

**THEISEN**

SMART SOLUTIONS

He

H<sub>2</sub>CO<sub>2</sub>O<sub>2</sub>N<sub>2</sub>

Ar

# HEAT EXCHANGERS

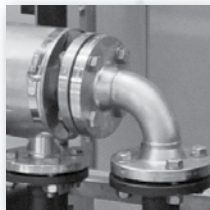
## Individual performance requirements

Many applications in industry require technical gases to be vaporised, heated or cooled. We calculate and manufacture heat exchangers individually according to your performance requirements.



Heated by hot  
water

Pages 4-5



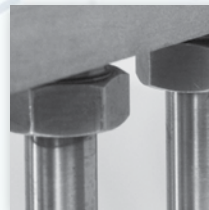
Heated by  
steam

Pages 6-7



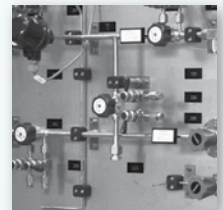
Heated  
electrically

Pages 10-11



H<sub>2</sub> high-pressure  
coolers

Pages 12-13



Compact  
stations

Pages 14-15

### Our strengths are in particular:

- ≡ High pressures up to 420 bar (special solutions up to 1400 bar possible)
- ≡ Low temperatures down to - 260°C
- ≡ Special materials
- ≡ Toxic, corrosive, flammable and high purity gases
- ≡ Explosion-proof versions
- ≡ Complete systems including electronic controls
- ≡ High purities up to 6.0
- ≡ Manufacturing according to PED 2014/68/EU and AD2000
- ≡ Process simulation
- ≡ Stability calculation

### Materials:

- ≡ Austenitic stainless steels e.g. 1.4541 / 1.4571 / 1.4404 / 1.4435 etc.
- ≡ Monel®/ alloy 400; 2.4360
- ≡ Hastelloy® / alloy c-4; 2.4610
- ≡ Inconel® / alloy 825; 2.4858
- ≡ 1.4539 / alloy 904L highly corrosion resistant

**Water bath evaporator  
for argon**

Installation on site,  
capacity 3,000 Nm<sup>3</sup>/h







# HEATED BY HOT WATER

## Heat exchangers

For over 30 years we have been manufacturing water bath evaporators for cryogenic, liquefied gases such as:

Ar / N<sub>2</sub> / O<sub>2</sub> / H<sub>2</sub> / He and CO<sub>2</sub>

The pressure equipment is designed and constructed according to customer requirements. Depending on the heat source, it is possible to use cooling water, process water or waste water.

In addition to closed units, there is also the option of placing the evaporation coils directly in an open water basin, e.g. in a cooling basin or septic tank.

Under certain circumstances, enormous energy savings can be achieved in the manufacturing process with the aid of a water bath evaporator if process water is available which is cooled via cooling systems. The CO<sub>2</sub> balance can be improved sustainably in your company. When using air evaporators with a large capacity, problems often occur due to heavy fog formation on the premises or the nearby surroundings. Using a water bath evaporator can solve this problem.



**The following options can be added to the water bath evaporator design:**

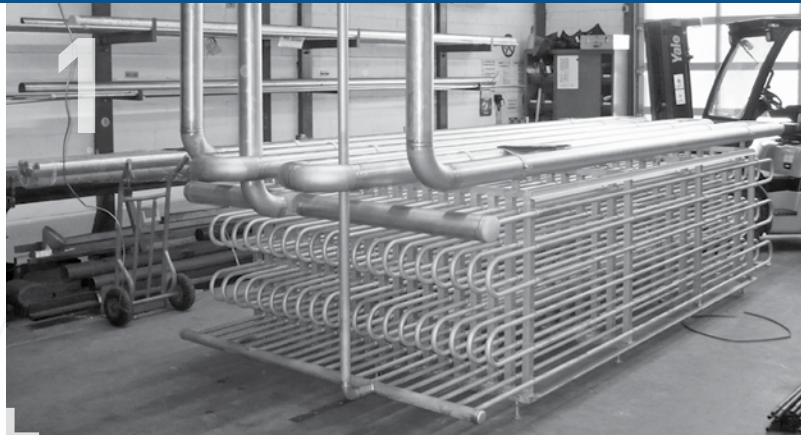
- ≡ Pressure build-up evaporator
- ≡ Shut-off line for pressure and temperature monitoring
- ≡ Automatic switching between air and water bath evaporator
- ≡ Control cabinet (also in EX version)
- ≡ Thermal insulation with mineral wool and aluminium or VA sheet metal jacket
- ≡ Circulating pumps
- ≡ Compact version in modular design
- ≡ Frost protection

