Solutions for ketchup production lines
Ketchup manufacturing

Food manufacturers must stay competitive in highly pressured global markets. Staying ahead of the competition means offering top quality products that meet consumer demands, while remaining flexible and innovative to develop new recipes and products in response to changing market expectations.

Global growth in western-style diets, coupled with increased consumer demand for fast food, and the growing popularity of frozen and easy-cook ready meals, have spurred huge growth in the worldwide market for ketchup. This tomato-based condiment is a staple food cupboard favorite, as an accompaniment to burgers, cooked meats, fries and other potato products, and as a flavoring for sauces.

To meet regional demands in global markets, manufacturers are also developing ketchup variants that contain different spices, or particulates including vegetable pieces.

GEA offers a complete range of components, technologies and complete integrated lines for manufacturing all ketchup recipes. Our efficient, reliable and sustainable solutions give our customers the flexibility to remain competitive, but stay cost-effective, and meet environmental sustainability goals.
Our expertise

GEA understands the complexities of designing efficient, versatile plants for food processing. We work with our customers to configure and install equipment that will match every requirement for ketchup manufacture, and allow them to grow, expand and diversify.

GEA technologies are constructed on decades of experience and know-how in every sphere of food processing. We offer individual solutions, components and stand-alone equipment for ketchup manufacture, and can design, deliver and install complete end-to-end plants for commercial-scale production.

All GEA engineering is backed by our industry-leading expertise in configuring liquid processing systems. Our customers can be confident of consistent, repeatable processing, resulting in high quality, stable, homogeneous products with long shelf life.

GEA experts work with customers to optimize key stages in their manufacturing processes. Our batch and continuous processing systems are optimized for reliable, sustainable operation, and require minimal maintenance. Tailored automation minimizes the need for manual intervention, while fast, efficient cleaning-in-place (CIP) reduces down time and ensures product safety.
GEA process design and plant integration

GEA has global expertise in configuring state-of-the-art technologies and equipment for fully integrated ketchup manufacturing lines, from raw materials reception to filling.

We understand that food manufacturers have unique process requirements that can change over time. To meet these needs, we offer versatile plants that are designed to match immediate production requirements and also ensure future scalability.

GEA experts will develop and configure optimized solutions for ketchup manufacture, whatever your ingredients, capacity, product range or plant layout. We supply preconfigured, standalone equipment and technologies for fast, easy installation to extend or upgrade your existing lines. We also design, deliver and install complete ketchup processing lines for small- and large-scale production.

GEA in addition configures upstream solutions that will fit in with the throughput, capacity and processing times of your ketchup filling lines, so end-to-end processing is seamless, without delays or bottlenecks.

And of course, all GEA equipment and solutions meet the strictest hygiene requirements.
Project management
GEA makes sure that no detail is overlooked, and that every deliverable is achieved on time and to budget. All GEA customers benefit from our project management expertise. Enter into a partnership with a dedicated team of GEA experts to guarantee the safe and efficient installation of your next plant. We will provide an initial analysis of your project and propose the most suitable plant layout, process control system and production technology.

GEA’s engineering, installation and process expertise, combined with our manufacturing know-how, means that you can expect optimum plant performance from day one. We will stay by your side, supporting you throughout the full life cycle of your plant and equipment to ensure lasting business success.

Training and support
Our certified and experienced service engineers train your employees – on site or in one of our modern training centers. Our experts will provide your staff with comprehensive operational training and valuable process knowledge so they can safely and expertly run and maintain your plant and processes from the day of installation. All training modules are tailored to the individual needs of your business.
Ingredients handling and mixing

GEA configures complete, safe systems for handling solid and liquid raw ingredients such as sugar, vinegar and spices. All powder ingredients are scanned and weighed prior to delivery to the BATCH FORMULA® Mixer. Slurry can be standardized in a buffer tank before transfer to the mixing system.

