

CRYOTEC
Anlagenbau GmbH



IDEAS INSIDE

CRYOTEC Anlagenbau GmbH
**Your specialist for
technical gases**

Made-to-measure plant construction. That's CRYOTEC.

Industrial plants have been built in Wurzen since 1880. From this time onwards, this small Saxony town near Leipzig gained a worldwide reputation. CRYOTEC Anlagenbau GmbH is proud to be a part of this long history and also to continue our strong reputation as the worldwide-leading manufacturer of cryogenic plants and an engineering partner.

Our company merges tradition with the modern world. We place great value on the feasibility and environmental friendliness of our projects – which is ensured by high standard of engineering. Satisfied clients are our highest priority. Our team will work closely together with you to develop new ideas and set trends for the future.

Our employees have vast experience and know exactly the wishes and requirements of our clients. They will guide you competently from day one of our cooperation starting from the engineering, through manufacturing and assembly until the start-up of the plant. And definitely we will not forget about After-Sales-Service! As a member of the worldwide active EPC Group, we are able to offer large turnkey projects. Our modular design offers you flexibility of handling and installation of the plant. At the same time, the plant fulfills the highest safety and quality standards all within a small space.

Are you interested in getting to know more about us? You are most welcome to contact us.

Kind regards,

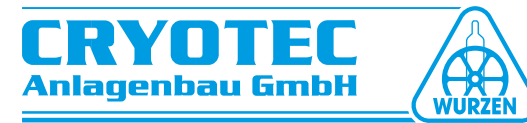


Corinne Ziege

Corinne Ziege
Managing Director



Headquarter of CRYOTEC Anlagenbau GmbH with manufacturing and storage hall in Wurzen, Saxony.



... a member of **EPC GROUP**

CRYOTEC is part of a strong, worldwide engineering company – the EPC Group

For generations, industrial plant construction and engineering have been at the center of the Henkel Family, the founders of the EPC Group. The passion for intelligent engineering is still alive and well after more than 140 years. With vast experience and huge enthusiasm for engineering challenges, the EPC Group has successfully completed more than 1,000 projects in over 40 countries. Starting with an idea all the way to plant handover, EPC will plan and deliver the most advance and resource-efficient plant to you – Made in Germany.

In 2009 CRYOTEC Anlagenbau GmbH joined the internationally active EPC Group. This opened up even more possibilities for the Wurzen-based company to fulfill the individual needs of their clients with an even wider range of services. Since then, engineers from many diverse fields and specializations are working together hand-in-hand, sharing a vast pool of knowledge. This allows them to always think of the best ideas in order to solve even the most complex technical challenges.

EPC GROUP

			
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- Polymers & Fibers
- Chemistry & Specialty Chemistry
- Renewable Energies
- Biotechnologies
- Pharmaceuticals & Fine Chemistry
- Engineering Services & Infrastructure

- Cryogenic Systems
- Systems for Compression & Liquefaction of Gases
- Small Scale LNG Systems
- Air Separation Systems
- CO₂ Technologies
- Special Applications for Technical Gases

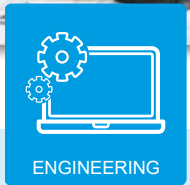
- Construction Engineering
- Infrastructure
- Building & Civil Engineering
- Project Management
- Technical Building Equipment

- Building Automation
- E/I&C Technology
- Electrical Engineering & Telecommunications
- Heating & Sanitary Systems
- Ventilating & Air-Conditioning Systems

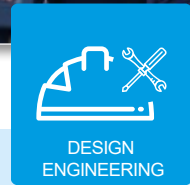
Our Portfolio



- Technical concepts
- Commercial concepts
- Feasibility studies
- Risk analyses
- Financing concepts



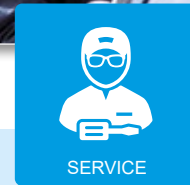
- Process development
- Process engineering
- Pre-Basic engineering
- Basic engineering
- Detailed engineering
- Engineering for public authorities
- Technical purchasing
- Commissioning & trial operation
- Documentation



