



The GEA Pharma Solids Center

Improving your products, optimizing your processes, making science work



COMMITTED TO OUR CUSTOMERS

With our unparalleled history of expertise in processing OSDs, from pills and pellets to MUPS, and our tried and tested technologies, our focus is on price-performance leadership, safety and quality. How do we do this? By making science work.

Investing in the Future of Pharma

Test, develop and optimize your products and processes with cutting-edge batch and continuous technologies

The GEA Pharma Solids Center (GPSC) represents our continued commitment to and our ongoing support for the current and future pharmaceutical industry. With a total footprint of 1100 m², including 200 m² of technical space, the GPSC epitomizes the state-of-the-art in oral solid dosage (OSD) form testing, development and optimization, and offers a full range of batch and continuous manufacturing technologies. From process enhancement to real-life simulations and test and loan machines, we provide a unique range of services that are designed to improve production and enhance the quality of your product.

The new center offers a wealth of opportunity for GEA's clients, including customer demonstrations and trials, training sessions and hands-on lab experience, as well as CQA evaluation and updates on what can be achieved with our equipment.

By delivering everything from technical know-how and process insight to project management and the service you need to meet your objectives and bring your plans to fruition, we supply the added value and the deep-rooted knowledge that counts.

Whatever the scale of your operation or application, we have the capability to make your concept a reality, enhance your process, improve your production efficiency and deliver the ongoing support to make your business a success. How do we do this?

By making science work.



A Wealth of Opportunity

Get on the fast track to product success
and discover new opportunities

A well-established expert in the pharmaceutical processing and manufacturing industry with a long history of experience, GEA has developed a deep and thorough understanding of the challenges you face, the hurdles you need to overcome and the goals you want to achieve.

At the GPSC, we combine advanced in-house technology with a thorough understanding of the processing industries to help customers maximize their development results, gain more know-how and discover additional opportunities for their applications.

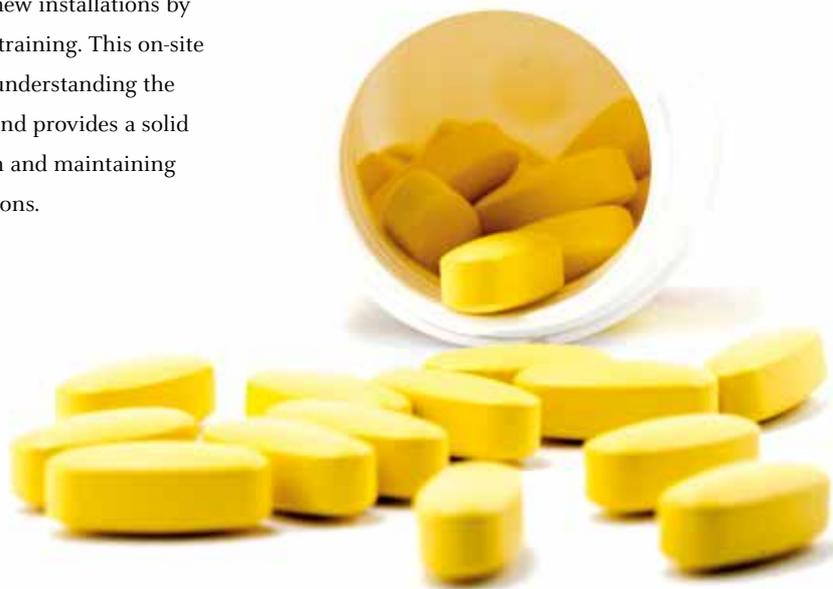
The GPSC supports the development of new technologies and increase the fundamental understanding of existing pharmaceutical processes and technologies.

Furthermore, we can help with new installations by providing unit-specific operator training. This on-site hands-on guidance is critical to understanding the functionality of the equipment and provides a solid foundation in terms of operation and maintaining optimum manufacturing conditions.

Additionally, we provide a unique range of services that are designed to enhance production and expedite time-to-market, such as testing new concepts (equipment/advanced controls), developing and refining new procedures to increase both our understanding and the capabilities of our equipment, as well as equipment and operator training.

We can help with process development of

- tablets
- pellets
- effervescent
- MUPS
- inhalable fine powders
- granules, dragées and crystals.





WE BELIEVE OUR SERVICES GREATLY BENEFIT ANYONE INVOLVED IN PHARMACEUTICAL R&D, EQUIPMENT SELECTION, PROCESS OPTIMIZATION AND PRODUCT DEVELOPMENT

Batch Processing Capabilities

From powder to coated tablet and from R&D to full-scale manufacturing, no other supplier offers such a comprehensive range of batch-based technologies for oral solid dosage form production

Whatever your application, no matter how challenging, GEA's powder handling, granulating, pelletizing, drying, compression and coating solutions will meet and exceed your individual requirements.