**BATCH FORMULA® Mixer**

GEA systems are designed for highly repeatable batch processing. Ketchup recipes typically include relatively high ratios of sugar and spices compared with liquid tomato paste. Mixing is a key manufacturing stage for viscous products such as ketchup, which can affect final product consistency and quality. GEA’s one-pot BATCH FORMULA® Mixer features a high-shear device that is ideally suited to processing stable, high viscosity ketchup.

The BATCH FORMULA® Mixer uses a vacuum system to introduce liquids and powders below the liquid surface so wetting is almost instantaneous. This approach results in faster processing times, eliminates air incorporation and foaming, and deaerates the premix, so there is no need to include a deaerator in the pasteurization process.
The BATCH FORMULA® Mixer technology ensures that there is less equipment clogging, which also speeds processing and enables more efficient cleaning-in-place (CIP). The high shear technology is energy efficient, and so reduces energy costs. Overall benefits for our customers include increased production capacity and operational efficiency, and reduced product loss, which means improved profits and faster return on investment.

Key features of the BATCH FORMULA® Mixer:
- High shear and low shear mixing are carried out in the same vessel
- High efficiency mixing results in a stable dispersion
- Hygienic system design ensures total mixer drainage between batches
- Versatile design for multiple high viscosity applications with up to 80% total solids
Pasteurization

GEA offers a wide range of standard and custom-built, multi-purpose pasteurizers for both small-scale and large-scale ketchup production.

Available with capacities ranging from 100 l/h to 20,000 l/h, our pasteurizers are designed as modular systems that can be assembled to meet just about any ketchup or liquid food product and process requirements. Application-specific modules added to the basic unit allow us to create solutions that offer a perfect combination of functionality and productivity. Benefits include increased yield, reduced losses, and process flexibility.

We can supply both indirect pasteurization units with tubular heat exchangers, and direct steam injection systems. All GEA pasteurization solutions are built for reliability, and some configurations are capable of running for several days continuously.

Indirect heating using heat exchangers

We offer a comprehensive range of VARITUBE® heat exchangers, which means that we can tailor indirect pasteurization units to match your capacity and recipes, including smooth ketchups and products that contain pieces of vegetable or herbs.

Unlike conventional pasteurizers, GEA tubular heat exchangers have no wearing parts. Maintenance is a case of routine inspection. Our VARITUBE® tubular heat exchangers are engineered and fabricated in GEA workshops, which means that we can offer a wide range of monotube, multitube, straight and corrugated configurations to meet each customer’s requirements. Strict quality control is guaranteed.

The modular design of the VARITUBE® technology allows for easy installation, extension or modification to match changing capacity and processing needs. VARITUBE® modules feature a sanitary sealing system, and product flow paths without ‘dead zones’. Customers are assured of both maximum reliability and product quality.
Direct steam injection

GEA offers systems for pasteurization using direct steam injection as an alternative to indirect heating. Using this approach steam is injected into the product using a direct steam injector (DSI), heating the product to the required temperature almost instantaneously.

Pasteurization using a direct steam injection system can have significant advantages compared with indirect systems, including better color retention. Using direct steam injection the product is held at high heat for a much shorter time than it is using indirect high heating. Some of the largest end users of ketchup, including major global fast food outlets, are increasingly demanding that the ketchup they purchase has been processed using direct steam injection pasteurization, rather than by indirect heating methods.
Homogenization

GEA expertise spans both hot break and cold break processing for tomato ketchup. We configure and install hot break systems that carry out homogenization during pasteurization, and cold break solutions that exploit a high shear pump technology.

The hot break method involves rapidly heating the chopped tomatoes to approximately 90°C, which inactivates the natural enzymes. Homogenization (microfibrillation) during the pasteurization process increases viscosity, without the need for stabilizers.

For cold break processing the chopped tomatoes are only mildly heated, which increases enzymatic activity and yield. The texture results from processing that generally involves the actions of a high shear pump in combination with the use of stabilizers and a high-pressure homogenizer to avoid syneresis. The final product exhibits very intense color and flavor.

High pressure homogenization is a mechanical method that changes the tomato’s particle structure to deliver a better overall product quality. Single cell production, disruption of crystals agglomerates and cutting effect on fibers are just some of the effects that homogenizers can achieve, dependent upon the final product requirements.

