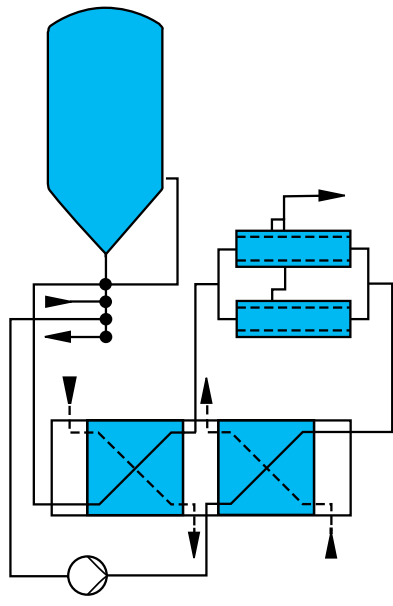


Innopro

Process Technology



KHS Process Technology –

Process engineering solutions for water, soft drinks, juice, wine, beer, and mixed beer beverages. From raw materials to ready-to-drink beverages.



■ Innopro System Engineering – All from a One Source	4
■ PARAMIX CMX – Always a Perfect Blend!	6
■ CONTIMIX CCMX – Gets Everything Mixed Up	8
■ BATCHMIX BMX – Continuous Dosing to Mixing Tanks	10
■ DELTA Jet K and B Sugar Dissolvers – (Dis)solve All Problems with Equipment from KHS	11
■ Syrup Room – All You Need to Produce Mixed Beverages	12
■ CIP and SIP Systems – Meticulously Immaculate Right Down the Line	13
■ Innopro DX, DOX, and DK Water Deaeration – Low Oxygen Content Maintains Freshness	14
■ Innopro DS Juice Deaeration – Foamless with Flavor Recovery	15
■ Innopro HBG High Gravity Blending – Capacity Increase with Minimum Investment	16
■ Innopro KZE – Flash Pasteurizers – Gentle-to-product Pasteurizing	17
■ ACF Process Engineering – Aseptic Product Preparation and ACF Filling from One Source	18
■ Measurement and Control Engineering – Safety for Products and Processes	20
■ Perfect Control – Everything under Control	21
■ Project Planning and Engineering – A Comprehensive KHS Service Package	22

The information contained in this brochure is non-binding.
Only the technical specifications of our quotes are determinative with regard to design and scope of delivery.
Subject to design modifications.

Innopro System Engineering – All from a One Source



■ Your individual requirements and local conditions are the basis.

You get a tailored solution.

As a complete line or standalone equipment.

From the planning stage to commissioning.

■ The successful Innopro concept includes:

Analysis of the overall process.

Concept and design of the process components as compact systems.

Optimum integration of peripherals into the process without interfaces to the filling line.

Engineering and installation.

Process visualization.

Process data acquisition.

You have only one point of contact and profit from KHS' comprehensive know-how.





- KHS offers competence and years of experience in system engineering for:
 - Sugar dissolving and pasteurizing.
 - Syrup and beverage blending.
 - Water deaeration and carbonization.
 - ACF systems.
 - Plate, screen, and candle filters.
 - HGB systems.
 - CIP/SIP sanitizing and disinfection.
 - Project planning and engineering.
 - Automation and visualization.

- You benefit from:
- Quality products
 - Great economy
 - User-friendly operating
 - Production flexibility
 - High operational reliability
 - Environmentally sound processes
 - Alternative and creative solutions

