



Solutions for Beverage Applications

Specialists in processing equipment and technologies



GEA customers trust our world-leading technologies, industry insight and engineering expertise to meet the challenges of a competitive global beverage industry.

Solutions for Beverage Applications

GEA offers unrivalled expertise in the design, delivery and installation of turnkey plants, processing lines and technologies for any beverage, worldwide.

Meeting consumer expectations

Consumers expect top quality alcoholic and non-alcoholic beverages, and look for a wide choice at the right price. The pressure is on for producers of every type of wine and water, beer and juice to meet these expectations, but also to improve process efficiency and sustainability, and increase profitability. New processes must be developed for innovative new recipes, both to keep up with customer demand and to match global competition.

Industry insight and technological expertise

GEA offers a unique insight into the global beverage industry. We combine our international, national and local market knowledge with more than 100 years of

technological expertise in beverage processing, state-of-the-art engineering capabilities, project planning, installation and commissioning, together with global excellence in service.

Most importantly, GEA doesn't just provide machines. Our engineering teams can work in partnership with every customer, right from the stage of conceptual design, through to the delivery of state-of-the-art customized plants. From supplying and installing individual components and systems, to the integration of energy efficient utilities, refrigeration plants, water and waste management and recycling solutions, we will meet every deliverable and deadline.

Working in partnership with every customer

GEA customers are assured of a long term collaboration.

Process automation and software

GEA has a unique and deep understanding of our customers' process automation and process control requirements, and we can tailor modular, precisely configured solutions for monitoring, analyzing, optimizing and fine-tuning each processing stage and overall plant operation.

Our software solutions guarantee efficient, reliable and reproducible processing for top quality products.

Cost saving and quick R.O.I.

By choosing GEA solutions our customers achieve significant cost savings and quick return on investment. They benefit from the latest technological innovation, software and components from the world's leading process technology supplier and developer. Continued dialogue with our customers' commercial, process and product experts means that we can identify and address bottlenecks and challenges, to minimize delays and unnecessary costs.



The benefits of GEA solutions and systems speak for themselves:

- Our technologies are constructed using the highest quality materials and components for longevity and optimum performance.
- Our process control software and automation solutions continually monitor, analyze and adjust working parameters and variables to ensure efficient processing, optimize use of raw materials and minimize product losses and system down time.
- State-of-the-art cleaning-in-place and sterilization-in-place systems enable more efficient cleaning, reduced use of water and manpower, and minimized plant and machine stoppages.
- Industry-leading hygienic and aseptic systems comply with the most stringent of regulatory requirements to ensure product safety and quality.
- Highly efficient heat and water recycling solutions dramatically reduce resource and energy use and make GEA plants and processing lines environmentally sustainable.
- Patented and innovative technologies for processes as diverse as carbonation, homogenization, freeze concentration and centrifugation have allowed us to develop some of the world's most efficient, effective and versatile processing solutions.
- Skid-mounted, modular and easily integrated technologies are supplied ready to install, to ensure minimal down time and plant disruption.





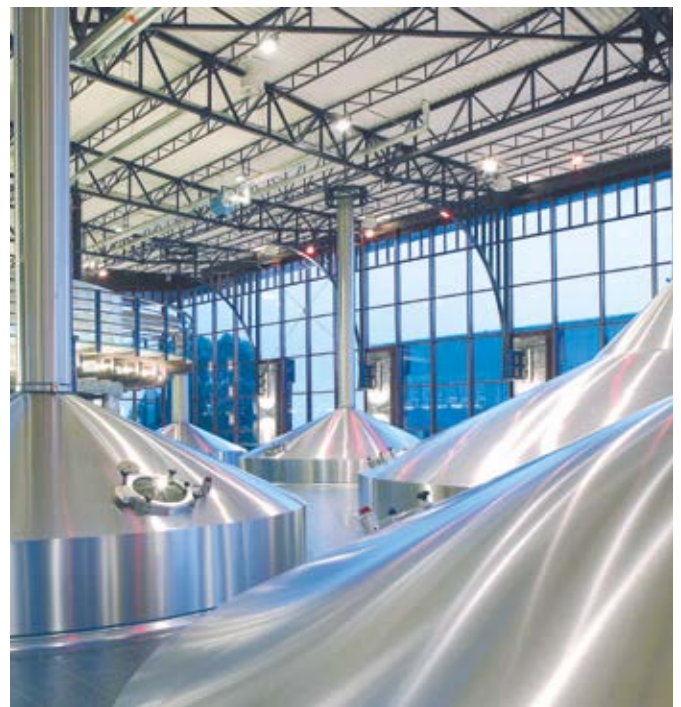
GEA partners with customers to tailor end-to-end solutions and stand-alone technologies for industrial-scale and craft breweries.

