



System solutions

Refrigeration that keeps you cool

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When it comes to cooling, we've got you covered.

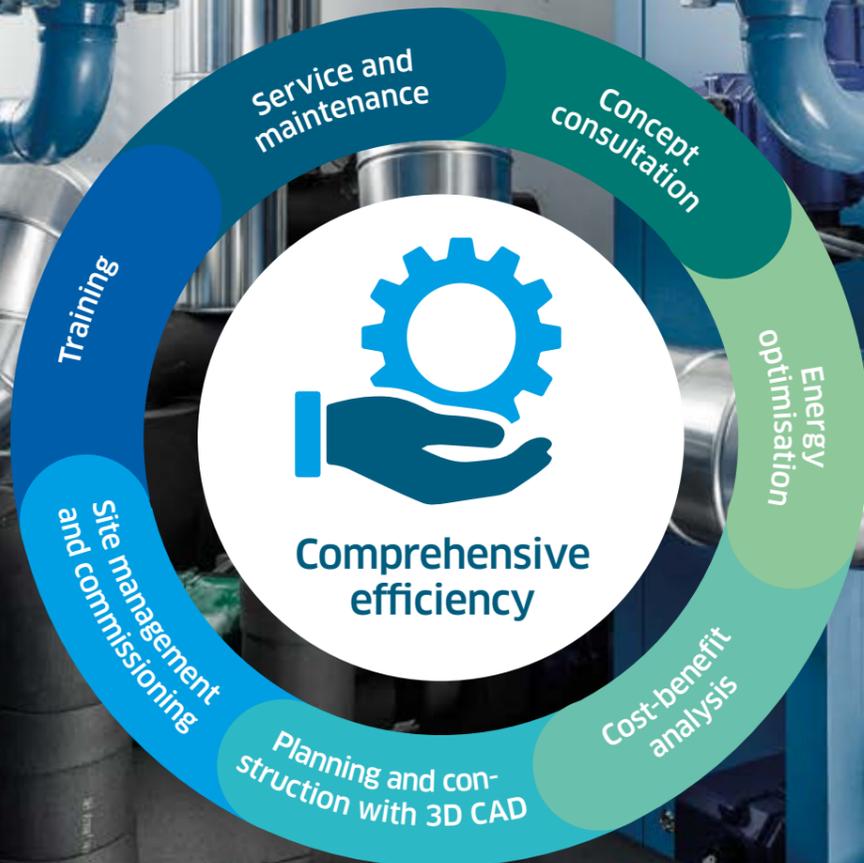
We know that only one thing matters to you as our customer: getting the best cooling solution to suit the needs of your processes. Yet getting the most appropriate type of refrigeration is just one factor in a much bigger picture – it's a means to an end. Our mission is to integrate the required "chill factor" into your processes as efficiently as possible.

For us, our holistic approach towards refrigeration does not just mean keeping the entire life cycle of a refrigeration system in mind. Instead, it means we also consider refrigeration as a whole: We plan complex refrigeration systems with you, taking as much care and attention as we would when integrating individual components into existing processes and systems. We know that although refrigeration is only one of many factors, much can depend on the correct temperature.

Our service portfolio

- Training
- Production
- Integration of existing systems
- Commissioning
- Needs analysis
- Planning
- Servicing and maintenance
- Construction

With so many advantages, it's an easy decision.



Individual: Tailored to your requirements.

We plan our cooling and cold water system solutions taking your exact needs and requirements into account. On-site inspections, CAD planning and coherent designs for the system's components are part of the package.

Minimal: Keeping things to a minimum.

Our systems have been specially designed so that only a minimal amount of maintenance is necessary. By combining quality components and advanced technology, maintenance can be carried out less often, dramatically reducing the cost of maintenance.

Efficient: Energy and water savings from the start.

Our systems are customised to meet your exact temperature requirements and offer a whole host of ways to save energy and water. This means the hydraulic systems can be connected via a multi-chamber system, which saves energy. Further ways to save electricity can be achieved by regulation depending on wet bulb temperature, speed of the re-cooling tower and the pump motors.

Skilled: Troubleshooting tips included.

Our customers are given extensive training and instructions for operating the systems. This means that they will be capable to solve any smaller issues that arise.

Our cooling and cold water system solutions always perform as you would expect – they cover a range of temperatures from -15°C to 65°C, with a cooling capacity starting at 100kW.