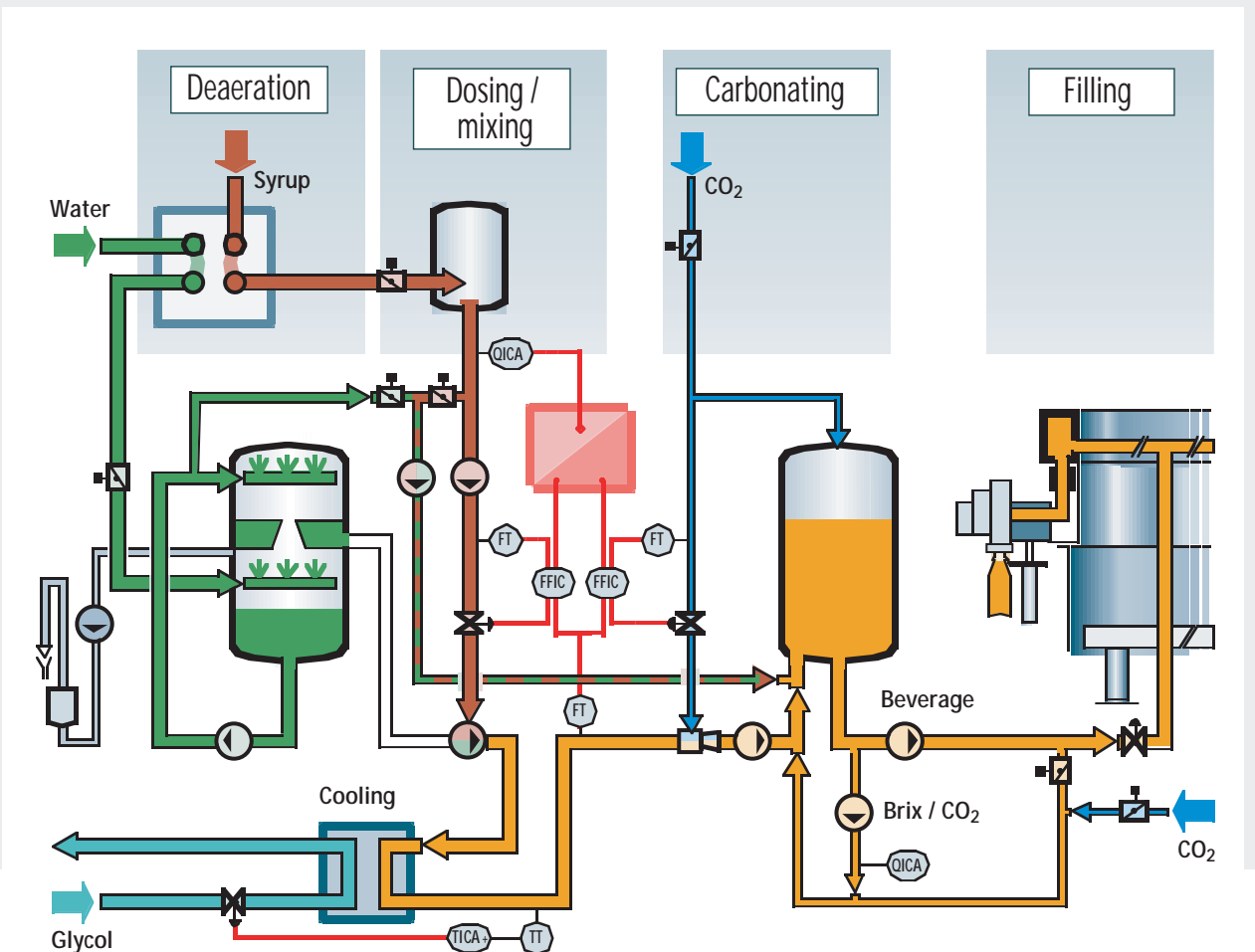


Innopro PARAMIX CMX – Always a Perfect Blend



- Continuous production of carbonated and non-carbonated beverages – cold or warm.
You can deaerate, mix, and carbonate in a single compact unit.

- Your choice of output capacities:
5,000–65,000 l/h
Dosing precision for syrup: $< \pm 0.03^\circ$ Brix
Dosing precision for CO₂: $< \pm 0.1\text{g CO}_2/\text{l}$





■ Performance range of the PARAMIX CMX:

- One- or two-stage vacuum spray deaeration.
- Syrup dosing with ratio control of the flow according to the recipe and proportionally to the beverage output.
- Inline mixing by a special multiple-stage mixing pump.
- Inline carbonating by a special mixing nozzle and carbonation pump.
- Return of the CO₂ displaced in the buffer tank to the carbonation nozzle.
- Fully automatic production and cleaning programs.
- Operating by means of a multiple-line display or menu-assisted touchscreen monitor.

■ For you, modular design and optional equipment alternatives mean:

- Water deaeration according to technological requirements.
- Safe production through Brix and CO₂ measurement and setpoint feed-forward control.
- Mass flowmetering.
- No-dump startup.
- Integrated product cooling.
- Energy-saving buffer tank insulation.
- Recipe backups in recipe storage.
- Visualization of all system statuses.
- Continuous information from product and process data acquisition.

Innopro CONTIMIX CCMX – Gets Everything Mixed Up



- Continuous beverage production through inline dosing of each individual component including CO₂ without the necessity of separate syrup production.