Key effects of high pressure homogenization on ketchup:
- Improves product stability
- Increases viscosity using the tomato’s natural pectin properties
- Improves mouthfeel and taste
Deaeration

The BATCH FORMULA® Mixer carries out premixing under vacuum, which means there is no need for a separate deaeration step. Only for systems that don’t carry out premixing under vacuum, a deaeration stage is required to remove any micro air bubbles trapped in the product. This ensures a higher quality product, but also avoids burn, and so ensures longer production runs and no CIP issue.

GEA has designed a highly efficient, cost-effective deaerator that is ideally suited to handle high viscosity products. The system features feed flow from the bottom, and an aroma recovery system, to ensure no loss of quality during the process.
Product recovery

VARICOVER® Product Recovery Systems
Lower product losses mean improved profits, so GEA has developed state-of-the-art pigging technology for recovering valuable product from pipe systems.

Using GEA’s VARICOVER® Product Recovery System, residual products are expelled from the pipes and returned into the product flow by pigging. This results in less product remaining in the pipes and more efficient cleaning, which also dramatically reduces the waste water load. Our systems can also be installed in aseptic environments. For long piping routes we have developed the VARICOVER® Product Recovery System, which reduces waste, prevents carry-over between batches or at product changeover, and improves the economic efficiency of your production plant.
The amount of time it takes to switch between products can have a major impact on your plant’s overall capacity. GEA systems have been developed to maximize that capacity and so increase operating efficiency. Our technologies and plants feature sanitary, hygienic construction, and can either be configured with integrated cleaning-in-place (CIP) or are designed to require minimal manual cleaning. By using our MIXPROOF valves, one process line can be cleaned while the other runs product through it, thereby saving time.

CIP to save resources and costs
Innovative CIP solutions from GEA meet all critical hygiene standards to guarantee product safety at every point of processing. As well as enabling faster product changeover, optimized CIP reduces the use of cleaning agents and water.

Our highly efficient CIP plants prevent product leakage into cleaning lines, and so reduce the potential for contamination and carry-over. Where possible, production lines can continue operating even when some parts are undergoing a CIP cycle, so that stoppage time and associated costs are reduced.
Automation and test facilities

**Process automation for reliable, reproducible manufacturing**

Every plant will have different process automation requirements. GEA offers a wide range of automation systems and services that range from basic process control to integrated, enterprise-wide network systems with MES (Manufacturing Execution System).

Our MES solutions are built on our extensive industry know-how, and allow customers to manage and monitor every stage in their ketchup production processes to ensure both optimum use of resources and consistent product quality. Our process automation solutions reduce the need for manual tasks so that you can be confident of reproducible, reliable processing, every day.

And with the option of GEA’s intelligent recipe application module, our customers can easily create and manage recipes and production scheduling for all their food products.

**GEA test facilities**

GEA offers laboratory and pilot plant testing facilities for customers to try out new ketchup recipes and formulations, and work on process development and validation. Our experts can offer an unparalleled range of equipment and industry-leading know-how for any recipe and every stage of your process, from early-stage product development through to final process refinement.
GEA Service – 
For your continued success

Working with GEA Service means partnering with a dedicated team of service experts. Our focus is to build, maintain and improve customer performance throughout the entire life cycle of the plant and its equipment.

**Beginning of Life Services**
Getting you started with seamless support for instant productivity and performance

**Lifetime Services**
Keeping it running with the cost-efficient way of ensuring safety and reliability

**Extended Life Services**
Constantly improving by sharing our knowledge to safeguard your investment

**Consulting & Enhanced Operations**
Together with you by enduring commitment to you and your business
We live our values.

Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA is a global technology company with multi-billion euro sales operations in more than 50 countries. Founded in 1881 the company is one of the largest providers of innovative equipment and process technology. GEA is listed in the STOXX® Europe 600 Index. In addition, the company is included in selected MSCI Global Sustainability Indexes.