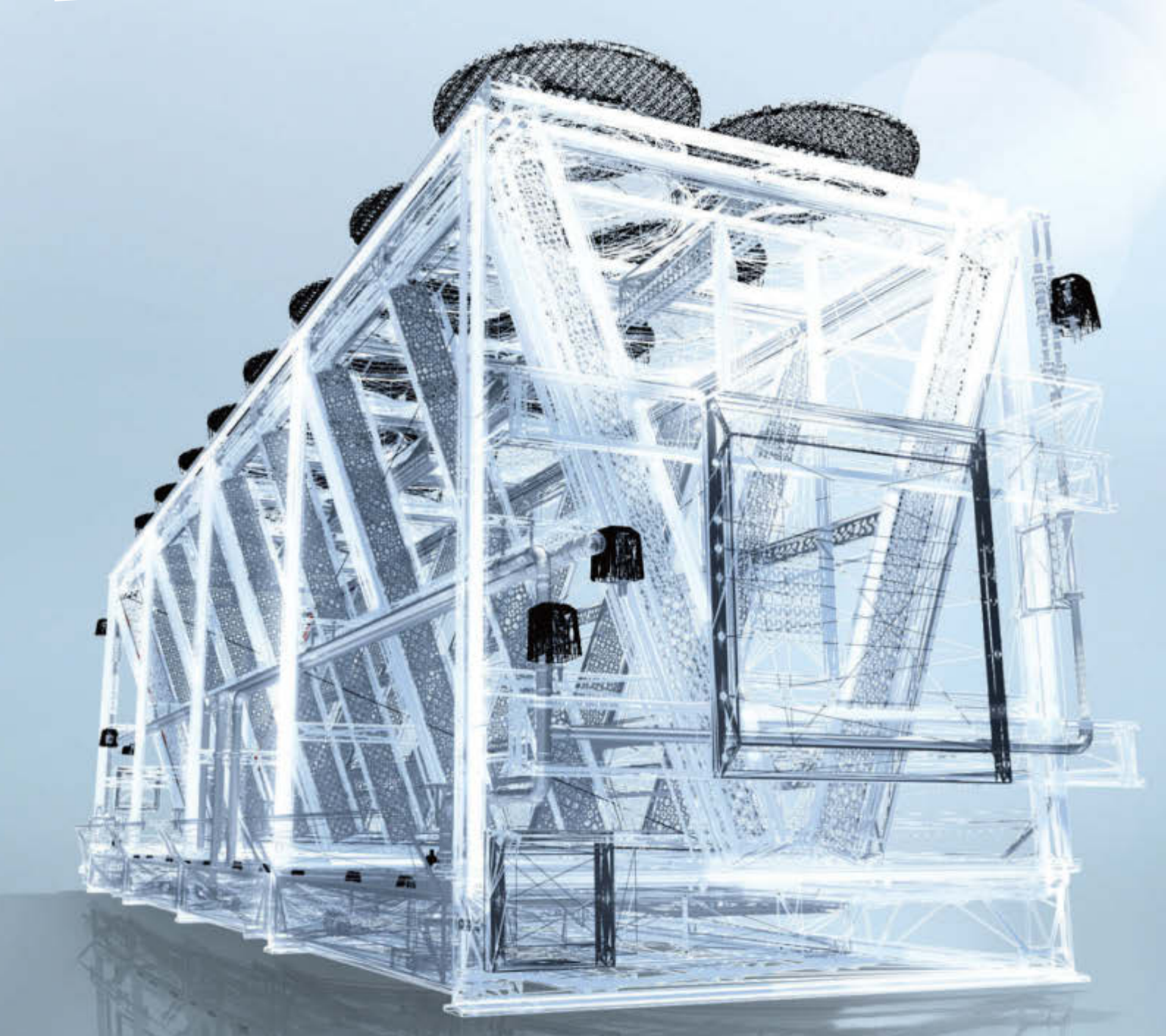
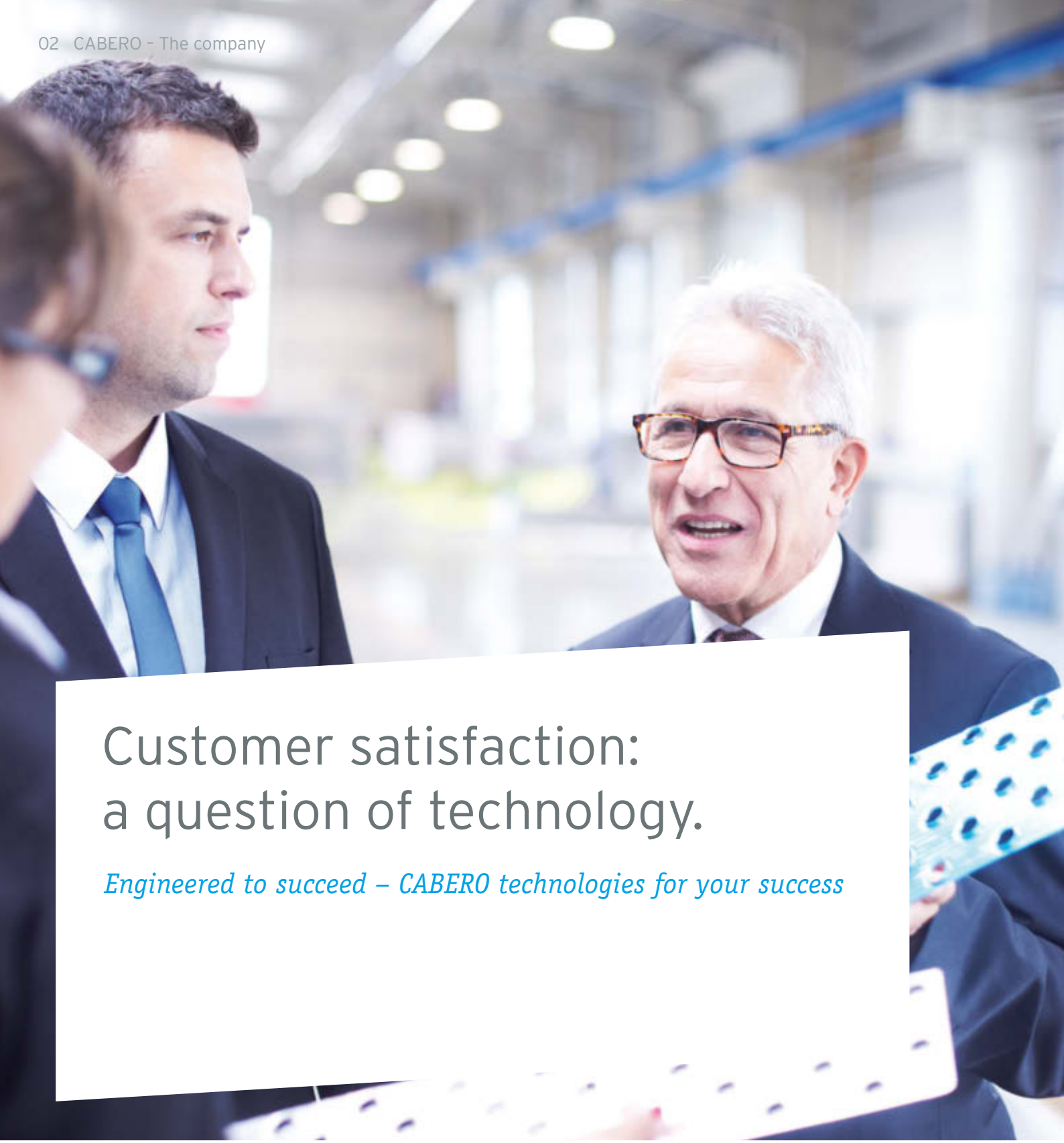
Commercial heat
Industrial heat

CABERO condensers and heat exchangers

Interclima
airconditioning & klimaatbeheersing

CABERO
engineered to succeed°





Customer satisfaction: a question of technology.

