

IRO EVENT

Netwerkbijeenkomst 24 mei 2022

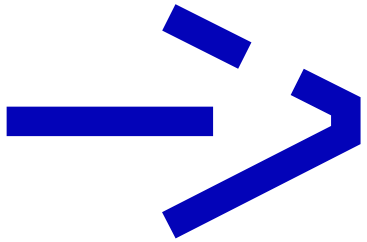
GEA Nederland
24 mei 2022

WELKOM

GEA Nederland

Peter Versloot
Director of Sales GEA-SFT Netherlands

SAFETY



- Er is geen oefening gepland
- In geval van een melding of sirene:
 - Beweeg u naar de nooduitgang
 - Verzamel bij de aangegeven verzamelpunten
 - Wacht op instructies
- Vrij rondlopen zonder begeleiden is niet toegestaan vanwege veiligheid

IRO Members meeting 24 mei 2022

Agenda van de dag

15.00-15.10 : Aanvang programma en welkomstwoord door GEA Nederland en IRO

15.10-15.30 : New Members Pitches

15.30-16.00 : Presentatie GEA

16.00-17.00 : Tour –Deelsessies (verdeling in 3 groepen)

1. GEA Truck (parkeerterrein)
2. GEA Westfalia Separator (kantine)
3. GEA LPT (meeting room Food)

17.00 : Netwerk Borrel



IRO verwelkomt de volgende nieuwe leden voor een pitch:



	NAAM BEDRIJF	PITCHHOUDER
1.	AMACS	Roger Hollman
2.	Q3 Heavy Lift	Lisette Valstar
3.	Van Ee Staalspecialisten	Martijn van Ee
4.	VDL Klima	Wim Jenniskens
5.	VIRO	Jordi Meulmeester
6.	Vydraulics	Hans Luiken





IRO BEURZEN

- **Global Offshore Wind (GOW), Manchester wind & water works**
21-22 juni - nog 1 plek beschikbaar!
- **Suriname Energy, Oil & Gas Summit (SEOGS), Paramaribo**
28-30 juni - nog 2 plekken beschikbaar!
- **ONS Stavanger**
29 augustus-1 september - zie IRO website voor inschrijven - deadline 31 mei!
- **Wind Energy Hamburg wind & water works**
27-30 september - vol
- **Oil & Gas Asia, Kuala Lumpur**
13-15 september - zie IRO website voor inschrijven - deadline 17 juni
- **ADIPEC, Abu Dhabi**
31 oktober-3 november - zie IRO website voor inschrijven - deadline 30 mei!

GEA GROUP

Company overview

April 2022

WIE IS BEKEND MET GEA?

GEA is betrokken bij veel zaken om ons heen.....

24 mei 2022

Our applications put consumers in touch with GEA every day



Food

Approx. every third chicken nugget is produced using GEA technology



Food

Approx. every third process line for instant coffee was installed by GEA



Dairy farming & processing

Roughly one quarter of processed milk comes from GEA production systems



Beverage

Approx. every second liter of beer is brewed with the aid of systems and process solutions from GEA



Pharma & healthcare

Roughly every fourth liter of human blood for making plasma-derived products is processed using GEA equipment



Chemical

More than one third of all polymer producers are using GEA drying technology



Environment

Approx. two million tons of pollutants are averted annually thanks to GEA emission control plants



Heating & refrigeration

Each industry we serve utilizes industrial heating and refrigeration technology from GEA



Marine

Roughly every second container ship in the world sails with GEA marine equipment on board



GEA at a glance

Order intake



5,222

EUR million
Previous year: EUR 4,703 million

Revenue



4,703

EUR million
Previous year: EUR 4,635 million

EBITDA before restructuring measures



625

EUR million
Previous year: EUR 532 million

EBITDA margin before restructuring measures



13.3

percent of revenue
Previous year: 11.5 percent

Employees



18,143

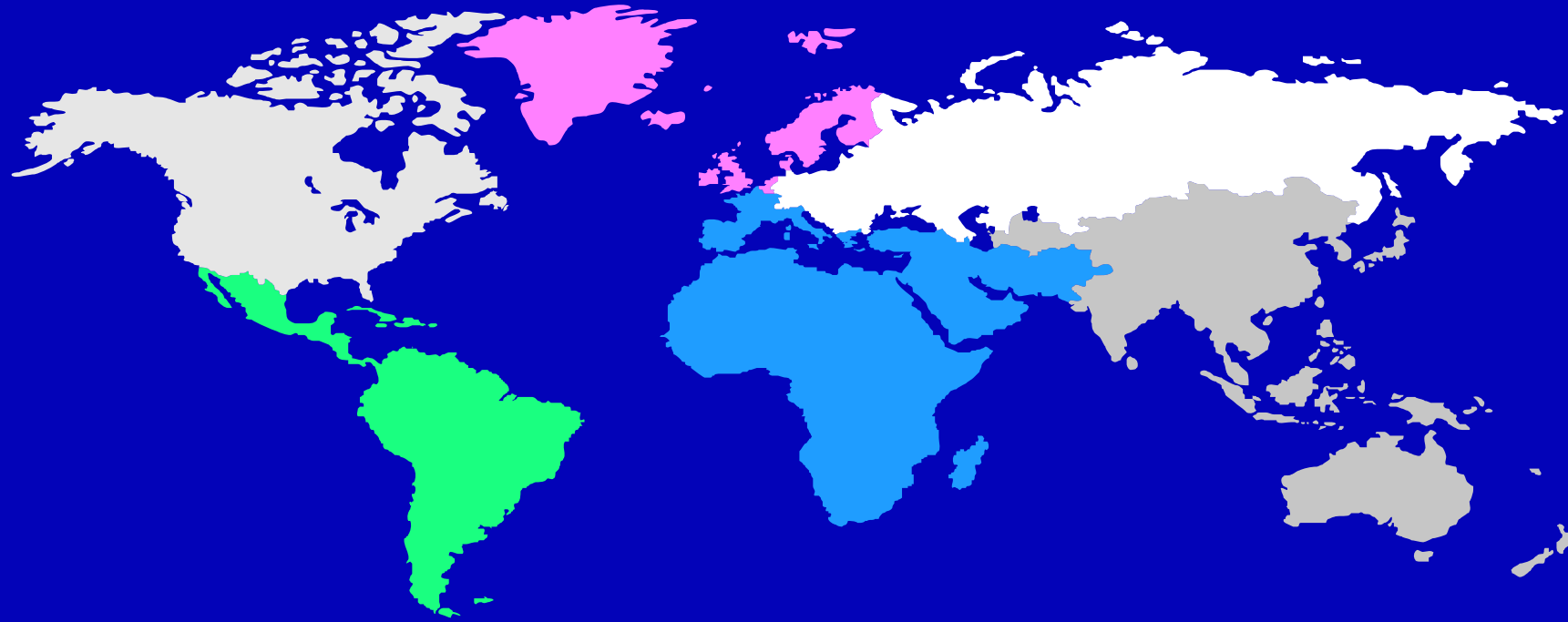
Full-time equivalents
Previous year: 18,232



GEA is one of the world's largest suppliers of systems and components to the food, beverage and pharmaceutical industries. The international technology group, founded in 1881, focuses on machinery and plants, as well as advanced process technology, components and comprehensive services.

GEA is listed on the German MDAX and the STOXX® Europe 600 Index and is also included in the DAX 50 ESG and MSCI Global Sustainability Indices.

Strong local presence around the globe



🏠 = Revenue

👤 = Employees (FTEs)

