



# Solutions for Non-Alcoholic Beverage Applications

Specialists in processing equipment,  
components and technologies



GEA is your single-source solution provider for the technology you need, including standard and bespoke equipment

# Solutions for non-alcoholic beverage applications

GEA's know-how and expertise gives you a head start by providing a total beverage processing solution

GEA's world-leading technology provides a unique synergy that accelerates product development, provides fast-tracked design and installation, reduces time-to-market and creates best-of-breed plant that perform now and well into the future. Our expertise extends from complete turnkey projects, engineering and construction to automation.

## We start with your vision

The processes used to manufacture non-alcoholic beverages, including beverage concentrates, present very specific challenges and require a particular set of skills. With more than 150 years of experience, GEA provides the most important deliverable in capital and scale-up projects: security of outcome.

At GEA, we start with your vision; we look at the challenges you face, understand your manufacturing processes and select the most suitable plant design and technologies to achieve agreed outcomes.

From that point onward, we use our unique combination of process and automation resources — as well as our global presence — to tailor integrated and cost-efficient manufacturing solutions for optimum performance. With our history of innovation and worldwide network, we believe that it is our responsibility to seek the most effective solution in terms of price-performance leadership, sustainability and operational risk.

## Solving complex challenges around the world

In every country we operate, our combined sales and support activities offer the entire range of GEA products and services from a central customer contact point.

Coupled with world-class service, this enables us to leverage our strengths and deliver customer benefits such as faster innovations and global production networks.

# Partnering for success, today and tomorrow

GEA has access to market leading technology and, possibly, the most comprehensive portfolio of processing knowledge and expertise in the world today

However, it is not the technology itself nor the experience alone that matters, it's the way in which the whole package comes together to conceive, design, build and then run the most advanced processing plants.

## From idea to installation

We use our beverage processing expertise, industry insight and engineering excellence to support you, the customer, at the earliest stages of your projects, and turn your processing concepts and requirements into successful designs.

## Attention to every detail

Our global specialists will design and configure every machine and system, valve, pump and component of the processing line or plant. We also integrate process automation and control platforms into the plant design to maximize performance,

efficiency and product quality. GEA has a unique and profound understanding of your process automation and process control requirements, and we can tailor precisely configured, modular solutions to monitor, analyze, optimize and fine-tune each process stage and overall plant operation. Our software solutions guarantee efficient, reliable and reproducible processing for top quality products.

## Clean-in-Place (CIP)

From mobile CIP skids to single, multi-stream and mega systems, GEA supplies both manual and fully automated CIP and sterilize-in-place (SIP) solutions, ensuring reliable process outcomes with minimal downtime. Whether it's liquid, solid or semi-solid, GEA's extensive range of cleaning and sterilization solutions — from R&D to full-scale production and from standalone equipment and modules to completely integrated processing lines — are



*Working in partnership with  
every customer ensures a long  
term collaboration*

