

# IDEAS INSIDE

EPC Group Company Presentation  
**Turnkey Plant Construction  
& Engineering Services**



**EPC GROUP**

BRANCHES

- Amstadt (Headquarter)
- Rudolstadt
- Jena
- Gera
- Wurzen
- Leuna
- Alzenau
- Hamburg
- Moscow

### We play global.

EPC Group has designed and installed chemical and industrial plants that are operating all over the world. Our customers can confirm the high performance and reliability of their finished plants. You can see selected references on the map.

## Engineering and Plant Construction EPC Group

To meet the challenge of constructing a new industrial plant or revamping an existing facility you need a reliable, trustworthy and strong partner to support you in the realization of your vision.

The EPC Group is a German family-owned business with over 140 years of engineering tradition. With more than 300 qualified employees at 8 locations in Germany, we design and deliver turnkey industrial plants and infrastructure projects all over the world.

Our vast experience in engineering combined with continual research and development make it possible to deliver a variety of innovative, efficient and high quality processes and plants. Customer satisfaction is our priority, alongside environmental and social awareness. Our flexibility and fast decision-making bring each project to a punctual conclusion, safely and within budget.



(left to right) Ulf, Peter, Jens, Tim and Nadine Henkel  
Company founder and successors

### EPC - Ideas Inside

Dipl.-Ing. Peter Henkel  
Company founder

Dipl.-Wirtsch.-Ing. / MBA  
Nadine Henkel  
Managing Director

Dipl.-Ing. Jens Henkel  
Managing Director

Dipl.-Ing. Ulf Henkel  
Managing Director

Dipl.-Ing. Tim Henkel  
Managing Director

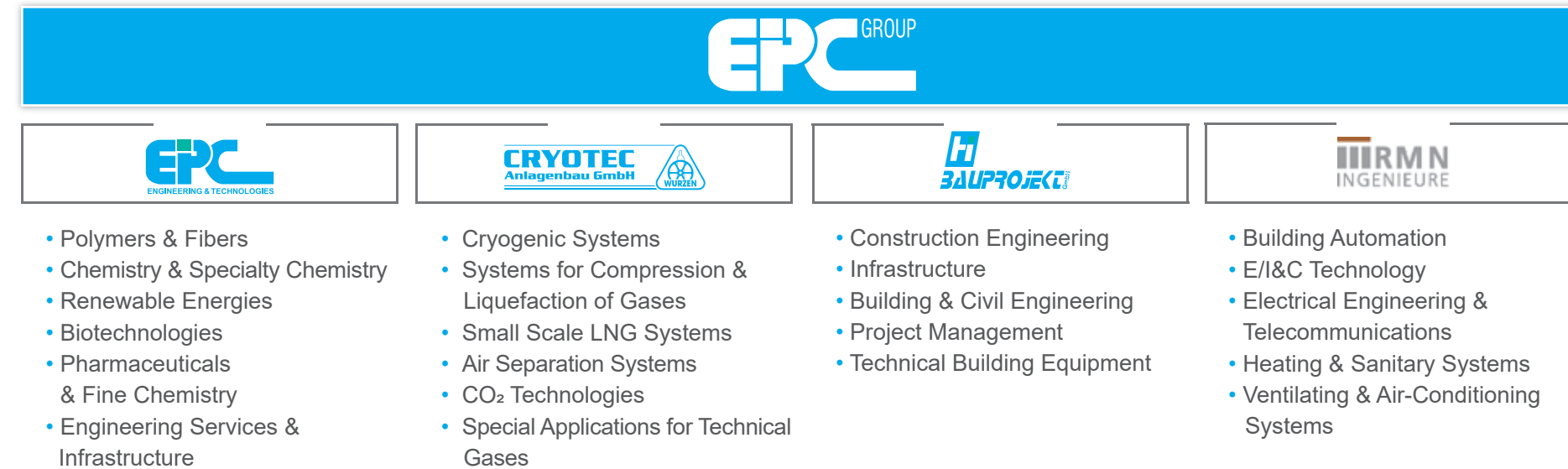


## Company structure and areas of competence

EPC Group employs more than 300 professionals spread across four specialized companies located at eight different sites within Germany.

As a general contractor we offer you all the necessary services required for the successful delivery of your project. We are experts in the fields of polymers & fibers, fine chemistry & pharmaceutical technologies, chemical plant construction, renewable energy technologies, foodstuff & bio-technologies, cryogenic systems as well as construction and infrastructure projects.

Even following project delivery we will remain at your side to ensure that your industrial plant conforms to the latest state of the art. Plant revamping, optimization, maintenance work and staff training are all integral parts of our extensive after-sales service.

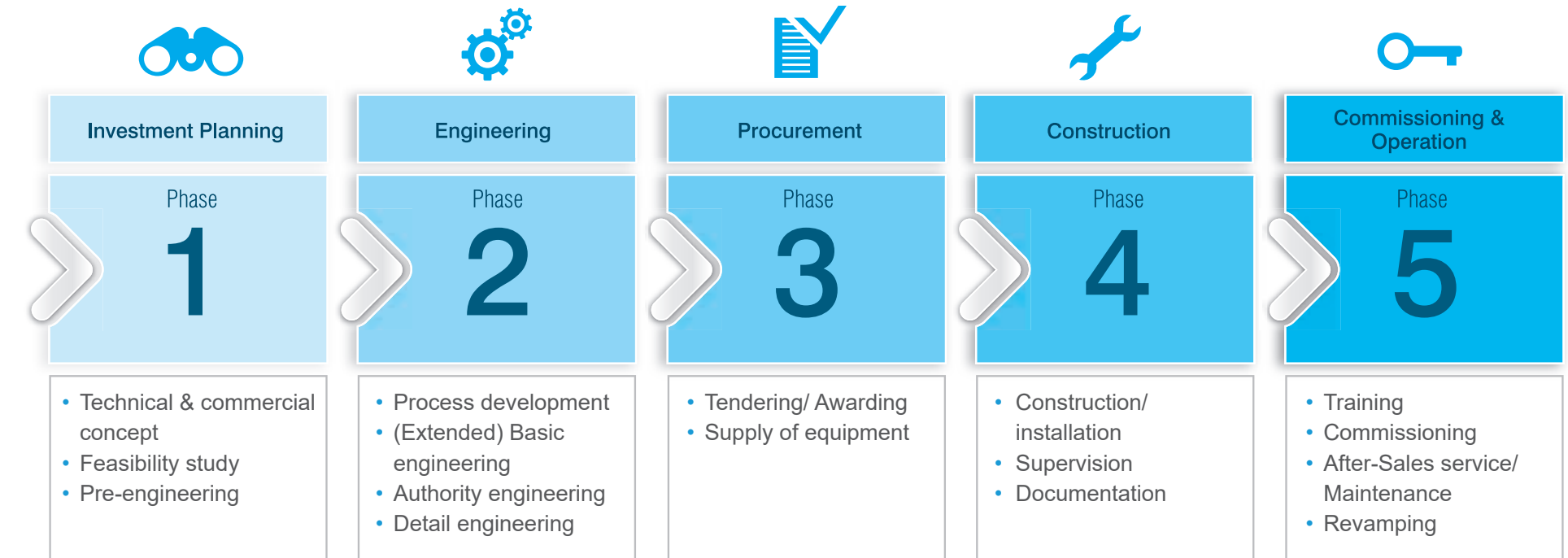


## Engineering for all stages of an investment project – Turnkey Plant Construction

5 steps to a complete plant delivery. EPC Group can deliver all the professional services required for each phase of the project. Having all experts under one roof optimizes communication within the team.