The GPSC enables you to investigate all the batch-based solid dosage production techniques offered by GEA, at laboratory, pilot or production scale. Our experts are available to provide objective, unbiased advice on the merits and implications of each process and to help you to choose the best solution for your specific application. Some of the key application areas that are on offer at the GPSC include the following:

- IBC blending
- high shear granulation (top and bottom drive)
- fluid bed FlexStream® granulation, drying and coating
- fluid bed top spray granulation and precision coating
- containment measures (BUCK® valves, Hicoflex®).
- single-pot drying
- extrusion/spheronization
- tablet compression
- milling/calibration



Mobile PharmaConnect® with 60-L PMA bowl – available for trials onsite and for rental



Mobile PMA-1 high shear granulator – available for trials onsite and for rental



INCREASING KNOWLEDGE

Our permanent staff of experienced engineers, technicians, and industrial pharmacists can assist with any production problems, new developments and the modification of GEA technology to meet specific needs.



WHATEVER YOUR APPLICATION

Whether it's high shear granulation or inhalation blending, extrusion and spherization or IBC blending, safety, containment, product flow and building requirements are in-built for full integration and optimum process efficiency.

Batch Processing Capabilities

The quest for continuous innovation is the force that drives us every day, and flexibility, performance, accuracy and control are the criteria that focus our thinking.

Everything we do is aimed at improving these key factors to help you to make better products and improve productivity.

Below you can find examples of the innovative solutions that can be tested in the GPSC:

Integrated Small-Scale Granulation and Drying: At the heart of GEA's small-scale and R&D portfolio is PharmaConnect®, which allows a number of diverse process modules to be docked to a single control unit. The GPSC offers both a mobile and a permanently installed PharmaConnect® system with high shear granulation modules.

Flexible Fluid Bed Processing: FlexStream® is a multipurpose processor that addresses the current shortfalls of traditional fluid bed processing, including linear scale-up, and fully contained loading and unloading for pharmaceutical applications. In the GPSC, this technology can be tested and demonstrated at lab, pilot and production scale.

Optimized Pellet and MUPS Formulations: Pharmaceutical pellets offer many additional features compared with conventional tablets. GEA is able to offer all the typically used pelletization processes and help you to select the one that best suits your needs, including powder and liquid layering, melt and wet granulation processes, and innovative MUPS production technology that eliminates segregation and significantly increases process yields.



NICA IPS25 for extrusion and spheronisation – available for trials onsite and for rental



Production scale contained discharge system including milling option

Continuous Processing: ConsiGma®

At GEA, we believe that continuous processing improves the quality of pharmaceutical end products by focusing on quality during the whole product lifecycle — not just “tested in” quality — and by understanding the capability of your processes, managing sources of variability and decreasing any associated risks.

The ConsiGma® concept enables small amounts of product to be processed and developed quickly and efficiently. And, once a formulation has been optimized, it can be reliably reproduced in pilot, clinical or production batches, simply by running the machine for longer, avoiding scale-up problems and the lengthy validation processes that hinder bringing new products to market faster.

ConsiGma® is a Six Sigma-inspired manufacturing platform, incorporating different technologies to produce oral solid dosage forms in a continuous, cost-efficient way:

- by collecting more information during R&D in a short time with less product
- by excluding risky, time- and product-consuming scale-up exercises
- by introducing online measurement and closed loop control for real-time release (Six Sigma production)
- by incorporating flexible batch sizes (JIT production) and reducing inventory
- by decreasing the energy cost per tablet, reducing the environmental impact.

The GPSC enables you to investigate the possibilities that continuous manufacturing can offer for your production. In the GPSC, the following technologies are available for testing.