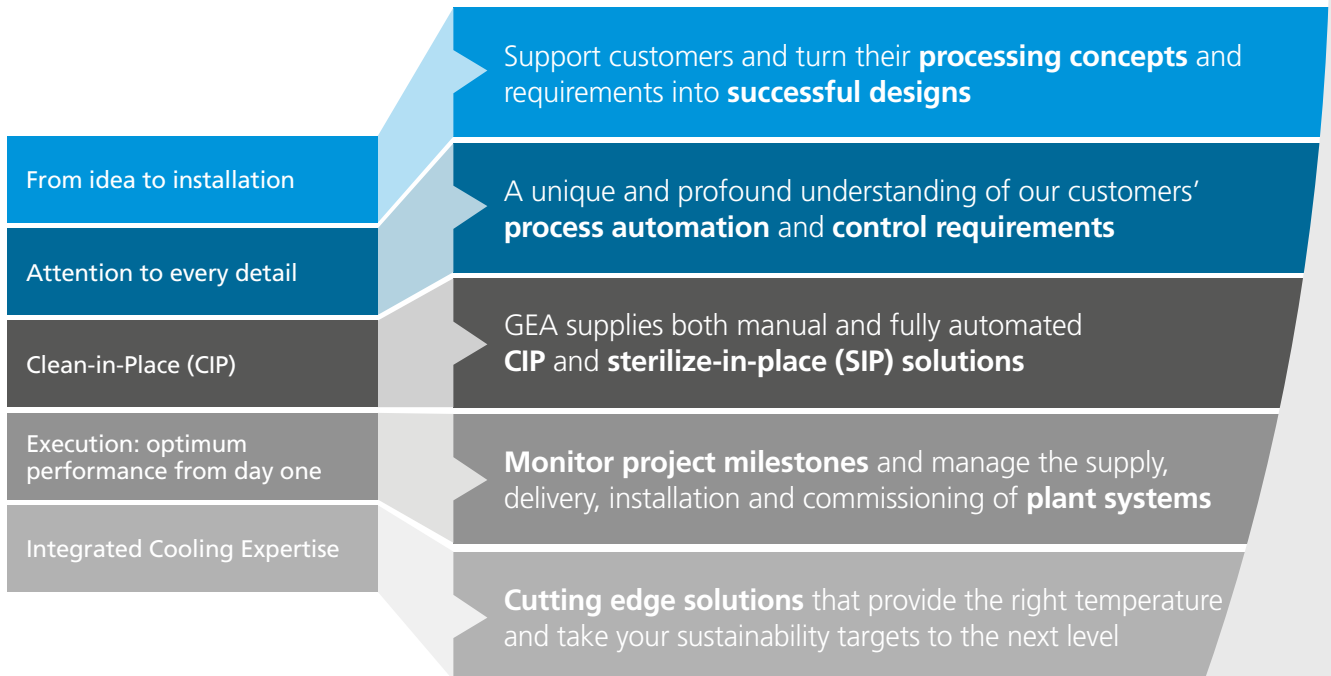
an essential requirement for any quality conscious manufacturer. We also recognize the increasing need to handle highly potent and toxic actives, guarantee both operator and product safety, prevent batch-to-batch cross-contamination and protect the environment.

#### Execution: optimum performance from day one

Our experienced project managers closely monitor project milestones and manage the supply, delivery, installation and commissioning of plant systems. GEA project teams conduct comprehensive qualification testing and the validation of all systems and components to ensure optimal performance.

#### Integrated Cooling Expertise

Offering detailed engineering for the integration of utilities into production processes, GEA's tailor-made solutions provides a holistic way to improve your processes, minimize energy consumption and improve your Total Cost of Ownership. Our industrial cooling solutions provide the right temperature for each application, our heat pumps recycle waste process heat and the use of natural refrigerants ensures both long-term functionality and minimal environmental impact, all of which contribute to a lower carbon footprint and, in some cases zero emissions.



# Research & development

GEA supplies advanced technologies for the end-to-end preparation and processing of non-alcoholic beverages

## We know your product

With an established development program and an unparalleled track record of innovation, we focus on applying our expertise and methodologies to new product testing to give you a competitive advantage in a crowded marketplace.

GEA strives for price–performance leadership, providing the beverage industry with high quality, cost-effective, integrated modules, systems and complete lines. Funded and supported by GEA Group leadership, the company’s research and development (R&D) activities are driven by our senior scientists; with customer innovation strategies firmly in mind, we collaborate with and listen to you, our clients, to meet your needs and bring your products to fruition. Dedicated to innovation, the company is a single-source solution provider with a long history of expertise

and experience derived from its well-established brands, technology centers and many years of product development — both new and existing — and process optimization.

GEA is proud to partner with its customers to provide R&D-scale and standalone production equipment, to supply complete integrated production lines that maximize operational reliability, to implement more sustainable processes and tackle the increasing burden of industrial legislation.

We recognize how important it is for our customers and clients to keep abreast of sector trends, process novel ingredients and bring successful products to market. GEA is more than your one-stop-shop for beverage production technology, it’s your partner for success.



### Test centers

Our test centers provide an opportunity for you to trial new recipes, conduct tests prior to plant design and for us to form collaborative and innovative partnerships.

From mixing, filtration and separation to filling and packaging applications, our experts can assist and expedite the development of innovative new products or optimize the production of existing ones.

From lab- to pilot-scale and beyond, including skid-mounted options, we can perform comparative process studies, facilitate customer trials, help with application development and conduct product- and customer-specific tests.