Sustainable: Cold water production is only the beginning.

Our experts don't just have extensive knowledge of cold water production. They also have many years of experience in downstream systems such as water treatment.

Our recipe for a system that works in harmony: components that are perfectly matched.

Everything starts with your project: Your core business relies on refrigeration – and it's our core business to provide you with the best solution for your refrigerating needs. That's why we are with you every step of the way: from initial planning of the cooling and cold water system, to construction, production and

assembly, up until it is fully commissioned. Our engineers develop made-to-measure and economical solutions with you whilst on-site. We manufacture key components ourselves and select others for you with a keen eye on maintaining high-quality standards which are then safeguarded by using comprehensive

service features ensuring trouble-free and low-maintenance operation for many years to come.

In short:
We look after the refrigeration so you can focus on your core business

Example diagram: multi-circuit system of a cooling and cold water system

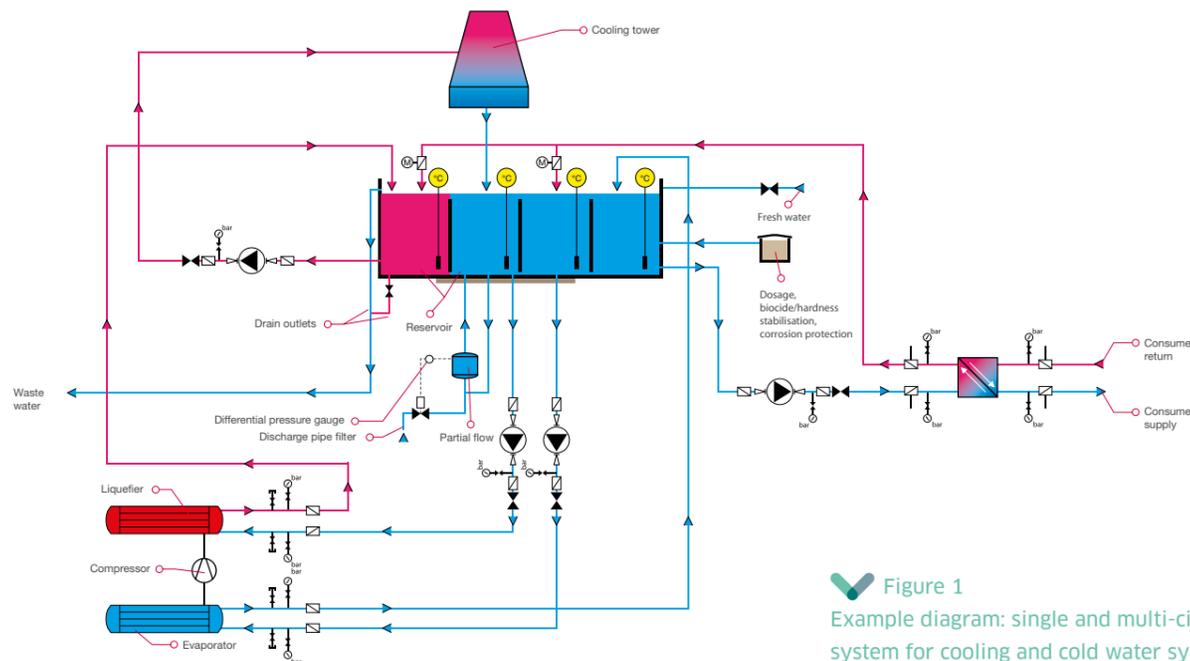


Figure 1
Example diagram: single and multi-circulation system for cooling and cold water systems.



Separate machine room inside refrigeration container with ammonia chiller and buffer tank.

