Product Guide
Beer & Beer Mix Beverages
Comprehensive understanding of your brewery
When it comes to brewing technology, GEA is a leading global specialist. With our extensive know-how and vast engineering experience we are uniquely qualified to build brewery plants. Unlike other suppliers, GEA has solutions that can address the smallest details of the complete brewing process – from the mill to the valve manifold of the bright beer tanks.

GEA – the competence center for breweries all over the world
Our range of services includes everything from engineering, manufacturing, delivery, installation and automation up to the servicing of plants and components. Our core competence is in process optimization, modernization and extension. Upon request, we realize complete greenfield projects.

Focus on green breweries
Reduce your environmental footprint and go green – our equipment and processes are optimized for long-term sustainability and designed for a successful economic future. We develop innovative solutions considering our customers' local conditions and their economic and ecological requirements.

- Minimized consumption of natural resources like water, energy and raw materials
- Entire brewing process made as efficient and predictable as possible
- Recycling of by-products or waste products
- Tailored energy management
Beer – On Everyone’s Lips
Today, every second liter of the global brewing output passes through GEA processing plants and components. Look to future success with beer – You’ve got what it takes.

Discover our Solutions
- Brewhouse Solutions
- Cold Process Solutions
- Craft Brewing Solutions
- Sustainable Solutions
- Utilities
- Process Automation Solutions
- Service next level
- Processing Units

Market-specific Applications
- Beer
- Alcohol-Free Beer
- Flavored Alcoholic Beverages
- Specialty Beer
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Successful brewing companies know they must keep up with technological progress and market developments. For this you can rely on our expert services during every phase of plant building – from initial planning and technical specification to the handing-over of a turnkey, fully operational brewery.

**From plant manufacturer to engineering company**

Our comprehensive planning and implementing services have become as important as classic plant engineering and construction competencies. Using our broad range of engineering and process integration know-how we at GEA understand the individual needs of our customers and assume every task in setting up complete plants for beer and beer mix beverages, anywhere in the world.

The choice is all yours: Our specialists are ready to design and select the right equipment for both green and brown fields. They supervise the delivery and the correct installation and commissioning. They stay on each project as part of the team until the final handing-over, and they train your staff during and after commissioning – all to guarantee successful implementation and operation of the plant.

**Engineering competence from a single source**

Accept no limits: Extensive joint ventures with internationally leading engineering and contracting companies place us in a top position to set up, manage and keep overall control of large-scale brewery projects.
Brewhouse Solutions

The heart of the brewery beats in the brewhouse. Each stage in the production sequence decisively influences the quality of the beer, flavor stability and yield. Apart from employing the right equipment, all processes must be perfectly geared to one another – a fact realized by GEA at a very early stage. The construction of fully combined brewhouses thus became a cornerstone of our company’s success.

For GEA, the origin of great beers lies in small details
Our strength lies in the fact that for each process stage in the brewhouse our engineering competencies and our brewing technology are all networked to your requirements. This approach is based on our understanding of all the connections and interactions involved in beer making, enabling us to evaluate the required process steps with maximum insight and to create innovative solutions with your objectives in focus.

All GEA brewhouse solutions, products and service offers are developed with a view to practical application, in close dialogue with every customer. This individual approach and the proximity to our in-house production facilities ensure the safety of your investment. We meet your requirements with viable and affordable solutions – and with no compromise on quality.
Optimizing brewing technology starts right at the beginning of the process. The MILLSTAR™ system combines the advantages of both dry and wet milling in a single system. This ensures the highest quality of mash and wort for your brewing line from the start, with maximum economical efficiency.

Your advantage with the MILLSTAR™ milling system
- Smallest footprint compared to other milling systems
- Savings on civils due to reduced ATEX impact
- Up to 20% increase in brewhouse capacity
- Up to 1:2 malt-to-water ratio achieved by positive displacement pump for mashing-in – perfect for high-gravity brewing
- Improved beer flavor stability thanks to minimized oxygen uptake
- Longer service intervals thanks to optimized crushing roller and maintenance-free conditioning chute

Important details
- Level control in mash hopper for low oxygen uptake
- Optimized spray geometry to avoid mash flotation
- Quality automation system with feed roller speed control
- Optional inert gas flushing and mash acidification
- Fully automated and manual version available

Available sizes: from 2.5 t/h for craft brewers to 40 t/h
The more effective your mashing process, the better the wort quality, brewhouse yield and character of your beer. Parameters such as temperature, circumferential speed, agitator design, vessel wall temperature, physical and biochemical conversion all have a defining influence on the process. With GEA you command all the options for a gentle, energy-saving and economical solution.