Each phase of your project will be closely supported by an experienced team from EPC Group. Our engineers can cope with the most challenging tasks. A project manager will accompany you from the start and will constantly interact with the project team, keep an eye on progression and will be your contact partner for the duration of your project. Our turnkey plant solution includes all

the necessary steps to ensure your completed plant can be handed over ready for operation. These steps include concept development, planning and site selection, assistance with financial negotiations, realization and construction including all necessary auxiliary systems.





## We are family - engineering tradition since 1873

An innate passion for machinery and plant construction has dominated the history of the Henkel family for generations.

As shown by old documents, machinery from the Henkel family has been awarded prizes at a number of exhibitions as early as 1894. Almost a century later, the first company of EPC Group was founded as EPC Engineering Consulting GmbH in Rudolstadt, Germany. After the reunification of Germany, the success story continued where it had begun in Thuringia, Germany. Since its inception EPC Group has continuously developed, formed new subsidiaries and expanded its international business portfolio.

The Henkel family is synonymous with decades of engineering experience and great enthusiasm for technical challenges. The core of EPC Group is formed by over 300 professionals who implement and deliver each project with great passion. With this combination, it is possible to find the optimal solution for each client.



„Our responsibility is to successfully continue our tradition and to shape the future in a sustainable way.“  
Management of the EPC Group





August Oskar Henkel



Albin Henkel



Karl Henkel



Peter Henkel



left to right: Jens, Ulf, Nadine und Tim Henkel



1873

**SCHWARZATAL**  
The A.O. Henkel machinery factory is founded by August Oskar Henkel in Cursdorf, Thuringia for the production of agricultural machinery

1894

**ERFURT**  
Award of the Silver Medal at the Thuringian Trade and Industry Exhibition in Erfurt to the A.O. Henkel machinery factory

1899

**SCHWARZATAL**  
Relocation of the A.O. Henkel machinery production to Schwarzmuehle, Thuringia

1919

**SCHWARZATAL**  
The A.O. Henkel machinery factory is transferred to the next generation of Henkels: Carl, Oskar and Albin Henkel

1922

**SAALFELD**  
The A.O. Henkel company is awarded a certificate of honour for outstanding agricultural machinery and equipment

1925

**COBURG**  
Award of the Gold Medal at the Agricultural Exhibition in Coburg to the A.O. Henkel company

1933

**SCHWARZATAL**  
The A.O. Henkel company continues as a business enterprise and trading company for agricultural machinery under the management of Albin Henkel, the son of the founder of the A.O. Henkel machinery factory

1940

**SCHWARZATAL**  
The A.O. Henkel company continues as a business enterprise and trading company for agricultural machinery under the management of Karl Henkel, the grandson of the founder of the A.O. Henkel machinery factory

1994

**RUDOLSTADT-SCHWARZA**  
EPC Engineering Consulting GmbH is founded as an engineering company at the Rudolstadt-Schwarza industrial site by Peter Henkel, the great-grandson of the founder of the A.O. Henkel machinery factory

1995

**RUDOLSTADT-SCHWARZA**  
EPC Technology GmbH is founded in Rudolstadt

2000

**JENA**  
HI Bauprojekt GmbH is founded in Jena

**LEUNA**  
EPC Technology GmbH establishes a new branch office in Leuna and takes over employees from the former research department of the famous Leuna industrial site

2002

**ALZENAU**  
EPC Group establishes a new branch office in Alzenau near Frankfurt together with specialists for polymerization technologies

**ARNSTADT**  
EPC Engineering Consulting GmbH establishes a new branch office in Arnstadt and takes over employees from the former CHEMA Anlagenbau GmbH

2009

**RUDOLSTADT-SCHWARZA**  
The founder of EPC Group, Peter Henkel, and his successors Nadine, Jens, Ulf and Tim Henkel, the current Managing Directors, host the celebration of the 15th anniversary of EPC

**WURZEN**  
EPC Group acquires CRYOTEC Anlagenbau GmbH in Wurzen

2013

**GERA**  
HI Bauprojekt GmbH establishes new branch offices in Gera

Today

**WORLDWIDE**  
Leading international technology provider and engineering and turnkey plant construction company





## We play global Plant Construction & Engineering Services

The EPC Group is the partner by your side.

For the successful delivery of a project it is important to have a partner that you can trust during all stages of the project development. EPC Group can provide all necessary services from our in-house team. Each phase of your project is supported by an experienced team of experts, from the first steps - and the development of your project - to the handover of your turnkey plant.

Even after project completion, we remain at your side to ensure that your industrial plant keeps pace with the latest economic, environmental and technical developments as well as considering your social responsibility. Trust us on that.

Our task is to deliver all the services at the correct time, within the budget and to the highest quality standards. This applies to our entire range of services including engineering, procurement, production of equipment, assembly at the building site, commissioning and turnkey project handover. We aim to keep the investment and operational costs as low as possible - without compromising operational safety or plant reliability.

Our high quality standard is independently approved by TUEV according to DIN EN ISO 9001:2008.

### THE EPC GROUP IS A GENERAL CONTRACTOR FOR:

- Chemical plants
- Pharmaceutical & Fine Chemistry plants
- Polymer & fiber plants
- Industrial plants
- Renewable energy technologies
- Biotechnology plants
- Cryogenic plants



### WITHIN THESE FIELDS WE OFFER:

- Investment preparation
- Engineering
- Procurement / delivery
- Construction / installation
- Commissioning & start-up / training
- After sales services

### OUR ENGINEERING SERVICES:

- Feasibility studies
- Pre-engineering
- Basic engineering
- Authority engineering
- Detail engineering
- Procurement support
- Construction and installation supervision
- Commissioning & start-up
- Training

In order to survive in the global market, you need to be flexible and react quickly to new demands. For this, EPC Group can rely on its competence centres with more than 200 experienced engineers and employees. We combine the experience and expertise from different specialised fields. This ensures excellent support to our clients at all phases of a project. As a general contractor we are more than a service provider, we are your engineering partner.

