTIMATIC INDUSTRIAL PLATINUM 5 PACKAGE

- **Glassware with expansion vessel for processing foaming mixtures**
- **Work in the time-controlled mode of the Hei-VOLUME Distimatic automatic module with maximum performance**
- **Process large volumes safely and unattended – even overnight**

Injection molding production samples

Cleaning with solvent

Quality control – measuring dimensions

* Anonymized on customer request

APPLICATION *story 9*

Solvent recovery from stevia extracts

When extracting plant substances, large volumes of extraction solution are produced. If the end product is to be suitable for consumption later on, ethanol is often the solvent of choice. This is also the case in the production of the natural sweetener stevia. Ethanol is used to extract the desired stevioglycosides from the plant material, which then has to be separated again on the rotary evaporator.

One stevia producer from Thailand* uses three large-scale Heidolph rotary evaporators for this purpose. Two Laborota 20 (predecessor of Hei-VAP Industrial) are operated manually to process volumes of up to 40 liters. In addition, a Distimatic Industrial Platinum 7 Package is used to automatically process extract volumes of up to 50 liters per day. The system operates at a heating bath temperature of 50 °C, a cooling temperature of 10 °C, and within a range of 150 to 200 mbar.

DISTIMATIC INDUSTRIAL PLATINUM 7 PACKAGE

- **High performance glassware for maximum throughput**
- **FDA conformity of all media-contacting materials allows foodstuffs to be processed**
- **Extraction solvents can be reused multiple times thanks to very good separation performance**

* Anonymized on customer request

Extraction of medicinal plants for analysis

Extraction is an important step in the analysis of medicinal plants. In this process, the chemical components are extracted from the plant material for further separation and analysis. This allows, for example, the substance in a plant that is responsible for its medicinal effect to be determined.

This is what one customer from India* does to obtain plant extracts: The company processes a wide variety of medicinal and aromatic plants, including tea, roses, stevia leaves, marigolds, and lavender. The plants are washed and then either traditionally dried in the oven or freeze-dried. Then the plant material is ground to increase the surface area in contact with the solvent system chosen for extraction. This is followed by the actual extraction step, in which the plant material is extracted with various organic-aqueous solutions in a large-scale rotary evaporator and separated from the solvent directly afterwards. During the entire process, special attention must be paid to ensuring that potentially active substances are not lost, altered, or destroyed.

For this purpose, the customer uses a Laborota 20 (predecessor of Hei-VAP Industrial) for the manual processing of smaller batches and a Distimatic Industrial Platinum 6 Package for the automated processing of larger volumes.

DISTIMATIC INDUSTRIAL PLATINUM 6 PACKAGE

- **Glassware with backflow valve for extraction**
- **Extraction solvents can be reused multiple times thanks to very good separation performance**
- **Large volumes of extracts can be processed automatically**

* Anonymized on customer request

APPLICATION *story 11*

Production of botanicals for gin

The secret of gin lies in the composition of the different spices and aromas used to create the flavor of the spirit. Besides the typical juniper flavor, gin distilleries use many other extracts of spices, herbs, and fruits (botanicals) to give their product its distinctive aroma.

During production, the desired flavor components are mixed with and soaked in neutral alcohol (maceration). In the process, it is possible to either make a defined mixture of botanicals at once or prepare each component individually and then combine them to achieve the desired result. Maceration is followed by distillation, for which purpose large rotary evaporators are being used more and more due to the gentler conditions they offer.

One Australian gin distillery* prepares its botanicals individually in large canisters and uses a Distimatic Industrial Platinum 8 Package for the distillation process. These are then blended with their traditionally distilled gin in a carefully developed ratio. This gives the final product the traditional flavor of gin, combined with fresh, pure aromas that stand out in their uniqueness.

DISTIMATIC INDUSTRIAL PLATINUM 8 PACKAGE

- **High-performance glassware for maximum throughput in the distillation of botanicals**
- **FDA conformity of all media-contacting materials allows foodstuffs to be processed**
- **Large volumes of extracts can be processed automatically**

* Anonymized on customer request

Solvent recovery after plant extraction

When extracting plants for medicinal purposes, the solvent required is a major investment. For this reason, manufacturers of plant extracts make every effort to recover their used extraction solvent in high purity in order to feed it back into the process.

