CHANGING
GEA HEAT EXCHANGERS

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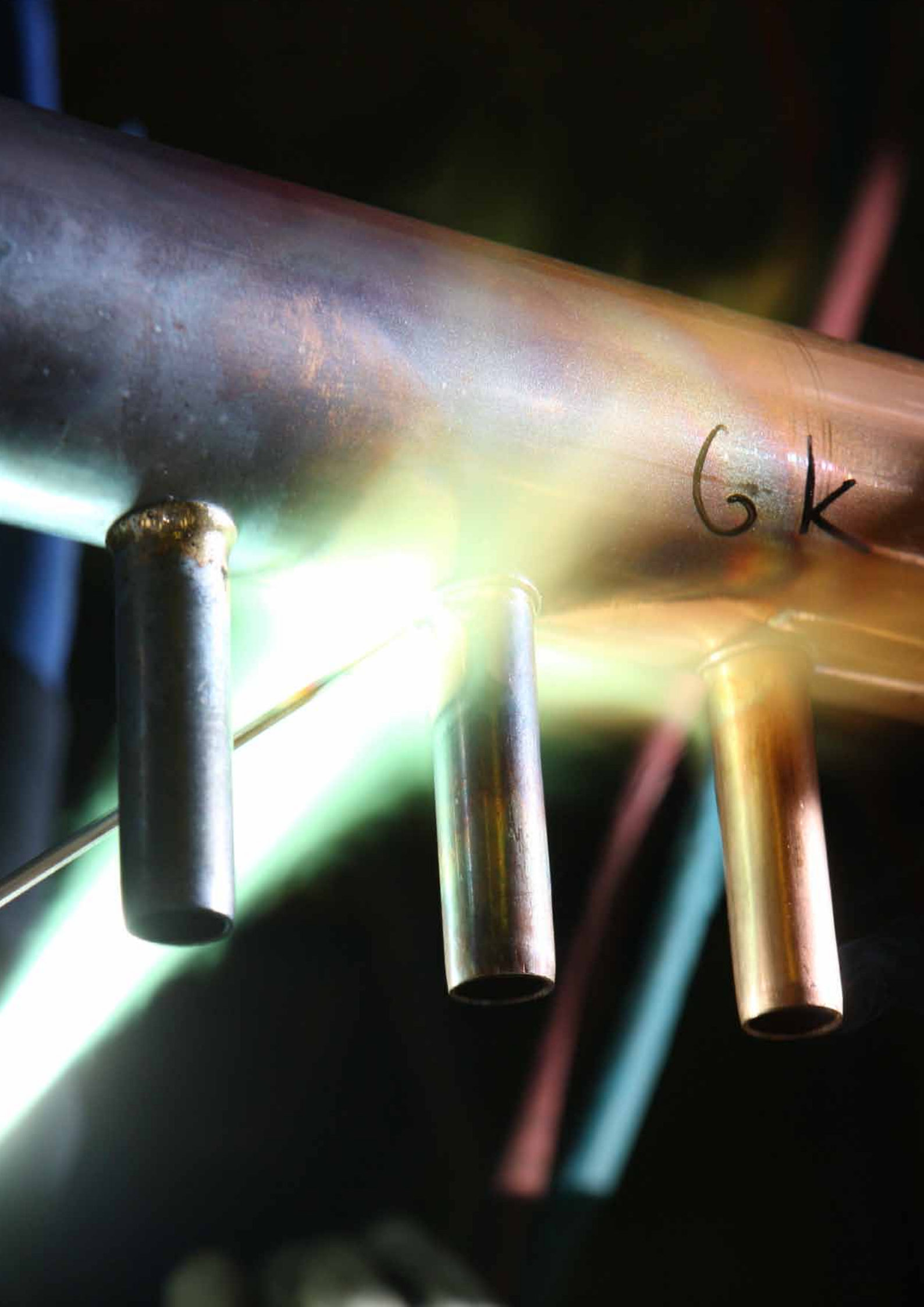


ErP ready

Goedhart Standard products

Goedhart PAC (Pleasant Atmosphere Cooler)
Cu/Al

R404A - Coolants


6k

Welcome at Goedhart

Do not settle for compromise, but go for the best cooling solution to suit your situation. That is the philosophy which Goedhart makes himself hard. Since 1935 we develop, produce and deliver worldwide air coolers, air cooled condensers and composite systems for (semi) industrial applications and various markets. Our products are ideal for projects requiring a technically demanding and involving a great deal of flexibility in terms of design, dimensions, accessories and cooling system types and methods.