We can help you to build quality into your processes, adjust key parameters to drive your critical quality attributes to the required target levels and bring new products to market in a quick and efficient way.

Our skillset includes collaborating with customers to design, tailor and optimize solutions to meet specific processing requirements and/or test new concepts. From new product and feasibility trials to scale-up studies, training programs and process support, we believe that our services greatly benefit anyone involved in industrial R&D, equipment selection, process optimization and product development.

We combine advanced in-house technology with a thorough understanding of the industry to help you maximize your development results. Your needs are critical and individual; our worldwide beverage test centers have been designed to meet those needs.

Dedicated to working with you to overcome your processing challenges, our expertise includes mixing, filling and packaging, homogenization, freeze concentration, thermal treatment, separation, compressors, filtration and evaporation.





This category comprises 100% pure fruit or vegetable juice (fresh or frozen), juice drinks (up to 24% juice content) and nectars, which include frozen and unfrozen juices (25–99%) that are manufactured using a concentrated juice base or a pasteurized fruit pulp puree to which sugar and water are subsequently added



# Juices

Your liquid way to five a day!

GEA is fully aware of the challenges that juice producers face every day to develop new products that meet and exceed market demands: recipes that change from one day to the next, highly concentrated ingredients that require precise dosing and a wide variety of raw material formats, to name just a few.

GEA offers a diverse range of modular and bespoke processing solutions for the production of juices, flavored drinks, nectars and smoothies, including products with pieces, pulp, cells or fibers.

Flexibility and precision are key to an efficient juice processing installation. GEA integrates the technologies required to achieve these objectives; and, if a conventional solution doesn't exist, we'll develop one that meets your demands.

GEA has the necessary design, equipment portfolio, processing units, implementation and automation expertise to create entire, hygienic juice processing plant. We develop customized solutions - from the receipt of raw materials to packaging lines — anywhere in the world, on time, on budget and with guaranteed results.

For example, with a reliable and accurate heat treatment process that operates according to strict hygienic parameters, we can handle both aseptic and non-aseptic products, neutralize enzymes and inactivate micro-organisms with our plate and tubular pasteurizers.

To prevent the occurrence of negative air effects inside a juice product, such as foaming, GEA's deaerators not only ensure a constant volume for filling and further treatment, they are also designed for efficient aroma recovery and optimum aroma dosing into the vessel for better mixing. A specially designed inlet and automatic vacuum adjustment — based on the inlet temperature — guarantees enhanced deaeration for superior juice products.

And, depending on the product characteristics (viscosity, fibers or pulp content), we can accurately control the addition of every ingredient — whether powder or liquid — by using specific instruments and mixing solutions (in-line and batch mode).





Soft drinks can be either carbonated or non-carbonated; cola and non-cola carbonates are naturally and/or artificially sweetened and have low fruit juice volumes, whereas non-carbonated drinks include functional beverages such as energy, sports and health & wellness products

# Soft drinks

## Producing sparkling results

When innovation and brand reputation are key, manufacturers depend on product quality and processes that are robust, flexible, reliable, efficient and easily adapted to respond to new trends and product launches.

GEA specializes in developing and implementing a seamless blend of technology and expertise for the production of soft drinks such as cola and non-cola carbonates, non-carbonated beverages, craft soft drinks, complex health, energy and sports drinks.

Whether you favor batch or continuous processing, whether you need individual units or a complete plant, we have a solution to match your requirements. From pilot skid to industrial-scale solutions, GEA's superior quality equipment meets the strictest hygiene standards. And, regardless of the many parameters that can affect the manufacturing process, a robust and repeatable process is the universal constant we provide to ensure the same formulation is produced each and every time.

Whether delivered in bulk, bags, sacks, IBCs, drums or cans, we offer raw ingredient storage and handling for all types of ingredients, as well as water deaeration systems to ensure a very low oxygen content of the process water, which reduces oxidation effects and leads to high quality products. Our portfolio also includes highly accurate bulk dissolving systems for granulated products and much more.

Our batch mixing systems for both liquid and dry components include complete track-and-trace functionality in the form of barcode scanners and labels to identify each and every component. Preproduction processes such as ingredient weighing are automated to make them as foolproof as possible.