**1 O<sub>2</sub> evaporator**

Open version for cooling basins,  
capacity 10,000 Nm<sup>3</sup>/h

**2 N<sub>2</sub>/Ar/O<sub>2</sub> water bath evaporator**

Enclosed version, capacity 3,000 Nm<sup>3</sup>/h





# HEATED BY STEAM

## Heat exchangers

Whether for the running process or as a back-up. Steam-heated heat exchangers provide the option of large-scale evaporation capacity.

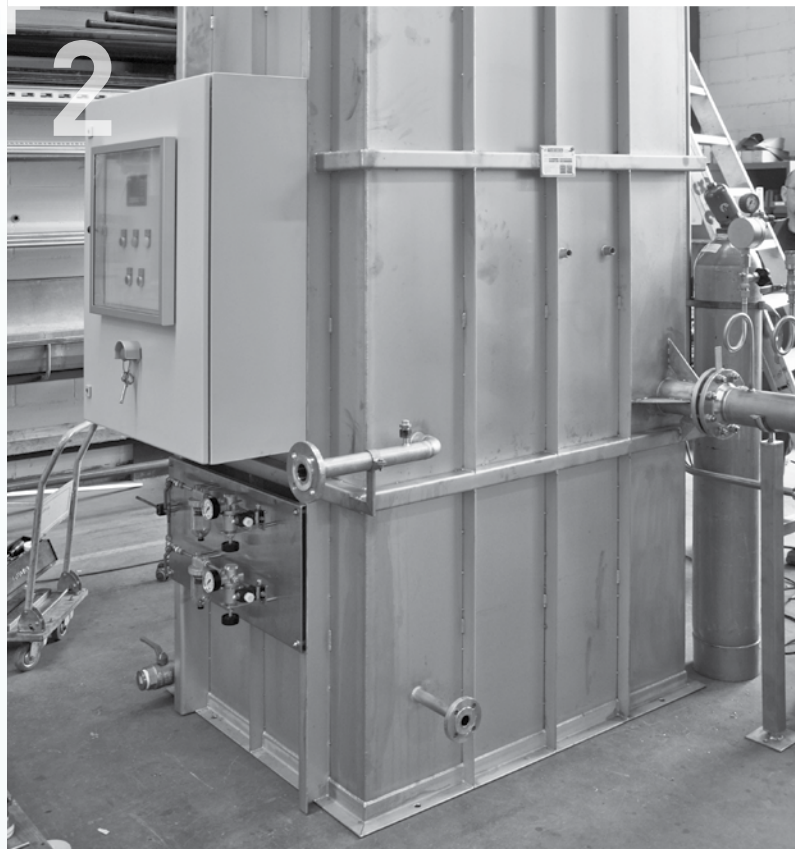
Our engineers will design the heat exchangers bespoke to your application.

The maximum capacity is approx. 12,000 Nm<sup>3</sup>/h per heat exchanger.  
The steam can be fed directly into the water basin via a condensate coil or heats the water via a secondary circuit by using plate heat exchangers.