To achieve the most optimal and cost efficient cooling system Goedhart uses three 'Levels of engineering':

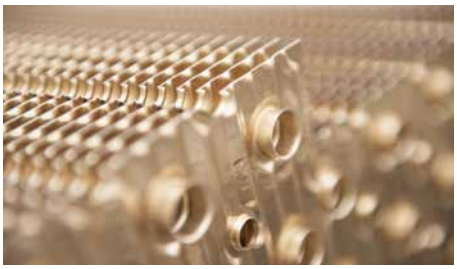
- Level 1 Fully standarized: standard cooking systems available in different fixed sizes;
- Level 2 Systematic customized products: custom made cooling systems built from standard components;
- Level 3 Designed to order products: extensive cooling systems and applications specifically designed for niche market.

Extensive theoretical and practical project analysis by our professional sales engineers will determine which configuration, materials, and level of engineering best fit your program requirements. Additionally, you can use the innovative 'Goedhart Product Catalogue (GPC), the digital selection program for all Level 1 and 2 industrial air coolers and air-cooled condensers.

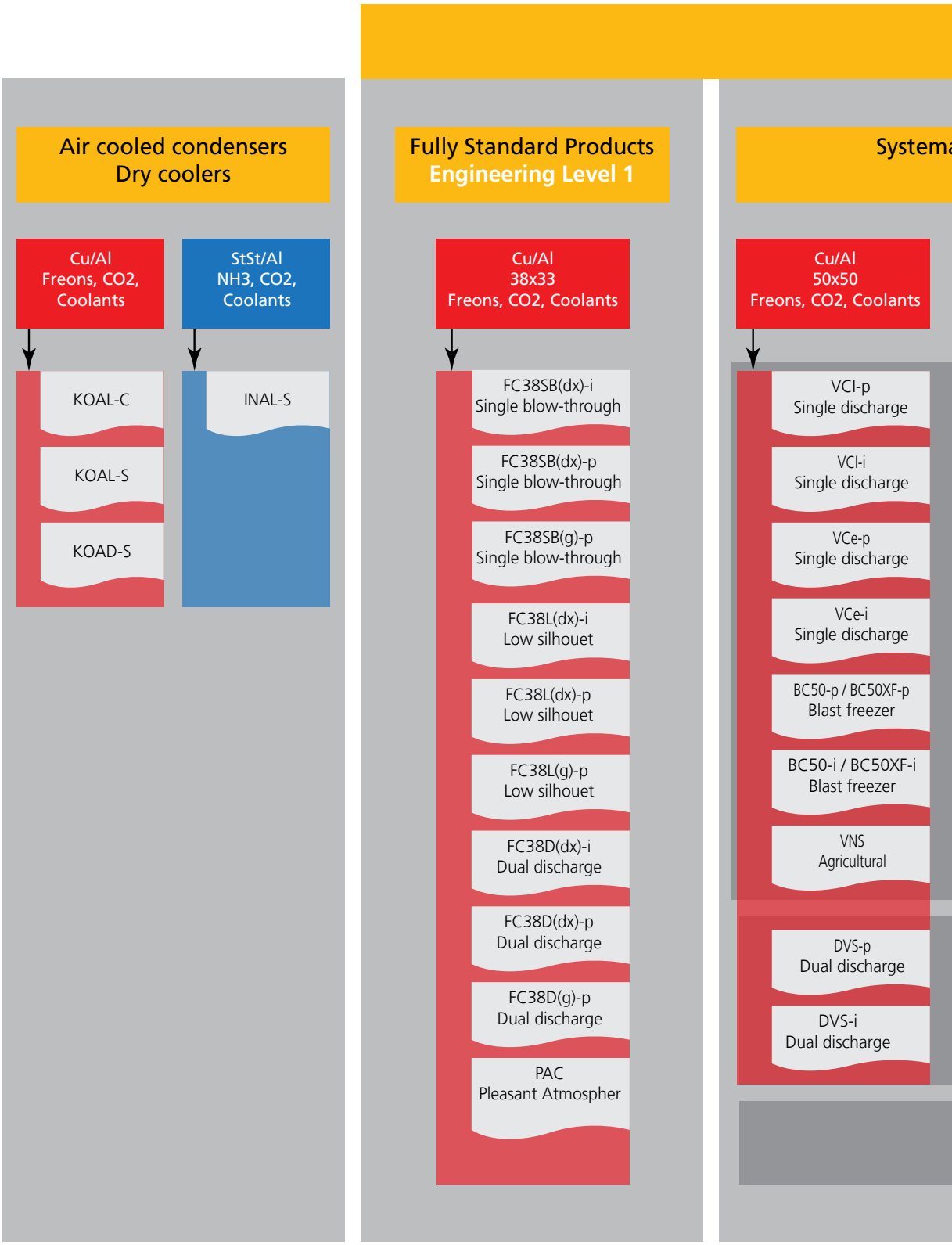
For what kind of level of engineering you choose; at Goedhart you are in good hands for heat exchangers in cooling and freezing applications. This brochure provides information on Cu /Al series PAC (Pleasant Atmosphere Cooler), a level 1 standard product.