Engineered to succeed – CABERO technologies for your success

Your requirements are our mission CABERO is one of the leading manufacturers of heat exchangers for cooling and air-conditioning technology. As an independent supplier of innovative solutions, we have been making a name for ourselves worldwide since 1980 with well designed products and dynamic processes. Our focus is always on the objectives of our customers: Our experienced engineers do not just follow short-lived trends but have the declared objective of providing perfect support for your projects with state-of-the-art technology – flexible, solution-oriented and forward-looking.

Know-how in every CABERO product Whether cooling technology, air-conditioning technology, power plant cooling or industrial cooling: We cooperate closely with operators, planners and cooling system engineers. Our sales advisers use specially developed software to define the best possible complete or individual solutions, of course including a range of accessories and calculation of the operating costs for each version of the required system. From the outset we ensure that all employees have a healthy and productive work environment with regard to hygiene, noise and air movement.

CABERO COOLING

CABERO AIR-CONDITIONING

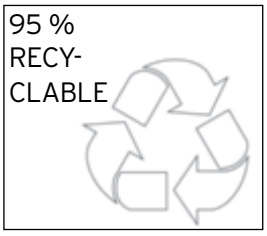
CABERO POWER PLANT COOLING

CABERO INDUSTRIAL COOLING

Service and sales near you Our well-coordinated team designs, plans and specialise in the implementation of customised solutions from the CABERO headquarters in Grafrath near Munich. Furthermore, we have established state-of-the-art production facilities and warehouses in Germany, Hungary and China. Choose CABERO to obtain unlimited service: We are at your service with sales offices at 17 national and international locations. This enables us to respond immediately if required.

Production takes place in three state-of-the-art workshops at our new factory in Kaposvár, Hungary.

Environmentally friendly production We ensure the best possible use of resources an an environmentally friendly disposal process of harmful substances along the entire manufacturing process. 95 % of all parts processed at our plants are recyclable and free from harmful substances – and all CABERO locations are certified to EN ISO 9001 and to VDI 6022 with regard to ventilation and air-conditioning technology and indoor air quality. The new VDI 2047 is observed for the control of adiabatic systems and hybrids, while the hygiene certification according to HACCP is in preparation.



Tailored efficiency: the technical details.

Comprehensive quality – adapted to your on site requirements

Flexibility instead of standard solutions CABERO has been supplying line builders and planners all over the world with customised performance for different products and market segments for 35 years. Flexibility is everything – for each product poses its very own challenges. Our systems accurately meet the general requirements for temperature, operational safety, reliability, noise and hygiene but also with regard to ambient details such as humidity and air flow.

Features of all CABERO systems:

Housings

Made of galvanised and power-coated sheet metal in RAL 9010. The powder coating is applied before assembly, ensuring that all cut edges are treated. The sheet metal processing is subject to strict quality control regarding accurate fit and workmanship. Virtually all other RAL colours are available as special orders.

Air vents and fans

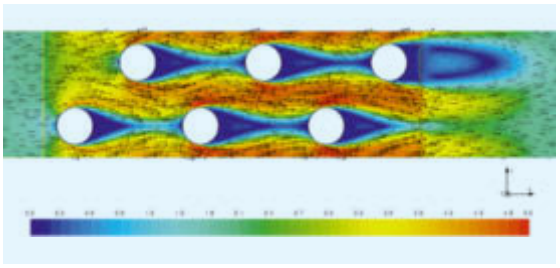
More than 100 different fans, with low-noise, air-flow optimised fans in EC or AC versions, optionally with air rectifier. As a standard, we install products from the suppliers Ziehl Abegg or ebm Papst. The specially designed products allow optimum efficiency levels: After sound power, air volume and electrical data, the efficiency is measured on specially designed test benches following DIN requirements.

Fins

Made of copper, pure aluminium or special aluminium alloys (e.g. AlMg2.5 or AlMg3) which have a higher resistance to aggressive environmental influences. We use smooth fins which can guarantee a lower contamination factor than so-called turbo fins due to their surface texture.

Copper or stainless steel tubes

Thickness and purity of the material guarantee density and durability even under thermal expansion.



The CABERO engineers use thermodynamic simulations to determine the ideal circulation speed to prevent flow separation drops and escaping moisture.

Connecting elements

Rivets, screws, nuts, washers etc. are made of stainless steel or other corrosion-resistant materials.

High level of safety, reliability and long service life

A special design prevents friction between tube and fin.

CABERO heat: our products at a glance.

Always the right performance – condensers, heat exchangers and hybrid systems

Our products:

08 **Table coolers**
Commercial range
***ACS** CONDENSER*
***ACS** GAS COOLER*
***GCS** HEAT EXCHANGER*

10 **Table coolers**
Industrial range
***ACH** CONDENSER*
***ACH** GAS COOLER*
***GCH** HEAT EXCHANGER*