Brewery Solutions

Environmental sustainability is built into all GEA plants. We tailor efficient energy recovery solutions, heat recovery systems, and combined heat and power plants, to ensure that energy requirements are optimized to match local environmental conditions and utilities infrastructure.

Every second litre of beer - classic styles as well as specialty beers - that is produced around the world passes through GEA brewery equipment. We are a global leading process specialist for both the craft brewer and the brewery industry. Our expertise is built on more than 150 years of experience designing, constructing and commissioning complete greenfield and brownfield breweries, upgrading and modernizing existing plants, and supplying individual technologies, solutions and components.

GEA competence covers the whole beer production process. Our portfolio starts with raw material handling, including both conditioned milling and dry milling. On mashing we meet all demands from infusion and decoction with or without adjunct. We offer state-of-the-art lauter tuns, mash filters and decanters for special applications, to meet all of our customers' wort clarification requirements. GEA offers both wort treatment systems for wort boiling and centrifuges for processes that include the trub removal in a whirlpool or with high hop dosing.



Solutions for hop treatment

For improved hop utilization in the brewhouse, GEA can provide pre-isomerization units as well as centrifuges for the handling of high hop dosing. Hop oil and hop flavors can be added to the beer during fermentation and lagering using an extraction unit.

Tailored solutions in the cold process area

GEA offers a complete portfolio of technologies for the cold process area. Our fermenters, lager tanks and bright beer tanks feature tailor-made, flexible piping. GEA piping systems incorporate state-of-the-art hygienic and aseptic, for low overall life cycle cost. GEA technologies include fewer valves and simple automation, for low maintenance and easy cleaning.

Yeast is prepared in well-engineered, hygienic propagation plants that offer the flexibility required for achieving consistent, high product quality. Pre-piped plug & play wort aeration systems from GEA allow the yeast to start fermentation.

GEA's revolutionary system for gentle liquid jet mixing in fermentation has been developed to optimize fermentation efficiency and homogeneity. This supports the natural fermentation process and enhances the natural convection flow during cooling. Our automated technologies help to shorten residence time in the cold block, and because the fermentation time can be more consistent, downstream process planning becomes more accurate and reliable.

A unique portfolio - skids & units to meet requirements

GEA offers a comprehensive range of highly versatile separators that can be tailored to any requirement for use throughout the brewing process.

GEA pumps and tank cleaning equipment meet the highest global hygiene standards and guarantee effective, safe brewing for the lifetime of every plant.

Whether you need a hygienic carbonation system, an in-line-blending system for the final definition of your product specification, a sugar dissolving unit or a perfect flash pasteurization unit, GEA can easily include any technology into the project design. For beer de-alcoholization we provide reverse osmosis plants, as well as thermal falling film technologies.

High quality beer concentrates

For beer concentrate production GEA's freeze concentration systems combine a crystallizer and heat exchanger in a single system, producing the highest quality beer concentrates that retain perfect flavor after reconstitution, with no product losses.

Utilities concept

For greenfield projects GEA includes the design, engineering and realization of the full utilities package. Whether it is steam, compressed air, electrical or water treatment, GEA has the integration expertise, ensuring all production needs – sustainable and demand oriented.