Do you have any further questions, we are happy to help you personally. We thank you in advance for your interest in Goedhart and its products.

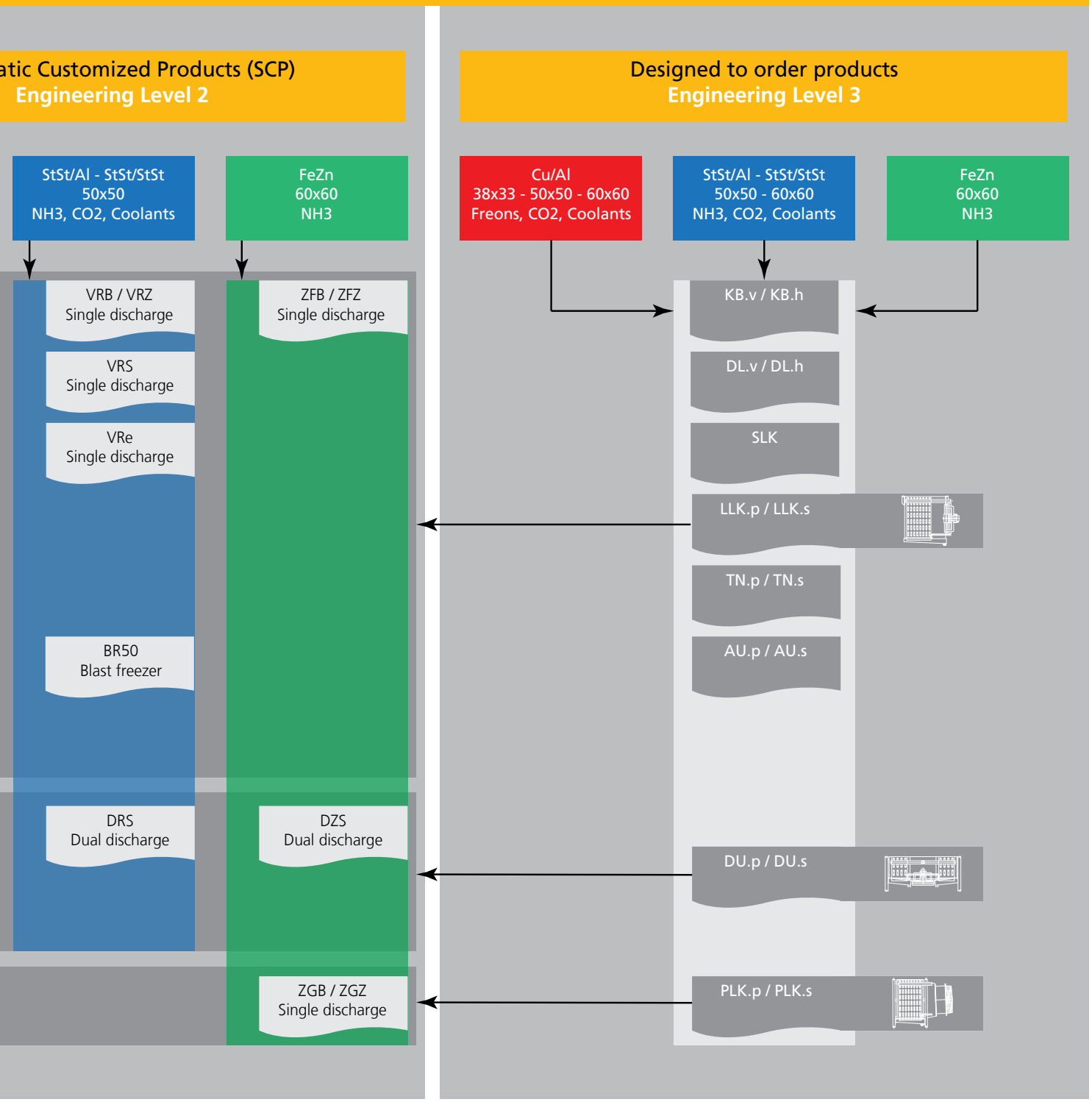




3 Levels of engineering



Goedhart´s 3 Levels of engineering









GEA Goedhart PAC air coolers
Pleasant Atmosphere Cooler

The range Goedhart PAC (Pleasant Atmosphere Cooler) ceiling mounted air coolers is especially designed to take care for cooling with decreased draft. Because of that PAC is preeminently suitable for rooms that people are working in, like working room applications. The build-in height is low in order to maximize the use of the cooling room. The range consists of 22 types with a nominal capacity range between 5,3 and 63,8 kW (E-glycol 28%). The modular design incorporates 3 different sizes of fans (400, 450 and 500 mm).

Coil block

Tube configuration : 38x33 mm staggered
Fin spacing : 4 and 7 mm
Material : 12mm o.d internally smooth tube (p) for coolants or internally enhanced (i) copper tube for refrigerants.
: aluminium HT-fins

A good thermal contact of the aluminium fins is achieved by expansion of the tubes into the fin collars, that are also utilised as spacers to provide a constant distance between the fins. All coil blocks are pressure tested on 15 bars at coolants and 40 bars at refrigerants and are supplied with a light over pressure charge of dry air. Goedhart PAC is suitable for almost all known refrigerants and coolants, with the exception of NH3.

Casing

- Construction suitable for ceiling mounting
- Casing is made from galvanized sheet steel. (Stainless steel optional)
- Corrosion resistant white spray finish (RAL 9003)
- Header and bend side is easy accessible for maintenance.
- Executed with hinged drip trays
- PAC will be delivered under a little angle, so the condensation always carry away to the drains at one side.
- Fixing materials are made of stainless steel.