Your advantage with GEA mashing technology

- Top-efficiency mash agitator design, reflecting the properties of coarse grist or hammer milled grist
- Operation with low shear stress
- Homogeneous temperature distribution during heat-up
- Easy integration into economical energy recovery systems
- Perfect combination with the MILLSTAR™ system
- Spectacular pre-mashing system for dry milling
- Mash tuns, mash tun kettles and cereal cookers available for brewhouses from 25 hl to 1,800 hl

Important details

- Steam heated jackets
- High-pressure, hot-water-heated jackets
- Water-heated jackets for energy storage water
- GEA Safety system on manhole
When optimizing brewing operations, two major targets are to maximize extract yields and to ensure the efficient use of resources. With GEA LAUTERSTAR™ technology you benefit from shorter lautering times as well as minimized flushing and CIP cycles. Operating and maintenance costs are so low that the investment in a LAUTERSTAR™ always pays off in a short time. A wise decision regarding life cycle costs.

**Your advantage with the LAUTERSTAR™ lauter tun**
- Clear wort with no solids
- Flexibility of malt load – suitable for high gravity brewing
- Mash inlet via bottom seat valves
- Optimized knifes with shaft and double shoes
- Quick and efficient rinsing, easy cleaning
- Multifunctional Lautering Management (MLM) software tool

**Important details**
- Advanced, GEA made lauter tun drive
- Spent-grains flap with fitted false bottom
- Spent-grains removal blade with mechanical actuation
- Mash intake through the bottom seat valve with reduced oxygen pick-up
- Seal-less center column with gentle central intake of the wort during circulation and trub addition
- Safety system in accordance with EU directives
The JETSTAR™ solution permits a completely innovative process: Two-phase wort boiling in the wort kettle – a more gentle and energy-efficient solution with an internal boiler. In the first phase, the conversion phase, the integrated subjet system ensures a more homogeneous circulation, with minimum thermal stress. In the second phase, the two-level wort spreader provides for very intensive evaporation and stripping of volatiles. Intermediate cleaning in the midst of brewing weeks can be reduced to a minimum.

**Your advantage with JETSTAR™ wort boiling**
- High thermal effectiveness due to internal boiler
- High energy savings due to low evaporation rate
- Effective evaporation due to two-level wort spreader
- High hop isomerization yield with low total evaporation
- Reduced pulsing and good homogeneity in wort kettle

**Important details**
- Two-phase boiling with low evaporation rates from 3 to 4.5%
- Intelligent Wort Management (IWM) software tool
- Individual adjustment of quality parameters
- Natural circulation without pump
- Good fit with GEA's Energy Storage System
- Easy maintenance – easy retrofit
- Technological flexibility
- Hygienic design

For hop treatment in brewhouses and cold process areas GEA provides a variety of advantageous methods. You can isomerize hops outside the wort kettle in an independent process, or you can remove whole hops from the wort. Loading your beers with special hop ingredients in the cold process is a further option.

**Your advantage with HOPSTAR™ hop technology**

**HOPSTAR™ Iso**
- Processing of hop extract or hop pellets (or even a mix of both)
- Freely adjustable process parameters – time, temperature, pressure
- Raw material savings of up to 30 % due to isomerization
- Dosing point according to the design of the brewing process
- 50 % energy savings during wort boiling
- Hygienic design using tubular heaters

**HOPSTAR™ Back**
- Ideal upgrade for craft brewing applications
- Efficient removal of whole hops in a cylindro-conical tank
- High surface using a wedge-wired sieve design

**HOPSTAR™ Dry**
- Standardized plug & play unit, installed on a skid
- Hop pellet application in the cold process area of a brewery
- Dosing rates from 200 g/hl to 600 g/hl
Update your wort handling process with a innovative, fully automatic aeration concept: GEA has developed the WORTSTAR™ solution that treats the wort gently and operates with great efficiency compared to conventional systems. Its core advantage is the fine and even introduction of air into the cold wort through an annular gap nozzle.

Your advantage with WORTSTAR™ wort aeration
- Completely pre-assembled system in a compact design with electrical and pneumatic installation
- Simple installation and commissioning – can be carried out by the customer
- Optional combination of two wort aeration units in parallel for higher throughput
- Adjustable levels of dissolved oxygen

Important details
- Available sizes (wort pipe): DN 25 to DN 125
- 1.0 to 2.5 m/s wort flow velocity
- Less than 1.0 bar pressure drop in the wort pipe
- Residual oxygen concentration of 5–12 mg O₂/liter (26 ppm)
- Sterile-air pressure of 6.0 to 8.0 bar Ü
- Product flow rate of up to 1,250 hl/h
Don’t throw away good beer! For beer recovery from surplus yeast and trub wort separation, or for the use in brewhouse, GEA decanters are the efficient solution with high clarifying performance and a maximum degree of solids dewatering.