In-line blending systems with GEA's own digital control system and state-of-the-art in-line analysis ensures the accurate blending of liquid ingredients, high quality products and ultimate production flexibility; no large buffer tanks or on-site material stockpiles are necessary. We also provide

- product carbonation using a highly accurate CO<sub>2</sub> measurement system (batch and in-line); the carbonation system can also be used as a buffer tank for the filling machine
- technology and systems integration experience that come together for maximum efficiency, profit and quality
- market-leading equipment that aids product development, provides fast-tracked design and installation, reduces time-to-market and creates best of breed plant
- in-house capabilities, including design, procurement, coding, validation, installation, testing/inspection and commissioning.



# Liquid and powder blends

## A broad scope of technologies

GEA can handle projects of all sizes and levels of complexity. GEA designs and manufactures equipment for a wide range of products, including beverage concentrates, emulsions, extractions, oils and juice concentrates.

With our combined expertise and experience, we have identified and overcome many of the challenges that customers in this industry face, including processing non-standard fluids and mixtures such as high viscosity fluids ( $\geq 1000$  cP), fluids with undissolved solids (sugars, pulp, etc.), poorly soluble powders, temperature-sensitive and corrosive/flammable/explosive ingredients.

Handling these non-standard fluids and mixtures can be highly complicated and dangerous, depending on the product's characteristics; as such, application-specific equipment (pumps, valves, mixers etc.) is required to facilitate their safe movement through a plant.

GEA focuses on designing systems to minimize the yield loss of high value components by using highly accurate dosing, conveying and product recovery systems.

GEA advises and guides you throughout the design process. Our expertise includes designing solutions that are scalable from small to large batch size manufacturing with efficient product



changeovers, the accurate addition and mixing of multiple high value ingredients and identifying and implementing the most appropriate mixing and powder dissolving technologies, such as venturi, high shear mixing or vacuum mixing.

We can also select and specify emulsifying technology, such as high shear mixing and homogenization, and extraction technology, such as centrifugal contacting/separation, membrane separation and distillation, for your specific application.

Using sophisticated but user-friendly automation and seamless process design that is fit for purpose, GEA works closely with you to integrate complex and tailor-made solutions. From initial concept stage through to plant handover, GEA can provide integrated turnkey or standalone equipment for a variety of project scales, ranging from the minor modification of existing processes to entirely new facilities.

The term *liquid and powder blends* refers to blending agents, compounds, dilutables, emulsions, extracts, flavors, raw fruit and juice concentrates, oils, premixes and the applications in which they are used



# Bottled water



## Sensitive handling, every step of the way

GEA offers a wide range of integrated process solutions for bottled water.

Depending on shelf-life requirements and both raw water and final product specification, GEA can integrate a range of filtration systems with softening, dechlorination, mineral premixing, high accuracy dosing, sterilization and ozonation systems to deliver a highly efficient solution according to your specific requirements.

Our hygienic components and process units can be designed and integrated into a fully EHEDG/3A-compliant solution for any number of bottled water applications.

And, if you produce flavored water products, you can also rely on GEA's expertise and applications in flavor handling and dosing systems.



Bottled water includes flavored, unflavored and functional water, both still and carbonated

# Specialty beverages

## Food, plant and milk-based formulations

With GEA's versatile processing solutions, manufacturing challenges such as market trends and changing beverage components can be overcome with ease. Whatever the driver, be it hygienic design, product safety, productivity, profitability or quality, we can accommodate any requirement, anywhere on the planet.

For example, popular beverages such as ready-to-drink (RTD) teas and coffees can be enhanced with additional ingredients such as chamomile, lavender and other herbs to satisfy consumer demand for health and wellness applications. We also have a wealth of experience in applications such as Asian specialty drinks and a wide variety of exotic formulations, including soy milk, peanut milk and almond juice, to name just a few.



Our extraction technologies range from basic, yet highly effective baskets to advanced continuous horizontal systems that have been specifically designed to operate at atmospheric pressure and low temperatures. Extracting only aroma-rich fractions, these innovations are successfully used to process many health and herbal products, such as leaves, stems and roots. They're also an excellent choice for those wishing to obtain high quality coffee extracts.