Goedhart PAC features

- For cooling applications with reduced drafts
- Extremely suitable in processing areas where people are working
- Comprising 22 models
- Capacity range from 5,1 to 54,5kW (R404A).
- EC fan technology possible
- Fans are not wired as standard to a junction box (optional)
- Suitable for almost all known refrigerants and coolants, with the exception of NH3.
- Goedhart PAC is delivered on a wooden frame, for easy mounting

Goedhart Standard air coolers Cu/Al

Goedhart PAC

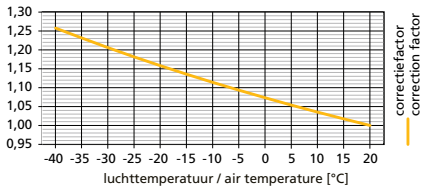
Goedhart PAC - Air coolers



1	2	3	4		
PAC	p	4	3	45	7
				5	6

1. Goedhart range : PAC
2. Tube execution : p = internally smooth
   i = internally enhanced
3. Number of rows deep : 4
4. Number of fans : 1 - 4
5. Fan diameter : 400, 450, 500
6. Fin spacing : 4, 7

Fans



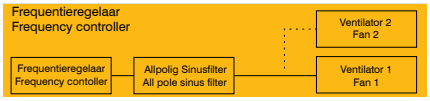
Because of the flexible construction of the Goedhart air coolers, in principle it is possible to deliver with different fans. GEA Goedhart selected a standard fan range of Ziehl Abegg (we reserve the right to alter the manufacturer) which fit perfectly on the Goedhart VCI-i air coolers. The fans can be supplied in both blow-through and draw-through executions. Against an extra price and with extra delivery times stainless steel guards and EC-fans are available.

Execution

The fans meet the ErP 2015 directive. The fans have very good aerodynamic features because of the special impeller geometry.This special impeller geometry gives the fan a low noise level and an high efficiency.

1x230V fans are suitable for a room temperature till -25°C. 3x400V fans are suitable for a room temperature till -40°C. When lower room temperatures are desired, special fans are need.

Tension : 3x400V-50Hz-3 fase (450 and 500 mm)
: 1x230V-50Hz-1 fase (400 and 500 mm)
Protectio : IP44 / IP54
Color : RAL9005 (black)
Speed controlling: : - 3 Phase motors are suitable for 2-speed regulation by Δ-Y reconnection at 3x400/690V-50Hz
- 3 Phase motors are suitable for frequency controller with all-pole sinus filter.
- 1 Phase motors are suitable for phase control and transformator.





The motors are standard executed with a thermo contact (TB) and must be connected to prevent motor damages. The maximum allowable working data in the table and on the name plate of the fans are to operate in an air temperature of 20 °C (air density of ρ = 1,2 kg/m³). For air temperatures lower then +20 °C, the current amperage can be calculated by using the diagram multiplication factor, suitable thermal overloads can then be selected. In Goedhart GPC program the fan values are also displayed in the operating point.

Sound data

The mean sound pressure (LpA @ 3m ± 2 dB (A)) each air cooler is a calculated indication value according to the EN13487 standard parallel pipe. Goedhart uses the fan manufacturer's sound power level (LwA) at the inlet side of the fan. Changes to or by the fan or the product, affect the sound, in these cases, consult the manufacturer for the new indication value. In critical sound requirements, we advise you to consult an expert.

Fan type	Nominal values at 50Hz-3x400V-T=20°C								Nominal values at 50Hz-1x230V-T=20°C					Fan data
	Δ				Y									
	Speed	Absorbed power	Absorbed FLC	Sound power indication each fan (LwA) (+/-2 dBA)	Speed	Absorbed power	Absorbed FLC	Sound power indication each fan (LwA) (+/-2 dBA)	Fan type	Speed	Absorbed power	Absorbed FLC	Sound power indication each fan (LwA) (+/-2 dBA)	
mm	min⁻¹	Watt	A	dB(A)	min⁻¹	Watt	A	dB(A)	mm	min⁻¹	Watt	A	dB(A)	
-	-	-	-	-	-	-	-	-	**FN040**	950	130	0,58	67	
FN045	900	180	0,50	66	630	100	0,24	60	-	-	-	-	-	
FN050	910	260	0,56	68	740	180	0,32	58	**FN050**	910	270	1,25	74	