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Commercial range
***ACW** CONDENSER*
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Industrial range
***ACD** CONDENSER*
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Industrial evaporative cooler
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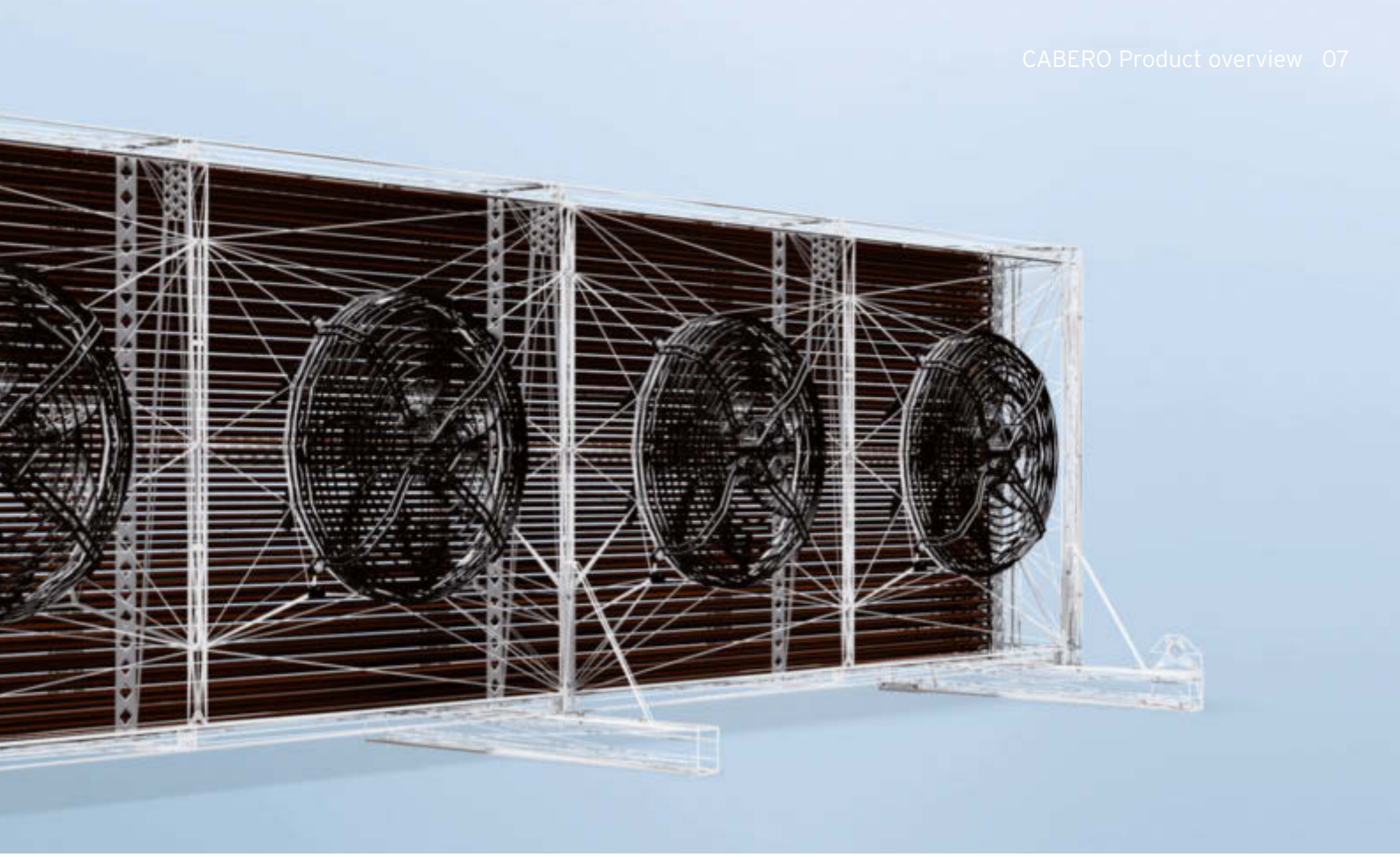
22 **LNG (liquid natural gas)**
Industrial range
***ACH- LNG** CONDENSER*



Our accessories:

24 Adiabatics

CABERO condensers and heat exchangers

26 Self-draining heat exchanger

Industrial range

***SD-GCH** HEAT EXCHANGER*

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CABERO control technology

Our references:

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Table cooler

Commercial range

ACS

ACS CONDENSER

ACS GAS COOLER

GCS

GCS HEAT EXCHANGER

Description:

The table design (horizontal and vertical air flow) is intended for use in commercial cooling and air-conditioning technology. In addition to the use of renowned quality fans and the selection of best possible materials, the top-quality, sturdy design is a unique feature. The heat exchanger technology provides the user with a high level of safety and reliability as well as a long service life for the product.

In practical application, this product range maximises and combines important ergonomic and economic aspects. Compared to conventional products from competitors, it provides buyers with clear benefits with regard to purchase price and operating costs.

Details:

Pipe spacing offset 2522 and 4035

Design:

- housing made of FeZn powder-coated RAL 9010, cut edges painted
- collector and tube bend cover (protection against contact)
- STES (Safety Tube Expanding System) floating tube system (tube has no contact with plates), therefore no possibility of leaks during transport and operation
- maintenance-free axial fans with diameter 500-630 mm – ErP 2015 compliant (for Europe)
- normal to extremely quiet sound pressure levels
- single-row and double-row fan positioning
- separate fan intake chamber
- smooth fin surface (less contamination, best possible cleaning)
- ribbed inside/smooth tubes
- all fixing materials made of stainless steel or corrosion-resistant materials
- sturdy design, virtually no torsion and no bending (high operational safety and long service life)
- manufactured according to PED and ISO guidelines
- container-optimised ranges and stackable (up to 3 condensers stacked)
- crane lugs

Accessories:

+ subdivision of circulation
+ housing materials V2A and AlMg3
+ flanged or threaded connectors
+ vibration dampers
+ adiabatics (see page 24/25)
+ custom colour
+ streamer or ANAC (range increase)
+ EC and monophase fans
+ integrated collector system (tube connection)
+ extensive options for wiring and control (see page 28/29)
+ lateral inspection openings
+ folding nozzles
+ extended feet up to 2000 mm clear height
+ ZA PLUS (fan design optimised for noise and air volume)
+ split fins in special environments
+ special fin spacings 1.8 - 4.2 mm
+ different fin materials and thicknesses
+ suitable for transport with only a fork-lift truck
+ transport pressure with dried air can be tested via Schrader valve

Application: CABERO cooling / CABERO air-conditioning

	Condenser					Heat exchanger	
Design	ACS R	ACS CO_2	ACSS CO_2	ACSSA	ACSS	GCS	GCSS
Medium	HFC/propane	CO_2	CO_2	NH_3	HFC	brine, oil, glycol, etc.	
Tube material	Cu	Cu	SST	SST	SST	Cu	SST
Fin	aluminium, epoxy, AlMg3, stainless steel (on request), Cu						
Fin spacing	2.0 - 2.2 mm						
Air direction	vertical and horizontal						
Geometry	high-efficiency offset pipe spacing						
Length	850 - 7200 mm						
Power range	10 kW - 150 kW						
Gas cooler		✓	✓				
Heat pump	✓	✓	✓	✓	✓	✓	✓
Adiabatics	✓	✓	✓	✓	✓	✓	✓

Table cooler

Industrial range

ACH

ACH CONDENSER

ACH GAS COOLER

GCH

GCH HEAT EXCHANGER

Description:

The table design (horizontal and vertical air flow) is intended for use in industrial cooling and air-conditioning technology and in power plant cooling. In addition to the use of renowned quality fans and the selection of best possible materials, the top-quality, sturdy design is a unique feature. The heat exchanger technology provides the user with a high level of operational safety and a long service life for the product.

In practical application, this product range maximises and combines important ergonomic and economic aspects. Compared to conventional products from competitors, it provides buyers with clear benefits with regard to purchase price and operating costs.

Details:

Pipe spacing offset 5527 and 4035

Design:

- housing made of FeZn
- powder-coated in RAL 9010, cut edges painted
- collector and tube bend cover (protection against contact)
- R-profile (heat exchanger from 4200 mm finned length) can easily be separated from the fan housing
- STES (Safety Tube Expanding System) floating tube system (tube has no contact with plates), therefore no possibility of leaks during transport and operation
- maintenance-free axial fans with diameter 800-1000 mm – ErP 2015 compliant (for Europe)
- normal to extremely quiet sound pressure levels
- single-row and double-row fan positioning
- separate fan intake chamber
- smooth fin surface (less contamination, best possible cleaning)
- ribbed inside/smooth tubes
- flanged or threaded connectors
- all fixing materials made of stainless steel or corrosion-resistant materials
- sturdy design, virtually no torsion and no bending (high level of safety and reliability and therefore long service life)
- container-optimised ranges
- crane lugs can be removed and repositioned
- manufactured according to PED and ISO guidelines

Accessories:

+ fall protection
+ housing materials V2A and AlMg3
+ subdivision of circulation
+ vibration dampers
+ adiabatics (see page 24/25)
+ custom colour
+ streamer or ANAC (range increase)
+ EC fans
+ integrated collector system (tube connection)
+ extensive options for wiring and control (see page 28/29)
+ lateral inspection openings
+ folding nozzles
+ extended feet up to 2000 mm clear height (omitting the need for additional steel constructions and additional approval)
+ ZA PLUS (fan design optimised for noise and air volume)
+ split fins in special environments
+ special fin spacings 1.8 - 4.2 mm
+ different fin materials and thicknesses
+ transport pressure with dried air can be tested via Schrader valve