### The scope of our engineering services include:

- Process development
- Equipment specification/design
- Layout engineering
- Piping engineering
- Instrumentation & control engineering
- Civil engineering
- Structural engineering
- Infrastructure design
- Building services engineering

We also offer the implementation and configuration of process control systems and automation technology.



It all starts with a chemical formula

## Chemical plants - from process design to turnkey plant delivery

The most modern production processes – ensure profitable results.

**It all starts with a chemical formula. Our experts can bring this formula to life – converting it into a completed plant.**

Our client's requirements are the basis of our innovative chemical plant design. EPC Group can design and deliver all appropriate equipment and build the plant including all utilities and auxiliary systems.

We utilize the most modern technology for the simulation of the processes and to determine the mass and energy balances. Naturally our engineers consider safety and environmental protection from the planning stage to commissioning and beyond.

### CHEMICAL PLANTS FOR THE PRODUCTION OF:

- Basic chemicals
- Special waxes
- Dyes
- Liquid crystals
- Pastes, e.g. for lithium ion batteries
- Special chemicals, e.g. NaCN and HCN
- Methanol derivatives

### TECHNOLOGY SCOPE:

- Synthesis plants
- Hydrogenation plants
- Distillation and evaporation plants
- Crystallization plants
- Drying plants
- Product handling, packing and storage plants
- Utility / Auxiliary plants

### ADVANCED PRODUCTION PROCESSES

We value innovation and provide our clients with production processes that enable ease of future modification. These processes are based on our own technologies and patents or the licenses of renowned partners. If there is no licensor available we can offer customized process development, including process simulation.

### PROFITABLE RESULTS

Ensuring the success of our clients is an important goal for our company. Therefore, we offer production processes that give our clients an economic competitive advantage.

### ENERGY-OPTIMIZED SOLUTIONS

In the design of every plant, our specialists aim to achieve the best results and optimal energy balances. This is evident in the equipment selection and its integration into the overall concept. We also attach great importance to energy recovery from all waste streams.

### SUSTAINABLE SOLUTIONS

EPC Group aims to optimize the integration of safety and environmental protection into every project. We rely on the latest sustainable technologies when considering the process design and utility engineering, e.g. waste water and off-gas treatment plants.





## Sodium cyanide (NaCN) production plant

Capacity of 40,000 t/a – process licensor Evonik



### Selected reference:

Dzerzhinsk / Russia

#### Services of EPC Group

- Basic engineering
- Detail engineering
- Supply of equipment
- Construction and installation supervision
- Commissioning

#### Realization period

2010 - 2013

#### Project value

approx. 70 million Euro

#### Client

SAO „Korund-Zyan“



## Mono-product plant with multi-product characteristics

Synthesis and high-purity distillation



### Selected reference:

Wolfen / Germany

#### Services of EPC Group

- Basic engineering
- Detail engineering
- Supply of equipment
- Construction and installation supervision
- Commissioning

#### Realization period

2002 - 2004

#### Project value

approx. 2.8 million Euro

#### Client

Sensient Imaging Technologies  
GmbH





Polymers - Major feature: all-rounder

## Polymer & Fiber plants

The planning and start-up of every polymer plant or fiber plant is customized specifically to our clients' needs.

### POLYMER AND FIBER PLANTS FOR THE PRODUCTION OF:

- Polyester PET, PBT, PEN
- PAN | Carbon fiber
- Polycarbonate
- Lyocell fibers
- Polyamide PA 6, PA 6.6
- Polyvinyl chloride (PVC)
- Biopolymers
- Special polymers
- Masterbatch

### BUSINESS ACTIVITIES:

- Polymerization plants
- Extraction plants
- Post-condensation plants
- Compounding plants
- Recycling plants
- Spinning plants (e.g. HM, HMLS)
- Carbonization plants
- Texturizing and weaving systems
- Product handling, packing and storage plants
- Utility / Auxiliary plants

### Polymers - Major feature: All-rounder.

Polymers have conquered everyday life due to their all-round versatility. An advantage of polymers is that properties such as hardness, formability, elasticity as well as resistance to breakage, temperatures and chemicals can be greatly varied. This variability makes it possible for the EPC Group to implement and realize our customers' innovative ideas. The planning and commissioning of each polymer or fiber plant is tailor-made to request.

Our experienced engineers have collected decades of experience which enable us to offer a wide spectrum of services. Based on know-how developed over many years, the EPC Group can also offer its own proprietary processes and technologies.

Our engineers set new standards when developing concepts for new spinning plants. Satisfying customer requirements is always our priority. For example, we can achieve highly differing color nuances or degrees of matting per spinning position, e.g. POY or FDY speciality yarns (NC, HC or micro filaments). This is possible for both PET and PBT filament yarns.

### Polycarbonate production plants

Polycarbonate is a very tough and forgiving polymer that offers some excellent features. It has high stability and rigidity and is slow to deteriorate when exposed to the influences of weather or UV-radiation. It can be manufactured as a transparent material or it can be dyed to any required colour. EPC possesses proprietary process technology for the production of polycarbonate chips, which can be offered as part of the turnkey industrial package.

### PAN / Carbon fiber production

EPC offers advanced polymerization plants for the production of PAN - the feedstock for precursor production - and also builds complete turnkey carbon fiber production plants. In addition to the plant design and the equipment supply for PAN polymerization plants, EPC Group offers the complete engineering package including infrastructure, auxiliary systems and construction planning.

Nowadays, due to its very impressive stability and light weight features, PAN-based carbon fiber is being used increasingly in the aviation, aerospace and automotive industry including Formula 1.

### EXCERPT OF EPC'S TECHNOLOGIES

**EPC PETvantage®** - innovative process technology by EPC specifically for the economic and efficient revamping and optimization of existing PET plants

**EPC inside PET®** - proprietary operating software that enables a fully automated plant operation and quality control of plants with the innovative EPC polyester process

**EPC PAttraction** - efficient and cost-effective extraction technology for the polyamide process

**EPC Variyarn®** - modular color spinning plant for POY and FDY

**EPC VariPlant®** - flexible plant concept for production of multiple polymers





## Revamping of 4 existing polycondensation plants

Conversion from textile-grade PET chips production to bottle-grade PET chips production and capacity increase to 1,000 t/d



*Selected reference:*

**Yanbu / Saudi Arabia**

**Services of EPC**

- General engineering
- Equipment delivery
- Construction and installation supervision
- Commissioning
- Personnel training

**Realization period**

2006 - 2009

**Project value**

approx. 45 million Euro

**Client**

IBN Rushd Saudi Arabia  
(a SABIC affiliate)



## PET Complex 1 - extension of an existing PET plant

Production of tire cord - approx. 30 million meters/ year for the russian market



*Selected reference:*

**Wolschski / Russia**

**Services of EPC**

- General contracting
- Supply of the plant
- Re-planning according to changes in customer requirements
- Maintaining the mechanical and technological guarantees
  - Installation & Supervision
- Commissioning instruction and monitoring
- Optimization of quality to the customer's requirements

**Realization period**

2007 – 2012

**Project value**

approx. 47 million Euro

**Client**

Sibur | Gasprom Chimvolokno





## Highest demands of constant product quality

# Fine chemistry and pharmaceutical technologies

The engineers in the EPC Group look after a broad spectrum of chemical syntheses.