Exceptional flexibility through capabilities for processing a wide range of beverages. Minimum space requirements and low liquid volume.

- CONTIMIX CCMX – the syrup room within a minimum amount of space. For the following capacities: 10,000–80,000 l/h.

Dosing precision for syrup: $< \pm 0.03^\circ$ Brix

Dosing precision of each component:

$< \pm 0.3\%$ of the measured value.

Dosing precision for CO₂: $< \pm 0.1\text{g CO}_2/\text{l}$





- Special characteristic features of the CONTIMIX CCMX:
 - Ratio control dosing of all components including CO₂.
 - Inline mixing by specially developed dosing points.
 - Menu-assisted monitor operating and visualization.
 - Software regulation and control software that guarantee safe dosing precision.
 - Optimum integration in the overall system.
 - Sugar dissolver, flash pasteurizing, water deaeration, filler, and CIP system.

- Advantages the CONTIMIX CCMX offers you:
 - Up to ten components and an unlimited number of recipes as standard.
 - Easy-to-operate, fully automatic operation for production as well as CIP.
 - Exact dosing for best possible utilization of raw materials.
 - Low-loss product changeover.
 - Constant dosage control by balancing accrued beverage and concentrate flow pulses.
 - Continuous monitoring of Brix and CO₂ contents.
 - Recording of production and product parameters.

BATCHMIX BMX – Continuous Dosing to Mixing Tanks



- Virtually continuous syrup and beverage mixing in alternating mixing tanks.
While the product is being blended and controlled in one tank, other tanks are ready for filling.

- Intensive product blending by means of a jet mixer or stirrer. Batches are released after Brix and conductivity checks.

High product quality based on exact pulse measurement of components.

- Industrial touch PC for operating and visualization with a constant system status dialog, quick access to operation parameters, simple recipe configuration and maintenance, production data acquisition, and product accounting.
Easy, safe operating through fully automatic operation.

- Other advantages:

Best possible utilization of raw materials by dosing exactly according to the recipe.

Integrated quality controls (e.g. Brix and conductivity controls) ensure reliable production.

Exceptional production flexibility by pre-specifying any quantity of product (even mini batches).

Possible automatable integration of sugar dissolver, flash pasteurizer, and CIP system.



DELTA JET K and B Sugar Dissolvers – (Dis)solve All Problems with Equipment from KHS



- Cold or hot dissolving –
Different options with and without flash pasteurizing.
Tailored project planning according to your requirements.
- Sugar supplied by means of a pneumatic feed or feedscrew. Bag emptying or silo connection.
Optimum product handling.
- Closely adjustable Brix limit values with automatic redosing.
Exactly definable syrup output regulated by the level in the syrup tank.
- Inline Brix measurement to correct the supply of dissolving water.
Maximum Brix value accuracy better than $< \pm 0.5^\circ$ Brix.

DELTA Jet K continuous sugar dissolving or DELTA Jet Batch mode sugar dissolving

- Continuous or batch operation for simple syrups of up to 65° Brix.



Innopro

Syrup Room – All You Need to Produce Mixed Beverages



- Layout and dimensioning according to your requirements with regard to types of beverage and filling outputs. Integration of sugar dissolvers, syrup flash pasteurizers, batchmix systems, mixing and storage tanks, and CIP systems.

You get a tailored syrup room solution.

- Product recipe management and quality-related production flows.

Quality assurance for all of your products.

- Optimum piping layouts and shortest possible conveying routes.

Minimized product loss.

- Automated syrup room for integrated process flows.

Safe overall system operating.



CIP and SIP Systems –

Meticulously Immaculate Right Down the Line



- Variable number of tanks, sizes, and volume flows.
Optimum adaptation to processing.
- Manual, semi-automatic, and fully automatic versions.
Reproducible cleaning results, documented processing sequences.
- Signal interchange with all areas of the system to be cleaned.
Reliable sanitizing of the entire system.
- Leak-proof valves used.
No mixing of media.
- Use of high-quality materials resistant to high temperatures and product-related choice of chemicals.
No corrosion. Long service life.
- Sterilization steps by means of super-high temperatures or disinfectant solutions.
Great safety of sanitizing results.



Innopro

Water Deaeration with Innopro DX, DOX, and DK – Low Oxygen Content Maintains Freshness



Innopro DOX water deaeration system

Ideal as a central water deaeration facility for use in breweries and in the soft drink sector. Only one water deaeration system for several production lines.