DACH & Eastern Europe

🏠 981 EUR million
👤 6,939

Western Europe, Middle East & Africa

🏠 825 EUR million
👤 2,906

North & Central Europe

🏠 636 EUR million
👤 3,105

North America

🏠 835 EUR million
👤 1,590

Latin America

🏠 335 EUR million
👤 564

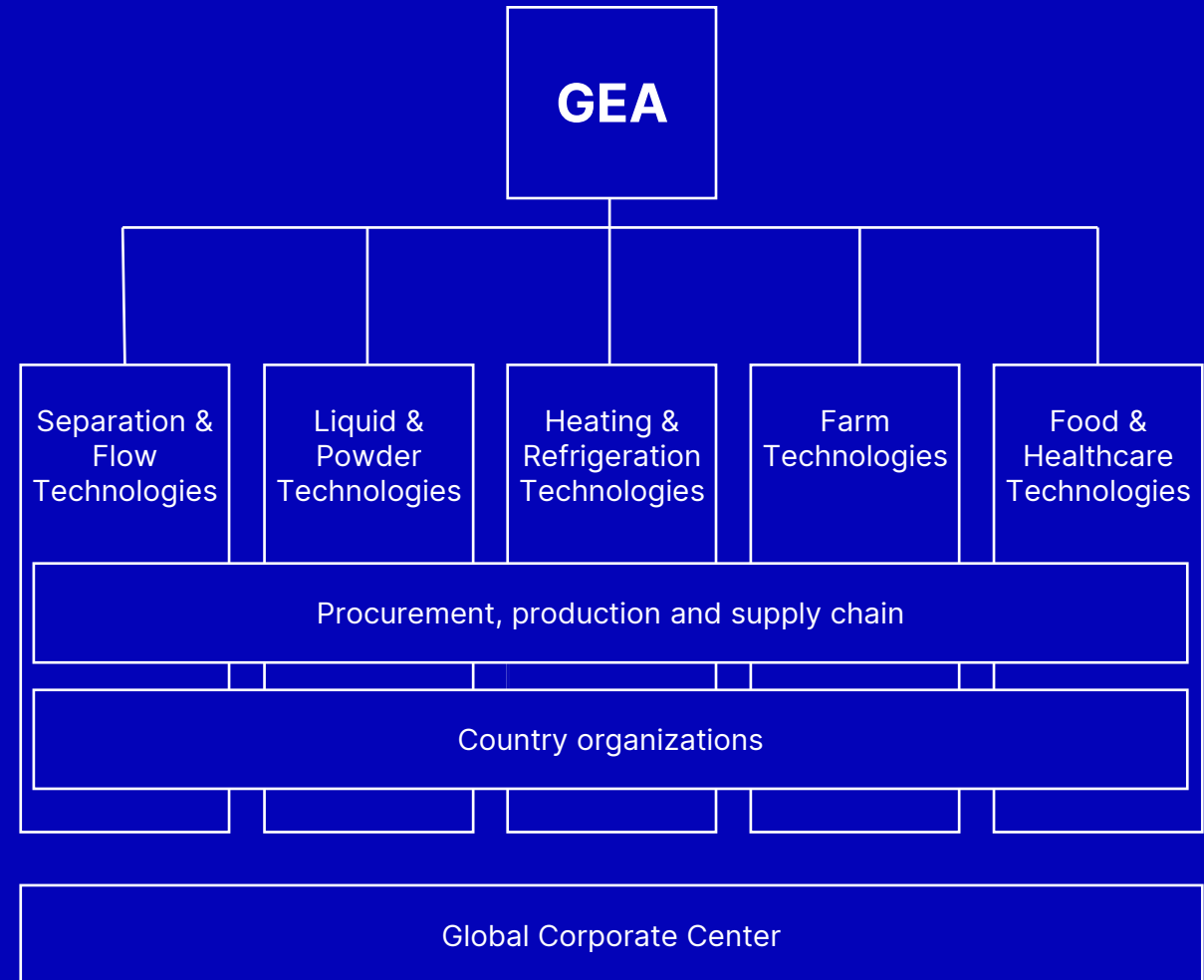
Asia Pacific

🏠 1,091 EUR million
👤 3,039

Our organization

GEA is divided into **five divisions**, each with up to six business units. The units are based on comparable technologies and have leading market positions.

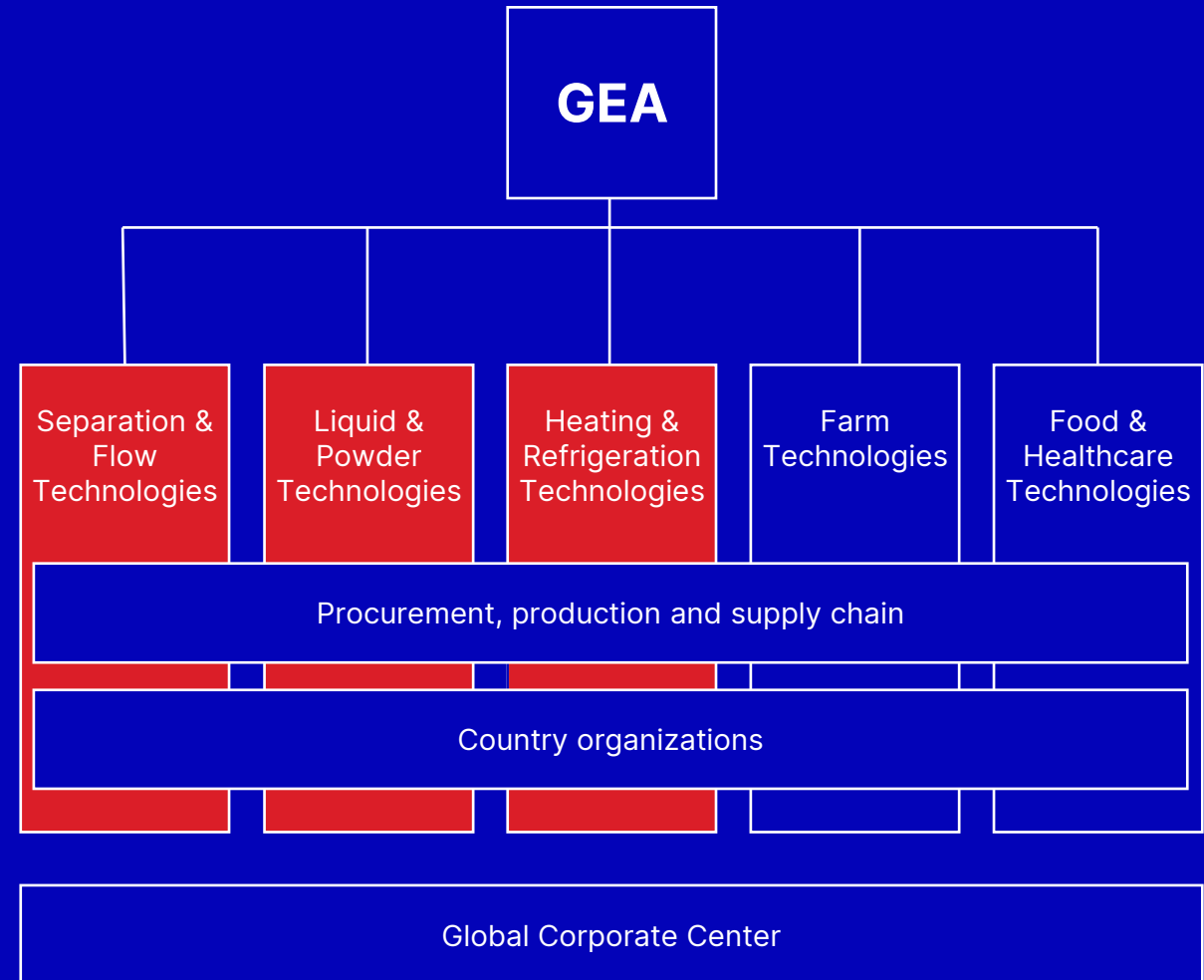
The **country organizations** stand ready to serve their respective customers as a central point of contact, offering them local access to an extensive portfolio of products and services.



Our organization

GEA is divided into **five divisions**, each with up to six business units. The units are based on comparable technologies and have leading market positions.

The **country organizations** stand ready to serve their respective customers as a central point of contact, offering them local access to an extensive portfolio of products and services.



GEA NEDERLAND

1500 medewerkers

Fabrieken

Bakel, Weert

Production Food Processing & Packaging

Leeuwarden

Production Barn Equipment

's-Hertogenbosch

Production Compression Equipment

Werkplaatsen

Deventer

Repair workshop

's-Hertogenbosch

Niro PT

Cuijk

Repair workshop

Separation & Compressors

Drachten (external)