Goedhart Standard air coolers Cu/Al

PAC Basic data

Capacities

Capacity optimization

To achieve the best possible combination of application, refrigerant and capacity, Goedhart can optimise the coil circuitry, depending on the specific conditions under which the aircoolers will be used. The coil circuitry of the PAC are standard en has been optimized according to the most commonly used refrigerants/ coolants and conditions. Specific applications can vary from this, our sales department is there to assist you in selecting the best circuiting for your application. In order to do this, the following information is needed :

- Needed capacity
- Refrigerant
- Air on temperature
- Coolant temperature
- Evaporating temperature

Correction factors

The nominal capacities are based on an air-on temperature of 12°C, a RH of 85% and:

R404A :	evaporation temperature	= +2°C
Water:	in / out temperature	= +1/+5°C
E-Glycol:	in / out temperature	= - 2/+3°C
P-Glycol:	in / out temperature	= - 2/+3°C
Pekasol:	in / out temperature	= - 2/+3°C
Freezium:	in / out temperature	= - 2/+3°C

Correction factors for various air-on temperatures and refrigerants or secondary coolants are as indicated in the tables below. The requested capacity must be multiplied by a correction factor from the table, so that a cooler with te resulting nominal capacity can be chosen from the selection tables.

Q nominal = factor x Q requested

Calculation example

Fin spacing	: 4 mm
Requested capacity	: 11 kW
Air-on temperature	: +13°C
Coolant	: E-glycol 28%
Temp. in/out	: 0 / 5 °C

- Correction factor = 1,057
- Multiply requested capacity with correction factor.
  11 kW x 1,057 = 11,63 kW
- Select air cooler from the tabel (type PAC 41454-S =11,7 kW)

R404A

	Air-on temperature (°C)								
°C	+8	+9	+10	+11	+12	+13	+14	+15	+16
0	1,44	1,20	1,03	0,91	0,82	0,73	0,65	0,58	0,53
1	1,70	1,42	1,19	1,01	0,90	0,81	0,72	0,64	0,58
2	2,15	1,68	1,40	1,18	1,00	0,89	0,80	0,72	0,64
3	2,76	2,13	1,66	1,39	1,17	0,99	0,87	0,78	0,70
4	4,00	2,72	2,10	1,64	1,36	1,16	0,97	0,85	0,77

Water

in/out	Air-on temperature (°C)								
°C	+8	+9	+10	+11	+12	+13	+14	+15	+16
1 / 5	1,99	1,59	1,32	1,14	1,00	0,88	0,78	0,72	0,66
2 / 6		1,95	1,57	1,30	1,12	0,98	0,87	0,78	0,71
3 / 7			1,92	1,54	1,28	1,11	0,97	0,86	0,77
4 / 8				1,94	1,56	1,31	1,13	0,98	0,87
5 / 9					1,86	1,49	1,25	1,07	0,94

E-glycol 28%

in/out	Air-on temperature (°C)								
°C	+8	+9	+10	+11	+12	+13	+14	+15	+16
-2 / 3	1,81	1,46	1,34	1,16	1,00	0,88	0,82	0,81	0,69
-1 / 4	2,35	1,72	1,41	1,28	1,10	0,96	0,85	0,79	0,75
0 / 5	2,43	2,30	1,64	1,40	1,24	1,06	0,93	0,84	0,76
1 / 6		2,38	2,28	1,59	1,37	1,21	1,05	0,92	0,82
2 / 7			2,28	2,09	1,55	1,35	1,17	1,03	0,91

P-glycol 34%

in/out	Air-on temperature (°C)								
°C	+8	+9	+10	+11	+12	+13	+14	+15	+16
-2 / 3	1,66	1,45	1,26	1,11	1,00	0,91	0,83	0,76	0,70
-1 / 4	2,00	1,65	1,42	1,24	1,11	1,01	0,90	0,81	0,77
0 / 5	2,48	1,94	1,65	1,41	1,23	1,14	1,00	0,91	0,85
1 / 6		2,46	1,97	1,64	1,42	1,29	1,12	0,10	0,92
2 / 7			2,45	1,96	1,63	1,64	1,28	1,11	1,00