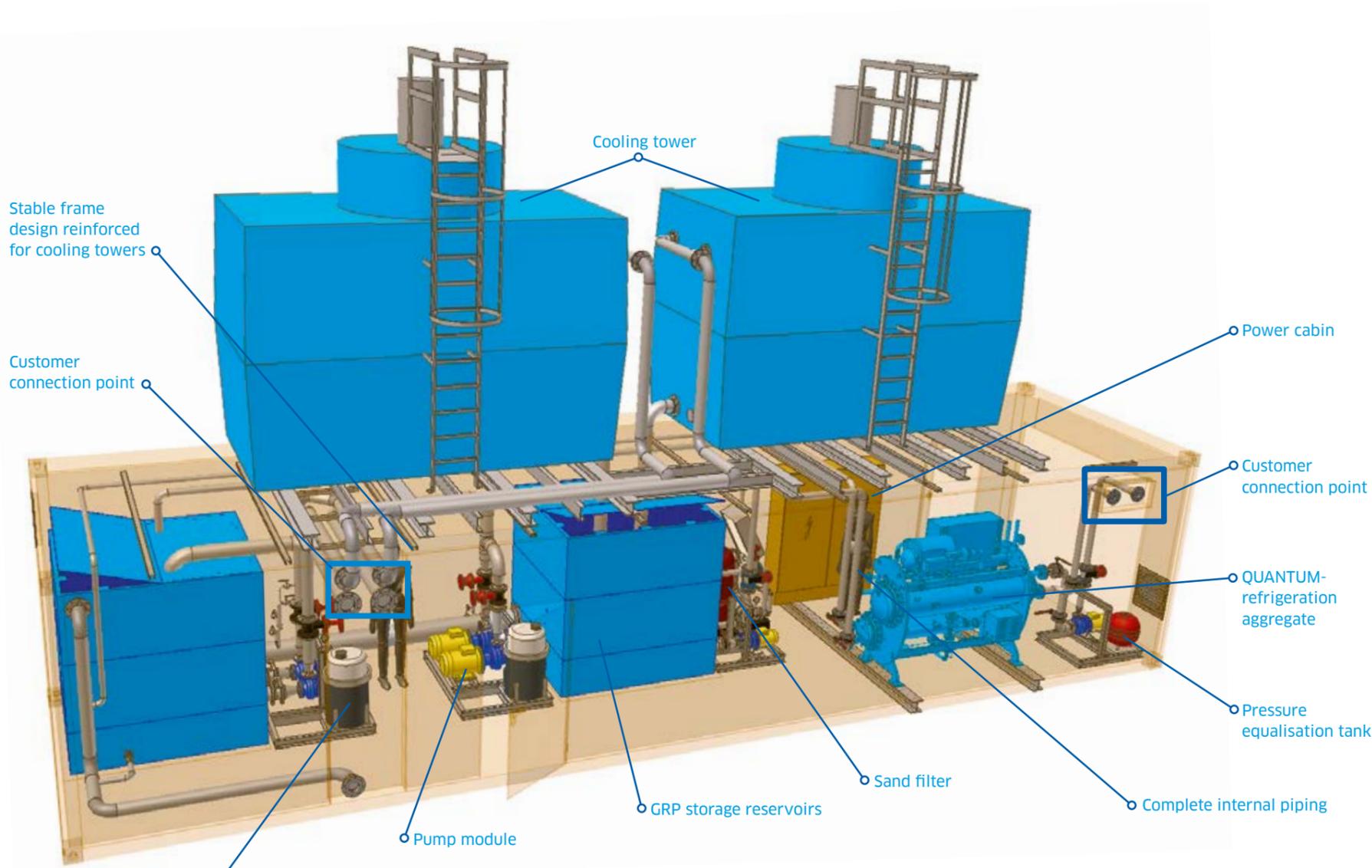


Figure 2
3D CAD diagram of a realised cooling and cold water system in a container design.

Our container systems are efficiency experts - and space-saving experts, too.

The container systems from ENGIE Refrigeration combine high-quality, energy efficient refrigeration and re-cooling technology with a space-saving design and simple connection and set up options. Our containers incorporate quality cooling and cold water systems complete with internal piping and wiring, a central control unit and all of the components needed for the smooth operation to meet your refrigeration needs.

Container systems come with many advantages. Firstly, you generally do not need to go through any time-consuming procedures to obtain building permission and no structural analysis is needed, saving you time and money. Secondly, the container can be adapted to the individual conditions on-site, such as the possibility of additional heat or noise protection.

The installation is very straightforward. As a customer, all you have to provide is the supply line, the electricity feed and the foundation. The outer dimensions of a container can be adapted according to the customer's requirement and can be up to 16m long, 4m wide and 3.5m high.



Figure 3
Container system with built-on re-cooling system.



Figure 4 and 5
view inside the container system.