Your advantage with GEA clarifying decanters
- High yield thanks to GEA summationdrive
- High-speed operation for excellent operation efficiency
- Low life cycle cost

Important details
- Hydro-hermetic sealing to avoid oxygen pick-up
- Gentle feed systems
- Solids-dependent speed control
- Wide range of machine portfolio
- Hygienic design
From manual-operation to fully automatic piping systems: GEA is able to plan and provide all the equipment your operation requires in the cold process area. With finely tailored, comprehensive solutions we are sure to meet your individual specifications and requirements.

**Leading technology, individual solutions**

GEA has been internationally renowned for technically and economically optimized brewing technology, with a special regard on engineering competence and complete solutions for the cold process area. Our goal is to give you enhanced technical solutions aimed at your economic advantage and your market needs.

Our success derives from our special understanding of optimum process integration and control system solutions. Our philosophy can be described as listening, understanding and working in close dialog with our customers towards for the best approach in each case.

**Comprehensive expertise in the cold process area**

As an international company, GEA does not only stand for excellent engineering know-how, but also for economic stability, innovative strength and excellent reliability.
Innovative beer variations are the trend that is here to stay. Whether mixed beverages or new beer specialties: GEA provides you with comprehensive solutions for the economical production of all blended high-quality beverages. For both tank-based batch production and continuous inline production in a multi-stream blender we design individual and flexible systems that exactly fit your needs.

**Your advantage with ECO-BEVUMIX™ technology**

- Efficient combinations of proven, well-engineered process steps
- Maximum consumer satisfaction thanks to consistently high product quality
- Increased yield from raw materials thanks to high mixing accuracy
- Efficient production ensuring minimized product losses
- Trouble-free production process with modern blending technology

**Important details**

- Full automation of the core processes dosing and mixing
- Flexible plant concepts, batch-by-batch or fully automated, fast and continuous
- Precision measuring instruments and special digital flow controllers
- Plant concepts individually tailored to the space available on site
For all your piping requirements, GEA supplies you with individually tailored solutions that optimize your process and improve the foam and flavor stability of your beer – at reduced life cycle costs. The fully automatic ECO-MATRIX™ pipe connection system is based on a compact tank outlet tree. The short vertical pipe below the tank and the highly functional double-seat valves all guarantee good cleaning conditions and minimum product losses.

**Your advantage with ECO-MATRIX™ piping solutions**

**Lower investment costs**
- Fewer valves
- Easier installation
- Easier automation

**Lower operational costs**
- Less flush-out due to favorable valve arrangement and shorter pipes
- Less CIP losses due to the integrated LEFF® module
- Less maintenance work required

**Important details**
- Highest flexibility
- Ecologically sound operation
- Lower cleaning agent losses
- Fail-safe operation
GEA innovations have always been on the cutting edge of piping technology – the ECO-FENCE™ system is further proof of this. The system has been developed from the established ECO-MATRIX™ concept and offers you roughly the same benefits and cleaning advantages. An essential detail is the direct connection of the valves for tank filling and emptying to the respective inlet and outlet – the superior alternative to conventional designs with pipe fence or swing bend panels and with long pipes between the actual tank connection and the valve matrix.

**Your advantage with ECO-FENCE™ piping solutions**
- Ideal solution in terms of process technology and hygiene
- Very good cleaning conditions
- Minimum losses
- Maximum product safety

**Important details**
- New installations and upgrades possible
- Patented in Germany, with international patents pending
- EHEDG certified components
Valve blocks, pipe fences, and swing bend panels are used in the fermentation and maturation areas of a brewery. GEA provides you with the right solution for every task at hand. To ensure the correct distribution and regulation of gases and liquids within the production process, these types of factory-prefabricated piping systems are assigned to specific tank lines and supply them with media.

**GEA valve blocks**

Our extensive experience and expertise in valve block design guarantees high maintainability/accessibility as well as low space requirement.

**GEA pipe fences**

GEA provides cost-effective pipe fences for media distribution in breweries, designed to customers' specifications and individually tailored to your system.

**GEA swing bend panels**

In piping systems that utilize GEA swing bend panels, media distribution is performed via pipe bends and valves (generally butterfly valves). Operators must have good knowledge of the process to avoid errors!
The flexible ECO-FLASH™ system is an ideal process module for highest demands in beer pasteurization. GEA has developed microbiological stabilization by flash pasteurization into a safe and cost-effective method ensuring uncompromised quality. Thanks to the recuperative design the expended heat energy can be recovered to a large extent.

**Your advantage with ECO-FLASH™ flash pasteurizer**
- Precise control of Pasteurization Units (PU)
- Recontamination prevented by positive pressure gradient
- Maximum hygiene thanks to inline instrumentation
- Quick change between operation and hot water sterilization due to circulation-mode process design
- Minimum beer losses thanks to GEA level control strategy

**Important details**
- Intelligent software for minimum number of stops
- Design based on well-proven EHEDG principles
- Consistent use of GEA mixproof valves
- GEA D-Force valve for pressure control
- GEA process control to avoid cavitation and noise emission
- Wide range of software, instrumentation and equipment options

Available in 5 different sizes from DN 25 to DN 100, covering 20 hl/h to 600 hl/h
Generating a beneficial environment for the yeast and ensuring yeast vitality are core considerations in the conception of a propagation plant with advanced technology. The hygienic design and gentle product handling of GEA’s yeast management solutions result in high-quality yeast with ideal fermentation properties, with a positive impact on all the subsequent process steps.