Skid building

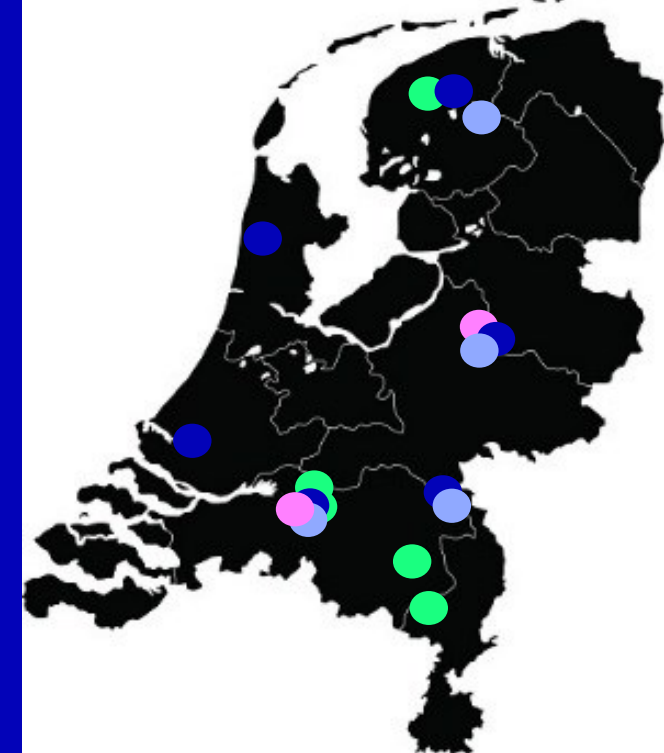
Engineering

Deventer

Process Engineering base

's-Hertogenbosch

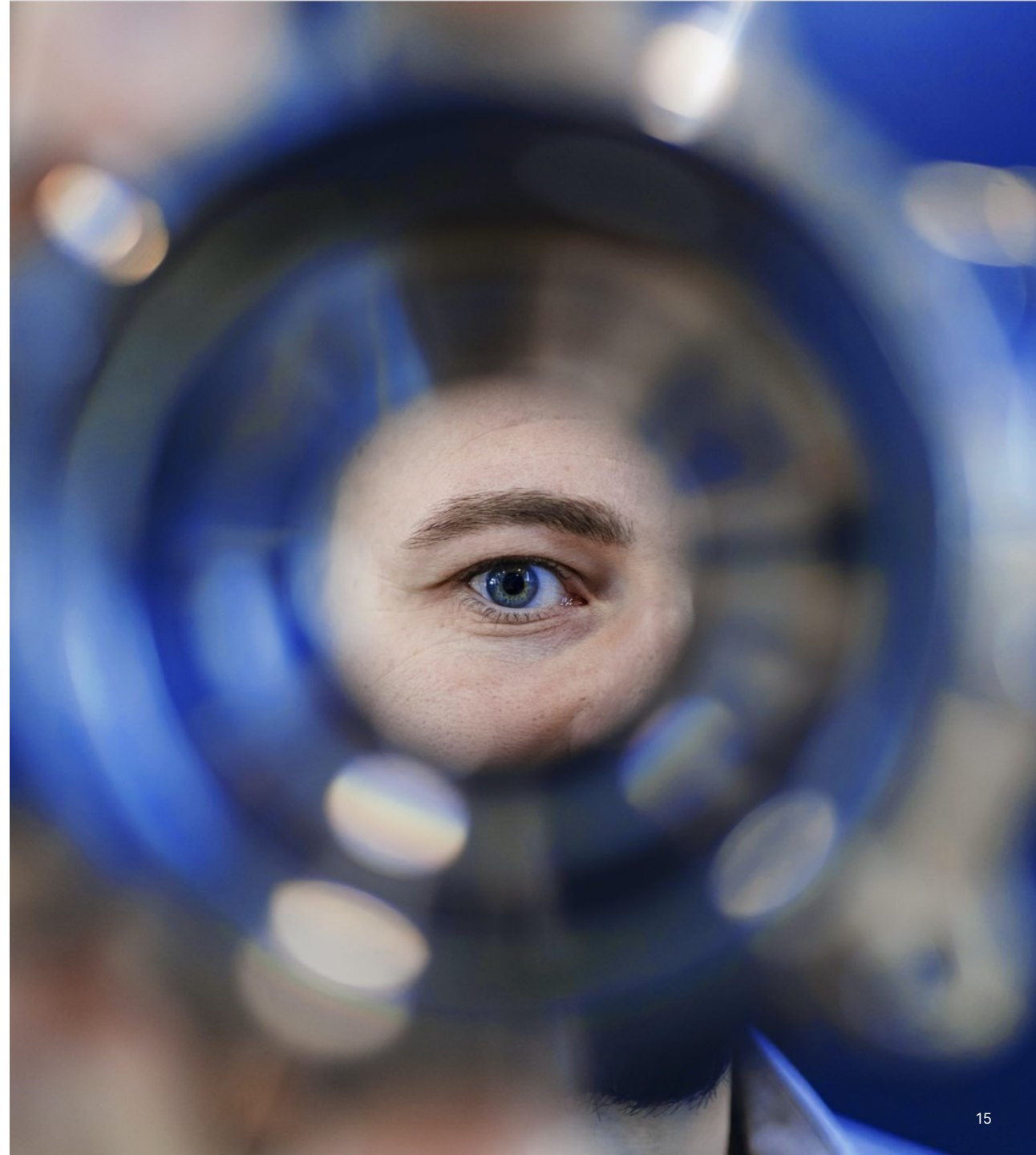
Utilities Engineering base



- Regions & Countries NL + GCC / SSC
- Werkplaatsen
- Engineering
- Fabrieken

Ons Doel

**Engineering
for a better
world.**



Onze Visie

We safeguard future generations by providing sustainable solutions.



GEA IN THE OIL & GAS INDUSTRY



OIL, GAS, ENERGY & MARINE

WORLD-CLASS SOLUTIONS FOR DEMANDING APPLICATIONS



TREATMENT OF:



Amine & MEG



Fuel & Lube oil
„Future Fuels“ i.e. Ammonia



Crude oil
(dehydration & desalting)



Bilgewater, produced water, drain & oily water



Fluid catalytic cracking slurries



Waste, Slop & Marpol oil



Drilling Mud
Spent drilling fluids



Industrial Waste Streams



Tank bottom washing liquids



Industrial liquids in the Metalworking Industry
i.e.; Washing lye Oils

SOLUTIONS FOR :



Emission control
i.e. carbon capture



Vacuum distillation



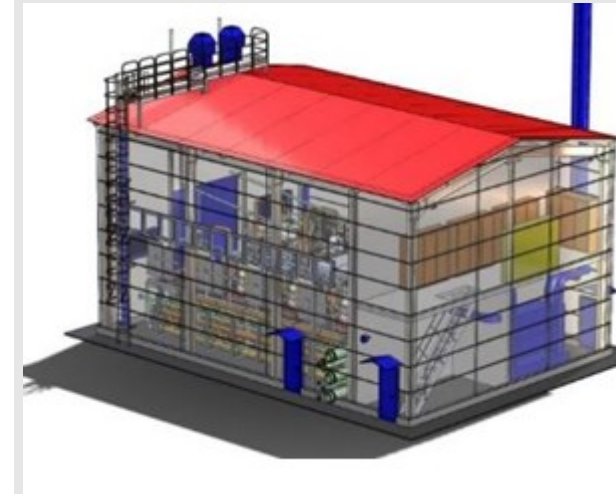
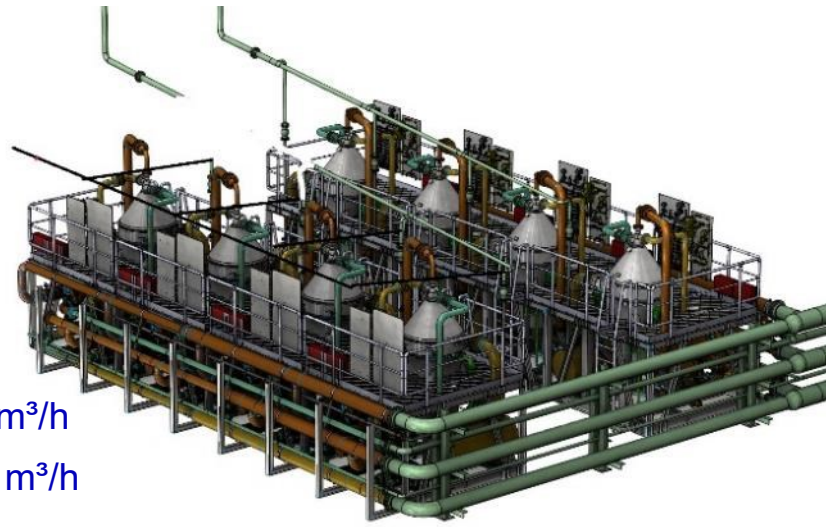
Gas Compression