Application: CABERO cooling / CABERO air-conditioning

	Condenser					Heat exchanger	
Design	ACH	ACH CO_2	ACHSS CO_2	ACHSA	ACHSS	GCH	GCHSS
Medium	HFC/propane	CO_2	CO_2	NH_3	HFC	brine, oil, glycol, etc.	
Tube material	Cu	Cu	SST	SST	SST	Cu	SST
Fin	aluminium, epoxy, AlMg3, stainless steel (on request), Cu						
Fin spacing	2.0 - 2.5 mm						
Air direction	vertical and horizontal						
Geometry	high-efficiency offset pipe spacing						
Length	1200 - 13600 mm						
Power range	20 kW - 1800 kW						
Gas cooler		✓	✓				
Heat pump	✓	✓	✓	✓	✓	✓	✓
Adiabatics	✓	✓	✓	✓	✓	✓	✓

V-shape

Commercial range

ACW

ACW CONDENSER

ACW GAS COOLER

GCW

GCW HEAT EXCHANGER

Description:

The small, V-shape design (vertical air flow) was designed for use commercial cooling and air-conditioning, process cooling, power plant systems, etc., particularly for small footprints. In addition to the use of renowned quality fans and the selection of best possible materials, the top-quality, sturdy design is a unique feature. The heat exchanger technology provides the user with a high level of safety and reliability as well as a long service life for the product.

This product range maximises and combines the ergonomic and economic aspects which are so important in practical application, providing buyers with a high level of competitiveness compared to conventional products with regard to purchase, price and operating costs.

Details:

Pipe spacing offset 5527 and 4035

Design:

- housing made of FeZn
- powder-coated RAL 9010, cut edges painted
- tube bend cover (protection against contact)
- optimised, top-mounted fan housing for improved fan efficiency
- STES (Safety Tube Expanding System) floating tube system (tube has no contact with plates), therefore no possibility of leaks during transport and operation
- maintenance-free axial fans with diameter 800-1000 mm – ErP 2015 compliant (for Europe)
- normal to extremely quiet sound pressure levels
- single-row and double-row fan positioning
- fan intake chamber separated in pairs
- smooth fin surface (less contamination, best possible cleaning)
- ribbed inside/smooth tubes
- flanged or threaded connectors
- all fixing materials made of stainless steel or corrosion-resistant materials
- sturdy design through R-profile longitudinal stabilisers and internal reinforcing units, virtually no torsion and no bending (high operational safety and therefore long service life)
- container-optimised ranges
- crane lugs can be removed and repositioned
- manufactured according to PED and ISO guidelines

Accessories:

+ fall protection
+ housing materials V2A and AlMg3
+ subdivision of circulation
+ vibration dampers
+ adiabatics (see page 24/25)
+ custom colour
+ streamer or ANAC (range increase)
+ EC fans
+ integrated collector system (tube connection)
+ extensive options for wiring and control (see page 28/29)
+ lateral inspection openings
+ folding nozzles
+ ZA PLUS (fan design optimised for noise and air volume)
+ split fins in special environments
+ special fin spacings 1.8 - 4.2 mm
+ different fin materials and thicknesses
+ separate intake chamber for each fan
+ transport pressure with dried air can be tested via Schrader valve

Application: CABERO cooling / CABERO air-conditioning

	Condenser					Heat exchanger	
Design	ACW	ACWSS CO_2	ACW CO_2	ACWSA	ACWSS	GCW	GCWSS
Medium	HFC/propane	CO_2	CO_2	NH_3	HFC	brine, oil, glycol, etc.	
Tube material	Cu	SST	Cu	SST	SST	Cu	SST
Fin	aluminium, epoxy, AlMg3, stainless steel (on request), Cu						
Fin spacing	2.0 - 2.5 mm						
Air direction	vertical						
Geometry	high-efficiency offset pipe spacing						
Length	2400 - 13600 mm						
Power range	40 kW - 1100 kW						
Gas cooler		✓	✓				
Heat pump	✓	✓	✓	✓	✓	✓	✓

V-shape

Industrial range

ACD

ACD CONDENSER

ACD GAS COOLER

GCD

GCD HEAT EXCHANGER

Description:

The V-shape design (vertical air flow) was designed for use industrial cooling and air-conditioning, industrial refrigeration and power plant cooling – particularly for small footprints. In addition to the use of renowned quality fans and the selection of best possible materials, the top-quality, sturdy design is a unique feature. The heat exchanger technology provides the user with a high level of safety and reliability as well as a long service life for the product.

In practical application, this product range maximises and combines important ergonomic and economic aspects. Compared to conventional products from competitors, it provides buyers with clear benefits with regard to purchase price and operating costs.

Details:

Pipe spacing offset 5527 and 4035

Design:

- housing made of FeZn
- powder-coated in RAL 9010, cut edges painted
- tube bend cover (protection against contact)
- optimised, top-mounted fan housing for improved fan efficiency
- STES (Safety Tube Expanding System) floating tube system (tube has no contact with plates), therefore no possibility of leaks during transport and operation
- maintenance-free axial fans with diameter 800-1000 mm – ErP 2015 compliant (for Europe)
- normal to extremely quiet sound pressure levels
- single-row and double-row fan positioning
- fan intake chamber separated in pairs
- smooth fin surface (less contamination, best possible cleaning)
- ribbed inside/smooth tubes
- flanged or threaded connectors
- all fixing materials made of stainless steel or corrosion-resistant materials
- sturdy design through R-profile longitudinal stabilisers and internal reinforcing units, virtually no torsion and no bending (high operational safety and therefore long service life)
- container-optimised ranges
- crane lugs can be removed and repositioned
- manufactured according to PED and ISO guidelines

Accessories:

+ fall protection
+ housing materials V2A and AlMg3
+ subdivision of circulation
+ vibration dampers
+ adiabatics (see page 24/25)
+ custom colour
+ streamer or ANAC (range increase)
+ EC fans
+ integrated collector system (tube connection)
+ extensive options for wiring and control (see page 28/29)
+ lateral inspection openings
+ folding nozzles
+ ZA PLUS (fan design optimised for noise and air volume)
+ split fins in special environments
+ special fin spacings 1.8 - 4.2 mm
+ different fin materials and thicknesses
+ separate intake chamber for each fan
+ transport pressure with dried air can be tested via Schrader valve

Application: CABERO cooling / CABERO air-conditioning

	Condenser					Heat exchanger	
Design	ACD	ACDSS CO_2	ACD CO_2	ACDSA	ACDSS	GCD	GCDSS
Medium	HFC/propane	CO_2	CO_2	NH_3	HFC	brine, oil, glycol, etc.	
Tube material	Cu	Cu	Cu	SST	SST	Cu	SST
Fin	aluminium, epoxy, AlMg3, stainless steel (on request), Cu						
Fin spacing	2.0 - 2.5 mm						
Air direction	vertical						
Geometry	high-efficiency offset pipe spacing						
Length	2400 - 13600 mm						
Power range	150 kW - 1800 kW						
Gas cooler		✓	✓				
Heat pump	✓	✓	✓	✓	✓	✓	✓
Adiabatics	✓	✓	✓	✓	✓	✓	✓

Jumbo V-shape

Industrial range

JACD

JACD CONDENSER

JACD GAS COOLER

JGCD

JGCD HEAT EXCHANGER

Description:

The Jumbo V-shape design (vertical air flow) is intended for use industrial cooling and air-conditioning, industrial refrigeration and power plant cooling – particularly for small footprints. In addition to the use of renowned quality fans and the selection of best possible materials, the top-quality, sturdy design is a unique feature. The heat exchanger technology provides the user with a high level of safety and reliability as well as a long service life for the product.