Your advantage with YEAST-STAR™ yeast management
- Perfect adaption of yeast to fermentation conditions thanks to assimilation step in process design
- High vitality of the yeast (average ICP value higher than 6)
- Final cell count about 100 million cells/ml
- High process safety and perfect cleaning ability
- Smooth heat transfer and easy temperature control

Important details
- Gentle homogenization with a circulation loop
- Static aeration device with perfect functionality and cleaning ability
- Repeated-fed-batch process design
- Semi-automated or fully automated unit available
- Optional wort sterilization
- Design conforming to EHEDG guidelines
Save significant time during fermentation – with no compromise on beer quality! GEA's revolutionary ECO-FERM™ system for jet mixing in fermentation tanks has been specially developed to improve fermentation performance and homogeneity by supporting the natural upward flow process in a vertical fermenter, especially in slim fermenters.

Your advantage with ECO-FERM™ fermentation

- Optimized production schedule and additional tank capacity thanks to reduced fermentation time
- More active yeast cells kept in the suspension, improved yeast vitality
- Consistently high beer quality with unchanging flavor profile
- Low-shear jet mixing principle

Important details

- Mixing device without movable parts, fully cleanable and free from wear
- Reduced energy consumption due to jet mixing principle
A kieselguhr-free and waste-free cross-flow filtration solution – that is the clearamic BeerFiltration unit with ceramic membranes. The use of these membranes ensures high sustainability and low costs of your operation, with no compromise on consistently high product quality and process reliability.

**Your advantage with clearamic BeerFiltration**
- Heat-resistant up to 135°C – easy to sterilize, no risk of contamination
- Waste-free process, no consumables, no filter aids needed
- Long lifetime of membranes, approx. 10 years
- Completely inert material, neutral to taste
- Permanent, reproducible quality
- Highly flexible plant concept, upgrading possible at any time
- Pre-assembled, short installation and start-up times

**Important details**
- Cross- and filtration flow adaptable to varying beer qualities
- Back flushing device to get longer operational times
- Stainless steel housing with special seals to protect the ceramic elements – ensures permeate and retentate flow channeling
- Different pore sizes available for optimum filtration
- Standard cleaning agents
- Yeast-free filtrate
In a modern brewery operation, the carbon dioxide content is adjusted at the final step of production, for flexibility and consistent product quality. This step is critical to the final taste and appearance of the product, which is why carbonation systems require a very high hygiene status at all times and must be easy to clean. DICAR-B™ carbonating systems have been developed by GEA to fulfill your carbonation needs in every respect, with special attention to the CO$_2$ injection nozzle and the dissolving section design.

Your advantage with the DICAR-B™ carbonation system

- High-accuracy carbonation of beer and beer mix products
- Measurement of CO$_2$ content in the product
- Direct control of CO$_2$ content
- CO$_2$ dissolution by means of a special jet nozzle

Important details

- Compact, factory-tested unit
- Possible combination with DICON-B™ gravity optimizing system to form a DIMIX-B™ compact unit
- Unit also adaptable as nitrogenator where required
Evaporation De-Alcoholization Units – Thermal evaporation for real beer taste.

Alcohol-free beer must taste like beer. For this reason, the gentle treatment of product is of major importance during alcohol reduction. GEA is one of the most experienced manufacturers in the field of thermal separation technology. For feed rates between 10 hl/h and 50 hl/h, we offer directly heated falling film evaporation plants. For larger feed rates, plants with mechanical vapor recompression are designed. Compared to conventional de-alcoholization processes, this strategy proves impressive for its low energy costs.

Your advantage with GEA evaporation units

- Gentle product treatment – process temperatures of less than 40 °C
- Very short residence time of the product in the plant
- No possibility of germ formation, no direct steam contact

Important details

- Residual alcohol content adjustable to any value between initial value and 0.05 vol. %
- Carbonation within the plant
In addition to proven evaporation technology for de-alcoholization, GEA also offers an efficient process at low feed rates, using reverse-osmosis membrane filtration. We offer two plant configurations for capacities of 5 hl/h and 10 hl/h. The plants are compact and optimized for batch process. Partial automation ensures high process reliability and low service expenditure. All plants can also be revamped for a capacity increase.

**Your advantage with GEA membrane filtration units**
- Low filtration temperature (< 10 °C) ensures high quality beer
- Standard, modular product for fast return on investment
- Semi-automatic operation for reduced labor costs and enhanced operational safety

**Important details**
- Alcohol reduction from 5 to 0.5 vol.% (optionally up to 0.05 vol. %)
- Simple design with small footprint
- CIP for easy cleaning
Flavored Alcoholic Beverage Lines – Modular systems for innovative flavors.