### Highest efficiency. Best compatibility.

These two key issues set the standards for our clients in fine chemistry and the pharmaceutical industry. It is imperative to be able to react to the results of research and development at any time. We know the characteristics and the standards of this industry sector. With specific knowledge, know-how and experience, we are the partner for each of our clients from the design of the plant and the simulation of critical processes up to commissioning and start-up.

*We design and implement processes and industrial plants to operate within wide temperature ranges e.g. -100 °C up to 400 °C and at pressures up to 100 bar(g). Specified materials include stainless steel / enamelled steel / nickel-based alloys, with explosion-protected design (e. g. IIC T4), for hazardous substances, e. g. CMR classification, with all required safety systems based on multiple scenarios of possible incidents and their prevention.*

### SERVICES

- GMP-compliant and FDA-conforming plant layout
- Qualification and validation
- Synthesis plants
- Hydrogenation plants
- Distillation and evaporation plants
- Crystallization plants
- Drying plants
- Product handling, packing and storage systems
- Utility / Auxiliary systems

In simplified terms, the configuration of a synthesis module for organic synthesis of specialty chemicals can be represented as follows: - Feeder for solvent, - Dosing system for reaction partners, - Agitator reactor, temperature-controlled with distillation system, - Utility supply (centralized/de-centralized), - Vacuum condensation system, - Co-reactor for phase separation, - Separation of solids, drying of solids, - Containment systems for hazardous substances.

In cases of multi-purpose systems, either the reference syntheses or the limit values for the usage resulting from the configuration of the plant are defined.



### Pharmaceutical plants

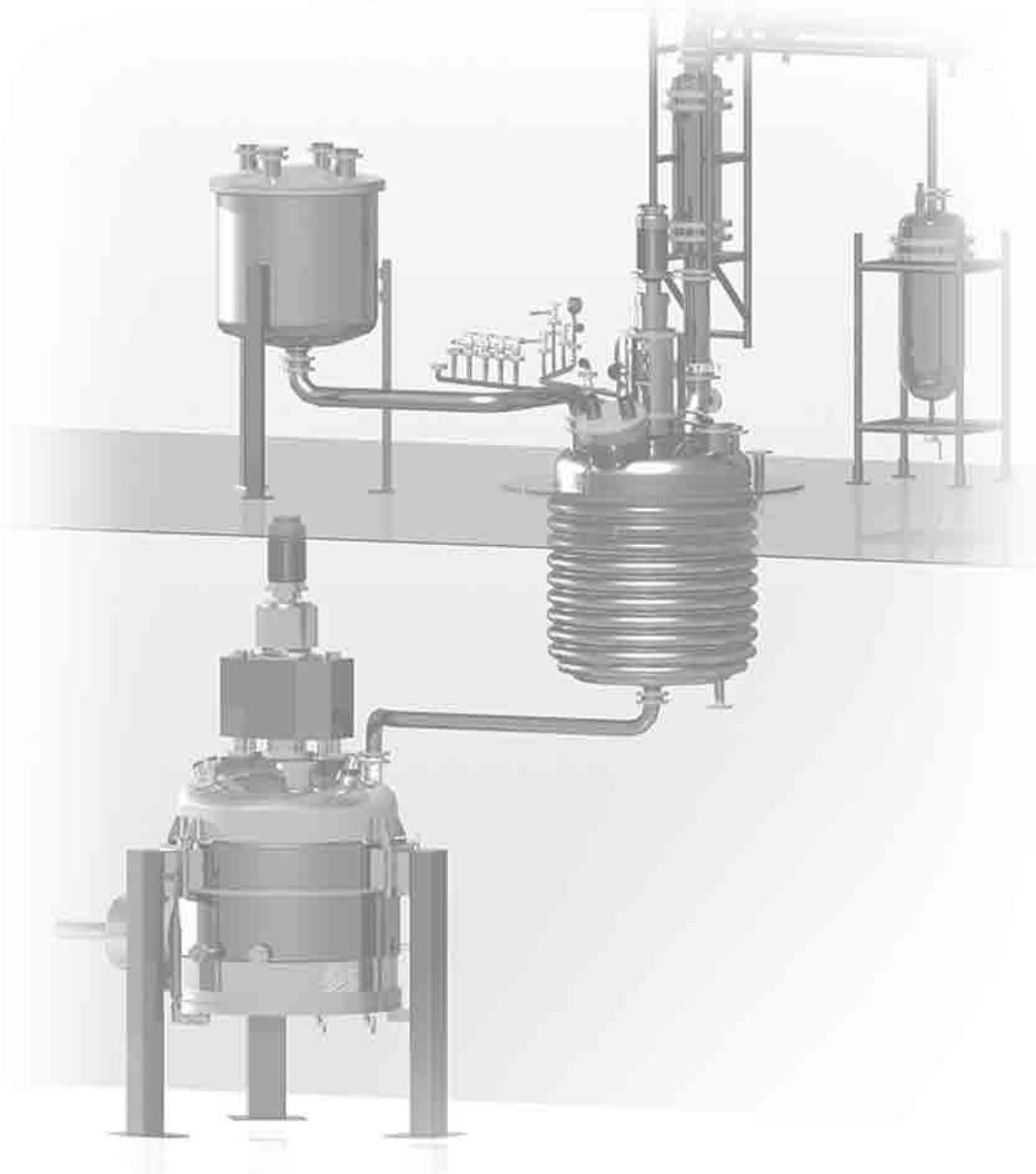
Our deep understanding of pharmaceutical drug synthesis is evident not only in the process and plant design, but also in the integration of pharma-grade automation systems. Discontinuous batch production or continuous synthesis stages are possible and each plant design will ensure implementation of safety functions by redundant, fail-safe PLC. Flexibility to enable a quick product changeover and the reproducibility of batch processes are considered to ensure consistent product quality.

### Fine chemistry plants

The visions of our customers are often unique and diverse. Examples of our innovative solutions include complex multi-purpose specialty chemistry plants. Our design may include thermally-sensitive rectification separation processes. Our experts address the technical challenges of synthesis in the low-temperature and high-temperature range. Naturally, the management of hazardous chemicals and materials is always considered in the process design.