Container systems from ENGIE Refrigeration

The benefits of compact, modular and pre-assembled cooling and cold water systems:

Space-saving

- Only small installation space required due to compact design and closed system
- The container is also a heated and well-lit engine room
- Excellent savings in terms of space, time and cost as the container serves as a sub-structure for the re-cooling plant

Outdoor installation

- System doesn't take up any space in production facilities
- Usually no need for building permission

Mobile

- The container is machine room and transport packaging in one - and can therefore be moved with the production if require

Secure

- Integrated safety features (e.g. gas warning systems, escape routes)

Protected

- The container protects the systems against the effects of weather and the environment

Whatever component you may need, we can get it for you. Our one-stop concept at your service.

Our components

- Chillers
- Re-cooling plants
- Pipelines
- Heat exchangers
- Storage reservoir
- Pumps
- Control/regulation system
- Control cabinet planning
- Water treatment

The quality of each component becomes more important, the more complex the overall system becomes. The system will only provide an optimal and efficient performance when everything is working perfectly together. ENGIE Refrigeration manufactures its own vital core components but also relies on tested products of a high quality from specially selected and professional partners and suppliers. We only provide the best products – our success is based on the satisfaction of our customers.

Our customers therefore get everything they need, all from one place: a complete system made up of components that work perfectly with each other and offer optimised control.

Our chillers: the efficiency specialists.

Chillers are the core components of refrigeration. We rely on “our specialists” for this: the QUANTUM, SPECTRUM, AMONUM and PENSUM chillers. They enable us to offer the perfect solution depending on the refrigeration needs.

Benefits and performance features:

QUANTUM

- Turbo liquid chiller for applications ranging from 250kW to 3MW
- High operational reliability due to redundant compressors and constant availability of refrigeration
- Precise control of re-cooling process by using variable performance controls and a smooth start-up
- Low-maintenance, low-vibration and quiet operation
- Highest level of energy efficiency with outstanding performance figures (COP)

PENSUM

- Particularly efficient for use in smaller power ranges from 45kw to 360kw
- Extremely versatile: water or air-cooled as a chiller or heat pump
- New generation of robust and reliable scroll compressors
- Highly customisable: comes with efficiency packages different pump options and hydraulic sets
- Quickly ready for use: equipped with various options connect to the main building control systems

SPECTRUM

- Highly efficient when at full and part load operation
- High SEER/SCOP throughout the course of the year, improved CO₂-balance
- Highly efficient rotor profiles for optimised compression
- Soft start function: without current peaks, smoothly reaching operating current
- Rotational speed variance of compressor: giving variable and consequently precise control
- Stable efficiency factor at partial load: no power factor correction is needed
- Intelligent SIMATIC S7 automation system to regulate the entire peripheral equipment in an energy efficient manner
- Open flash economiser
- Smart Grid compatible

AMONUM

- High efficiency values when used at full or partial capacity with possible variable adjustments to the actual cooling requirement due to a variable speed piston compressor and variable displacement
- Natural, environmentally friendly ammonium as coolant
- No CO₂ equivalent from direct emission, no contribution to global warming
- Future-proof technological solution
- Long life of electrical components in control cabinet due to hermetically-sealed machine parts
- IE3 motors in conjunction with a frequency converter already surpass the requirements of EU guideline 2005/32/EC (IEC 60034-30)

VENTUM Re-cooling plants for your cooling System solutions at a glance.



VENTUM open circuit, wet evaporative cooling towers



Series VENTUM Compact

VENTUM cooling towers are our true all-rounders, with a wide range of applications. They are available in many sizes and with different power ratings.



Series VENTUM Compact Modupol

For systems with a high cooling demand of up to 3,600 m³ of water per hour.



Series VENTUM Compact-D, VENTUM Compact-D-EC

Extra energy savings thank to the use of EC fans.



Series VENTUM Compact-E

Pressure-ventilated open circuit cooling towers. Feature: Stainless steel housing.

VENTUM closed circuit, wet evaporative cooling towers



Series VENTUM Compact-F

Pressure-ventilated closed circuit cooling towers. Feature: Stainless steel housing.

VENTUM dual re-cooling towers



Series VENTUM Compact Dual

Closed circuit dual re-cooling system with axial fans.

When cooling with a dual system in the summer, the evaporation heat of the water is used; and in the winter, the heat of the temperature difference is emitted into the air. On cooler days, the system operates like a pure dry cooler, and the heat transfer surface only gets wet during periods of high ambient air pressure.

Reliable, simple, well-thought-out: further components for efficient refrigeration.

We use components that work perfectly together to ensure that cooling and cold water System solutions operate at exactly the right temperature.