- Plant planning
- Pipeline engineering
- Engineering, measuring & control equipment
- Construction / steelwork
- Manufacture
- Quality assurance
- Project management



- Construction & assembly
- Supervision of construction & assembly
- Pre-Commissioning
- Start-Up
- Commissioning



- Maintenance & repair
- Wear & tear, spare parts
- Remote maintenance
- Modernization
- Plant conversions
- Training

CRYOTEC Anlagenbau – Made in Germany

AIR SEPARATION PLANTS

- Low temperature rectification process
- Liquefaction & Storage of O₂ / N₂ / Ar
- Membrane and pressure swing adsorption technology

NATURAL GAS AND BIOGAS PLANTS

- LNG / bio-LNG plants to liquefy natural gas / biogas
- Preparation of natural gas / biogas
- Storage of LNG / Bio-LNG
- LNG filling stations (modular or stationary construction)
- Boil-off gas recovery

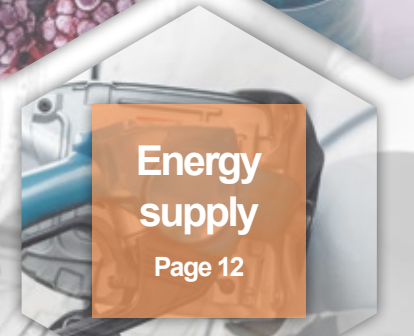
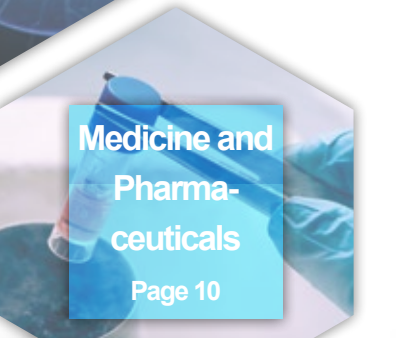
CARBON DIOXIDE PLANTS

- CO₂ Recovery
- Cleaning / Purification
- Liquefaction / Storage
- Dry ice production

SPECIAL SOLUTIONS FOR TECHNICAL GASES

- Liquefaction of associated gases
- Storage of gases

APPLICATIONS



Industry

METALWORKING / METALLURGY



Oxygen, nitrogen and argon are of great importance in the metalworking industry. Oxygen is primarily used for autogenous welding, flame cutting, laser cutting, and in smelting processes. Nitrogen is used in bright annealing processes, and in liquid form in shrink technologies. Argon is mainly used as an inert gas in welding, but also in metal smelting technology.

The construction of plants for generating oxygen, nitrogen and argon is a core competence of CRYOTEC. Decades of experience and engineering at the highest level guarantee technically reliable solutions.

The installation of an on-site air separation plant enables the required technical gases (O₂, N₂, Ar) to be produced without having to rely on suppliers.

O₂ N₂ Ar Air Separation Plants

CHEMICAL / PETROCHEMICALS



In the chemical industry, methane is a raw material for the production of basic chemicals, such as methanol, and for producing synthetic materials.

CRYOTEC offers satellite stations for supplying methane to the chemical industry.

Oxygen is used in a multitude of oxidation processes. Nitrogen is primarily used for inertization processes.

O₂ N₂ LNG Plants

Industry

AVIATION



Oxygen is used in civil and military aviation. Pure nitrogen is used for inflating tires and filling shock absorbers to enhance safety during take off and landing.

CRYOTEC designs and supplies oxygen and nitrogen plants for these and other applications. Producing the gases on-site ensures a constant security of supply, that is independent from external gas suppliers.

O₂ N₂ Air Separation Plants

FIRE PROTECTION



Carbon dioxide, argon and nitrogen are used in modern fire extinguishing systems. The advantage of using these gases is that the extinguishing does not require water input. This avoids damaging equipment and technology.

Nitrogen also serves as an inert gas to prevent fires and explosions.

CO₂ N₂ Ar Plants

DRY ICE BLASTING



CO₂ dry ice is ideally suitable for use as an industrial blasting abrasive. For example, it can be used to clean surfaces gently. This minimally abrasive process is extremely environmentally friendly as it does not use any other chemicals.