Enhance your product portfolio with a future-proof Flavored Alcoholic Beverages (FAB) range! Simply add an easy-to-install FAB processing line to your existing brewery systems. A discolored and purified water-alcohol mixture made from beer (fermented alcohol bases) is produced as the basic FAB ingredient. Unwanted ingredients, such as sugar, salts and long-chain color and aroma components, are separated. For this process, GEA offers standard modular systems for feed rates from 50 to 250 hl/h. Plants for higher capacities are designed according to individual customers' requirements.

Your advantage with GEA FAB lines

- Product pre-treatment with standard brewery technology
- Compact design and cost efficient engineering due to batch processing
- Semi-automatic control system for maximum reliability and low supervision effort

Important details

- Optional diafiltration step at end of batch cycle to increase yield
- Use of cost-efficient spiral-wound modules
For the effective recovery of beer from tank bottoms, GEA offers centrifugal separators and cross-flow filtration units with robust ceramic membranes. The modular plants are available on compact skids in three sizes with processing capacities of approximately 250 hl, 500 hl and 1,000 hl per day, depending on the dry solids content of the product. The standard plant design reduces the investment costs and increases your profit. The technology has become trusted in the market with many reference sites worldwide.

Your advantage with GEA beer recovery units

- High quality of the recovered extract (beer)
- Use of mechanically robust and approved ceramic membranes
- Minimized operator effort

Important details

- Easy cleaning (CIP)
- Easy retrofit into existing operations
- Compact, hygienic standard design
- Yeast-free permeate (< 5 cells/100 ml)

For more information on centrifugal separation see section Brewing Separators, p. 47.
With hundreds of new and different beer styles every year and increasing customer awareness of beer quality, craft breweries are on the way up. All over the world, passionate brewers explore high-quality ingredients and optimize both traditional and experimental recipes, all to excite their consumers’ palate.

**GEA-tive solutions for the craft brewer**

From single-step infusion Ale recipes to sophisticated multi-step decoction mashing regimes, GEA provides the right technologies and equipment so you can make your beer exactly your way. Our versatile systems can be found everywhere, producing bold Trappist Ales in Belgium, award-winning India Pale Ales in North America, authentic Wheat Beers in Germany, Irish Stouts, Czech Pilsener, Baltic Porters, and many more.

GEA’s craft brewing solutions also have proven to be a perfect fit for numerous microbreweries that have left their start-up phase behind and are now using more efficient and versatile brewing systems to keep up with their business success and to be ready for future growth.

Get to know our solutions for your own success story with craft beer.
With a smart skid design, a striking visual appearance and a focus on specialty beer recipes, the CRAFT-STAR™ is the right tool for the artisan brewer to produce 40 hl of the finest wort in any style.

GEA’s state-of-the-art brewing technologies give you unsurpassed efficiency in the use of raw materials.

Your advantage with the CRAFT-STAR™ brewhouse

- Pre-engineered brewhouse concept for great cost reduction
- Over-sized vessels to handle high gravity beer recipes
- Pre-skidded system for extra-fast installation
- External wort boiling for maximum flexibility of batch sizes
- Up to 98 % extract efficiency ex lauter tun
- Up to 5 brews within 24 hours

Important details

- Mashing-in unit and mash agitator in proven GEA design
- GEA lauter technologies with differential pressure measuring
- Whirlpool/wort kettle with trub dam for higher hop loads
- Choice of 2-vessel and 3-vessel brewhouse configurations
- Built-in CIP manifold for semi-automated cleaning without separate CIP system
- Central media interface and water mixer included
- GEARBOXX™ automation providing process visualization, recipe database, monitoring, brew reporting and remote support
COMPACT-STAR™ Craft Brewhouse – The brewhouse for 40 to 115 hl.

Our flagship for craft brewers, the COMPACT-STAR™ combines the efficiency of GEA’s larger-sized systems with the flexibility you need for the full variety of beer types. Whether you build a new brewery or upgrade brewing vessels in an existing plant: a wide range of brewhouse configurations is available and a smart expansion concept keeps you prepared for future growth.

Your advantage with the COMPACT-STAR™ brewhouse

- Pre-assembled vessel modules for fast and smooth installation
- Step-by-step brewhouse expansion by adding additional vessel modules for higher throughput
- Eco-friendly wort production with low evaporation rates
- Up to 98% extract efficiency ex lauter tun
- From 5 brews/24 hours with a basic 3-vessel system to 12 brews with extended configuration

Important details

- Mashing-in unit and mash agitator in proven GEA design
- GEA lauter technologies with differential pressure measuring
- Internal calandria with multi-level wort spreader and JETSTAR™ technology
- Whirlpool/wort kettle for optimized throughput with fewer vessels
- GEARBOXX™ automation providing process visualization, recipe database, monitoring, brew reporting and remote support
The WORTSTAR™ Craft wort aeration unit represents a highly innovative concept compared to conventional aeration systems. It treats the wort gently and with high efficiency. This semi-automatic wort aeration system has been developed as a tailor-made craft brewing solution.