Precise control

Batch orientated and customized process control software underpins our advanced for intelligent data and product management. In combination with highly accurate control systems GEA technologies reduce response time to market demands and improve plant availability.





Creative craft beers and specialty brews

GEA offers an innovative portfolio of systems for smaller scale craft and speciality brewers. When customers are ready to upgrade, the modular brewhouse offers flexibility for medium-sized breweries. Yield and efficiency can be maximized using one of GEA's innovative, simple-to-use 'Plug & Brew' centrifuge skids that can be integrated easily into an existing piping infrastructure.

Alcoholic Beverage Processing



GEA combines unique know-how in the alcoholic beverage sector with in depth process and engineering expertise and understanding. Our extensive portfolio of the highest quality systems spans automated solutions for every stage of processing, from raw materials reception, handling and juicing, to separation, fermentation, distillation, refrigeration, filtration, homogenization and evaporation.

We have worked hand in hand with the industry over decades to develop sustainable plants, technologies, systems and components that will ensure state-of-the-art raw material processing to deliver perfect wort quality for downstream fermentation processes. GEA fermentation and yeast management facilities conform to the most stringent hygienic standards, to provide our customers with the highest product quality.

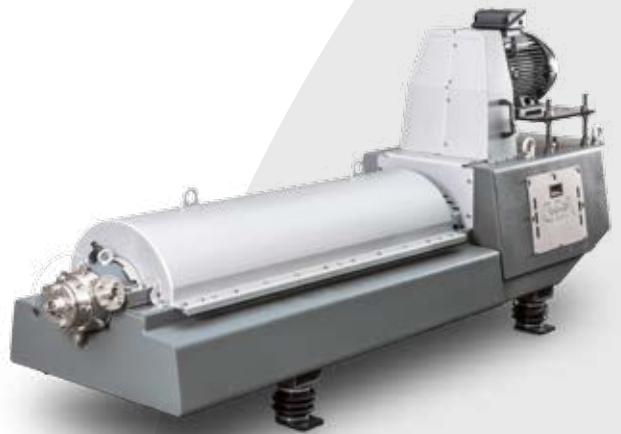
Our expertise in distillation spans components to whole plants for the production of neutral alcohol as well as the most exacting of processes for aromatic alcohols, such as whiskeys and gin. GEA has specialist know-how in the reuse of waste energy and we can exploit our vapor compression technology for reusing waste vapors to replace the steam at the reboiler. For distillation units integrated into major plants it is also possible to rechannel waste heat from elsewhere in the plant to the distillation operation.

Membrane filtration either with polymer membranes or ceramic membrane elements is used to clarify a wide range of alcoholic beverages. We can design any process for producing de-colored and de-flavored clear alcohol.

At GEA R&D centers our experts work hand-in-hand with the industry to develop innovative technologies.

Specialized separators and decanters

Building on more than 100 years of experience developing mechanical separation solutions, GEA offers the beverage industry decanters and separators that incorporate innovative technologies to ensure gentle product handling and maximum clarification of liquids. Solids are ejected from the separator bowl at full running speed to maximize operational efficiency. Hydrohermetic sealing minimizes product contact with and uptake of oxygen. GEA's multi-purpose separators and decanters can be incorporated into a complete new plant, or integrated into an existing plant or process. To meet the demands of the wine industry GEA has developed an innovative decanter centrifuge to carry out de-juicing and clarification of mash, juice and wine across the whole wine-making process.



GEA offers a full range of separators and decanters.

Hygienic by design

Designed for both complex and basic functions, our hygienic and aseptic flow components will meet the most stringent requirements, and are constructed using the highest quality materials to ensure long life and optimum performance. GEA can also provide pre-piped and pre-wired units for carbonization and blending.

Innovation

At the GEA test and R&D centers our engineers and process specialists continue to develop new technologies and solutions for the alcoholic beverages sector. Our experts can work with customers to design, tailor and optimize fermentation, homogenization, filtration, distillation and separation solutions to meet specific processing requirements or to test new concepts.