**As accessories we can offer you:**

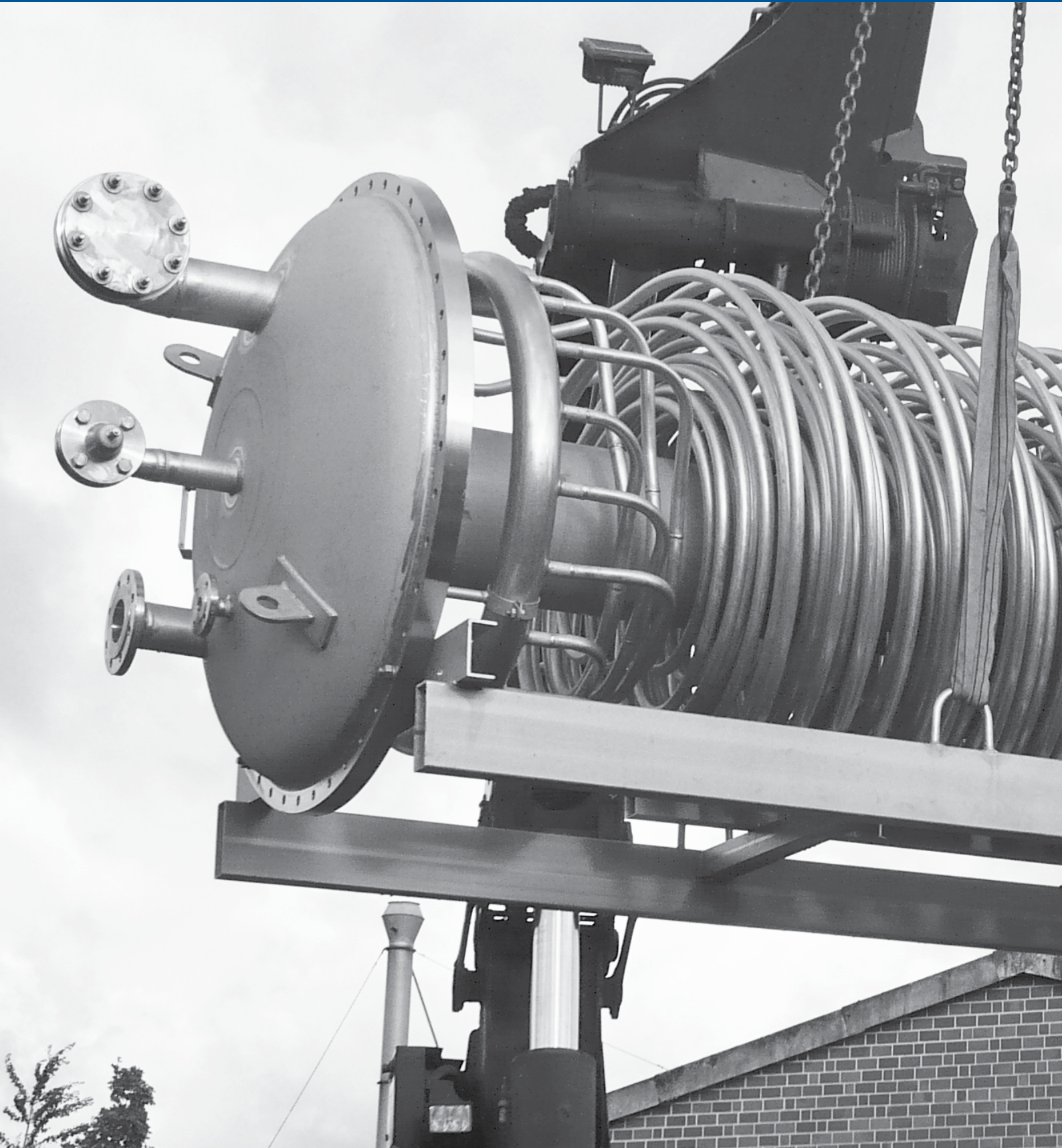
- ≡ Electrical control
- ≡ Thermal insulation with mineral wool and aluminium or VA sheet metal jacket
- ≡ Steam control
- ≡ Pressure control lines and instrument panels
- ≡ Version as compact skid
- ≡ Heating via secondary circuit by means of plate heat exchanger
- ≡ Integrated pressure build-up for supply tank



- 1 NH3 evaporator**  
Steam heating via secondary circuit, capacity 100 kg/h
- 2 O2 backup evaporator**  
Steam direct feed, capacity 3,000 Nm<sup>3</sup>/h