„Our deep understanding of pharmaceutical synthesis is evident in the process design and plant layout.“

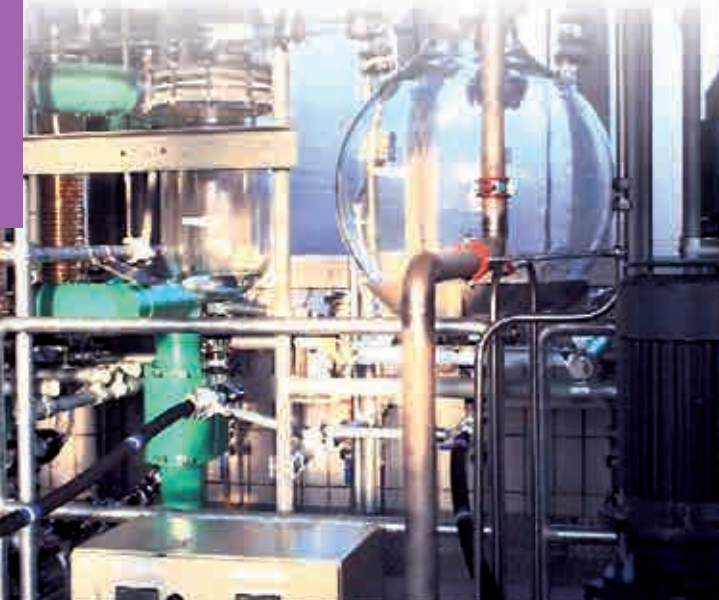
Dr. Manfred Richter | Branch Manager, EPC Engineering & Technologies Leuna





## Scale-up Centre Bielefeld (SCB)

Optimization and development of manufacturing processes for new recipes



### Selected reference:

*Bielefeld / Germany*

#### Services of EPC

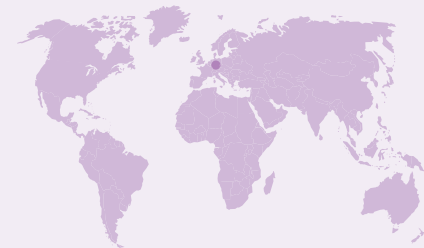
- Project preparation
- Detail engineering
- Engineering supervision during start-up and commissioning
- Training (design, installation, operational)

#### Realization period

2002 - 2003

#### Project value

approx. 2,5 million Euro



### Selected reference:

*Leuna / Germany*

#### Services of EPC Group

- Detail design of critical process stages
- Basic engineering
- Permit procedures
- Process control system
- Installation supervision

#### Realization period

1994 - 2013

#### Project value

approx. 40 million Euro



## Multi-product plant for production of fine chemistry

Multiple parallel manufacturing plants in successive stages of development





## Food industry and animal feed production plants Industrial Biotechnologies

Biotechnological methods in industrial production processes.

### Deep processing of grain

The deep processing of grain includes the production of modified flour, native/modified starch and glucose/ maltose syrup and fermentation products such as lysine, citric acid, feed yeast etc. The by-products that are generated during the main production process are used as high-quality nutritious animal feed. In EPC's grain refinement plants the raw material is automatically cleaned and separated into its basic components so that it can be further processed in the downstream process steps. All processes focus on precision, so that not even the smallest raw material components are wasted. Due to sophisticated technologies and efficient plant designs our customers are able to produce the finest high-quality grain products at globally competitive prices.



### BUSINESS ACTIVITIES:

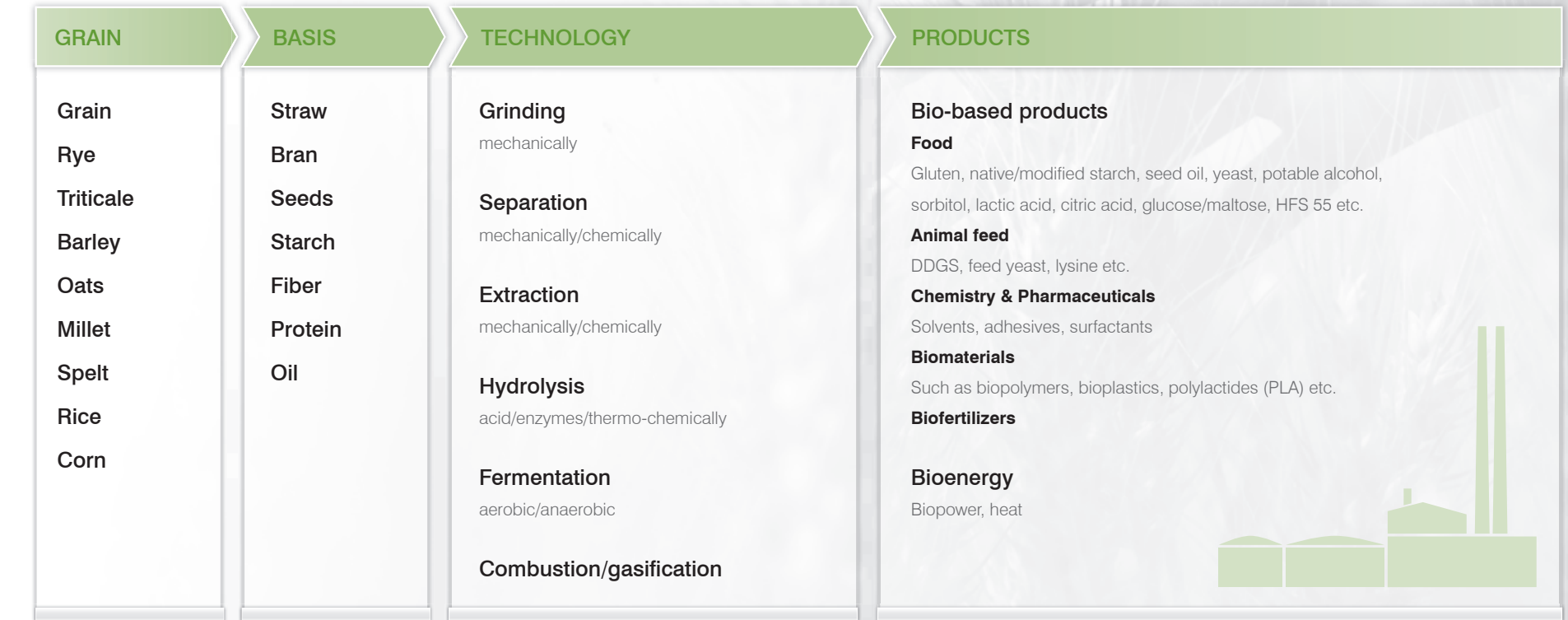
- Grain processing plants for production of lysine, citric acid, fodder, starch and gluten
- Oil mills with cold press, hot press or extraction process
- Turnkey breweries, incl. brewing and bottling systems
- Distilleries and liqueur production plants
- Plants for fruit processing
- Plants for soft drink and mineral water
- Plants for production of high-quality proteins, e.g. from lupine

### Oil mills – Oil refining

Vegetable oils are a major contributor to a healthy diet. The type of pressing process determines which raw material contents are preserved. Our clients are experts in this field and they give direction and impetus to our engineers. This results in the design of innovative systems for vegetable oil extraction, where depending on the plant size various pressing and extraction methods can be used.