GEA systems are recognized for their high thermodynamic efficiencies and the high distillate purities achieved.



GEA configures complete plants, processing lines and technologies for every type of non-alcoholic beverage, from water and juice, to complex health drinks.

Non-Alcoholic Beverage Processing

Beverages for every taste

The non-alcoholic beverage market includes a wide range of carbonated and non-carbonated soft drinks, juices, bottled waters, sports and health drinks. A variety of ready-to-drink teas and coffees offer alternative options for when we are on the go. The industry also produces concentrates and flavorings for widespread applications.

With decades of in-depth industry insight, processing and engineering expertise in this diverse sector, GEA represents a world-leading, single-source supplier for the design, construction and installation of 24/7 turnkey plants, processing lines and modular technologies. Our portfolio of equipment and technologies spans industry-leading valves, pumps and components, to blending, homogenizing and pasteurizing systems. We also configure robust automation solutions, sophisticated control software, refrigeration and aseptic filling and packaging solutions.

Whether you are looking to construct a complete plant, to upgrade or replace existing systems, or to install or optimize a processing line, GEA can customize a solution that will meet the most exacting specifications.

It's all in the mix

Mixing, dispersing, blending, homogenizing and dissolving are key technologies for processing many non-alcoholic beverages, such as juices, soft drinks and concentrates. GEA offers sector-specific expertise for continuous and batch processing of powdered and liquid ingredients, including sensitive and/or high viscosity products, emulsions and beverages with particulates.

Our optimized solutions are tailored to meet all our customers' production requirements, from pilot to large scale continuous processing, and whether the need is for a simple dissolving system for flavored water or more complex blending of flavors and concentrates.

GEA installed the world's first continuous in-line blending system for a global soft drink manufacturer in 1988, and we have since configured more than 1,000 commercial systems for customers around the world. In-line blending can be integrated with one of our carbonation units, to produce finished carbonated soft drinks containing precisely controlled CO₂ concentrations.



The DICON™ in-line blending technology couples our industry-leading flow meters with digital control to allow the precise simultaneous in-line blending of any number of liquids, including those with particulates.

Pasteurization for longer shelf life and better taste

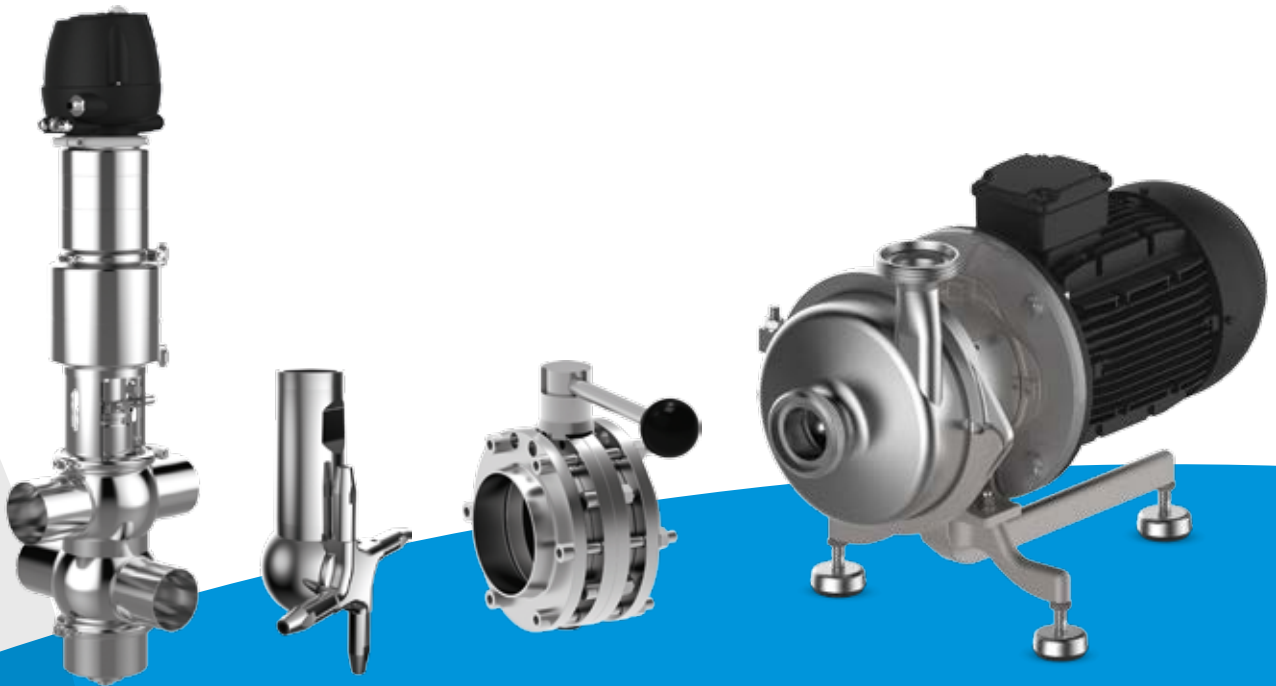
GEA customers rely on our in-depth knowledge and expertise to tailor pasteurization and UHT plants for a diverse range of products. Our extensive portfolio of tubular heat exchangers has been developed specifically for handling products with pieces, pulp, cells or fibers. At the GEA test center we have the facilities to work with customers on their processing challenges.