CO₂ Plants

N₂
CO₂
O₂
Ar
LNG
BIO
LNG

N₂
CO₂
O₂
Ar
LNG
BIO
LNG

Food and Beverage Industry

REFRIGERATION AND FREEZING



Odorless, tasteless carbon dioxide and nitrogen are used in the food industry for conservation, refrigeration and freezing. Shock freezing with cryogenic nitrogen is a special process used to retain the taste, appearance, ingredients and quality of food.

Cooling food with dry ice made of CO₂ offers a considerable advantage in comparison to conventional cooling processes. Dry ice in the form of blocks or pellets vaporizes residue-free, leaving no breeding ground for bacteria.

N₂ CO₂ Plants

PACKAGING



Nowadays, many foods are packed in a protective atmosphere. For food manufacturers, this is a way of lengthening shelf life without impairing characteristics or flavor. Various mixtures of nitrogen, carbon dioxide and sometimes argon are used as protective gases.

N₂ Ar CO₂ Plants

Food and Beverage Industry

BEVERAGE FILLING



Carbon dioxide is produced as a raw gas during brewing and fermentation processes. This raw gas can be captured, cleaned and liquefied with CRYOTEC recovery plants. The prepared carbon dioxide is used in the food- and beverage industry. Carbonated beverages have a more intensive taste and last longer because the carbon dioxide inhibits the growth of microorganisms.

CO₂ Recovery Plants

PLANT FERTILIZER | FRUIT AND VEGETABLE STORAGE



Plants need carbon dioxide for growth. Enriching a greenhouse atmosphere with carbon dioxide accelerates vegetation growth and increases the efficiency of production. The carbon dioxide input has a fertilizing function. It is obtained or recycled from various sources, such as factories and CHP plants, breweries and biogas plants.

Carbon dioxide can also be used to optimize the storage of fruits and vegetables in warehouses.

CO₂ Recovery Plants

N₂CO₂O₂

Ar

LNG

BIO

LNG

N₂CO₂O₂

Ar

LNG

BIO

LNG

Medicine and Pharmaceuticals

PATIENT CARE



Oxygen is often used for patient care during medical treatment. Medical oxygen therefore has to be continuously available in hospitals. Nitrogen is required for cryosurgery.

For these applications, CRYOTEC supplies plants which produce medical oxygen and nitrogen to the highest standards for patient care.

O_2 N_2 Air Separation Plants

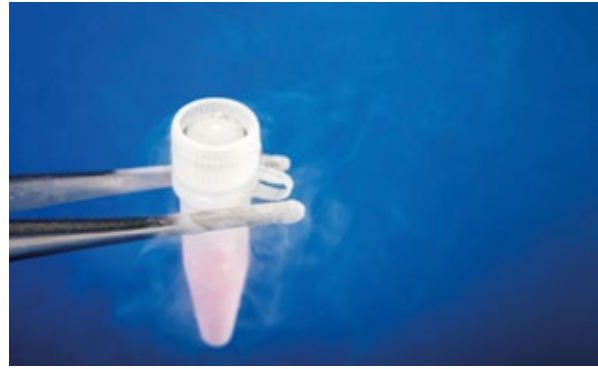
REFRIGERATION AND FREEZING



Liquid nitrogen is used for the cryogenic conservation of blood cells, egg and sperm cells and further biological materials.

Organs and blood reserves are kept cool in special containers during transport. An end-to-end cold chain shall be maintained for cooling these organic materials. This can be done with dry ice.

CO_2 N_2 Plants



Medicine and Pharmaceuticals

 N_2 CO_2 O_2

Ar

LNG

BIO
LNG N_2 CO_2 O_2

Ar

LNG

BIO
LNG

LNG as Fuel

FUEL



Liquid natural gas (LNG) is gaining importance as a fuel. Its environmentally friendly combustion and many possible uses are helping to make LNG a success. Particularly in urban areas and ports, liquid natural gas is a recognized alternative to conventional fuels as it significantly improves the air quality by reducing emissions.