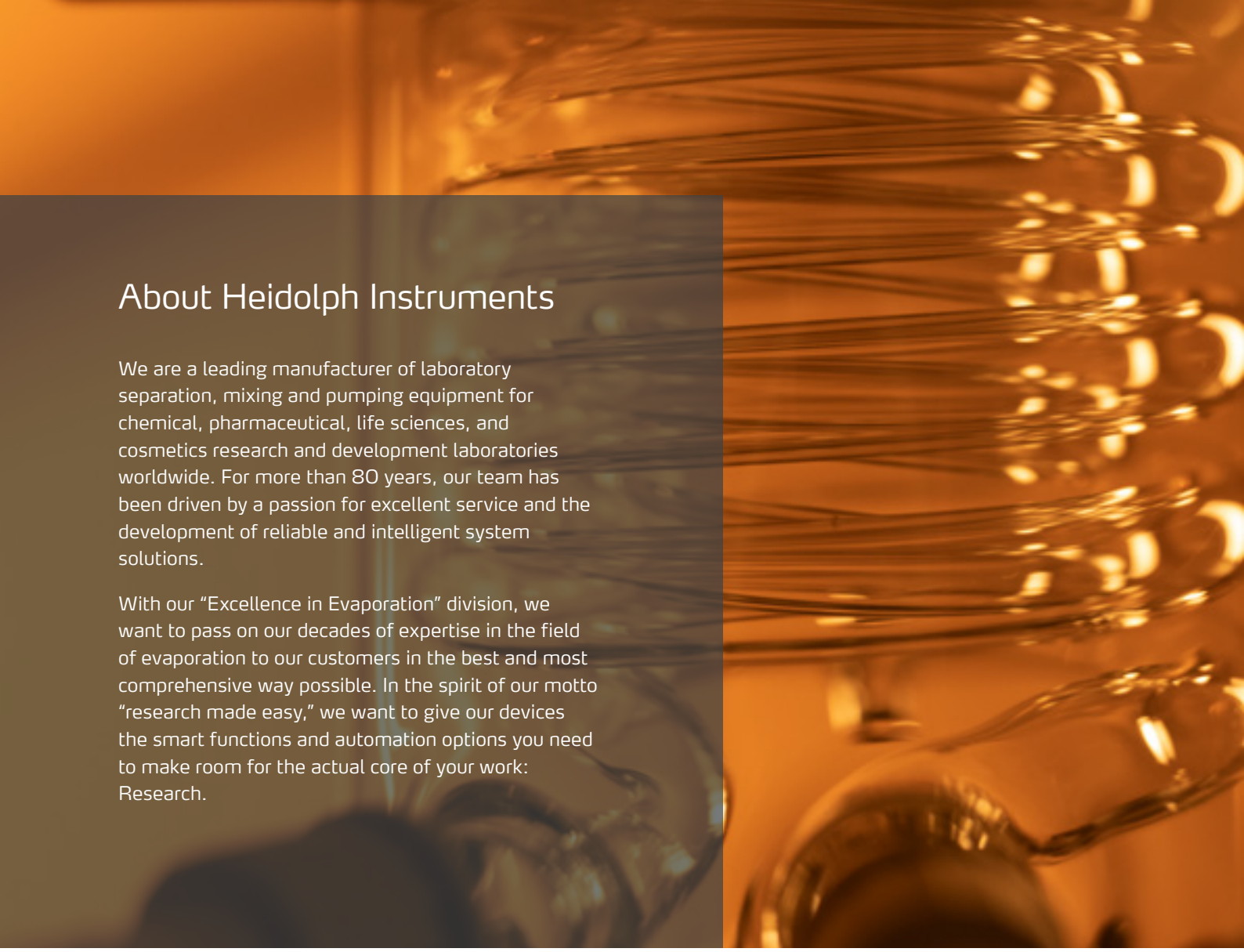
Among the solvents used in extraction processes, ethanol is one of the most popular. The main reason is its low toxicity and easy handling compared to other solvents.

One American plant extract manufacturer* uses a Distimatic Industrial Platinum 7 Package to automatically recover 290 liters of ethanol per day.

DISTIMATIC INDUSTRIAL PLATINUM 7 PACKAGE

- **High performance glass-ware for maximum throughput**
- **Extraction solvents can be reused multiple times thanks to very good separation performance**
- **Recover up to 290 liters of ethanol per day safely and unattended in 24/7 operation**

* Anonymized on customer request



About Heidolph Instruments

We are a leading manufacturer of laboratory separation, mixing and pumping equipment for chemical, pharmaceutical, life sciences, and cosmetics research and development laboratories worldwide. For more than 80 years, our team has been driven by a passion for excellent service and the development of reliable and intelligent system solutions.

With our “Excellence in Evaporation” division, we want to pass on our decades of expertise in the field of evaporation to our customers in the best and most comprehensive way possible. In the spirit of our motto “research made easy,” we want to give our devices the smart functions and automation options you need to make room for the actual core of your work: Research.

ANY QUESTIONS? CONTACT US:

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