Industrial Heat Recovery

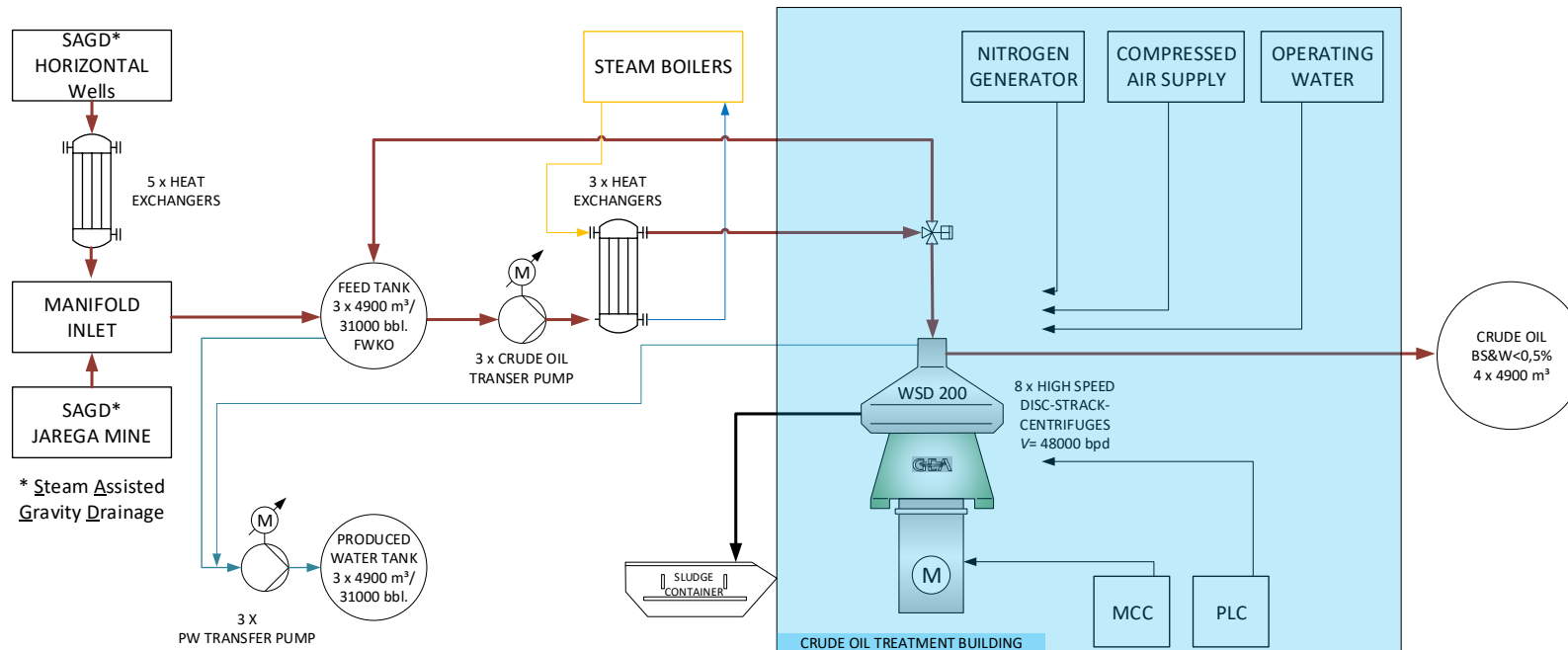
Crude Oil Treatment

Example Project



Phase I with 8 x Skid mounted WSD 200 flow rate 440 m³/h

Phase II with 8 x Skid mounted WSD 200 flow rate 440 m³/h



MARPOL Treatment Facility in Baltic



MARPOL
International Convention for the Prevention of Pollution from Ships



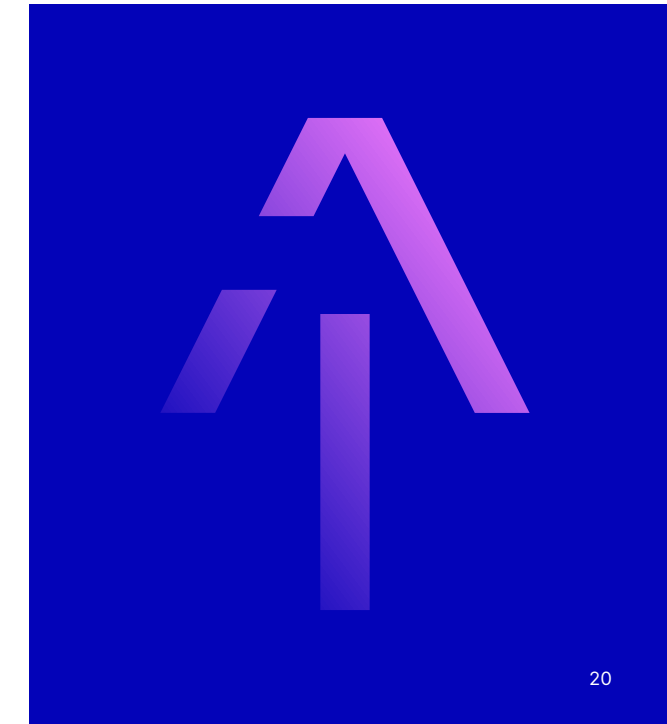
Customer: Green Marine

Location: Tallinn, Estonia

Application: Marpol and Slop Oil Treatment

Plant Capacity: up to 15 m³/h

- 1 x Decanter**
- 2 3 x Centrifugal separators**



Slop / Drain Water Treatment

Example Project



FPSO/FSO/FLNG operators have to comply with stringent environmental regulations.

This is in most cases the MARPOL [MEPC107(49)] and in some sensitive areas these regulations are even tougher. The treatment of oil water with GEA centrifuges allows over-board discharge of oil water in an environmentally sound way with OIW content < 15 ppm.



GEA Scope:

Self-ejecting centrifuges in skid mounted design according to valid oilfield standards of mayor oil producers such as:

- Euronav
- Total
- Shell
- BP
- Exxon Mobile
- Petrobras
- CNOOC



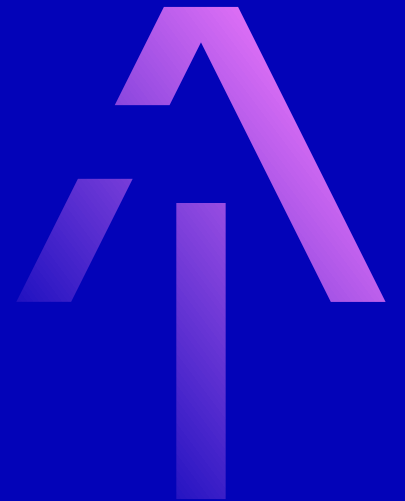
Amine Treatment

- Gorgon and Janz Fields Australia
3 +1 x WSD 200- 2 phase separation.
Delivery: 2011 / Weight: 45 tons
- Barzan field Qatar
3 x WSD 200- 2 phase separation.
Delivery: 2012 / Weigh: 49 tons
- Ichthys Hydrocarbon
5 x WSD 200- 3 phase separation.
Delivery: 2015 / Weight: 138,5 tons
- Ichthys Rich MEG
5 x WSD 200
Delivery: 2015 / Weight 135 tons



Industrial Applications

- Lube Oil
- Coolant Emulsion
- Washing Lye
- Morg oil
- Rolling emulsion



GEA Engineering
for a better
world.

GEA.com

GEA IRO MEETING

Oil, Gas, Energy & Marine

Martin den Hartog
May 2022

OIL, GAS, ENERGY & MARINE

WORLD-CLASS SOLUTIONS FOR DEMANDING APPLICATIONS



TREATMENT OF:



Amine & MEG



Fuel & Lube oil
„Future Fuels“ i.e. Ammonia



Crude oil
(dehydration & desalting)



Bilgewater, produced water, drain & oily water



Fluid catalytic cracking slurries



Waste, Slop & Marpol oil



Drilling Mud
Spent drilling fluids



Industrial Waste Streams



Tank bottom washing liquids



Industrial liquids in the Metalworking Industry
i.e.; Washing lye Oils

SOLUTIONS FOR :



Emission control
i.e. carbon capture



Vacuum distillation



Gas Compression



Industrial Heat Recovery

Separation & Flow Technologies Division

World-class performance from our process champions

Separators

GEA separators and decanters are used in thousands of applications by nearly every industry, including dairy processing, food & beverage, marine, oil & gas, power, chemical, pharma, farming and in water and wastewater management.



Homogenizers

With our high-pressure homogenizers manufacturers can micronize and standardize individual particles, ensuring product stabilization and long shelf life. These properties are key to many of today's health and personal care products and contribute to the quality of many processed foods and beverages.



Valves & Pumps

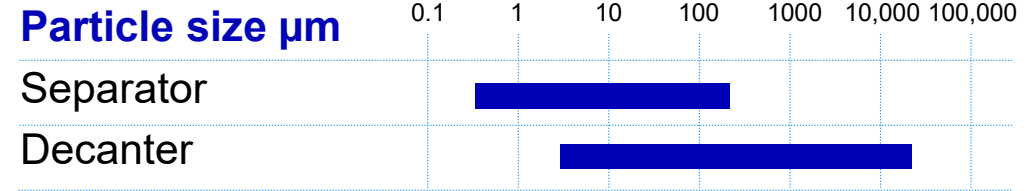
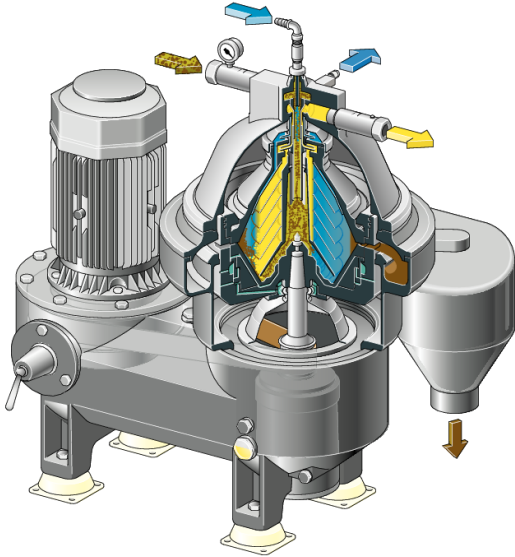
To ensure safe and sustainable production processes in the treatment of liquid products, GEA offers a comprehensive range of valves for all hygienic classes, as well as hygienic pumps and cleaning technology. Their modular design allows to create future-proof system and process solutions for the most challenging production tasks



GEA SEPARATION – CORE PRODUCTS

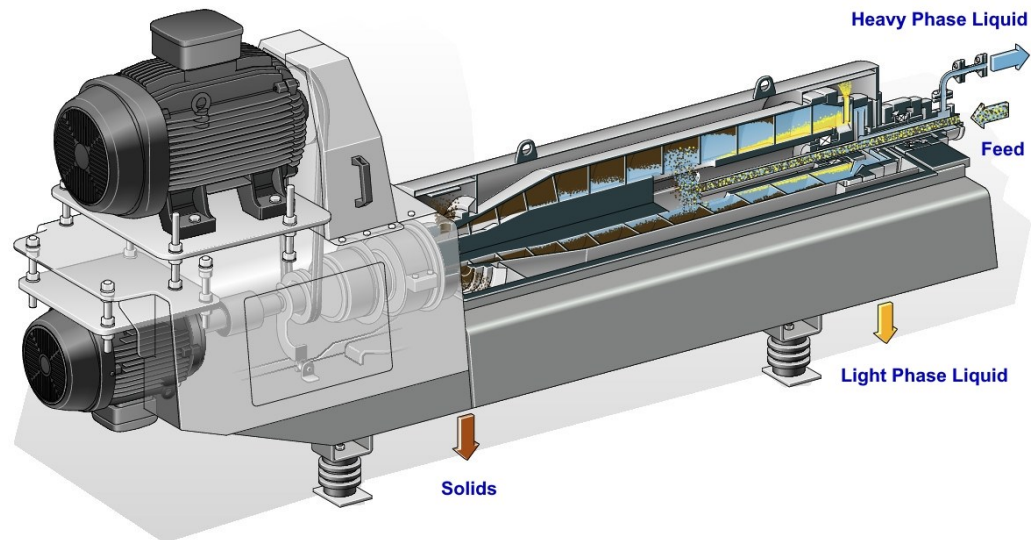
CENTRIFUGAL SEPARATORS

- Designed for liquid-based applications
- Particle size from 0.5 μm
- Throughput capacity up to 500,000 l/h
- With bowl diameters from 160 mm up to 1050 mm