In practical application, this product range maximises and combines important ergonomic and economic aspects. Compared to conventional products from competitors, it provides buyers with clear benefits with regard to purchase price and operating costs.

Details:

Pipe spacing offset 5527 and 4035

Design:

- housing made of FeZn
- powder-coated in RAL 9010, cut edges painted
- tube bend cover (protection against contact)
- optimised, top-mounted fan housing for improved fan efficiency
- STES (Safety Tube Expanding System) floating tube system (tube has no contact with plates), therefore no possibility of leaks during transport and operation
- maintenance-free axial fans with diameter 800-1000 mm – ErP 2015 compliant (for Europe)
- normal to extremely quiet sound pressure levels
- single-row and double-row fan positioning
- fan intake chamber separated in pairs
- smooth fin surface (less contamination, best possible cleaning)
- ribbed inside/smooth tubes
- flanged or threaded connectors
- all fixing materials made of stainless steel or corrosion-resistant materials
- sturdy design through R-profile longitudinal stabilisers and internal reinforcing units, virtually no torsion and no bending (high operational safety and therefore long service life)
- container-optimised ranges
- crane lugs can be removed and repositioned
- manufactured according to PED and ISO guidelines

Accessories:

+ fall protection
+ housing materials V2A and AlMg3
+ subdivision of circulation
+ vibration dampers
+ adiabatics (see page 24/25)
+ custom colour
+ streamer or ANAC (range increase)
+ EC fans
+ integrated collector system (tube connection)
+ extensive options for wiring and control (see page 28/29)
+ lateral inspection openings
+ folding nozzles
+ ZA PLUS (fan design optimised for noise and air volume)
+ split fins in special environments
+ special fin spacings 1.8 - 4.2 mm
+ different fin materials and thicknesses
+ separate intake chamber for each fan
+ transport pressure with dried air can be tested via Schrader valve

Application: CABERO cooling / CABERO air-conditioning

	Condenser					Heat exchanger	
Design	JACD	JACDSS CO_2	JACD CO_2	JACDSA	JACDSS	JGCD	JGCDSS
Medium	HFC/propane	CO_2	CO_2	NH_3	HFC	brine, oil, glycol, etc.	
Tube material	Cu	Cu	Cu	SST	SST	Cu	SST
Fin	aluminium, epoxy, AlMg3, stainless steel (on request), Cu						
Fin spacing	2.0 - 2.5 mm						
Air direction	vertical						
Geometry	high-efficiency offset pipe spacing						
Length	2400 - 13600 mm						
Power range	200 kW - 2400 kW						
Gas cooler		✓	✓				
Heat pump	✓	✓	✓	✓	✓	✓	✓
Adiabatics	✓	✓	✓	✓	✓	✓	✓

Hybrid

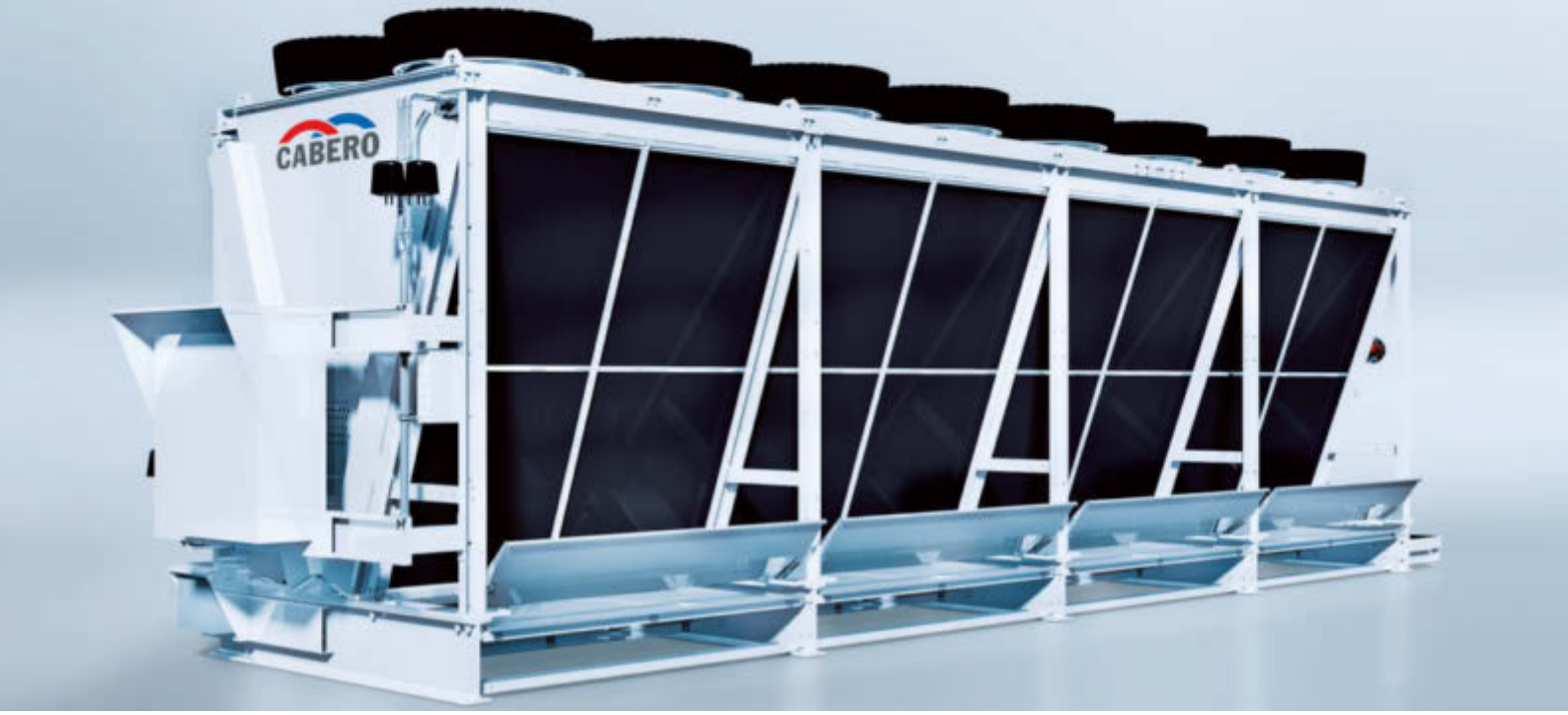
Industrial evaporative cooler

HCCD

HCCD CONDENSER

HGCD

HGCD HEAT EXCHANGER



Description:

The hybrid design (vertical air flow) was designed for use industrial cooling and air-conditioning, industrial refrigeration and power plant cooling – particularly for very small footprints and high cooling performance. In addition to the use of renowned quality fans and the selection of best possible materials, the top-quality, sturdy design is a unique feature. The heat exchanger technology provides the user with a high level of safety and reliability as well as a long service life for the product.