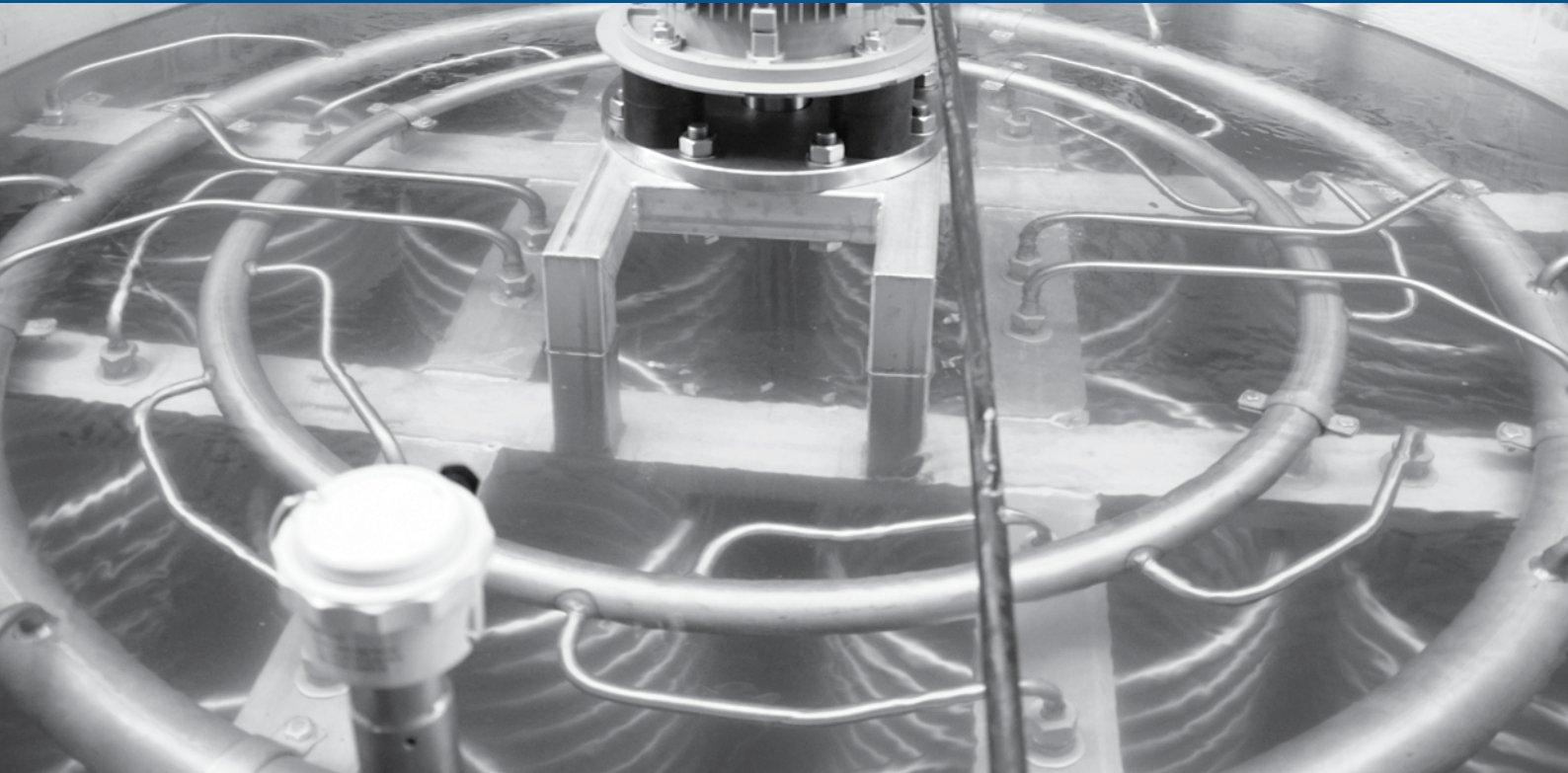


Evaporator coil of a water bath evaporator 02,  
capacity 10,000 Nm<sup>3</sup>/h, material 1.4539









# HEATED ELECTRICALLY

## Heat exchangers









Electrically heated heat exchangers are used in a wide range of processes. Size, capacity and design can vary greatly depending on the application.