- Two-stage vacuum spray deaeration with CO₂ injection. Maximum deaeration effect without increasing water temperature.
- Horizontal deaeration tanks. Low residual O₂ levels at normal water temperatures.
- Fully automatic operation for production and CIP. No constant operating and supervision necessary.
- Dry-running vacuum pump (optional). Saves you water.

Capacity range: 2,000–150,000 l/h
Residual O₂ content: < 0.05 mg O₂/l at temperatures >10 °C.

Innopro DX water deaeration system

Optimum adaptation to your production specifications in the soft drink sector.

- One- or two-stage vacuum spray deaeration with CO₂ added. High deaeration effect. Little space required.
- Fully automatic operation and external control capabilities. No constant operating and supervision necessary. Trouble-free stop and go operation.

Capacity range: 5,000–60,000 l/h
Residual O₂ content: single-stage: 1.5–1.8 mg O₂/l
two-stage: 0.5–0.8 mg O₂/l



Juice Deaeration with Innopro DS – Foamless with Flavor Recovery



Innopro DK water deaeration system

Water for maximum demands, especially for breweries.

- Hot deaeration with thermal countercurrent in trickle film column.
Maximum deaeration effect.
- Water heating with integrated pasteurization effect.
Additional microbiological safety.
High heat recovery for low energy consumption.
- Fully automatic operation for production and CIP.
Constant operating and supervision unnecessary.

Capacity range: 5,000–60,000 l/h

Residual O₂ content: < 0.02 mg O₂/l



Innopro DS juice deaeration system

- Vacuum deaeration with flavor recovery.
The characteristics of your product are preserved.
- Gentle, foamless product control.
No damage to pulp and cells.
- Deaeration temperature: 50–60 °C.
Heating system integration minimizes heat loss.

Capacity range: 5,000–40,000 l >/h

Residual O₂ content: < 0.5 mg O₂/l

Innopro

Innopro HBG High Gravity Blending – Capacity Increase with Minimum Investment



Innopro DOX water deaeration

System components:

- Vacuum spray or trickle film water deaeration.
High-quality diluting water.

- Ratio control blending of water and beer.
True-to-recipe blending to produce the desired product quality.

- Final carbonization, inline.
Carbonation of the blended beer to the desired final CO₂ content.

- Integrated measurement and control of original wort, alcohol, CO₂, O₂.

Assured adherence to product quality.

Dosing precision:

Original wort: < 0.1° Plato

Alcohol: < 0.05 vol. w/w

CO₂ < 0.1 g/l

Blending and carbonating



Innopro KZE-Flash Pasteurizers – Gentle-to-product Pasteurizing



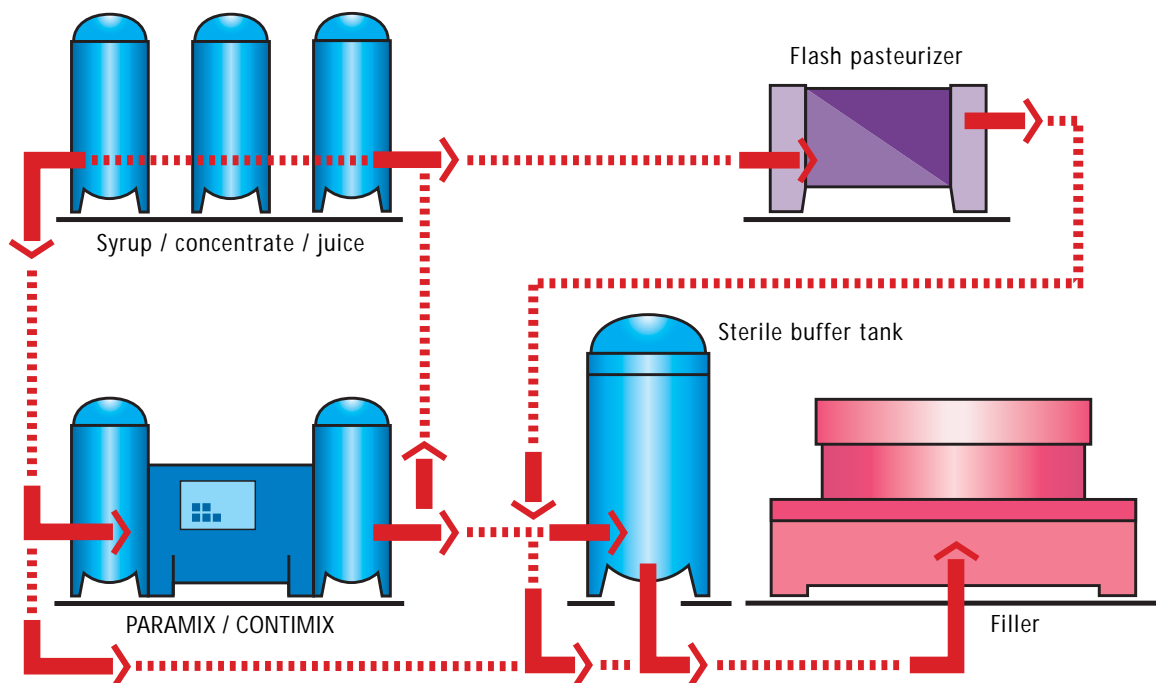
- Continuous pass-through pasteurization of carbonated and non-carbonated products at 71 °C to 105 °C and 30- to 60-second temperature-holding periods.
Energy-cost-cutting heat recovery.
- Pasteurization in plate heat exchanger, optionally tubular module.
Optionally for normal or fibrous products.
- Using booster pumps creates a “positive” pressure differential in the system.
No mixing of pasteurized and unpasteurized products.
- Fully continuous pasteurization regulation with a precision of ± 1 PU.
Consistent product quality.
- Buffer tank between the pasteurizer and filler.
Temperature/capacity regulation for exact PU control.
- Pasteurization parameters documented by the flash pasteurizer control.
Safe control provided by permanent production statistics.

Innopro

ACF Process Engineering – Aseptic Product Preparation and ACF Filling from One Source



- KHS also offers process engineering for preparation of your beverages along with ACF technology. Eliminates interface problems. You get everything from one source. Including comprehensive advisory services.
- Flexible process variants enable adaptation to the special characteristics of your products. You get the right process technique for each type of beverage.
- KHS offers you components such as the PARAMIX CMX, flash pasteurizers, and sterile buffer tanks for deaeration, dosing, mixing, carbonizing, pasteurizing, and sterile product control. You implement fully developed, field-tested KHS process modules that are perfectly compatible with ACF technology.





- Competent consulting by KHS specialists on all process flows.
Take full advantage of KHS' know-how with regard to the right treatment of each individual product and its preparation.

- Thermal beverage treatment in the flash pasteurizer.
The safest way to pasteurize your products.
- Modular, aseptic-design valve equipment.
Optimum complementation to sterile process flows.
Compact and space-saving.

- Using a sterile buffer tank.
A consistent flow of product is supplied to your filler.
Line stoppage compensation while maintaining technological requirements of the product.
Gentle-to-product pasteurization can continue without interruption.
There is no product loss.



Measurement and Control Engineering – Safety for Products and Processes



- Maximum-precision measurement engineering and sensory equipment.
Assurance of your product's quality.

- Choice of measuring devices matching your products or with regard to your special area of application.
Individual adaptation to your specifications.
- Structuring and parameterizing of measurements, evaluation, and processing of measurement data.
Optimum adaptation to processes.
- Fault factors and compensation variables are analyzed and feed-forwarded.
Greater efficiency of your system.
- Modern bus technology.
Fast measured value transmission and immediate utilization for control-related tasks.

- Recipe management, technological data, measuring results prepared especially for your laboratory.
Documentation of product quality.



Perfect Control – Everything under Control



- Modern controls with an external PC control desk in the system or located in a separate control room.
Optimum working conditions. Effortless call-up and monitoring of all production menus.
- Clear, simple operator prompting.
User-friendly. Clearly arranged. Perfect information on all line statuses.
- Fast operator – control – system communications with permanent feedback.
Safe startup and shutdown. Immediate reaction to deviations to target data, guaranteed adherence to all parameters.
- Online monitoring of critical control points (CCP).
Consistent control, systematic, and permanent monitoring of all process parameters.
Comprehensive information on completed and on-going processes. Maximum safety during the entire course of processing.

- AIS installation to record disruption data, production statistics, log aseptic data, and document the system utilization ratio.
For you this means constant transparency on the quality of the product and line efficiency.