Your advantage with WORTSTAR™ Craft wort aeration
- Continuous and exact wort aeration tailored to craft brewers
- Fine and even introduction of air into the cold wort through an annular gap nozzle
- Optimum oxygen uptake by the wort thanks to finest air bubbles
- Completely pre-assembled system
- Easy CIP cleaning

Important details
- Capacity range of 30 hl to 195 hl per hour
- Standard sizes (wort pipe): DN 25 to DN 50
- Wort flow rate of 1.0 to 2.5 m/s
- Pressure loss in wort pipe max. 1.5 bar
- Air pressure of 6.0 to 8.0 bar Ü
- Semi-automatic unit control
- Consistent hygienic design
Sustainable Solutions

There are many ways to address the rising costs in the field of energy management and environmental technology. Consistent and structured upgrades of your brewing technology enable you to cut energy costs and meet legal requirements in a commercially viable manner.

Go sustainable with GEA

Every energy management project begins with an assessment of the current state of your brewery with respect to energy and material flows. Our experience shows there is great potential for optimization particularly in the brewhouse – the biggest energy consumer in brewing, accounting for 40% of energy used.

We determine all relevant consumption figures in every section of your brewery to guide our concept solution for the optimization of your processes and the equipment required for this.

We assess exactly what has to be done to cut energy consumption and costs, to reduce water consumption and waste water production, and to decrease emissions. Of course, economic efficiency calculations are taken into account. But in all our optimization efforts the quality of the beer is always the number one priority.
Modern breweries cannot be imagined without CIP systems. In view of rising costs, particularly for fresh and waste water, CIP systems have recently been in the focus of interest to identify possible saving potentials. Our experts understand the special criteria that need to be met here. We at GEA know that when it comes to cleaning of brewing equipment, vessels and pipes, the major criterion can only be perfect cleanliness.

**Your advantage with CIP-STAR™ systems**
- Upgrade of CIP processes for a time advantage of at least 3 hours and reduced labor costs
- Tailor-made concepts for brewhouse and cold process area
- Brewhouse without caustic brew for pipe cleaning
- No extra CIP shift needed

**Important details**
- Simultaneous production and CIP processes
- Reduced consumption of cleaning agents and power
- Maximum product safety thanks to mixproof pipework design and components
Sustainable production methods are imperative in times of rising energy costs. The right basis for this is the Energy Storage System. Invented by GEA in 1988, ESS lets you recover energy from wort boiling and use it for wort heating by combining a vapor condenser with an energy storage tank, a wort pre-run tank and a wort heater. The system is your maximum-efficiency choice for atmospheric as well as for pressure or dynamic low-pressure boiling.

**Your advantage with the Energy Storage System**
- Open system for optimized management of energy and hot water surplus
- Customized solution considering all local conditions
- Reduction of CO$_2$ footprint
- Available as closed system as well as open system (2.0)

**Important details**
- Calorimetric control and Intelligent Wort Management (IWM) software module available on request
- Energy consumption and recovery data recorded and archived in Power Line Communications
- Significantly reduced fouling of internal calandria due to wort heating in the wort heater
- Status information available directly from the screen (operation time of vapor condenser as percentage of boiling time)
Brewhouse 2.0 –
Go news ways with GEA.

Given ever-rising energy costs and our company’s special focus on green breweries, we at GEA have developed a brewhouse aimed at reducing both operational expenditure (OPEX) and investment required for utility plants. Brewhouse 2.0 is a long-term sustainable solution for you: The intelligent combination of a traditional batch application for the mash and a continuous approach for the wort treatment.

Your advantage with Brewhouse 2.0
- Reduced batch sizes and high mashing-in frequency (40 min)
- Continuous wort treatment line
- Energy savings due to extremely low evaporation rates between 0.5 and 1.5 %
- Perfect stripping of volatiles
- Reduction of steam peak and/or smaller boiler plant
- Up to 50 % of thermal energy from CHP unit
- Generated electrical energy completely absorbed in the brewery

Important details
- Combination with heat and power plants possible
- Mash and wort heating with cooling water from the CHP plant
- Steam-heated booster for mash heating from 70 to 77 °C
- Redundant wort heating and wort cooling units
GEA is your competent partner when it comes to using solar heat in the brewing industry. Depending on the available space we provide all required tasks, or co-operate with an experienced partner from the solar industry. We design the solar field, assess the amount of solar heat that can be produced, and provide ideas for you to supply solar heat to different processes in the brewery or malthouse.