➤ Pump module with built-in storage basin

- Pump module with complete hydraulic and electrical connections and storage basin
- Short suction lines
- Compact construction
- Integrated ride control system
- High operational reliability due to redundancy
- High energy efficiency due to low loss of pressure of the components

➤ Storage reservoirs

- Suitable for many installation locations due to being available in various dimensions
- Acid and alkaline resistant designs are available
- Protects against evaporation and dirt due to a lid in one or two parts
- No corrosion, low weight, high stability
- Simple to clean due to easy access and smooth surfaces
- Longer life due to UV light resistant design in a robust industrial construction
- Possibility of multi-circuit cooling systems with only one storage reservoir by installing up to three separating walls
- Simple, custom-fit pipeline connection
- Available in all RAL colours

➤ Isolated pump module

- High-quality isolation against perspiration water formation
- Integrated piping anchorage, no nozzle loads
- Stable mounting frame, welded and electroplated

QUANTUM chiller is just one of many components in a container solution





➤ Plate heat exchangers

- Protection for sensitive consumer circuits
- Plate heat exchangers can be completely isolated for maintenance/cleaning
- Simple maintenance due to sufficient space available
- Integrated connections for cleaning
- Gauge on entry/exit to test for degree of contamination
- Drip tray for perspiration water (at low operational temperature)



➤ Stratified buffer tank

- Hydraulic separator/decoupling in closed cold water circuits
- Ensures good part load behaviour with reliable operation
- Reduces operating cycles of the chiller during off-peak operation
- Reduces temperature fluctuations



➤ Control cabinet

- Centralised control of the entire system
- Control system in accordance with highest industry standard (Siemens S7)
- Possibilities to transmit data with various bus systems using the customer's BMS; remote system maintenance
- Can be integrated with air conditioning system
- Available in all RAL colours



➤ Sand filter

- High capture rate of dirt particles
- Reduced use of chemicals, improved water quality
- Simple and economical assembly
- Low-maintenance operation and high reliability
- Fully automated control system
- Longer life due to high effectiveness
- Integrated desalination regulation
- Exact conductivity values
- Simple integration into system



➤ Gas detector alarm

- Meeting legal requirements
- Highest industry standard



➤ Connection point

- All connections in one place
- Clear interface unit, planning reliability
- Safe to transport due to inward facing connections and transportation covers

Innovative technology in the smallest of spaces: compact modules from ENGIE Refrigeration.



Compact cooling modules are prefabricated units in a modular construction for indoor installation. As with the container systems, they are immediately operational after connecting to an electrical power supply and connecting the coolant supply and return pipes. No further work or pipework is therefore required to be done to the compact module at the installation site.

Storage tankers, pumps, sand filters, control cabinet and all other components are assembled in a space-saving manner onto the base frame in accordance with the modular system and come fully wired with the pipes all ready for operation. The pipe installations for the cooling modules can have the following finishes: steel, stainless steel or PVC. Simple and safe usage of our cooling modules is ensured courtesy of their industrial design and controls in accordance with VDE, protection class IP 54.

Our fundamental principles:

1

Well-thought-out

You will receive the best technological solution: all components are ideally matched with each other; cables are fitted at our factory, tested and then immediately ready for operation. All connection points for electricity, water and data are clearly labelled. The best foundations for energy efficient operation.

2

Simple

Delivery takes place with wires and piping already installed. After connecting to an electrical power supply and connecting the coolant supply and return pipes, your compact module is ready to operate. It can even be installed alongside other building work. This saves time and installation costs.

3

Complete

Everything comes from one source and is assembled ready to use. This gives you complete control over the cost and confidence in your cost estimation.

4

Mobile

A compact module is not bound to one place – when relocating the production site, the system can simply be transported too.

5

Cost-effective

Fewer interfaces mean less time coordinating operations and therefore lower costs.

ENGIE Refrigeration supplies the right cooling for every process: from efficient chillers, environmentally friendly heat pumps and modular re-cooling systems to turnkey solutions such as refrigeration containers or modules. Efficiency, sustainability, cost effectiveness and first-class expertise in technical solutions are hallmarks of every ENGIE Refrigeration project. Our individualised advice and comprehensive services are centred around our customers and their requirements. As a member of the worldwide ENGIE Group, we have a global network of specialists at our disposal and can realise our refrigeration solutions both at home and abroad.

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Optimal use of energies.