ConsiGma® 1 for R&D scale continuous granulation

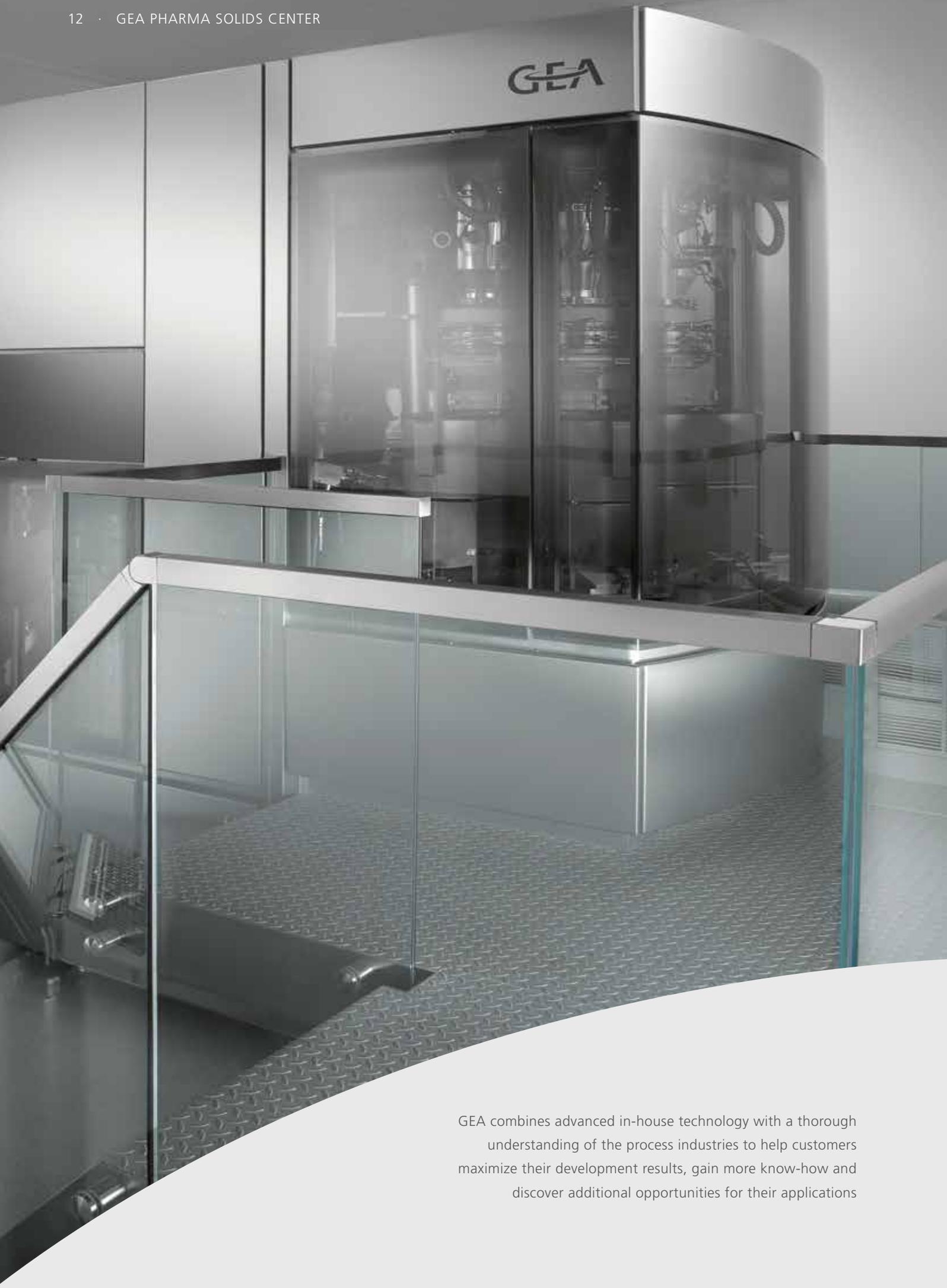
- ConsiGma® 1 for initial continuous wet granulation trials, feasibility and first DoE tests.
- Continuous Tableting Line CTL 25: a continuous wet granulation and drying production line, able to operate at a nominal throughput of 25 kg/h. Tablet compression and tablet coating can immediately be linked to the granulation and drying process, to evaluate the full continuous process.
- Offline Compact Feeder (CF): to investigate the right set-up of the feeder for your ingredients before moving to the full production line.
- ConsiGma CDC50 for continuous direct compression
- ConsiGma Coater Continuous Coating of tablets produced by the CTL25 or CDC50





FLEXIBLE, SAFE AND COST-EFFECTIVE

ConsiGma® provides maximum output in an energy efficient way, has been tested using a wide variety of formulations and is already being used by several large pharmaceutical companies, and both ethical and generic research and manufacturing centers worldwide



GEA combines advanced in-house technology with a thorough understanding of the process industries to help customers maximize their development results, gain more know-how and discover additional opportunities for their applications

Continuous Direct Compression

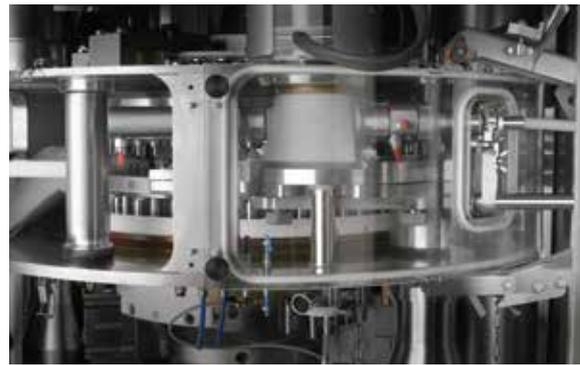
Available in the GPSC for product trials, the ConsiGma® CDC is a complete tablet production facility with embedded quality control in one machine, integrating four key GEA technologies — accurate loss-in-weight feeding, continuous blending, GEA compression technology and the online measurement of CQAs (Critical Quality Attributes) with a Lighthouse Probe™.