When it comes to specialty beverages, we understand your key requirements. By controlling key process parameters, our solutions offer stable production and constant product properties. Furthermore, from product management to recipe control, our plant is fully configurable to accommodate specific characteristics and requirements, and is also energy efficient and environmentally friendly.

GEA has the optimum process solution for your unique application, from raw material handling, extraction, aroma recovery, blending, storage and clarification to aseptic filling lines for delicate beverage products.

Specialty beverages include RTD tea and coffee, Asian specialty drinks and other beverages such as soy milk, peanut milk and almond juice



# Your partner for world-leading process technology

GEA is your single-source solution provider for the technology you need, including standard and bespoke equipment. Our process expertise ranges from design and engineering to integration, optimization and installation; we are committed to delivering high quality, expertly manufactured products that meet your requirements.

Supporting you takes a special type of partner; our expertise is wide ranging, covering virtually every aspect of beverage processing, production and plant design.

Problem solving by nature, risk aware and utterly reliable, we understand your challenges and are able to support, collaborate and innovate — completing buying in to your vision.



## Ingredients

Ingredient handling - Extraction & clarification - Brewing - Powder blending - Viscous product processing



## Raw Materials

Bulk liquids & powders - Drums, containers & bottles - IBCs & containers - Big bags, sacks and bags



Modular batch mixing systems provide a user-friendly, high performance, intelligent and flexible production solution for a wide range of recipes





**Continuous Mixing**

In-line blending - Emulsification -  
Dispersing



**Batch Mixing**

Batch blending - Pre-mixing -  
Emulsification - Dispersing



**Homogenizing**

In-line homogenization



**Bulk Dissolving**

Continuous and batch dissolving



**Heat Treatment**

Pasteurization - UHT - Cooling



**Concentration**

Evaporation - Freeze concentration  
- Decanter/Centrifuge - Filtration -  
Extraction



**Deaeration**

Water deaeration



**Product Storage**

Aseptic - Ultra clean - Hygienic



**Carbonation**

Continuous carbonation



**Blowing, Filling & Packaging**

Aseptic & ESL filling - Packaging



**Components**

Valves & piping solutions - Pumps  
- In-line measurement - Product  
recovery



**CIP & SIP**

Mobile CIP skid - Single stream -  
Multistream - Mega CIP



**Controls & Integration**

Digitalization, Smart factory - OEE  
systems - Notification systems - Plant  
monitoring - Preventive maintenance



**Utilities**

Refrigeration - Heat pumps -  
Chillers & Compressors

# GEA Service — For your continued success

GEA Service works alongside our customers in close partnership, supporting them throughout the entire life cycle of their plant and equipment ensuring business success. To sustain optimum performance and ensure continued success, GEA Service provides a wide range of services to maintain and improve your plant and equipment.

## Getting you started — Seamless support for instant productivity and performance

Right from the installation, our GEA Service teams will work with you to get the best out of your plant and equipment. We

start as we mean to go on, a supportive and committed partner for life. We plan and build around individual needs, sharing process knowledge, training staff and supporting operators to get you up and running and ensure a smooth, seamless on-going service for optimum performance and safety.

## Keeping it running — The cost-efficient way of ensuring the safety and reliability

Regular maintenance is not a cost, it is an investment.

By implementing corrective and preventive maintenance techniques, we ensure high performance, availability and quality



as well as maximum life cycle time of your equipment or plant. To ensure you benefit from continuous production for minimal unexpected downtime, we provide fast support and top quality spare parts, whenever and wherever needed.

#### Constantly improving — Sharing our knowledge to safeguard your investment

At GEA we will work with you to keep your equipment up to date and meeting your needs today as well as tomorrow. We safeguard your investments by constantly looking ahead, by upgrading or modernizing of equipment and optimizing of processes to meet changing needs and new market demands. We are always working to increase production efficiency and ensure peak performance.

#### Together with you — Enduring commitment to you and your business

By integrating the latest automation and control solutions we boost your output and efficiency, reduce waste and minimize resource use and the need for manual intervention. Our commitment to you and your business means investing in your objectives, your risks and your future success. We work in ever closer collaboration, providing on-going systems audits and on-site support, in order to generate improved performance through innovative new service models.



## We live our values.

Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA Group is a global engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881, the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX® Europe 600 Index.

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