Our engineers will design the heat exchangers bespoke to your application.

- ≡ Heating of gases for filling compressed gas cylinders
- ≡ Heating of gases for temperature protection
- ≡ Heating before pressure reduction (e.g. CO<sub>2</sub>, ethene, CH<sub>4</sub>)



**As accessories we can offer you:**

-  Control cabinets
-  Thermal insulation with mineral wool and aluminium or VA sheet metal jacket
-  Circulating pump
-  Open or closed version
-  Pressure control lines and instrument panels
-  Version as compact skid
-  Agitator for open containers
-  Ex version for gases such as NH<sub>3</sub>, H<sub>2</sub> or methane

1

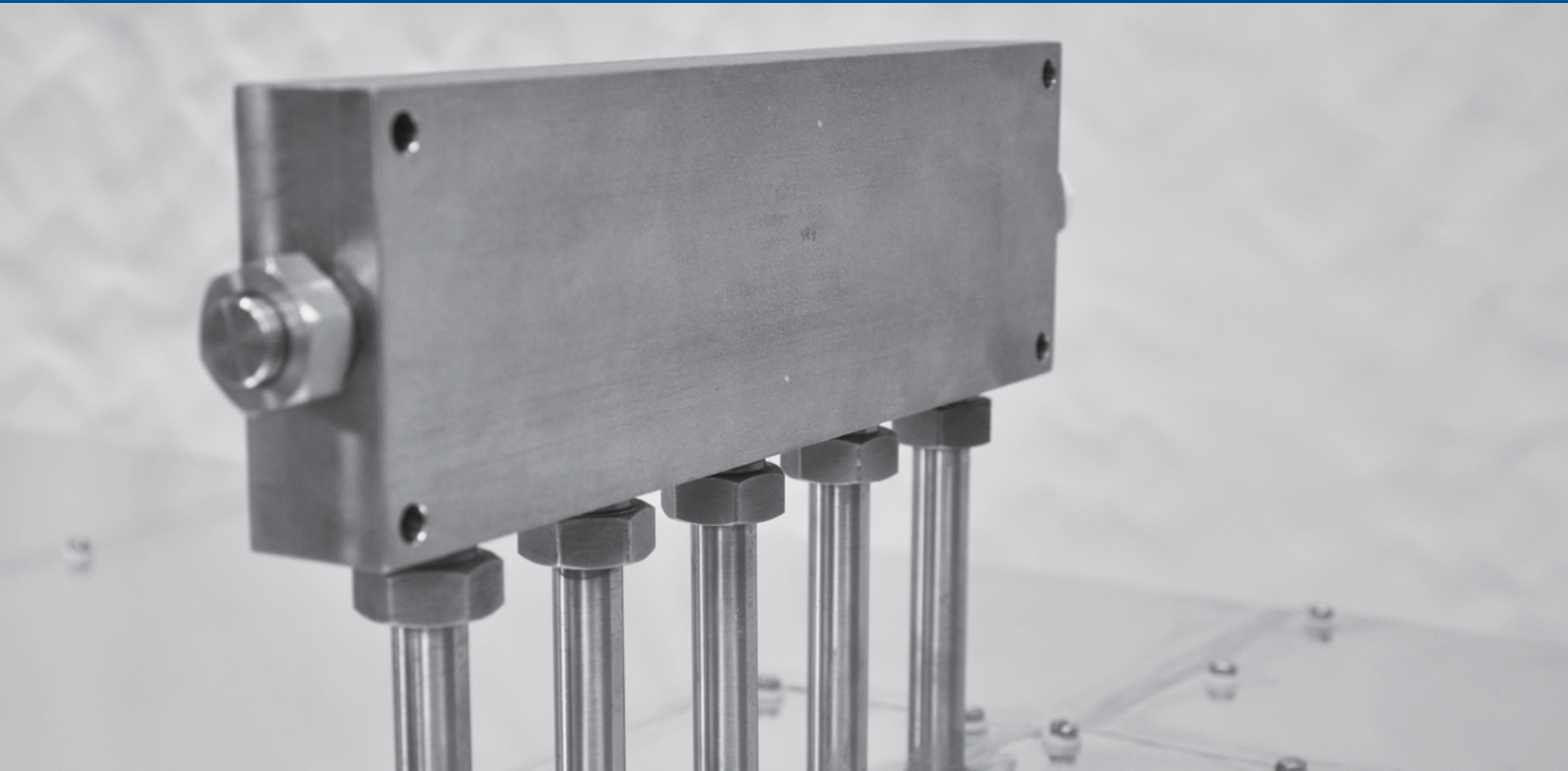


2



**1 Closed preheater for mixed gas filling**  
CO<sub>2</sub> 500 kg/h

**2 Open evaporator for spot applications**  
CO<sub>2</sub> up to 6,000 kg/h



# H2 HIGH-PRESSURE COOLERS

## Heat exchangers

When refuelling fuel cell vehicles with gaseous hydrogen, the hydrogen needs to be cooled down during the filling process in line with SAE specifications.

We manufacture high-pressure coolers for this application with an operating pressure of up to 1400 bar.