### Fruit processing plants

Careful processing. Highest quality flavors. Low energy consumption. These claims are only met if the technological concept for the fruit processing is correct. Our specialists make it their job to continuously optimize these processes. Their extensive know-how relating to each process stage guarantees highly-efficient modern plants, from the fruit intake system to the sterile filling system.





## Rapeseed Oil Refinery (cold press) in Rudolstadt, Germany

Processing of rape seed from local cultivation



### Selected reference:

Rudolstadt / Germany

#### Services of EPC Group

- General contractor
- General engineer

#### Realization period

2000 - 2001

#### Project value

approx. 5 million Euro



### Selected reference:

Baschkortostan / Russia

#### Services of EPC

- Pre-basic engineering

#### Realization period

2012 - 2013

#### Investment sum

approx. 150 million Euro



## Plant for the production of gluten, L-Lysine.HCl and animal feed

With a capacity of 20,000 t/a of L-lysine.HCl produced from wheat





Sustainable energy generation

**Renewable and alternative energy technologies**

Technologies making effective use of sustainable energy resources.

**Silicon production plants for the solar industry**

The sun makes the world go round. EPC has many years of experience in the solar industry, where we have completed projects for the manufacturing of high purity silicon, solar factories for ingot growth as well as PV wafers and module production. We will support you with our know-how during design, delivery, commissioning and maintenance. This includes attention to important auxiliary processes such as slurry handling systems, exhaust gas purification, hazardous material storage and consideration of all supply and disposal systems.

Value for money is considered from the initial concept to delivery of the finished plant to ensure that your project will be competitive in the market and remain profitable in the long term.

**BUSINESS ACTIVITIES:**

- Systems for production of TCS (Trichlorosilane), Monosilane and solar silicon
- Monosilane storage and handling systems
- Ingot, wafer and module production plants
- Thin-film solar production plants
- Utility / Auxiliary systems for the solar industry, e.g. slurry systems, off-gas treatment plants
- Biodiesel plants including bio-oil and pharma-grade glycerin production
- Bioethanol plants including waste recovery and biogas units
- Biogas plants for industrial applications
- Biomass plants e.g. wood-fuelled or straw-fuelled
- Energy concept development



**Sustainable communities - EPC develops and delivers complete solutions.**

Example: 100% renewable energy community in Schloeben, Germany

The village of Schloeben in Germany completed a community project which included the installation of a biogas plant and 3 CHP (combined heat and power) plants for electricity and thermal energy generation. A district heating system was installed to distribute the thermal energy to the buildings in the village. A woodchip boiler is used in winter to satisfy the peak thermal energy demand.

**Objective:**

To support the local region by providing an environmentally sustainable, independent energy supply based on 100% biomass. Members of the initiative are primarily local inhabitants and agricultural enterprises who are also the energy consumers.

<b>Location</b>	Schloeben, Thuringia, Germany
<b>Services</b>	<ul style="list-style-type: none"> <li>• Design of the district heating network and for the broadband network</li> <li>• Biogas pipeline</li> <li>• Heating system and CHP installation</li> <li>• Construction management for the biogas plant</li> </ul>
<b>Project Price</b>	approx. 5.4 Mio Euro
<b>Client</b>	'Bioenergiedorf Schloeben e.G.' and the Schloeben community
<b>Realization period</b>	2009 - 2012



**Biodiesel**

Natural resources. Integrated biodiesel plants provide both efficiency and sustainability. Bio-diesel and pharma-grade glycerin can be produced using an oil crop as a raw material. Our engineers also focus on optimization of all the auxiliary systems to help ensure the profitability of the complete integrated process.

**Bioethanol plants – Supporting the next generation**

Environmental awareness is evident within the EPC Group by the variety of technologies provided - e.g. 1st generation and 2nd generation bioethanol plants. All fermentation waste is recycled so that virtually no wastewater is discharged from the process. In addition, the energy consumption of the complete process is very low - thanks to ultra-modern distillation and rectification concepts implemented by EPC.

**Biomass and biogas processing plants**

Industrial applications. Combined heat and power concepts are given special consideration during our planning. By selection of the optimal raw material source and the most suitable site location we can ensure a cost effective solution for our client. EPC will support you with consulting services from the initial kick-off until delivery of a completely integrated plant, including electrical generation and thermal energy optimization concepts.





## Biodiesel plant

Production of 100,000 t/a - incl. warm press unit



### Selected reference:

Ebeleben / Germany

#### Services of EPC

- General contractor
- Plant design
- Basic engineering
- Detail engineering
- Supply of equipment
- Construction and assembly
- Commissioning
- Project management & training

#### Realization period

2006 - 2007

#### Project value

approx. 28 million Euro

#### Client

Emerald Biodiesel GmbH



## Silicon, ingot and wafer factory

incl. slurry handling system and utilities / auxiliary systems



### Selected reference:

Jena / Germany

#### Services of EPC

- Concept study with site selection
  - Approval procedure
- Engineering for infrastructure and utilities
- Construction management

#### Realization period

2007 - 2009

#### Project value

approx. 300 million Euro

#### Client

Schott Solar Wafer GmbH





Advanced and sustainable  
**Industrial plants**

High degree of automation and mechanization.

**EPC GROUP DESIGNS INDUSTRIAL PLANTS SUCH AS:**

- Concrete factories
- Glass factories
- Recycling plants

**WE ALSO OFFER:**

- Heat recovery / use of waste heat
- Revamping of complete factories and systems
- Energy concept development
- Process energy optimization
- Building services energy optimization

**Concrete factories**

The EPC Group supplies complete production plants for the manufacture of building materials, concrete pipes and other special elements. We hand over the production plants as complete functional units inclusive of all mechanical, electrical and control equipment. All auxiliary devices such as lifting cranes, concrete feeders and removal vehicles are included.



**Construction of glass production facilities | EPC Group & Schott AG**

When one of the world's leading glass specialists such as SCHOTT AG gets together with a dynamic engineering partner like EPC Group, customers all over the world benefit from the combination of know-how from the two German companies.

The result is a clearly structured, economic and energy-efficient plant design incorporating excellent technology. As a result of our vast practical experience, we can offer the shortest project realization time and shortest commissioning time for turnkey glass production plants.

**Recycling plant**

The EPC group designs and installs recycling plants for the recycling of plastics. The mixed plastics are separated in a chemical-physical process, which results in segregation of the individual plastic types.

The recycled products have similar characteristics as newly produced goods, but they are more favorably priced due to the better energy balance. This results in additional benefits such as better resource management and reduced impact on the environment.