Bio LNG is an environmental alternative that can be considered where sufficient raw materials are available from agricultural or industrial sources.

LNG BIO LNG Natural Gas Liquefaction Plants & Filling Stations

FILLING STATIONS



LNG filling stations are designed to refuel buses and trucks. Long distance buses, trucks and local public transport benefit from clean combustion and lower costs.

LNG is also an attractive option for significantly reducing the costs of waste collection and delivery traffic in the local community. Noise and emissions can be significantly reduced. Shipping is using LNG as a fuel to an increasing extent. In this sector, passenger transport is changing toward low-emission LNG.

LNG BIO LNG Natural Gas Liquefaction Plants

LNG for Supplying Energy

SATELLITE STATIONS



Natural gas is also gaining importance for energy supply. Diesel-powered back-up systems can be replaced by LNG satellite stations. Changing an independent energy supply to LNG enables energy to be generated with low-emissions. CHP plants as well as power plants burn natural gas with very low production of residues. LNG eliminates the need to connect to a pipeline as the satellite station is filled by a tanker. An LNG infrastructure can be planned as a back-up system for large gas turbine power plants.

BOIL-OFF GAS HANDLING



Solutions from CRYOTEC can recover the boil-off gas from LNG storage tanks and convert it back into usable form. This boil-off gas can be reliquefied, and fed back into the LNG tank or transformed into electrical energy.

LNG Natural Gas Liquefaction Plants

SMALL SCALE LIQUEFACTION



This technology offered by CRYOTEC enables even smaller natural gas sources to be exploited and operated profitably. This process is used to clean and liquefy natural gas (LNG) directly at the source or at the pipeline before transport.

LNG Natural Gas Liquefaction Plants



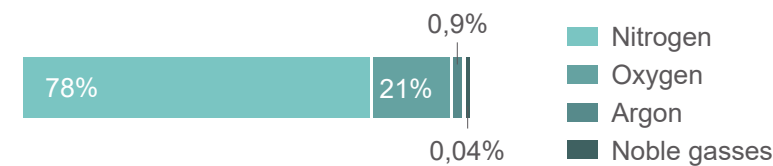
Air Separation Plants

CRYOGENIC AIR SEPARATION



The raw material for air separation is atmospheric air with its main constituents: nitrogen, oxygen and argon. The air separation is based on the cryogenic rectification process, in which the compressed air is cooled down to -195 °C and partially liquefied. The rectification separates the individual constituents of the air by means of their differing boiling points. The gases / liquids are then available in the highest purity.

Composition of ambient air



PSA PLANTS



MEMBRANE PLANTS



TYPES OF INSTALLATION



Containerized
Containerized plants can be used in any climate zone. They are transportable, i.e. via air transport, and can be used in a mobile manner due to their closed construction and the short dismounting time.



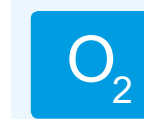
Skid Mounting
Skid-mounted plants have many advantages. The simple maintenance and service as well as the modular design are only a few of them.



Delivery and Installation on Construction Site
CRYOTEC constructs, stationary plants and brings them into operation directly on the construction site.

Air Separation Plants

PROPERTIES



Gaseous (GOX)

Capacity: 500 – 10,000 Nm³/h
Purity: 99.7 Vol. %

Liquid (LOX)

Capacity: 100 – 5,000 Nm³/h
Purity: 99.7 Vol. %

- 0.2 to 25 bar(g) for storage in liquid gas tanks



Gaseous (GN)

Capacity: 300 – 20,000 Nm³/h
Purity: 99.9999 Vol. % (1ppmv O₂)

Liquid (LIN)

Capacity: 100 – 10,000 Nm³/h
Purity: 99.9999 Vol. % (1ppmv O₂)

- 4 to 150 bar(g) for network supply



Gaseous (GAR)

Capacity: 15 – 240 Nm³/h
Purity: 99.9995 Vol. %

Liquid (LAR)

Capacity: 15 – 240 Nm³/h
Purity: 99.9995 Vol. %

- Max. 300 bar(g) for filling high-pressure cylinders

YOUR BENEFIT:

- Low investment and operating costs through optimized processes and the highest technical reliability
- Prefabricated plants or plant sections for short commissioning times
- Use of suppliers with good reputation and state-of-the-art technologies
- Training for the operating personnel
- High quality manufacturing in our own workshop
- Certified production to international standards i.e. DIN EN ISO 9001 and EN C 90 (quality management)
- Plants manufactured to international standards (API, GOST, ASME, etc.)