In practical application, this product range maximises and combines important ergonomic and economic aspects. Compared to conventional products from competitors, it provides buyers with clear benefits with regard to purchase price and operating costs.

Details:

offset pipe spacing 5527

Design:

- housing made of FeZn
- powder-coated RAL 9010, cut edges painted
- tube bend cover (protection against contact)
- optimised, top-mounted fan housing (removable) for improved fan efficiency
- adjustable irrigation system above the heat exchanger depending on air flow
- two irrigation lances per heat exchanger
- fog-free operation
- speed-controlled irrigation pump
- STES (Safety Tube Expanding System) floating tube system (tube has no contact with plates), therefore no possibility of leaks during transport and operation
- maintenance-free axial fans with diameter 800-1000 mm – ErP 2015 compliant (for Europe)
- normal to extremely quiet sound pressure levels
- single-row and double-row fan positioning
- walk-in fan chamber with non-slip and non-oxidising walk-on grate, lockable door and safety limit switch for fans
- smooth fin surface (less contamination, best possible cleaning)
- ribbed inside/smooth tubes
- flanged or threaded connectors
- parts with water contact (except heat exchanger) such as trays, slides, connecting tubes, all water tubes, water lips, etc. made of stainless steel
- inclined water tray
- CABERO Coil Protect System
- all fixing materials made of stainless steel or corrosion-resistant materials
- Sturdy design through galvanised structural steel profiles (powder-coated afterwards in machine colour) including longitudinal stabilisers and internal reinforcing units, virtually no torsion and no bending (high safety and reliability and therefore long service life)
- crane lugs can be removed and repositioned
- manufactured according to PED and ISO guidelines

Accessories:

+ fall protection
+ housing materials V2A and AlMg3
+ subdivision of circulation
+ vibration dampers
+ adiabatics (see page 24/25)
+ special colour
+ streamer or ANAC (range increase)
+ larger fan diameter
+ EC fans
+ integrated collector system (tube connection)
+ extensive options for wiring and control (see page 28/29)
+ ZA PLUS (fan design optimised for noise and air volume)
+ special fin spacings 2.9 - 4.2 mm
+ different fin materials and thicknesses
+ filter mats in tray and air intake
+ quick-cleaning system for water lances
+ transport pressure with dried air can be tested via Schrader valve

Application: CABERO cooling / CABERO air-conditioning

	Condenser			Heat exchanger	
Design	**HCCD**	**HCCDSA**	**HCCDSS**	**HGCD**	**HGCDSS**
Medium	HFC	NH_3	HFC	brine, oil, glycol, etc.	
Tube material	Cu	SST	SST	Cu	SST
Fin	AlMg2.5 black, epoxy, AlMg3, stainless steel (on request), Cu				
Fin spacing	2.0 - 2.5 mm				
Air direction	vertical				
Geometry	high-efficiency offset pipe spacing				
Length	2400 - 13600 mm				
Power range	200 kW - 3000 kW				
Heat pump	✓	✓	✓	✓	✓

Sandwich cooler

Industrial range

SKCH

SKCH HEAT EXCHANGER

Description:

The table design (horizontal and vertical air flow) is intended for use in the power generation industry. In addition to the use of renowned quality fans and the selection of best possible materials, the top-quality, sturdy design is a unique feature. On request, this system can also be applied in V-shape units.

Function principle: Two stacked heat exchangers allow operation of two circuits. The heat exchanger with the lower temperature level is positioned at the air discharge end. The heat exchanger technology provides the user with a high level of safety and reliability and a long service life for the product.

In practical application, this product range maximises and combines important ergonomic and economic aspects. Compared to conventional products from competitors, it provides buyers with clear benefits with regard to purchase price and operating costs.

Details:

Pipe spacing offset 5527 and 4035

Design:

- housing made of FeZn
- powder-coated in RAL 9010, cut edges painted
- collector and tube bend cover (protection against contact/accessory part)
- R-profile (heat exchanger from 4200 mm finned length) can easily be separated from the fan housing
- STES (Safety Tube Expanding System) floating tube system (tube has no contact with plates), therefore no possibility of leaks during transport and operation
- maintenance-free axial fans with diameter 800-1000 mm – ErP 2015 compliant (for Europe)
- normal to extremely quiet sound pressure levels
- forced-draft or induced-draft fan design
- single-row and double-row fan positioning
- separate fan intake chamber
- smooth fin surface (less contamination, best possible cleaning)
- ribbed inside/smooth tubes
- flanged or threaded connectors
- all fixing materials made of stainless steel or corrosion-resistant materials
- sturdy design, virtually no torsion and no bending (high level of safety and reliability and therefore long service life)
- container-optimised ranges
- crane lugs can be removed and repositioned
- manufactured according to PED and ISO guidelines

Accessories:

+ fall protection
+ housing materials V2A and AlMg3
+ vibration dampers
+ adiabatics (see page 24/25)
+ special colour
+ streamer or ANAC (range increase)
+ EC fans
+ extensive options for wiring and control (see page 28/29)
+ lateral inspection openings
+ folding nozzles
+ extended feet up to 2000 mm clear height (omitting the need for additional steel constructions and approval)
+ ZA PLUS (fan design optimised for noise and air volume)
+ split fins in special environments
+ special fin spacings 1.8 - 4.2 mm
+ different fin materials and thicknesses
+ transport pressure with dried air can be tested via Schrader valve
+ flanged or threaded connectors

Application: CABERO power generation

Heat exchanger

Design	SKCH	SKCHSS
Medium	brine, oil, glycol, etc.	
Tube material	Cu	SST
Fin	aluminium, epoxy, AlMg3, stainless steel (on request), Cu	
Fin spacing	2.0 - 2.5 mm	
Air direction	vertical and horizontal	
Geometry	high-efficiency offset pipe spacing	
Length	1200 - 13600 mm	
Power range	200 kW - 1200 kW	
Heat pump	✓	✓

LNG – liquid natural gas

Industrial range

ACH-LNG

ACH-LNG CONDENSER

Description:

The table design (horizontal and vertical air flow) is intended for use in the petrochemicals industry. In addition to the use of renowned quality fans and the selection of best possible materials, the top-quality, sturdy design is a unique feature. On request, this system can also be applied in V-shape units.

Function principle: To achieve larger transport volumes (tanker vessels) or better pumping efficiency (pipeline), the gas is condensed with a Cabero LNG condenser under high pressure. The heat exchanger technology provides the user with a high level of safety and reliability as well as a long service life for the product.

In practical application, this product range maximises and combines important ergonomic and economic aspects. Compared to conventional products from competitors, it provides buyers with clear benefits with regard to purchase price and operating costs.