Pekasol 50%

in/out	Air-on temperature (°C)								
°C	+8	+9	+10	+11	+12	+13	+14	+15	+16
-2 / 3	1,68	1,42	1,26	1,11	1,00	0,90	0,82	0,77	0,70
-1 / 4	2,02	1,65	1,42	1,24	1,10	0,98	0,89	0,81	0,76
0 / 5	2,39	1,96	1,62	1,39	1,22	1,07	0,96	0,87	0,80
1 / 6		2,36	1,93	1,60	1,37	1,20	1,06	0,94	0,86
2 / 7			2,32	1,89	1,57	1,35	1,18	1,05	0,94

Freezium 24%

in/out	Air-on temperature (°C)								
°C	+8	+9	+10	+11	+12	+13	+14	+15	+16
-2 / 3	1,66	1,44	1,25	1,11	1,00	0,91	0,83	0,77	0,71
-1 / 4	1,94	1,62	1,42	1,23	1,09	0,98	0,89	0,82	0,76
0 / 5	2,38	1,91	1,59	1,39	1,21	1,07	0,97	0,88	0,81
1 / 6		2,34	1,88	1,57	1,37	1,20	1,06	0,95	0,86
2 / 7			2,30	1,86	1,55	1,35	1,18	1,05	0,94

Capacities

Luchtintrede temperatuur 12°C
Ø 400mm 1x230V-50Hz-6 polig, Ø 450 & 500mm 3x400V-50Hz-6 polig - Δ (1000 min^{-1} nom.)

Type	R404A 2 °C*	E-Glycol 28% -2/3 °C (in/out temp.)			Water 1/5 °C (in/out temp.)			P-Glycol 34% -2/3 °C (in/out temp.)			Pekasol 50% -2/3 °C (in/out temp.)			Freezium 24% -2/3 °C (in / out temp.)			
	Capacity	Capacity	Volume flow	Pressure drop	Capacity	Volume flow	Pressure drop	Capacity	Volume flow	Pressure drop	Capacity	Volume flow	Pressure drop	Capacity	Volume flow	Pressure drop	LpA @ 3 m (+/-2 dB(A))*
PAC	**kW**	**kW**	**m3/h**	**kPa**	**kW**	**m3/h**	**kPa**	**kW**	**m3/h**	**kPa**	**kW**	**m3/h**	**kPa**	**kW**	**m3/h**	**kPa**	**dB(A)**
=4 mm																	
4.1.40.4	6,6	5,3	0,98	29,37	7,3	1,55	29,37	5	0,91	29,37	8,7	1,48	29,37	8,6	1,68	29,37	44,9
4.1.45.4	9	11,7	2,18	41,63	11,2	2,39	41,63	6,9	1,24	41,63	13,7	2,34	41,63	11,7	2,30	41,63	43,9
4.1.50.4	13,2	14,3	2,66	46,75	14,9	3,17	46,75	9,9	1,80	46,75	18	3,09	46,75	17,8	3,50	46,75	45,8
4.2.40.4	13,4	15,9	2,96	29,35	15,2	3,25	29,35	10,1	1,82	29,35	18,6	3,19	29,35	18,5	3,63	29,35	47,6
4.2.45.4	19,9	23,2	4,32	41,64	22,3	4,76	41,64	12,3	2,22	41,64	27,2	4,67	41,64	27	5,30	41,64	46,5
4.2.50.4	27	32,8	6,10	46,75	30,5	6,51	46,75	16,5	2,99	46,75	37,4	6,41	46,75	35,5	6,97	46,75	48,4
4.3.40.4	20,3	25,4	4,73	29,35	23,1	4,94	29,35	13,6	2,46	29,35	28,5	4,89	29,35	27	5,29	29,35	49,1
4.3.45.4	30,1	34,7	6,46	41,63	33,4	7,13	41,63	16,8	3,06	41,63	40,8	6,99	41,63	40,4	7,93	41,63	47,9
4.3.50.4	36,7	50,7	9,43	46,75	45,2	9,66	46,75	23,1	4,19	46,75	56,7	9,73	46,75	54,8	10,75	46,75	49,9
4.4.45.4	40,2	49,7	9,25	41,64	45,3	9,68	41,64	20,9	3,79	41,64	55,8	9,56	41,64	53,8	10,56	41,64	48,8
4.4.50.4	54,5	65,3	12,14	46,75	60,8	12,99	46,75	29	5,27	46,75	74,6	12,80	46,75	72,4	14,21	46,75	50,8