Leading concentration technologies

The concentration of juices and ingredients is a key focus area for GEA. We are a recognized leading process supplier for concentrate processing and handling, and offer a number of innovative concentration technologies around which integrated process plants can be developed.

- Our state-of-the-art evaporation technologies meet the needs and expectations of our customers with respect to plant capacity, run times, operational excellence, product quality and plant maintenance.
- For applications where heat treatment is not appropriate, GEA's freeze concentration technology utilizes low temperatures to process delicately structured liquids. This approach, which enables long run times, produces high quality concentrates that retain perfect flavor after reconstitution.

Evaporation or freeze concentration can be combined with GEA membrane technology as part of an integrated solution that can greatly enhance concentration performance, and provide the customer with flexibility, choice, and optimum plant capability.



Hygienic valves, pumps and cleaning technology – the core components of matrix-piped process plants.



The decisive factors in the selection of the appropriate UHT process are product quality, production safety and efficiency.

Filling and Packaging



The huge variety of beverages available worldwide has led to an increasing demand for efficient, sustainable filling and packaging technologies. Today's technologies must be able to handle traditional products such as water, still and carbonated alcoholic and non-alcoholic drinks, as well as sensitive products including juices with pulps, fibres or fruit pieces, isotonic drinks and vitamin-enhanced health drinks. Harnessing decades of experience working with the beverage industry GEA offers a broad portfolio of state-of-the-art hygienic and aseptic filling lines and packaging technologies for any beverage in PET and HDPE bottles.

Aseptic H₂O₂ sterilization technology for preforms and bottles

GEA's aseptic blow moulding technology underpins our unique aseptic blow fill (ABF) system. The ABF technology utilizes vaporized hydrogen peroxide (VHP) to sterilize the inside and outside of preforms, and then the blow moulding phase is carried out by an aseptic blow moulder. The ABF system reduces the use of chemicals and isn't reliant on water for processing. It can blow and fill up to 48,000 single-serve bottles per hour. Alongside preform sterilization, and for those customers who need to run several bottle format sizes, GEA can also supply H₂O₂ bottle sterilization technology.

PAA bottle aseptic sterilization technology

GEA has developed a range of aseptic solutions using peracetic acid (PAA) as the sterilization medium. Our flexible systems are suitable for both low- and high-acid beverages. The systems cover a production range from 6,000 up to 72,000 bottles per hour, and can run for 165 hours continuously without any intermediate sterilization cycle and maintaining a decontamination level of up to 6 Log reduction. Configurations are available both with and without air conveyors between the blow moulder and the container treatment carousels. For aseptic filling of beverages with big pieces into either lightweight PET or HDPE bottles, GEA offers a Dual Fill system that combines an electronic filler for clear beverages (still or carbonated), with an Aseptic Piston Doser for large solid particles such as fruits and cereals up to 10 x 10 x 10 mm.