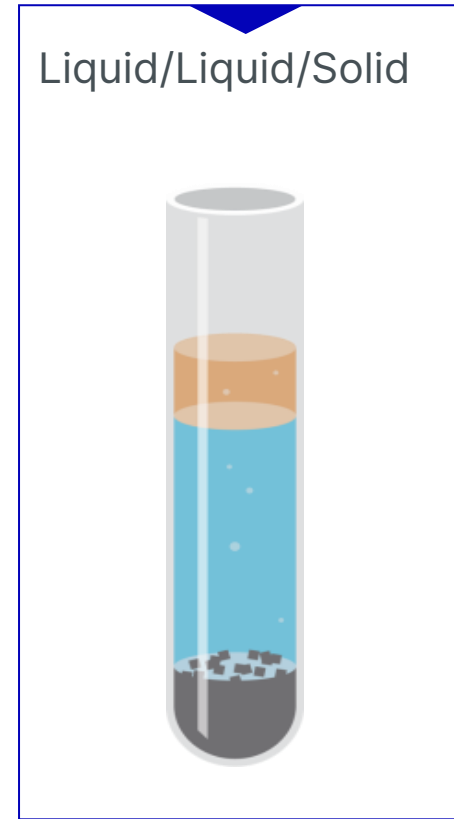
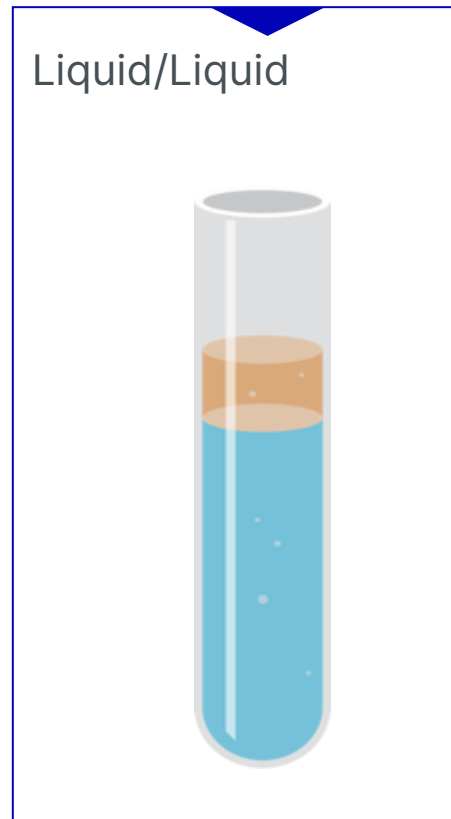
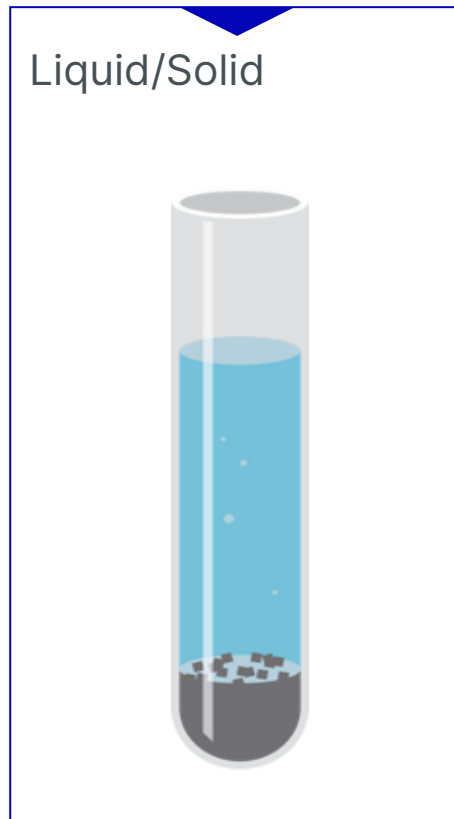
DECANTER CENTRIFUGES

- Designed for suspensions with high solids content
- Particle size from 5 μm
- Throughput capacity up to 350,000 l/h
- With bowl diameters from 200 mm up to 1030 mm



Fundamental Principles of Centrifugal Separation

Density difference: disk stack and decanter centrifuges can be used for separating mixtures of the following types:



g-force in real life and g-factor of centrifuges

2 g



2,5 g



4 – 5 g



max 6g – Baron 1898 = 3g



up to 5000 g



Decanter centrifuges

Bowl diameters from 200 up to 1030 mm

Throughput capacity up to 350,000 l/h
Particle size from 5 µm

10,000 – 15,000 g



Separator centrifuges

Bowl diameters from 200 up to 1050 mm

Throughput capacity up to 500,000 l/h
Particle size from 0,5 µm

Centrifugal Separation Technology

Settling Velocity – Stokes' Law



$$V_g = \frac{d^2 (\rho_p - \rho_f)}{18 \eta} g$$

V_g = gravitational settling velocity [m/s]

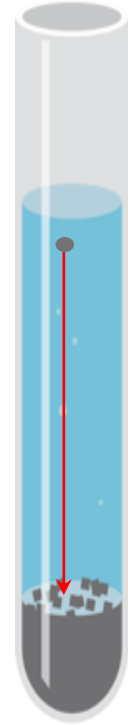
d = particle diameter (e.g. solid or water) [m]

ρ_p = particle density [kg/m³]

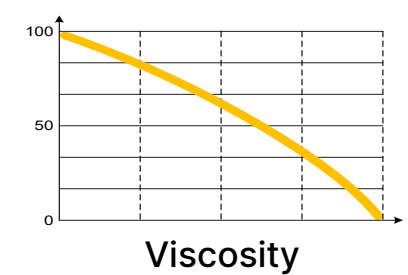
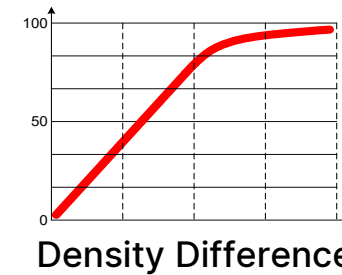
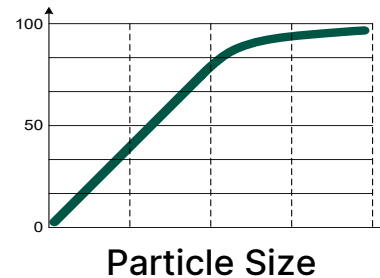
ρ_f = fluid density (e.g. oil) [kg/m³]

η = fluid dynamic viscosity [kg/m*s]

g = gravitational acceleration [9,81 m/s²]



Separation Efficiency



Space requirement: electrostatic tanks vs. centrifuges

Crude oil density

Electrostatic tanks

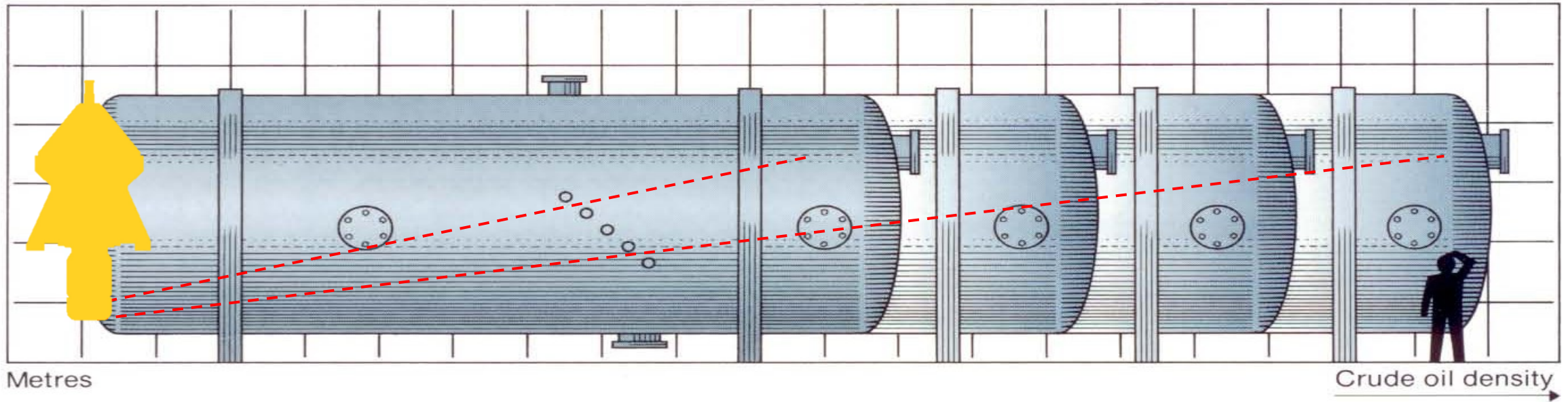
Required space is huge

The heavier the oil, the longer the tanks

Centrifuges

Very small footprint

We can squeeze 200,000 m² into just 8



Rotate, don't elongate!