Natural Gas Liquefaction Plants

PROCESS

Natural gas is a clean fuel and is in great demand all over the world as a raw material for the chemical industry. The liquefaction of natural gas into LNG ensures a flexible, independent supply in contrast to transporting gas by pipeline.

Methane is the main constituent of natural gas. Natural gas is cleaned and dried before it is liquefied. Carbon dioxide and water are removed because these substances interfere with the downstream process. The multi-stage cryogenic process developed by CRYOTEC cools the natural gas down to its liquefaction point. The liquefied natural gas can then be stored or transported in special containers.

ADVANTAGES OF LNG:

- Cost-effective production
- Environmentally friendly energy source
- Fuel produced with low investment costs
- Many possible uses, including as a raw material for the chemical industry
- Can be used as fuel, even in cold climate zones
- High energy density (similar to diesel)
- Efficient energy storage : $1\text{m}^3 \text{ LNG} \approx 600\text{m}^3 \text{ Natural gas}$

ADDITIONAL SERVICES



- Desulphurization
- Drying / CO_2 separation
- Compression
- Separation of propane / butane (LPG)
- Storage and filling

Natural Gas Liquefaction Plants

LNG FOR SUPPLYING ENERGY

APPLICATIONS FOR ENERGY SUPPLY:

Constant supply systems

provide a completely independent power supply. All the power required is gained from LNG.

Peak load systems

are designed to make up for supply shortages during peak load times (winter, increased production, etc.)

Back-up systems / emergency systems

are designed to ensure the continued operation of plants in the event of a power outage or loss of the gas supply.

N₂CO₂O₂

Ar

LNG

BIO
LNGN₂CO₂O₂

Ar

LNG

BIO
LNG

Natural Gas Filling Station

ROAD TRANSPORT



LNG is the fuel of the future for heavy load and long distance transport. The advantages of this fuel are its high energy density, low noise emission from combustion and low fine particulate emission. LNG allows an environmentally friendly transport and – by adding Bio-LNG – even makes the logistics almost climate-neutral.



CRYOTEC will construct complete LNG filling stations for your truck fleet, and will also handle all the planning processes. We accompany you from the first feasibility study through to the turnkey transfer and will also assist you with public authority engineering.

SHIPPING



In many ports emission limits are already put into practise in order to improve the air quality of the neighboring towns and cities. In the shipping industry, liquid natural gas is establishing itself as an alternative propulsion technology.

CRYOTEC develops and designs LNG tank storage facilities and refueling stations for the marine sector.

Biogas Processing Plants

BIO-LNG



The liquefaction of biomethane from biogas plants is an excellent technology for storing energy and delivering it again when it is needed.

Biomethane can be stored by the liquefaction process, and then transported to the end user. This liquefaction opens up new utilization concepts for running a biogas plant profitably.

A better environmental balance can be achieved by adding biomethane to fossil natural gas. If the biogas is cleaned to natural gas quality (or better), it can be fed into the natural gas network.

BIO-CO₂



The carbon dioxide produced by biogas plants is often allowed to go to waste. CRYOTEC has the technology to extract this carbon dioxide, and prepare it for various uses (i.e. as a „fertilizer“ in greenhouses, food industry).

Using carbon dioxide separated from biogas and liquid biomethane can make existing plants operate more efficiently resulting in improved profit and environmental performance.

N₂CO₂O₂

Ar

LNG

BIO
LNGN₂CO₂O₂

Ar

LNG

BIO
LNG

CO₂ Generation and Recovery Plants

PROCESS

The raw carbon dioxide gas is collected, cleaned, liquefied and stored.