GEA's portfolio of hygienic and aseptic beverage filling and packaging technologies include a unique aseptic blow fill technology that reduces the use of chemicals and water.

Filling solutions for ESL beverages

GEA has developed systems that are suited to the processing and filling of a wide range of high- and low-acid extended shelf life (ESL) beverages. The filling systems make use of PAA or H₂O₂ to decontaminate containers with an integrated ultraclean filler and capper. Technologies for decontaminating sports or flat caps can operate at a wide range of decontamination levels for different beverages.

Packaging and palletizing

GEA can provide end-to-end packaging and palletizing solutions, including primary packaging conveyors for empty or full bottles, jars and cans, along with secondary conveyors for packs, cartons and crates. We can supply and configure horizontal and vertical pallet conveyors, shuttles, dividers, drying systems, robotized and traditional palletizers for loose containers and cases, along with palletizers for cartons and shrink wraps, crates and loose containers.



The layer preparation system Polaris F can prepare an entire layer of products (even particularly unstable ones) without any jolts during the repositioning phases.



The high accuracy and performance of these filling machines is achieved through the use of magnetic flow meters managed by a high speed processor for flowrate control in real time.

Building perfect partnerships

At GEA we recognize that the industry must innovate and maintain product quality to remain globally competitive, amid increasing financial restrictions and stringent regulatory requirements. We design, build, configure and install versatile, sustainable and efficient components, equipment, processing lines and complete plants so that our customers can concentrate on their industry and business challenges, and not on operating constraints or bottlenecks.

From ideation to installation

We use our beverage processing expertise, industry insight and engineering excellence to support customers at the earliest stages of their projects, and turn their processing concepts and needs into successful designs that achieve the performance criteria required. From initial project analysis to selecting the most suitable plant layout, equipment, and processing systems, we offer complete master planning, pre-engineering and design study services through which we can configure even the smallest details of a prospective plant. Calculations of operational expenditure costs, from energy and water usage, to waste disposal and machine maintenance, are included in the engineering design to meet targets.

Attention to every detail

GEA customers can be confident that our experts will configure every machine, valve, pump and component in their process line or plant, and source the best prices for ancillary equipment, utilities and services. Process automation and control platforms are built into the plant design to maximise performance, efficiency and product quality.

And for that competitive edge, GEA plants are designed with the flexibility to switch between products, and to accommodate expansion of product range and capacity.

We realise that local knowledge and industry expertise are invaluable, so a local GEA team will ensure that nothing is lost in translation, both literally and with respect to customers' markets, regulations, cultural and industry infrastructure.

Trust GEA experts to take care of every detail, from project ideation and plant design, to construction and installation, maintenance, upgrades and expansion.