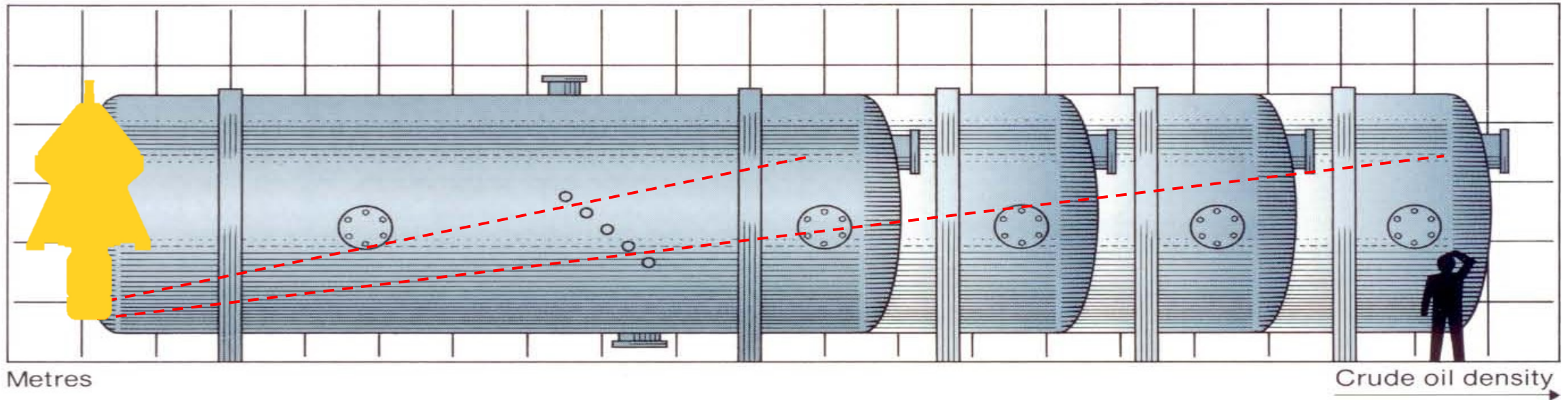
Capacity: electrostatic tanks vs. centrifuges

Initial cost calculation

Centrifuges

Small footprint, high capacity

Up to 1320 B/h at only 8 m²



What are your costs / square meter?

GEA LPT DIVISION

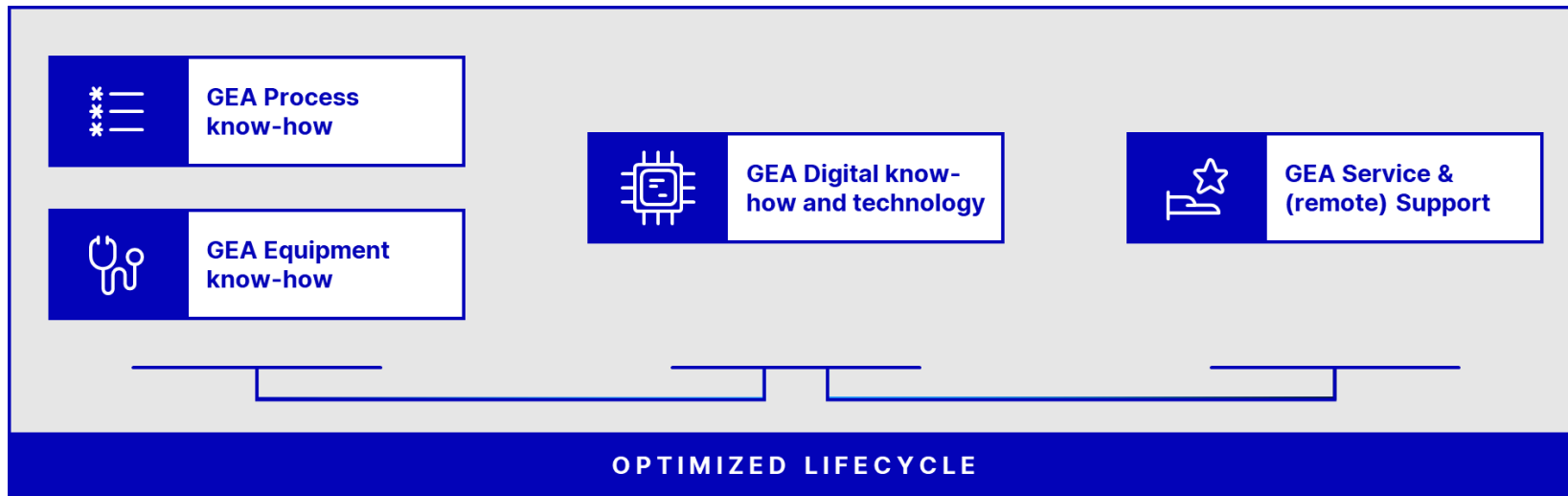
Liquid & Powder Technology

René Roelofsen

LPT introduction

Liquid and Powder Technologies

- The Engineering's department of GEA
- Providing sustainable solutions
- NL organization to support local customers
 - 80 Engineers at the Deventer office
 - Direct contact to the GEA global competence centers
 - Process Engineering Solutions to combine latest Engineering standards
 - Local Service Support



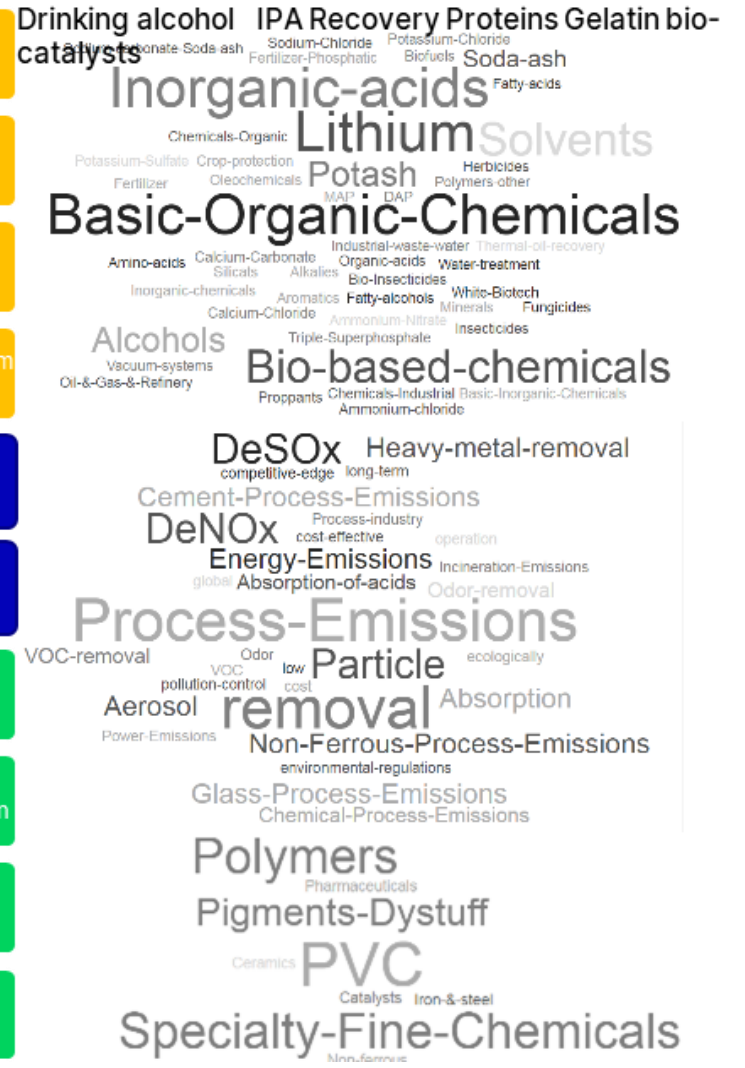
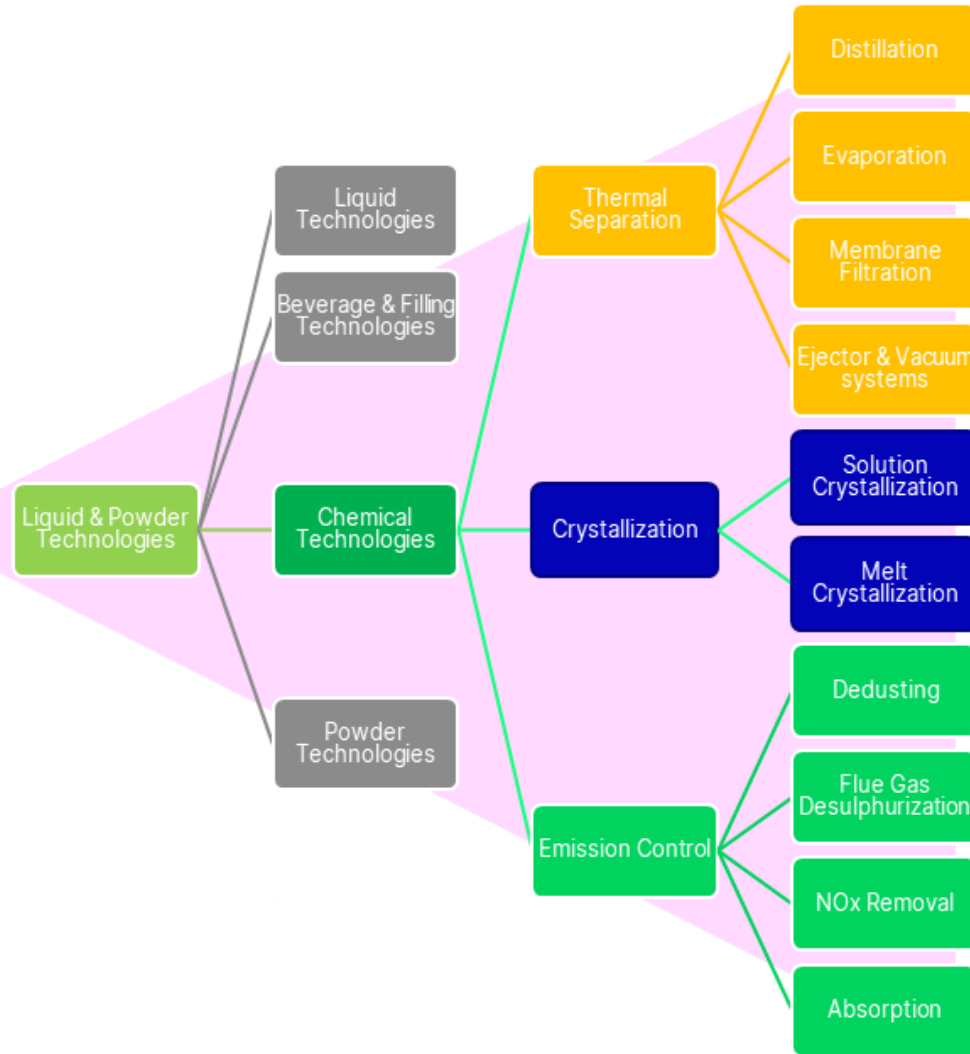
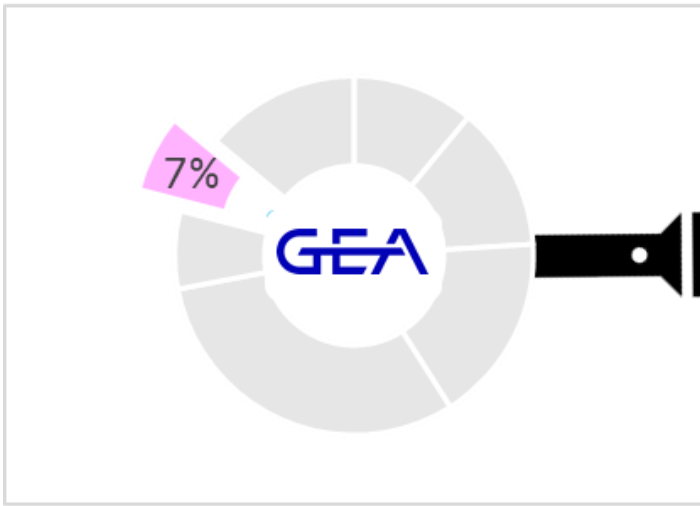
Markets:

- Dairy
- Food
- Beverage/Brewery
- Chemical

TECHNOLOGIES PORTFOLIO

Related to Oil, Gas, Offshore Renewable and Marine
Energy industry

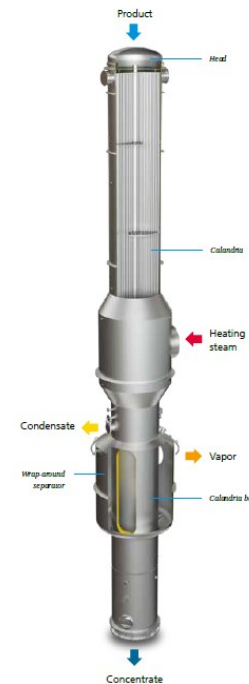
Spot on Chemical Technologies



Concentration Technologies

Related to Oil, Gas, Offshore Renewable and Marine Energy industry

- Distillation plants
 - Process/ Custom fit solutions
 - MVR / TVR heated Distillation
 - GEA R&D/test facilities (Karlsruhe) available
- Evaporator Plants
 - Process/ Custom fit
 - MVR / TVR heated
 - GEA R&D/test facilities (Karlsruhe) available
- Membrane filtration
- Crystallization
 - GEA competence center in Den Bosch

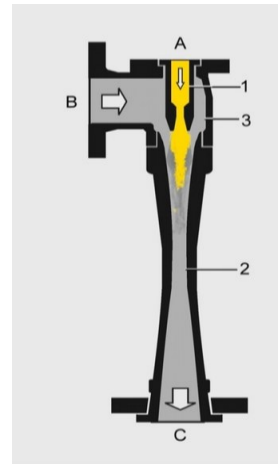


Vacuum solutions

Related to Oil, Gas, Offshore Renewable and Marine Energy industry

- Ejectors

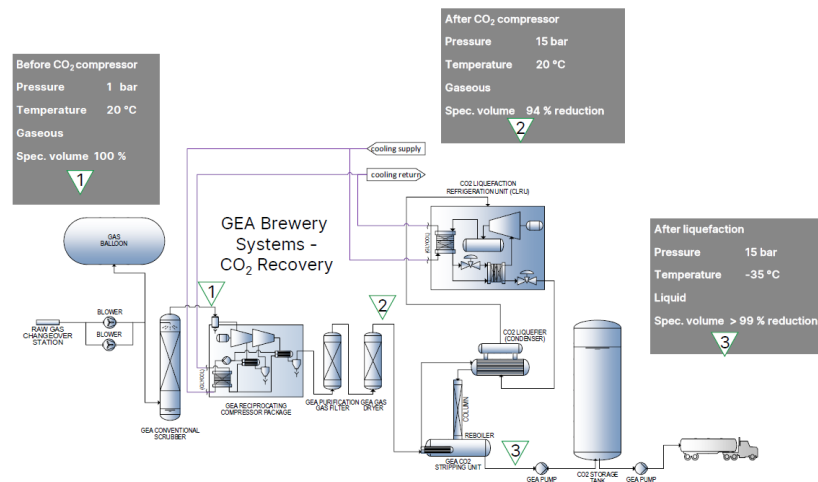
- Steam Jet vacuum pumps
- No Moving parts
- High reliability and safety of operation
- GEA R&D/test facilities (Karlsruhe) available











Emission control Technologies

Related to Oil, Gas, Offshore Renewable and Marine Energy industry

- Scrubbers
 - SOx removal
 - Particulate removal
 - NOx removal
- Spray Dryer Absorbers (SDA)
- CO2 saving processes
 - Waste Heat Recovery Unit (WHRU)
 - Carbon capturing (CO2 filtration)

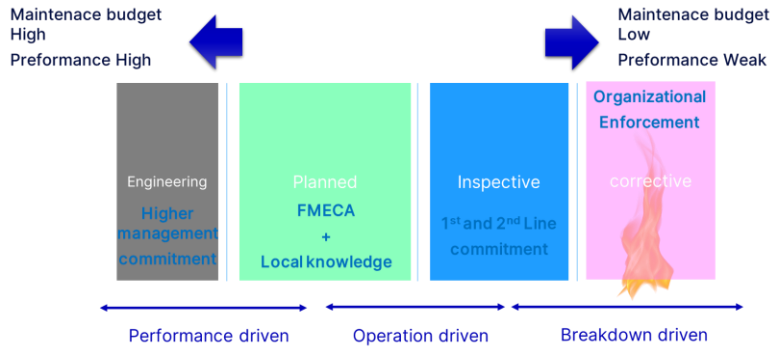


SO _x Removal	Particulate Matter Removal	NO _x Removal
Dry 	Bag filter 	Catlytic candle filter 
Semi - dry 	Candle filter 	SCR 
Wet scrubber 	(w) ESP 	Wet scrubber 

Maintenance & Digitalization

Performance driven maintenance

- Development of the strategy



- Executing FMECA

ID	Top Down FMECA										Bottom Up FMECA									
	S	L	Q	W	D	PM	IP	PP	PP	PP	S	L	Q	W	D	PM	IP	PP	PP	PP
1.12.07.01.01.01	L	L	M	M	H	H	L	L	L	L	L	L	M	M	H	H	L	L	L	L
1.12.07.01.01.02	L	L	M	M	H	H	L	L	L	L	L	L	M	M	H	H	L	L	L	L
1.12.07.01.01.03	L	L	M	M	H	H	L	L	L	L	L	L	M	M	H	H	L	L	L	L
1.12.07.01.01.04	L	L	M	M	H	H	L	L	L	L	L	L	M	M	H	H	L	L	L	L
1.12.07.01.01.05	L	L	M	M	H	H	L	L	L	L	L	L	M	M	H	H	L	L	L	L
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1.12.07.01.01.11	L	L	M	M	H	H	L	L	L	L	L	L	M	M	H	H	L	L	L	L
1.12.07.01.01.12	L	L	M	M	H	H	L	L	L	L	L	L	M	M	H	H	L	L	L	L
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1.12.07.01.01.14	L	L	M	M	H	H	L	L	L	L	L	L	M	M	H	H	L	L	L	L
1.12.07.01.01.15	L	L	M	M	H	H	L	L	L	L	L	L	M	M	H	H	L	L	L	L
1.12.07.01.01.16	L	L	M	M	H	H	L	L	L	L	L	L	M	M	H	H	L	L	L	L
1.12.07.01.01.17	L	L	M	M	H	H	L	L	L	L	L	L	M	M	H	H	L	L	L	L
1.12.07.01.01.18	L	L	M	M	H	H	L	L	L	L	L	L	M	M	H	H	L	L	L	L
1.12.07.01.01.19	L	L	M	M	H	H	L	L	L	L	L	L	M	M	H	H	L	L	L	L
1.12.07.01.01.20	L	L	M	M	H	H	L	L	L	L	L	L	M	M	H	H	L	L	L	L

Digitalization

- Condition monitoring



- Failure Mode library
- Remote support
- Drone inspections
- System platform integration



OUR PRODUCTS & SERVICES

Heating & Refrigeration Technology



Product overview

Compressors



The largest compressor program for industrial refrigeration, air-conditioning and heat pump applications.