**Discover the economic gains of solar heating in your brewery**

Our experts will gladly show you the technological and economical advantages of integrating solar thermal systems in your brewery – a decisive step forward for the entire industry. Brewing processes well qualify for solar heat technology because of the typical process temperatures of 50 to 100°C, highly suitable for efficient integration of solar thermal plants and solar collectors (flat plate and vacuum tube).
Our intelligent utilities solutions help manage the energy flow in your brewery with optimized processes and costs. GEA provides the right equipment for recovering CO\textsubscript{2} from the fermentation process, for water management and for the supply of cooling, heating and compressed air, all with a significant influence on the efficient use of expensive resources and primary energy.

We understand utilities as an essential instrument to affect the sustainability and efficiency in the process of beer brewing. With our vast experience in the engineering and construction of these systems we ensure perfect integration into your brewery’s overall concept – for maximum economical advantages.
Refrigeration systems are a part of GEA's comprehensive brewery utilities concept. With about 40 %, refrigeration is one of the largest electrical power consumers in a brewery. GEA refrigeration systems are a result of expert know-how with regard to both the brewing process and refrigeration technology. We provide functional and economical plant solutions, planned and built with the focus on the quality of your beer. The final product is what counts.

**Your advantage with GEA refrigeration systems**

- Combined expertise in process and utilities
- Optimized system solutions to meet process requirements
- Holistic planning – considering actual load and environmental influences
- Sparing and efficient use of natural resources
- Use of efficient natural refrigerants

**Important details**

- Plant concept and key components made by GEA
- Efficient control and data analysis systems
- Energy recovery utilization
- Use of high-performance components for full operational reliability
- Innovative condenser control system, to optimize refrigeration plant performance in view of environmental influences (wet bulb temperature)
Using CO₂ from your own fermenters guarantees perfect control over quality. This is an advantage in your brewery that no other source can offer. With GEA technology even the smallest amount of residual H₂S and oxygen in the CO₂ can be removed. We ensure perfect and seamless integration of the CO₂ recovery plant into your plant, for improved efficiency of both CO₂ and refrigeration processes at reduced investment.

Our CO₂ recovery plants offer surpassing advantages: maximum purity, highest operational reliability and low operating costs.

**Your advantage with GEA CO₂ recovery units**
- Expert knowledge of CO₂ quality impact on the beer product
- Important contribution to comprehensive brewery utilities concept
- Optimized system solutions
- Sparing and efficient use of natural resources
- Use of efficient natural refrigerants

**Important details**
- Plant concept and key components made by GEA
- Efficient control and data analysis systems
- Automated control systems linked to beer process control system
- Optimized operational reliability thanks to high-performance components
- H₂S purification columns and stripping systems to remove O₂
- Energy recovery via latent vaporization enthalpy
Streamline your brewing process with future-proof automation technology! Our process automation solutions pave the way for you to more operational reliability, enhanced product quality and economic gain. To achieve that, excellent and proven process automation solutions are individually tailored to your processes. Our experts select the right tools for you from market-leading software systems (Siemens WinCC & BRAUMAT, Wonderware InTouch, GE Intelligent Platforms iFIX, ProLeiT brewmaxx™, and more) and adapt them to your needs.

You benefit from our combined experience in process and plant engineering and our extensive knowledge of industry-specific brewing technology requirements – the key to making the right decisions.

**Our control systems at a glance**

- GEARBOXX™ – efficient process automation of plant sections and units
- OTAS™ – Open Technology Automation Solution for SCADA systems and for fully integrated, plant-wide process control
- brewmaxx™ – process control solution for breweries, MES included
- BRAUMAT – process control system for the entire beverage production process
GEARBOXX™ Process Automation – Compact control system for breweries.

Any automation solution for smaller breweries, plant sections or units requires a specialized control system designed for smaller-quantity structures, but efficiently covering all the important functionalities of a larger process control system. With GEARBOXX™ process automation, GEA offers a proven compact system that meets exactly these requirements.

We have the flexibility to adapt your solution to any local conditions. All GEARBOXX™ components are based on proven and constantly improved compact control concepts.

**Your advantage with GEARBOXX™ process automation**
- Operation and parameter correction of all I/O elements via graphical user interface
- Execution of recipe-controlled programs with pre-selectable recipes and objects
- Profibus DP and Profibus PA coupling of plant peripherals

**Important details**
- As-built documentation to write back from the system into the GEARBOXX™ tool anytime
- Program structuring and operation in accordance with S88
OTAS™ Process Automation – Open Technology Automation Solution.

Take automated plant and process control in your brewery to the next level. With Open Technology Automation Solutions OTAS™ from GEA, you can achieve this independent of the control system used. Various highly developed automation modules combine their different abilities to meet the requirements of each customer.

OTAS™ grows as requirements increase. In addition to the typical plant control and value recording functions, the scope of available modules also includes production reports and recipes, batch tracking, support of preventive maintenance and fault analysis.