**PROCESS AND BUILDING ENERGY OPTIMIZATION**

**Energy optimization of process technology**

Existing industrial processes and plant are examined specifically to identify the energy saving potential. Following the analyses, various comprehensive scenarios for energy optimization are developed.

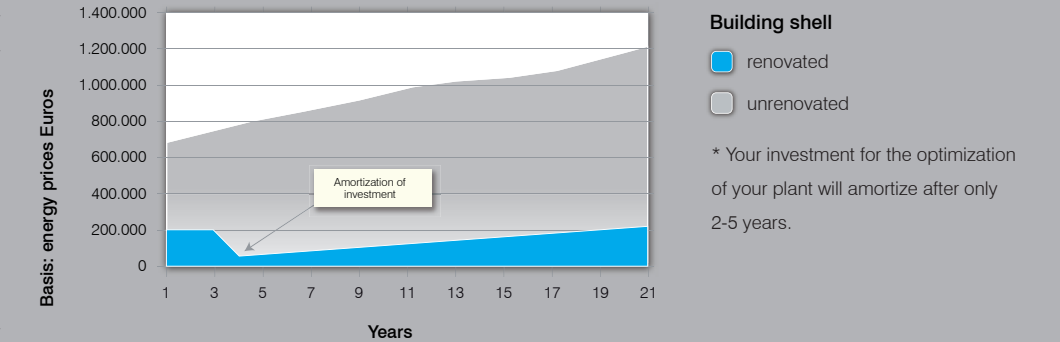
**Energy optimization for buildings and building services**

Energy assessment and energy improvement based on building design.

**Energy generation concepts**

Existing concepts are examined and assessed based on fuel efficiency and performance. Various alternatives are proposed including optimizing of existing energy streams and use of alternative energy technologies.

**DEVELOPMENT OF OPERATING COSTS (electricity + heat)**





## Plant for the production of precast concrete products & concrete pipes



### Selected reference:

Dagestan / Russia

#### Services of EPC

- Basic engineering
- Detail engineering
- Delivery of equipment
- Construction and installation supervision
- Commissioning

#### Realization period

2012 - 2013

#### Project value

approx. 10 million Euro

#### Client

SAO SZBI „Strojdetal“



## Construction of a High-Tech Production building for opto - electronical systems in Jena



### Selected reference:

Jena / Germany

#### Services of EPC

- General Contractor
- Permission Procedure
- Engineering / Tendering
- Construction Supervision
- Commissioning Support

#### Realization period

2013 - 2015

#### Client

AIRBUS Group  
Jena-Optronik GmbH





## Air separation units since the year 1880

### Cryotec Anlagenbau GmbH

Cryogenic plant construction - plants for technical gases.

#### CRYOTEC became a subsidiary company of the EPC Group in 2009.

Since the year 1880, air separation and gas separation plants have been built in the town of Wurzen in Saxony. Cryotec provides standard plants as well as individually adapted systems. The concept of each plant is determined by the specific project requirements.

#### OUR SERVICES

- Plant engineering and investment preparation
- Process design
- Certified manufacturing
- Installation and commissioning on site
- Training and support
- After-sales service

#### Air separation systems

Precious products (oxygen, nitrogen and argon) are obtained from atmospheric air, using a low-temperature rectification process.

#### Carbon dioxide recovery systems

From natural resources, economic and environmental friendly systems for fermentation processes and other industrial and chemical processes.

#### Processing of natural gas

Using CRYOTEC technology, natural gas is purified, desulfurized, dried and liquefied (LNG) directly at the source, ready to be transported.

#### FlareRec




With our intelligent and flexible proprietary FlareRec process, flare gas and associated gases can be purified and stored or used for local power generation.

#### Special applications for technical gases

We are specialists in technical gases. Specific applications include gas scrubbing, biogas processing and handling of special gases such as monosilane. Mobile air separation systems for oxygen and nitrogen generation have also been developed by CRYOTEC.

#### OXYGEN - NITROGEN - ARGON

##### Technical details

	<b>PERFORMANCE</b> <ul style="list-style-type: none"> <li>• O<sub>2</sub>: 50 - 5000 Nm<sup>3</sup>/h</li> <li>• N<sub>2</sub>: 50 - 10000 Nm<sup>3</sup>/h</li> <li>• Ar: 12 - 120 Nm<sup>3</sup>/h</li> </ul> all products gaseous and / or liquid
	<b>PURITY</b> <ul style="list-style-type: none"> <li>• O<sub>2</sub>: 99,5 - 99,9 % by vol.</li> <li>• N<sub>2</sub>: up to 1 ppm (v) O<sub>2</sub></li> <li>• Ar: up to 5 ppm (v) O<sub>2</sub></li> </ul>
	<b>PRESSURE</b> <ul style="list-style-type: none"> <li>• 0.2 - 25 bar g for the storage in liquid gas tanks</li> <li>• 4 - 50 bar g for network supply</li> <li>• max. 300 bar g for filling into high-pressure steel cylinders</li> </ul>

#### For the highest purity requirements

These systems are particularly suitable for the production of liquid and/or gaseous oxygen, nitrogen and argon.

The gas and liquids produced are of the highest purity and have a wide range of applications in medicine and industry.





## Air separation plant (Type: OANL 500 TC)

Production of 500 Nm<sup>3</sup>/h of liquid oxygen (LOX), 500 Nm<sup>3</sup>/h of liquid nitrogen (LIN) and 12 Nm<sup>3</sup>/h of liquid argon (LAr)



### Selected reference:

Baku / Azerbaijan

#### Services of Cryotec

- Plant design
- Basic engineering
- Detail engineering
- Delivery of equipment
- Construction and installation supervision
- Commissioning

#### Realization period

2011

#### Project value

approx. 4 million Euro

#### Client

AZENCO LTD



### Selected reference:

South Korea & Iraq

#### Services of Cryotec

- Plant design
- Basic engineering
- Detail engineering
- Delivery of equipment
- Construction and assembly supervision
- Commissioning