General process overview

- Gas washing
- Gas drying
- Active carbon adsorption / MEA wash
- Compression
- Liquefaction
- Distillation (gas stripper)
- Storage and filling
- Dry-ice generation

SOURCES OF RAW CO₂ GAS

- Breweries and / or alcohol distilleries
- CHP Plants
- Biogas plants
- Waste industrial gases / chemical processes
- Natural occurrence



ADVANTAGES

- Can be integrated in already existing production plants can be integrated
- Cost-effective processes
- Automatic operation – minimal operating costs
- Minimal maintenance expenditure
- Dry-ice production

CO₂ Generation and Recovery Plants



CO₂ EXTRACTION

There are natural gas fields with a very high CO₂ concentration particularly in the vicinity of volcanic regions. This CO₂ can be cleaned, dried and utilized.



FOOD QUALITY CO₂

The CO₂ recovered from fermentation processes is particularly suitable for producing food quality CO₂.



CO₂ FROM INDUSTRIAL APPLICATIONS

Large quantities of carbon dioxide evolve from many industrial processes, for example combustion and other chemical processes. The CO₂ can be recovered and made available for use in various branches of the industry.

N₂CO₂O₂

Ar

LNG

BIO
LNGN₂CO₂O₂

Ar

LNG

BIO
LNG

Supplies and Services

SUPPLIES



- Air separation plants (O₂, N₂, Ar)
- CO₂ recovery plants
- Plants for: cleaning, liquefaction, storing and regasification of natural gas and biomethane
- LNG / CNG / Bio-LNG Filling stations
- Plants for preparing special gases for various branches of the industry

SERVICES



- Planning / Concepts / Studies / Analyses
- Investment Planning
- Engineering (Pre-Basic / Basic / Detailed)
- Assistance for Handling Authorities and Approval Procedures
- Procurement / Logistics
- Manufacture / Installation (Delivered and Erected on the Construction Site)
- Commissioning / Trainings
- Service / Maintenance / Spare Parts / Optimization / Modernization
- Conversion of Existing Plants
- A Variety of Language Skills (En, Ru, Esp, Fr) for Optimal Project Management

Contact

CRYOTEC Anlagenbau GmbH, Wurzen, Germany



CRYOTEC ANLAGENBAU GMBH
Dresdener Strasse 76
04808 Wurzen, Germany
Phone: +49 3425 8965-1610
Fax: +49 3425 8965-1638
Email: contact@cryotec.de

Further locations of EPC Group



EPC ENGINEERING & TECHNOLOGIES GMBH
Dr.-Bonnet-Weg 1
99310 Arnstadt, Germany
Phone: +49 3628 66048-2900
Fax: +49 3628 66048-2925
Email: mail@epc.com



EPC ENGINEERING & TECHNOLOGIES GMBH
Breitscheidstrasse 152
07407 Rudolstadt, Germany
Phone: +49 3672 3023-00
Fax: +49 3672 3023-77
Email: rudolstadt@epc.com



EPC ENGINEERING & TECHNOLOGIES GMBH
Siemensstrasse 24-26
63755 Alzenau, Germany
Phone: +49 6023 5017-0
Fax: +49 6023 5017-17
Email: alzenau@epc.com



EPC ENGINEERING & TECHNOLOGIES GMBH
Am Haupttor | Buerocenter Leuna
06236 Leuna, Germany
Phone: +49 3461 4350-20
Fax: +49 3461 4350-77
Email: leuna@epc.com



HI BAUPROJEKT GMBH
Kahlaische Strasse 4
07745 Jena, Germany
Phone: +49 3641 5220-0
Fax: +49 3641 5220-22
Email: mail@hi-bauprojekt.de



HI BAUPROJEKT GMBH
Fasaneninsel 1
07548 Gera, Germany
Phone: +49 365 20587-7610
Fax: +49 365 20587-7680
Email: mail@hi-bauprojekt.de



RMN INGENIEURE GMBH
Am Sachsenkamp 5
20097 Hamburg, Germany
Phone: +49 40 535332-0
Fax: +49 40 535332-10
Email: office@rmn-ing.de

IDEAS INSIDE 

www.cryotec.de