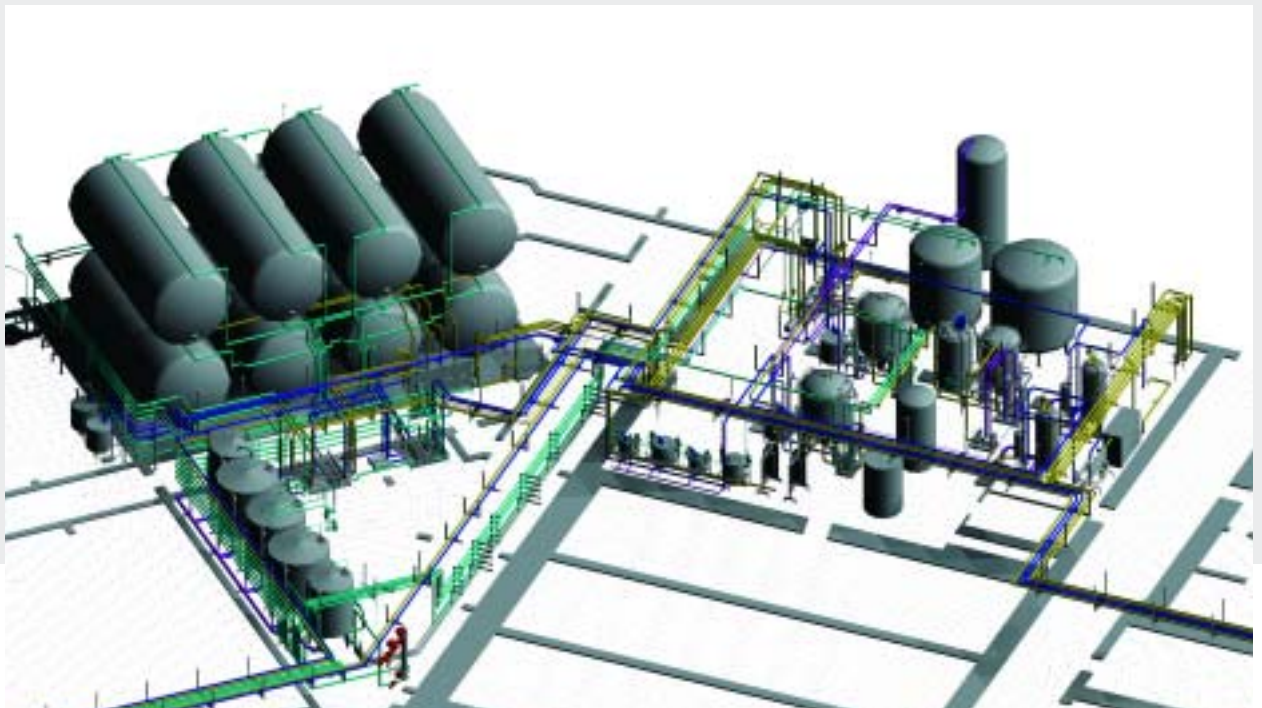
Innopro

Project Planning and Engineering – A Comprehensive KHS Service Package



New technologies combined with the practical application of the knowledge gained from research and development worldwide in all areas of system and component engineering ensure comprehensive performance in:

Planning and project management.
Process engineering concepts and designs.
Engineering, installation, and commissioning.
Automation, process visualization, and process data acquisition.





■ CAD system planning, computer-aided processing, automatic schedule monitoring. Professional project execution and turnkey delivery.

You benefit from the comprehensive know-how of KHS' staff based on the competence in KHS beverage engineering gained from international experience and far-reaching knowledge in the fields of:

- Syrup and beverage blending.
- Solids dissolving and pasteurizing.
- Water deaeration and carbonating.
- ACF systems.
- HGB blending.
- Candle, screen, and plate filters.
- CIP cleaning and disinfection.
- Automation and data acquisition.
- Process and application software.
- Engineering and project planning of plant and system equipment.

Get in touch with us.



Innopro



**KHS Maschinen- und Anlagenbau
Aktiengesellschaft**

Juchostrasse 20
D-44143 Dortmund, Germany
Phone +49 (2 31) 5 69-0
Fax +49 (2 31) 5 69-15 41

Planiger Strasse 139-147
D-55543 Bad Kreuznach, Germany
Phone +49 (6 71) 8 52-0
Fax +49 (6 71) 8 52-24 11

www.khs-ag.com
Email: info@khs-ag.com