High Performance Tablet Coating Technology:

The ConsiGma® coater is a revolutionary, high performance tablet coating technology that accurately deposits controlled amounts of coating materials on tablets. Designed specifically to be an integral part of the ConsiGma® continuous tableting lines, the ConsiGma® coater is able to process small quantities of tablets at very high rates, offering improved heat and mass transfer.



GEA Compact Feeder arrangement in the CDC 50 for direct compression



Exchangeable Compression Module (ECM) of the CDC 50 for direct compression



Advanced Control Systems enhance better understanding and control of the process





GEA and its partners are leading the way toward smaller, more flexible, continuous processing technologies that have the potential to transform the future of pharmaceutical development and manufacturing — and deliver customized quantities of drugs to patients in need in a quick and efficient way

Making Science Work

At our technology centers, interested parties can test any unit operation, from lab- to pilot-scale, or perform comparative process studies with our skilled operators by testing complete process trains

In addition, our permanent staff of experienced engineers, technicians and industrial pharmacists can assist with any production problems, new developments and the modification of GEA technology to meet specific needs.

Our personnel remain constantly up to date with the most recent developments in the industry to be able to provide you with the best assistance possible.

From solid dosage applications in the Wommelgem GPSC to the largest and most advanced spray drying facility in the world in Copenhagen, Denmark, and separation technologies in Oelde, Germany, 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.

With a long history of solid dosage form expertise, including hundreds of formulations, everyone at the GPSC is committed to going the extra mile to meet customer expectations. Wherever you are in the world, whatever your application, we'll take you further, faster.

GEA recognizes the important role that training plays in the proper use of its equipment. Whether the need is theory, general operational training or tuition on a specific process, GEA can help you to learn to use our technology to the fullest.

To support the needs of our customer base, regular training courses are scheduled at the GPSC. Custom classes can also be arranged, either at the customer's own facility or at the GPSC

Currently available courses include

- Understanding Continuous Processing
- Successful Tableting: How to Achieve Operational Excellence
- Tableting Technology Seminars
(operator, maintenance and process level)
- Customized training, etc.





A view of our training facilities



IBC blending at the GPSC

To discover more or organize a test, demonstration or training session, contact our dedicated, passionate and experienced team infoGPSC@gea.com



Available Services

Applications

FD
Formulation Development**

H
Hormones*

ACT
Anti-Cancer Treatments*

IFP
Inhalable Fine Powders

AA
Antibiotics* & Anti-Infectives

M
MUPS

E
Effervescent

P
Pellets

HVP
High Volume Production

T
Tablets

HPA
Highly Potent APIs*

Core Technologies

G
Granulation

- Addition of Liquid & Ingredients
- Continuous Blending (NEW)
- Continuous Granulation
- Dry Powder Blending
- Fluid Bed Granulation
- Fluidized Spray Drying
- High Shear Mixing
- High Shear Granulation
- Integrated Granulation
- Liquid Mixing & Blending
- Melt Granulation

DPP
Drying & Particle Processing

- Dispensing & Dosing
- Dry Bonding
- Extrusion
- Fluid Bed Drying
- Layering
- Melt Pelletizing
- Microwave Drying
- Particle Pellet Coating
- Pelletizing
- Single-Pot Processing
- Spheronization
- Spray Drying
- Vacuum Drying
- Wet Pelletizing

TC
Tablet Compression

- Contained Tableting
- Continuous Coating
- Continuous Direct Compression
- Continuous Tableting DC & WG
- Industrial Compression
- Tablet Coating
- Tablet Compression

PH
Product Handling

- Contained Materials Handling
- Containment
- Dispensing & Dosing
- Dispensing & Weighing
- Handling of Bulk Ingredients
- Mixing & Blending
- Tablet Handling

Available services will depend on the location of the test center. Please enquire for details.

* Acceptance of API depend on the risk analysis by the EH&S department.

** In collaboration with our partners

Expertise

PTD

Product
Testing &
Development

SUA

Start-Up
Assistance

PO

Process
Optimization

AD

Application
Development

F

Formulation**

PPL

Price-
Performance
Leadership

CT

Customer
Trials

HQ

Higher
Quality

TE

Training &
Education

FTM

Faster
Time-to-
Market





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.

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