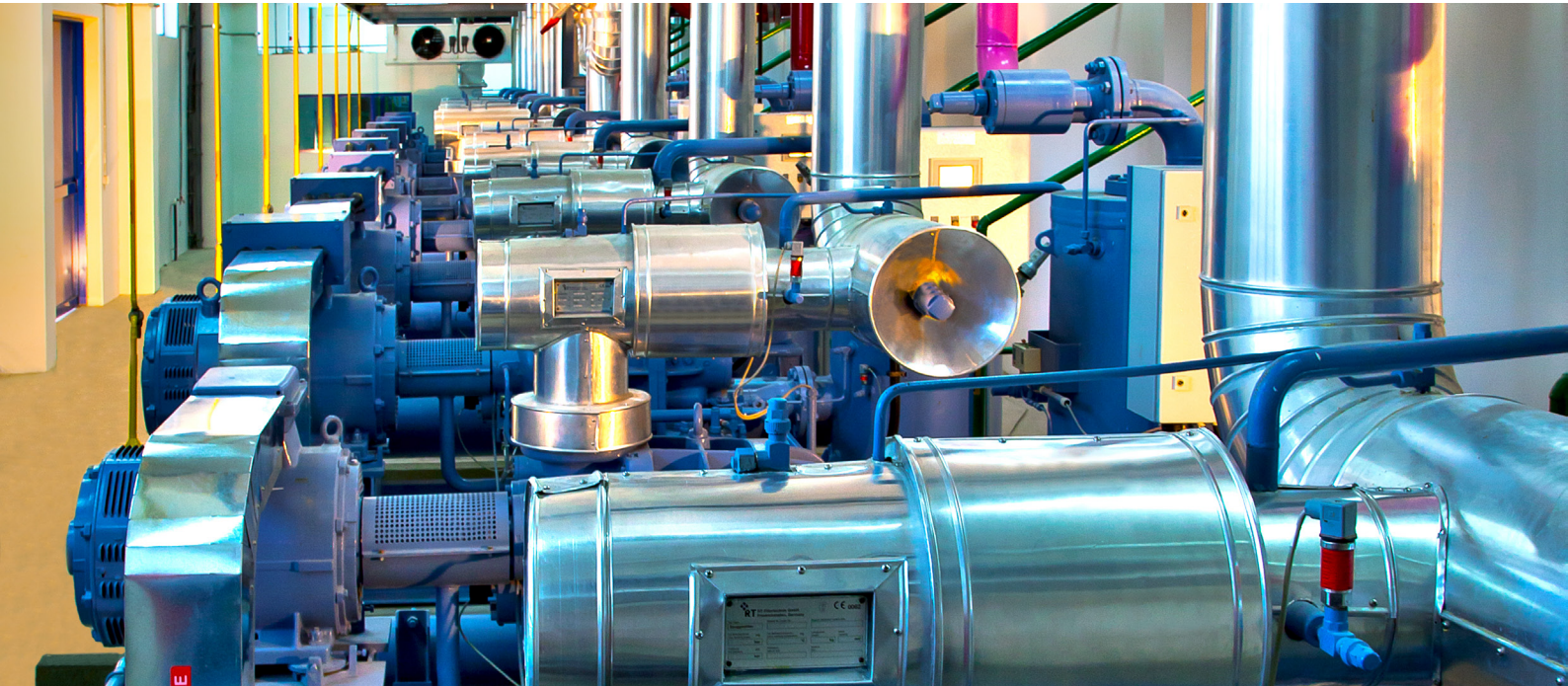


▶ POLAR REFRIGERATION GMBH OFFERS 3 LEVELS OF PROCESS ENGINEERING DESIGN FOR OUR CLIENTS:



Conceptual design (feasibility study)

Design deliverables will typically include a design basis with main process parameters defined, overall block flow diagrams, a preliminary space study to define overall space requirements and finally, an overall cost estimate for the system.

Basic design

Develop a well defined design package to ascertain the feasibility of the conceptual design. Typical documents to be provided at this stage are:

- Process flow diagrams
- Piping and instrumentation diagrams
- List of equipment
- List of instruments
- Preliminary equipment specification
- Preliminary layout.

Depending on the decisions of our clients, design work can continue to the next level.

Detailed design

Detailed engineering is offered to incorporate all elements of engineering works including final equipment layout, piping layout, input for civil works and HAZOP studies or other studies as required.

Due to our international experience and flexibility in the design approach we are capable to perform design according to the norms and requirements of the clients such as EN, ASME, GOST-R (Russia), GOST-K (Kazakhstan), etc.

We offer our services in Europe, East European and Central Asian countries, the Middle East and Africa. Whether your project is in a remote location or has difficult requirements, we are sure we will be able to serve you. Please do contact us to help you achieve your goals.

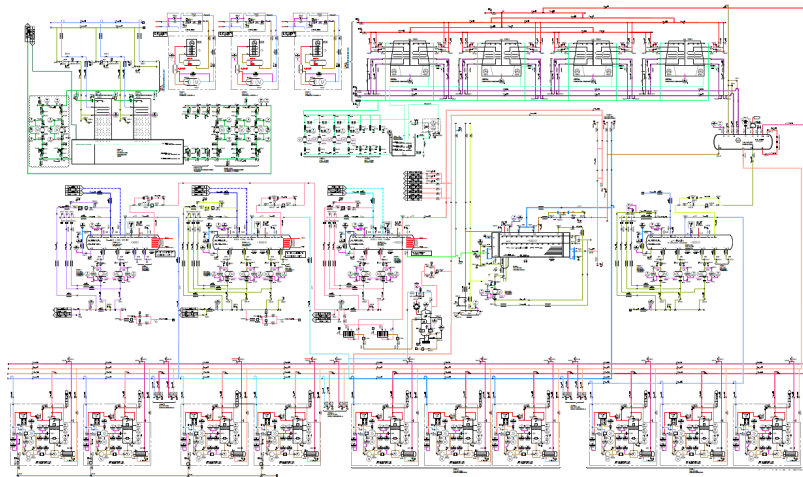
► PROCESS ENGINEERING DESIGN FOR A CO₂/NH₃ CASCADE LOW-TEMPERATURE REFRIGERATION PLANT

Polar Refrigeration GmbH performed the conceptual design of a cooling plant for a new construction of an ice cream factory. Parts of this factory are freezers and extruder lines as well as deep cold storages, cold stores and working areas which have to be supplied with cold.

Polar Refrigeration GmbH with its long term experiences in refrigeration developed an energy efficient solution with the refrigerant CO₂ for the low temperature consumers and NH₃ for the upper cascade stage.

Technical data at a glance

Cooling capacity CO ₂ , -45°C	2.780 kW
Cooling capacity CO ₂ , -35°C	1.800 kW
Cooling capacity CO ₂ , -8°C	1.040 kW
Cooling capacity NH ₃ , -1°C	5.930 kW
CO ₂ /NH ₃ cascade -8°C/-12°C	7.580 kW



Principle PID of the cooling plant (without consumers)

Why CO₂?

CO₂ is a natural refrigerant an ideal to use for low temperature application from ecological and safety point of view. It is non-toxic, non-flammable and has no ozone depletion potential, is chemical inactive and inexpensive. According to the good thermodynamically properties the design of components and pipes are smaller compared to other refrigerants for same capacity.