Details:

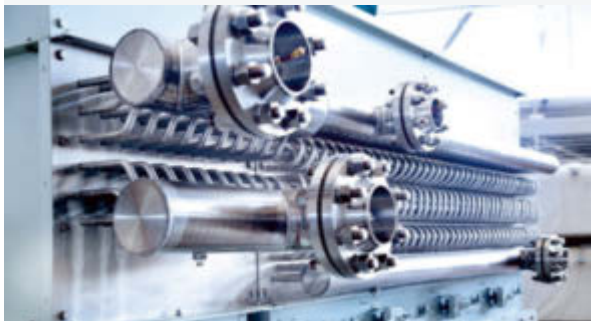
Pipe spacing offset 5527 and 4035

Design:

- housing made of FeZn
- powder-coated in RAL 9010, cut edges painted
- collector and tube bend cover (protection against contact/accessory part)
- R-profile (heat exchanger from 4200 mm finned length) can easily be separated from the fan housing
- STES (Safety Tube Expanding System) floating tube system (tube has no contact with plates), therefore no possibility of leaks during transport and operation
- maintenance-free axial fans with diameter 800-1000 mm – ErP 2015 compliant (for Europe)
- normal to extremely quiet sound pressure levels
- forced-draft or induced-draft fan design
- single-row and double-row fan positioning
- separate fan intake chamber
- smooth fin surface (less contamination, best possible cleaning)
- ribbed inside/smooth tubes
- welding connection
- all fixing materials made of stainless steel or corrosion-resistant materials
- sturdy design, virtually no torsion and no bending (high level of safety and reliability and therefore long service life)
- container-optimised ranges
- crane lugs can be removed and repositioned
- manufactured according to PED and ISO guidelines

Accessories:

+ subcooler or desuperheater circuit
+ louvre flap (adjustable by hand or motor)
+ housing materials V2A and AlMg3
+ fall protection
+ subdivision of circulation
+ vibration dampers
+ special colour
+ earthing strip
+ streamer or ANAC (range increase)
+ AC,EC and EX fans
+ extensive options for wiring and control (see page 28/29)
+ lateral inspection openings for both heat exchangers
+ folding nozzles
+ extended feet up to 2000 mm clear height (omitting the need for additional steel constructions and additional approval)
+ ZA PLUS (fan design optimised for noise and air volume)
+ special fin spacings 1.8 - 4.2 mm
+ different fin materials and thicknesses
+ transport pressure with dried air can be tested via Schrader valve



Application: CABERO industrial cooling

Condenser

Design	**ACH-LNG**
Medium	natural gas
Tube material	stainless steel
Fin	aluminium, epoxy, AlMg3, stainless steel (on request), Cu
Fin spacing	2.0 - 2.5 mm
Air direction	vertical and horizontal
Geometry	high-efficiency offset pipe spacing
Length	1200 - 13600 mm
Power range	200 kW - 1200 kW

Adiabatic systems

strategic all-round talents

CABERO condensers and heat exchangers: more efficiency through adiabatics.

Use with high outside temperatures:

A pipe construction running underneath or on the side of the heat exchanger with integrated spray nozzles can be used to significantly lower the intake temperature when outside temperatures are high. Water is sprayed from the nozzles into the intake air so that evaporation causes a significant cooling process. These adiabatic systems are predestined for use with absorption cooling systems and compression cooling systems with screw and turbo condensers in industrial cooling and power plant cooling.

Dry operation and adiabatic operation:

The adiabatic system switches on as required. In dry operation, heat output is convective using the ambient temperature. When the outside temperature rises, first the volumetric flow is increased via the fans. When these have reached their maximum speed and the air temperature rises above the dry switching point, the adiabatic stages are activated successively. When the temperature decreases, the spray stages are deactivated again with the closing of the actuators.

Adiabatic subcooling system:

The patented system allows cooling systems to be supplied with liquid (e.g. R134 a) at max. 25 °C all year round – often allowing selection of a smaller machine by one or even two performance levels. The large exchanger surfaces of the adiabatic heat exchanger systems provide many hours of free cooling. For medium temperatures from 18 °C to 12 °C that can be 3000 to 4000 hours per year in Germany where no liquid chiller is required, increasing energy savings.

Two systems LPSS and HPSS:

CABERO offers two systems depending on spray pattern, drop size and primary pressure on the nozzle. The low pressure spray system LPSS has a pressure of 1.5 to 2.5 bar. The high pressure spray system HPSS has a pressure of 2 to 4 bar. The additional water volume ensures that a partially hybrid pressure is created for saturating the air. Depending on the design, both systems achieve media discharge temperatures below the ambient temperature.

Self-draining heat exchanger

Industrial range

SD-GCH

SD-GCH HEAT EXCHANGER

Description:

The self-draining system with table design (only vertical air flow) and conditionally V-shape design is used in industrial applications such as industrial cooling, air conditioning, in process cooling and power plant systems. The independent draining of the medium from the tubes is a unique feature – without the use of any other tools such as compressed air, thanks to the heat exchanger placed diagonally upright in the housing. The connection collectors are also placed diagonally and a venting connection is integrated into the highest point of the system.

High-quality materials and the sturdy design guarantee operation without anti-freeze agents, preventing internal formation of ice in the tubes and therefore damage such as frost, even when using water as a medium.

Without antifreeze agents, the efficiency of the system is significantly increased and environmental damage is prevented – no drip trays for possible leaks are required. The application-specific heat exchanger technology in particular provides operating companies with a high level of operational safety and a long service life for the product.

The product range maximises and combines important ergonomic aspects and provides buyers with true investment benefits over comparable products with regard to purchase price and operating costs.

Details:

offset pipe spacing 5527

Design:

- housing made of FeZn
- powder-coated in RAL 9010, cut edges painted
- collector and tube bend cover (protection against contact)
- R-profile (heat exchanger from 4200 mm finned length) can easily be separated from the fan housing
- STES (Safety Tube Expanding System) floating tube system (tube has no contact with plates), therefore no possibility of leaks during transport and operation
- maintenance-free axial fans with diameter 500-1000 mm – ErP 2015 compliant (for Europe)
- normal to extremely quiet sound pressure levels
- single-row and double-row fan positioning
- separate fan intake chamber
- smooth fin surface (less contamination, best possible cleaning)
- smooth tubes
- flanged or threaded connectors
- all fixing materials made of stainless steel or corrosion-resistant materials
- sturdy design, virtually no torsion and no bending (high level of safety and reliability and therefore long service life)
- manufactured according to PED and ISO guidelines

Accessories:

+ fall protection
+ housing materials V2A and AlMg3
+ vibration dampers
+ adiabatics (see page 24/25)
+ custom colour
+ streamer or ANAC (range increase)
+ EC fans
+ extensive options for wiring and control (see page 28/29)
+ lateral inspection openings
+ folding nozzles
+ extended feet up to 2000 mm clear height (omitting the need for additional steel constructions and approval)
+ ZA PLUS (fan design optimised for noise and air volume)
+ split fins in special environments
+ special fin spacings 1.8 - 4.2 mm
+ different fin materials and thicknesses
+ transport pressure with dried air can be tested via Schrader valve
+ flanged or threaded connectors