Cooling takes place via a secondary circuit with a heat transfer fluid or directly with a refrigerant.



### Special features:

- ≡ Mass flow optionally 60g/s (216kg/h) or 120g/s
- ≡ Maximum transmission power of 72kW or 144kW
- ≡ Version with integrated change-over device (parallel or series connection) possible
- ≡ Crane lugs and forklift tabs for transport
- ≡ Thermal insulation with mineral wool and aluminium or VA sheet metal jacket
- ≡ High flexibility for the use of different refrigerants
- ≡ Excellent storage effect of the system enables the use of small and constantly running refrigeration plants

- 1 High-pressure cooler max. 144 kW**  
with change-over device for parallel or series connection
- 2 Double-pipe counterflow cooler**  
Capacity can be customised





# COMPACT STATIONS

## Heat exchangers

Our heat exchangers can be designed as a compact skid with regulation and control fittings on request. This offers you the possibility to install a compact system in a very small space.

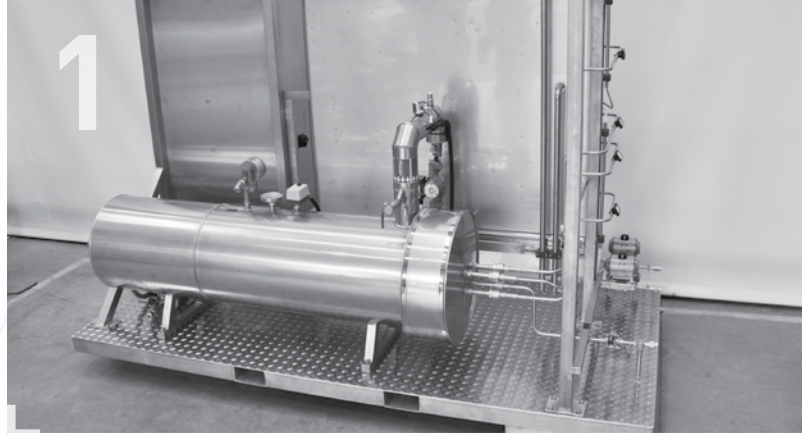
Prefabricated and tested in our workshop – assembly time on site can be reduced to the bare minimum.