Optimum performance from the first day

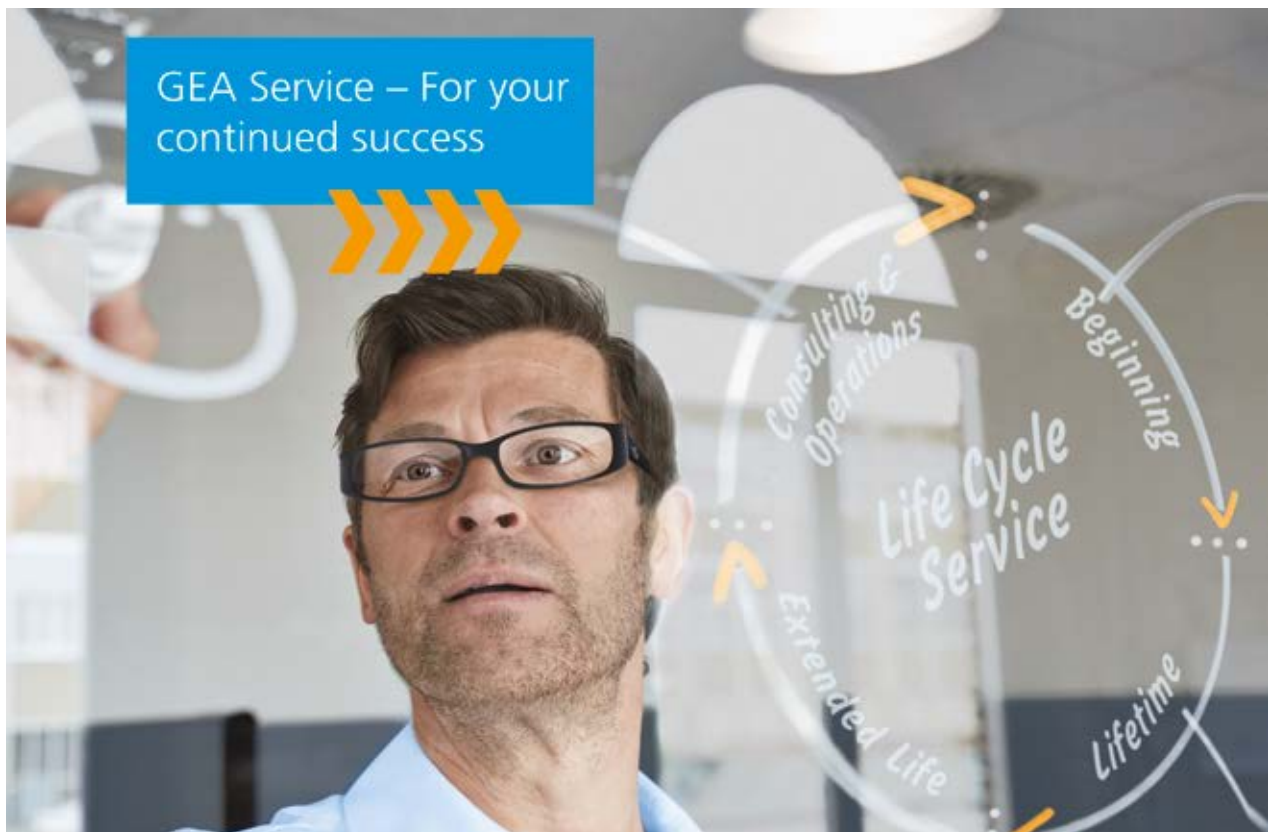
GEA project teams carry out comprehensive operational qualification testing and validation of all systems and components to ensure that they are running optimally from day one. Performance qualification testing then ensures that the plant continues to deliver peak performance. In addition to on-site training during commissioning, our experienced engineers can also offer customers classroom instruction so that all personnel are suitably trained and confident with equipment and software.

GEA Service – for your continued success

GEA specialists maintain and improve the performance of customers' plants, to maximize processing quality, reliability, efficiency and safety throughout the entire plant life cycle. We offer flexible service level agreements that can be tailored to match each customer's requirements and budgets. We also offer the option to book single audits, through which our

engineers and technicians will carry out a plant inspection to a pre-agreed plan, and compile a thorough report on plant condition or process efficiency. Preventive maintenance keeps plants, process lines and equipment safe and efficient, and extends working life to safeguard plant availability.

Upgrades improve performance, reliability and production capacity. Modernization can save on water and energy usage, and integrating the latest automation and control solutions boosts output and yield, reduces waste and minimizes resource use and the need for manual intervention. GEA guarantees fast and reliable repair services, and our service hotline is available 24/7. We only use genuine replacement parts for maintenance and repairs. All repairs, new configurations or upgrades are tested for safety, quality and performance. And we guarantee to have process lines and plants running at full speed, and optimal efficiency, as fast as possible.



Improve the life cycle costs of your plant and equipment with GEA Service.



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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