Compressor packages



Compressor packages characterized by intelligent design and premium components for maximum quality and efficiency.

Chillers



Extensive portfolio of ammonia chillers for virtually any application for industrial refrigeration and air-conditioning.

Heat pumps



The future of industrial heating with GEA heat pumps

Valves & components



Valves and components perfectly designed for industrial refrigeration.

Controls



The intuitive touch for machine control technology

Product overview

Screw Compressors

GEA GRASSO LT



Compact and powerful with long product life span and excellent noise and vibration level.

805 – 11,467 m³/h at 2,900 rpm

GEA GRASSO M



Boosting energy-efficiency. Outstanding energy-efficiency and easy to package.

231 – 870 m³/h at 2,940 rpm

354 – 1,332 m³/h at 4,500 rpm

GEA COMPAX Semi-Hermetic NH₃



World's first semi-hermetic compact ammonia screw compressor.

708 – 870 m³/h at 50 Hz

1,232 – 1,514 m³/h at 87 Hz

Gas compressors



Optimized for compressing natural and industrial gases. For chemical and oil & gas applications.

(API 619, ATEX and further design standards available)

GRASSO SCREWS GAS COMPRESSION

Ron Hoffmann
20.04.2022

Applications of Grasso screw compressors

Gas compression

Well head gas compression & natural gas transportation

Biogas & landfill

Boil off gas

Gas turbine feed

Process gas

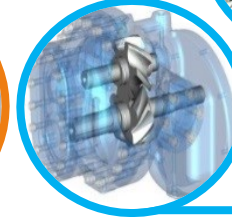
Refrigeration application

Marine

Cooling, freezing application
(NH₃, CO₂, freons)

Heat pump
(52 bar)

High pressure heat
pump (63 bar)

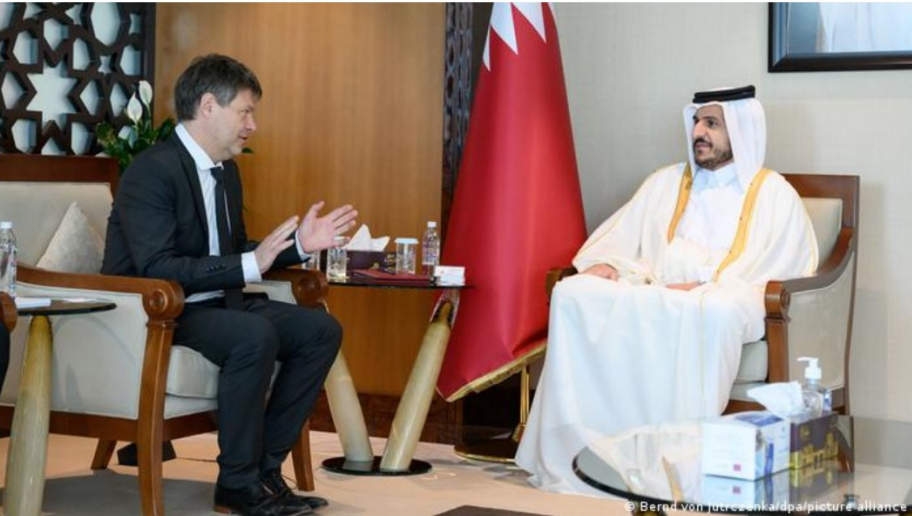


Gas applications – a future proof business?

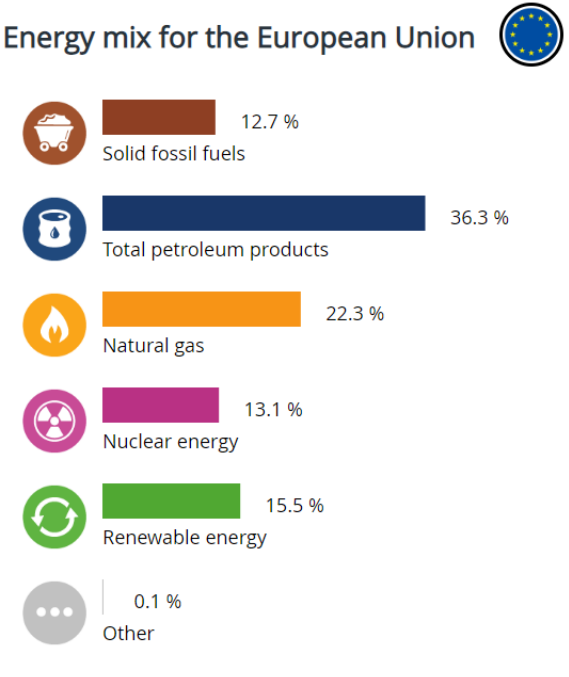
February 2022: European Commission declares natural gas as green energy source.

February 2022: Germany needs new gas power plants with a capacity of 43 GW to reach climate goals. (BDI, Climate Paths 2.0)

March 2022: Germany has agreed a contract with Qatar for the supply of liquefied natural gas (LNG)



Germany says it has secured an energy deal with Qatar that will help the country ween itself off Russian gas



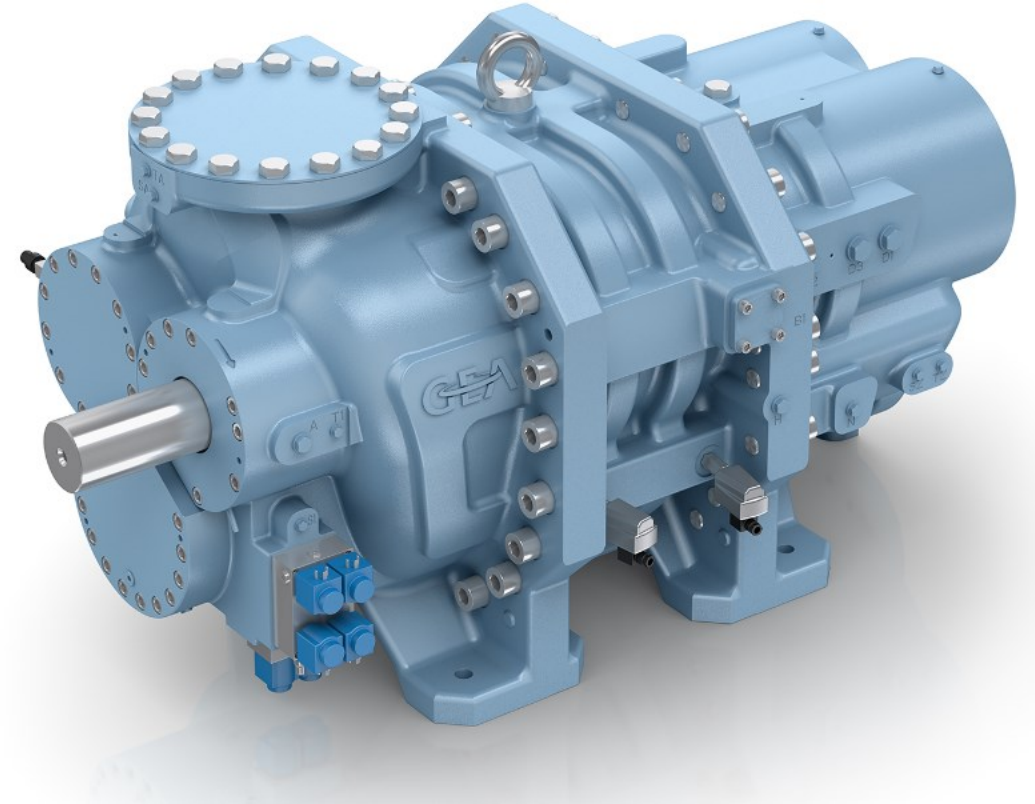
Marine fuels

A varied future



New High Pressure Screw

- Wide application range for high pressures
- Design pressure: 70 bar.g
- Swept volume at 50 Hz: 2748 m³/h (further sizes follow)
- Increased reliability and efficiency
 - New rotor profile optimized for the application
 - Load reduction and more robust components
- Release for field tests: Q2/2022
First project just sold



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