**The scope may include the following components:**

- ≡ Control and measuring instruments
- ≡ Electrical control
- ≡ Valve groups
- ≡ Circulating pump section to increase the heat transfer
- ≡ Water heating via secondary circuit
- ≡ Evaporator switchover for switching between air evaporators and water bath evaporators
- ≡ Pressure control line
- ≡ Pressure and temperature monitoring

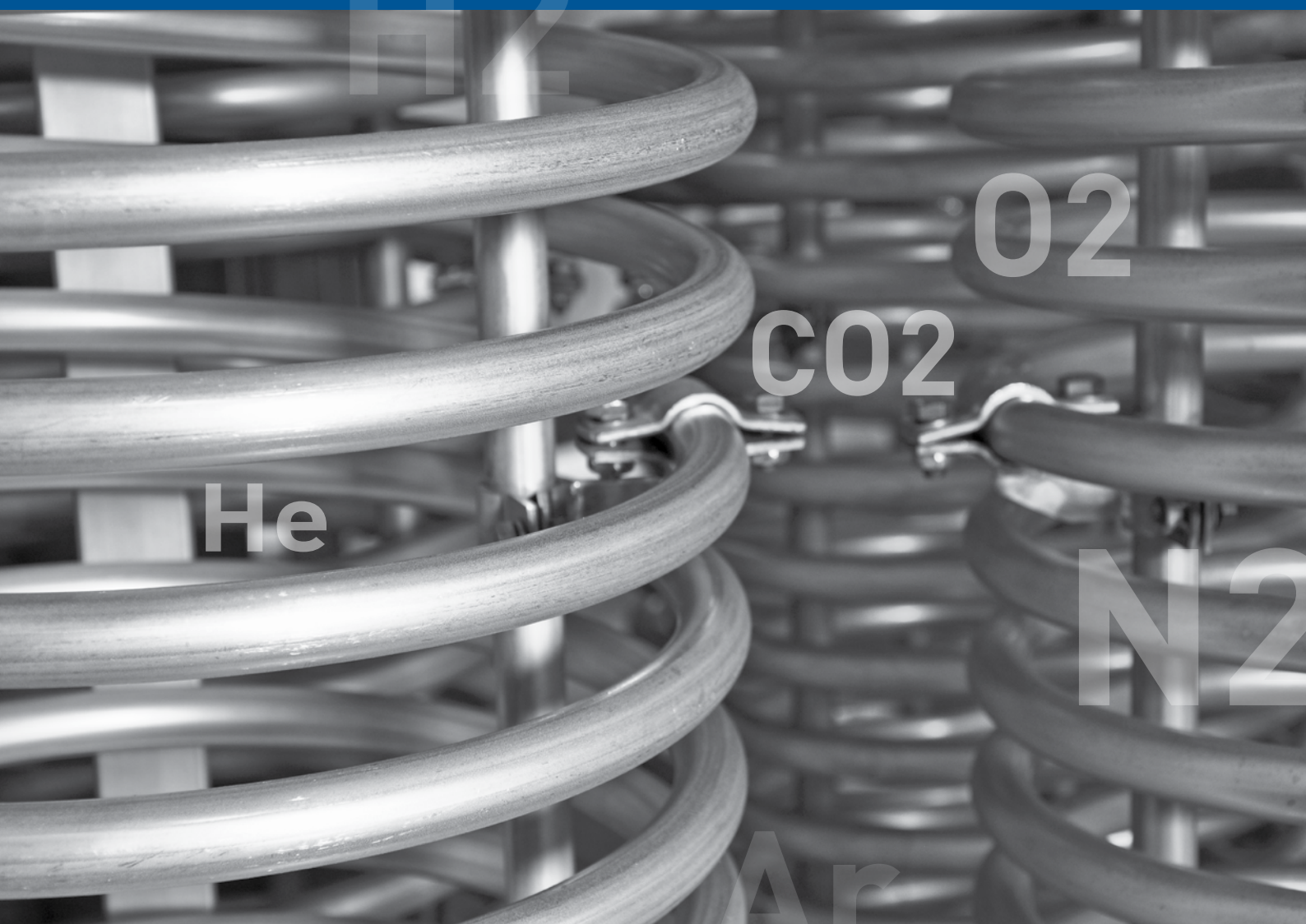
- 1 Evaporation skid for CO<sub>2</sub> 6.0**  
Capacity 50 kg/h incl. regulation and control
- 2 Evaporation skid for O<sub>2</sub>**  
Capacity 5,600 Nm<sup>3</sup>/h incl. evaporator switch-over and control





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