#### Realization period

2013

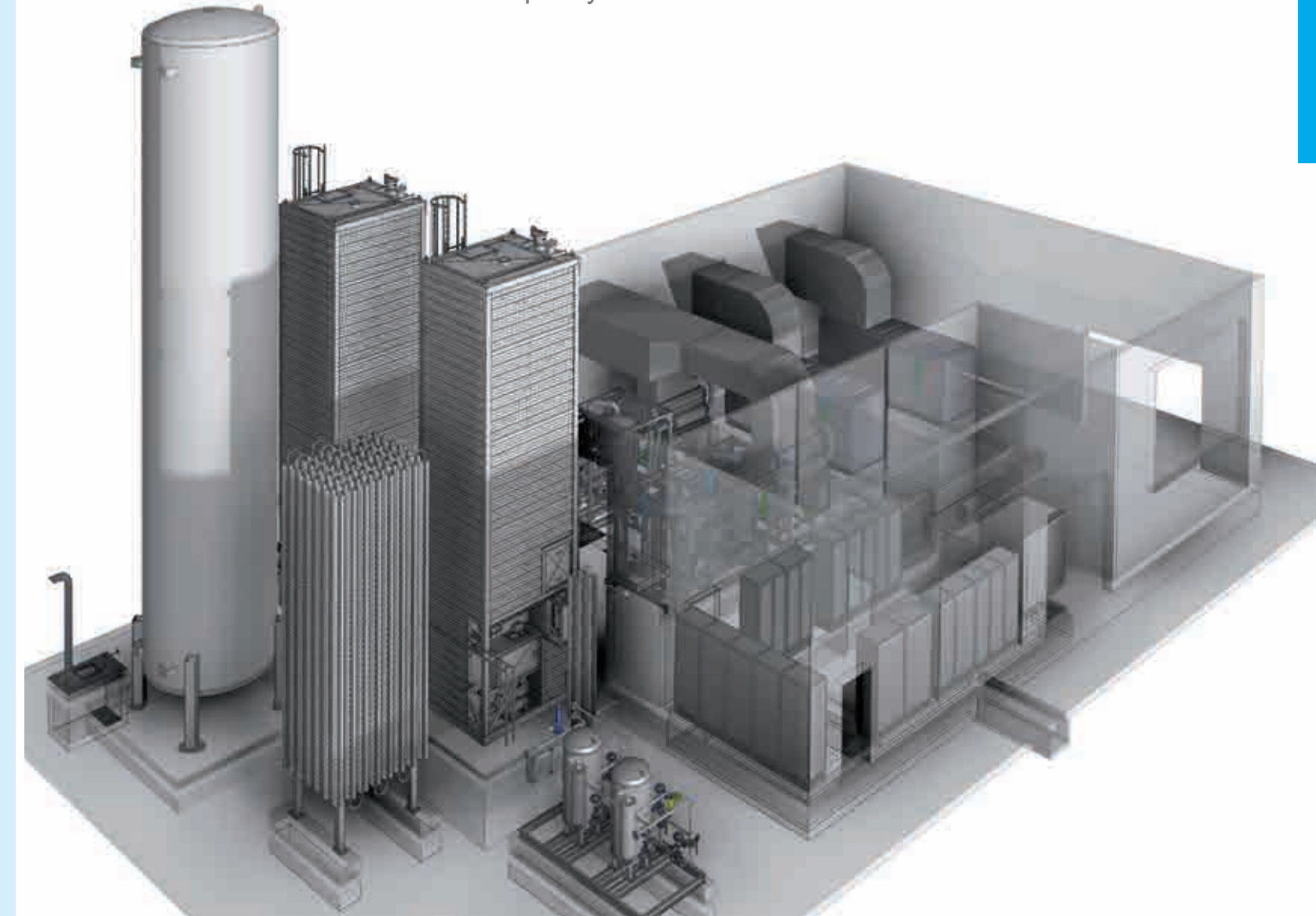
#### Client

Hyundai E&C Co. Ltd.



## 2 x Air separation plants (Type NG 450)

For production of high purity gaseous and liquid nitrogen with a capacity of 400 Nm<sup>3</sup>/h of GN and 50 Nm<sup>3</sup>/h of LIN





## Construction and Infrastructure Engineering

### HI Bauprojekt GmbH

You can count on us.

#### Engineering and consultancy services

We aim to provide the smooth and safe delivery of each ambitious project. To achieve this you will receive all the required professional support from us. Our experienced engineers who are specialists in the relevant disciplines will always be at your disposal. We adhere to the 'Official Scale of fees for services by Architects and Engineers' (HOAI):

1. Establishing the basis of the project
2. Preliminary design
3. Final Design
4. Building permission application
5. Execution drawings
6. Preparation of contract award
7. Assisting award process
8. Project supervision
9. Project control & documentation

HI Bauprojekt GmbH consistently represents a customer-oriented perspective. The structures and processes within our company are constantly optimized in your interest. We guarantee consistent performance by our integrated quality management system.



#### Building construction & Construction management

As an experienced service provider and as part of the global EPC Group, HI Bauprojekt GmbH has the manpower and expertise to plan and realize even the most demanding construction projects.

Our clients can entrust us with overall project design, including project management for a turnkey project solution or alternatively can commission us with individual design aspects (e.g. building design or building services design)

#### Our range of services includes:

- Project management and general planning
- Construction design / architecture
- Structural design
- Building services design
- Renewable energy
- Demolition services

#### Engineering & Consultancy Services

Inspections for bridges and building structures | Approval procedures | Thermal insulation certification | Sound insulation certification | Urban land-use planning | Surveying | Building energy optimization and integration of renewable energy technologies



#### Transportation systems & civil engineering works

The lifelines of our modern society include roads, bridges, railway systems, electricity distribution networks, etc. It is therefore important that our specialists are consulted in the early stages of each design. Civil engineering, especially the design of roads and transportation systems is a core competency of the HI Bauprojekt GmbH.

We provide ongoing support to our customers during the design stage, approval processes and naturally during the delivery of the project on site.

#### Our range of services includes:

- Complex infrastructure projects
- Roads
- Rail systems
- Bridges
- Green spaces & Outdoor facilities
- Energy and other utility supplies
- Various other civil engineering works

Our high quality standard is independently approved by TUEV according to DIN EN ISO 9001:2008.



## “Adolf Jass” Paper factory, new construction

incl. design of traffic system, utility supply and infrastructure



### Selected reference:

Rudolstadt / Germany

#### Services of HI Bauprojekt GmbH

- Infrastructure design
- Project management
- Health & Safety coordination

#### Realization period

2004 - 2006

#### Client

“Adolf Jass” Paper factory



### Selected reference:

Jena / Germany

#### Services HI Bauprojekt GmbH

- Feasibility study
- General design of complete facility
- Construction and installation supervision

#### Realization period

2009 - 2011

#### Project value

approx. 7 million Euro

#### Client

Service Center Jena  
Vermietungs-GmbH & Co.KG



## New construction of offices and business center, “Am Felsenkeller”

Offices and laboratories, circa 4.500 m<sup>2</sup>





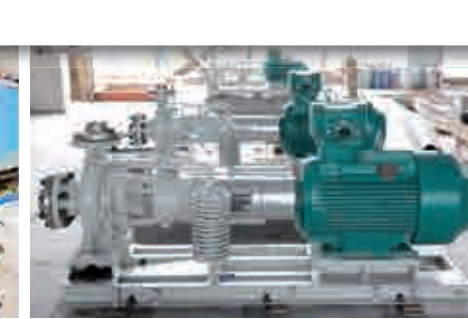
Internationally active engineering and plant construction company

# A selection of our satisfied clients and partners

We are grateful for the successful collaboration.



German Quality - Made by EPC Group Images





Contact us!

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# IDEAS INSIDE

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