Application: CABERO cooling/air-conditioning

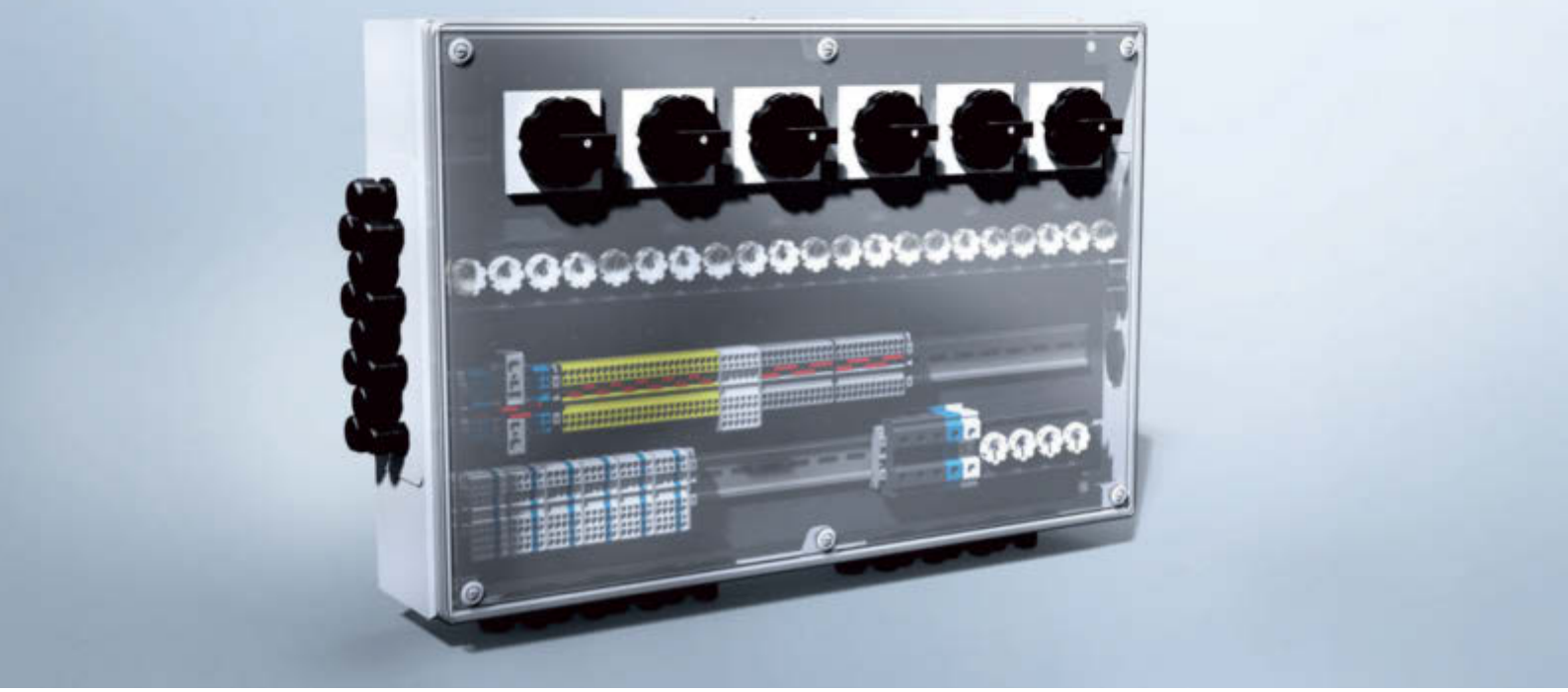
Heat exchanger

Design	SD-GCH	SD-GCHSS
Medium	brine, oil, glycol, etc.	
Tube material	Cu	SST
Fin	aluminium, epoxy, AlMg3, stainless steel (on request), Cu	
Fin spacing	2.0 - 2.5 mm	
Air direction	vertical	
Geometry	high-efficiency offset pipe spacing	
Length	1200 - 13600 mm	
Power range	20 kW - 1800 kW	
Adiabatics	✓	✓

CABERO control technology

intelligent networks

More efficiency and safety: controlled our way.



Efficient and safe control technology:

Intelligent control technology from CABERO balances performance and cost to achieve maximum efficiency. It furthermore supports the safety and reliability of the system because malfunctions are signalled immediately so that system and operator can react without delay. The control technology regulates the performance of the fans and wet operation in the area of the adiabatics and the hybrid systems; components such as the CABERO emergency retention system CERS can be connected.

Integration into the BMS and highly user-friendly:

All system parameters are checked continuously and automatically and are adapted through the specified closed control loops: This saves precious resources, every operating hour. All data can also be integrated into the on-site building management system and are visualised in a clear structure. The convenient operation is another benefit, such as touch panel control of the hybrid systems.

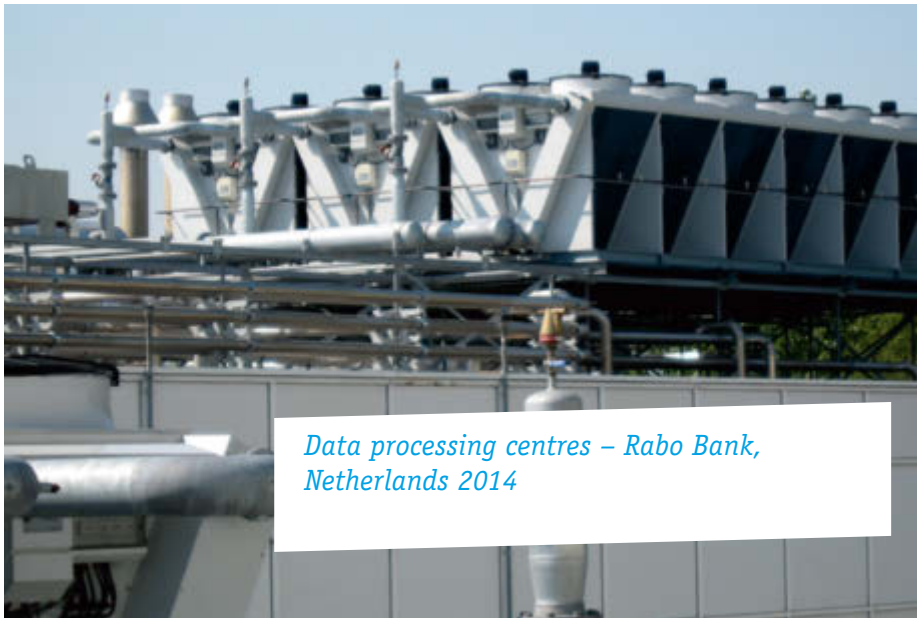
Model:	Small control cabinets AC	
	CXDM_AQ, phase-fired control	FXDM, frequency converter incl. all-pole sinus filter
Features	400 V/3/50 Hz, IP 44	
Power consumption	models from 6 - 80 A available	models from 4 - 40 A available
Interfaces	Modbus, optionally LON	

Model:	Small control cabinets EC
	Small control cabinet CMM (CABERO Motor Management)
Features	400 V/3/50 Hz and 230 V/1/50 Hz, IP 44
Power consumption	with pre-fuse in the terminal box up to 80 A
Interfaces	Modbus, Modbus Master, LON4 - 40 A optionally available

Model:	Control cabinets
	Adapted to the respective product
Features	400 V/3/50 Hz and 230 V/1/50 Hz, IP 44 Special voltages and protection ratings on request
Power consumption	can be produced in virtually all sizes
Interfaces	Modbus TCP/IP, USB (for touchscreen, optionally BACNET and many others)

Air-conditioning – Shopping Centre Gummersbach, Germany 2013

Air-conditioning – Tower 185, Frankfurt 2014, awarded the International Green Building Certificate LEED in gold



Data processing centres – Rabo Bank, Netherlands 2014

IQ Business Centre – Kiev Ukraine 2013

Industrial cooling – Chocolats Halba Division of the Coop Wallisellen, Switzerland 2014

Large data processing centres of e-shelter. Process cooling from CABERO. Germany 2015

If you want to achieve more, contact us to start today.

After all, each project starts with a conversation – so lets talk

CABERO
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Engineered to succeed° Would you like to learn more about our services, products and references? Can we offer our expertise to support your individual technical projects? We would be happy to help at any time and we are looking forward to hearing from you:

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