Your advantage with OTAS™ process automation
- Easy-to-use, reliable and highly functional automation solutions
- Open automation software
- Single automation system for the entire brewing plant
- Proven service support
- High investment safety

Important details
- Continuous plant parameterization for more flexible programming with increasing computing power
- Modifications/adjustments possible for technicians/maintenance staff without programming access
To enhance the efficiency of decisive steps in the brewing process, GEA supplies you with intelligent software solutions: Dynamic Filter Management (DFM) is a software system to optimize kieselgur filtration. Multifunctional Lautering Management (MLM) offers intelligent control technology for the lautering system. Both solutions are available as retrofit that pays off very quickly.

**Your advantage with GEA intelligent software solutions**

**Dynamic Filter Management (DFM)**
- Reduced kieselgur consumption per hl filtered beer
- Lower cost for CIP and kieselgur
- Enlarged batch size and runtime of sheet and cartridge filters
- Optimized green footprint of your brewery
- Suitability for any automated filtration system

**Multifunctional Lautering Management (MLM)**
- Shortened lautering time without affecting quality
- Higher yields and lower turbidity values
- Quick detection and auto-balancing of variations in raw material quality
- Increased numbers of brews
Together with you, our customer, we design solutions aimed at fully exploiting the potential of your brewery. Our intelligent service solutions are based on the goal to ensure a continuous and cost-effective production process during the entire life cycle of your equipment or plant.

**Your advantage with Service**next level

- Four main service modules:
  - Beginning of life services
  - Lifetime services
  - Extended life services
  - Consulting services & operations
- Individual contract periods
- Maintenance and improvement of plant performance levels
- Sound maintenance concepts based on criticality analysis
- Options to flexibly adapt service level at all times

**Important details**

- High plant availability
- Excellent plant efficiency
- Spare part availability as required, at optimized spare part costs
- Worldwide network
- Fast response time
- Cost control
- No compromise on quality and security of people or equipment
Apart from sophisticated technology systems for each key process in brewing, GEA also supplies you with all additional equipment necessary for heating, cooling, degassing, aroma recovery, desulphurization and condensation.

**All the solutions you are looking for**

Our components are flexible so they can be adjusted in the right way to optimize process parameters and ensure high productivity, efficient operation and a constantly high product quality. This is why we are one of the world’s leading manufacturers of process components.

Throughout GEA’s history we have introduced well-engineered and technically mature innovations to the market. Our research and development facilities work in close cooperation with the product management department and with our customers to create individual application solutions.

GEA components make sure your processes are carried out in a safe and high-quality way. They form soundly engineered interfaces between plants and satisfy the highest hygiene and sterility requirements. We provide easy-to-maintain and efficient process components for constant high quality under normal production conditions. All our products are designed and approved in accordance with international standards.
GEA separators are used in many different steps of beer production. Highly precise ejection systems and gentle feed systems lead to high yield without affecting product quality.

**Process options with GEA brewing separators**
- Hot wort clarification for beers with high solids content
- Trub wort separation to improve Whirlpool operation
- Green beer clarification after fermentation
- Lager beer clarification prior to filtration
- Beer recovery from surplus yeast
- Polishing of beer without filtration
- Turbidity adjustment of wheat beer

**Your advantage with GEA brewing separators**
- Standardization of the product entering the next process steps
- Low product losses
- Maximum energy efficiency of integrated direct drive
- Simple integration into existing process lines
- Special skid designs for craft brewers – simply plug & brew

**Important details**
- Hygienic design and gentle feed systems
- Hydro-hermetic seals to avoid oxygen pick-up
- Highly efficient ejection systems
- Wide range of machine types
Hygienic Pump Technology

Hygienic Valve Technology
Aseptic Valve Technology

Cleaning Technology
As a global leader delivering solutions for process industries in beer, beer mix beverages and other beverages GEA operates at the forefront of technology, with the brewer’s competitive advantage in mind. Challenging requirements from individual customers as well as insights from extensive market observation consistently lead us to sophisticated R&D and innovation projects.

Examples

- Semi-continuous and continuous brewhouse processes
- “Hot” cropping with separators
- Dry hopping for innovative new beer flavors
- Just-in-Time production: Blending systems that optimize production processes, for a significant reduction in lead time and dramatically reduced stock levels
- Brewery Progressive: All GEA innovations combined for a complete new brewery set up, from raw material intake to the interface packaging line (details and customer benefits on request)
- Brewhouse Advance: Engineering study for a lauter tun upgrade to 14 or 16 brews per day
Get in Touch

We would like to get in contact with you to discuss a customized approach for your needs. Our consultants know that every plant, every project is different. So, no matter if we end up planning a meeting for two hours or organizing a global workshop for several days, we are bound to make sure that the result of this process will help you improving your business.
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.