* Sound pressure indication (LpA) at 3 m distance each air cooler (+/- 2 dB(A)) , free field conditions, according EN13487

Air cooler data

=7 mm

4.1.40.7	5,1	4,4	0,81	18,05	5,3	1,14	18,05	4,2	0,76	18,05	6,1	1,05	18,05	6,1	1,19	18,05	44,9
4.1.45.7	6,1	6,1	1,13	26,25	8,4	1,80	26,25	5,8	1,06	26,25	10,2	1,76	26,25	10,1	1,99	26,25	43,9
4.1.50.7	9,9	7,9	1,47	29,74	11	2,35	29,74	8,3	1,51	29,74	13,2	2,27	29,74	13,1	2,57	29,74	45,8
4.2.40.7	10,1	8	1,48	18,06	11,3	2,41	18,06	8,4	1,52	18,06	13,7	2,35	18,06	13,6	2,67	18,06	47,6
4.2.45.7	14,8	10,3	1,91	26,25	17,5	3,73	26,25	10,6	1,91	26,25	21,6	3,70	26,25	20,2	3,96	26,25	46,5
4.2.50.7	19,8	14	2,60	29,75	23,3	4,99	29,75	15,1	2,75	29,75	27,7	4,75	29,75	27,4	5,39	29,75	48,4
4.3.40.7	15,3	17,6	3,27	18,06	17,8	3,79	18,06	11,5	2,08	18,06	21,1	3,62	18,06	20,9	4,11	18,06	49,1
4.3.45.7	23	27,7	5,16	26,25	25,8	5,52	26,25	15,8	2,87	26,25	31,8	5,45	26,25	31,5	6,19	26,25	47,9
4.3.50.7	24,7	39	7,25	29,75	35	7,47	29,75	21,1	3,83	29,75	43,3	7,42	29,75	41,7	8,19	29,75	49,9
4.4.45.7	29,7	38,9	7,23	26,25	34,9	7,45	26,25	19,5	3,54	26,25	43,1	7,39	26,25	41,6	8,17	26,25	48,8
4.4.50.7	39,8	51,9	9,66	29,75	46,6	9,96	29,75	26,5	4,81	29,75	57,6	9,88	29,75	56	11,00	29,75	50,8

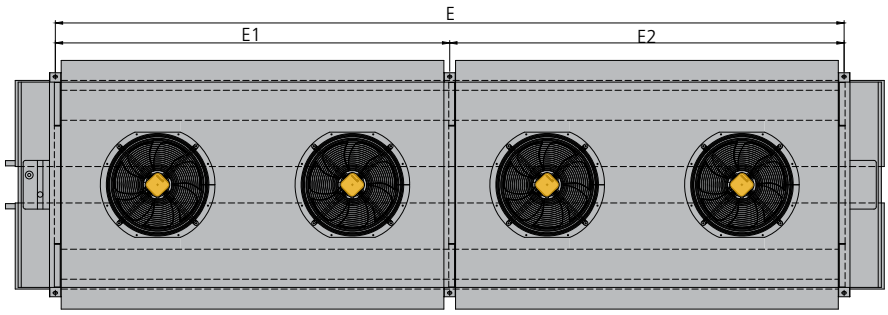
* Sound pressure indication (LpA) at 3 m distance each air cooler (+/- 2 dB(A)) , free field conditions, according EN13487

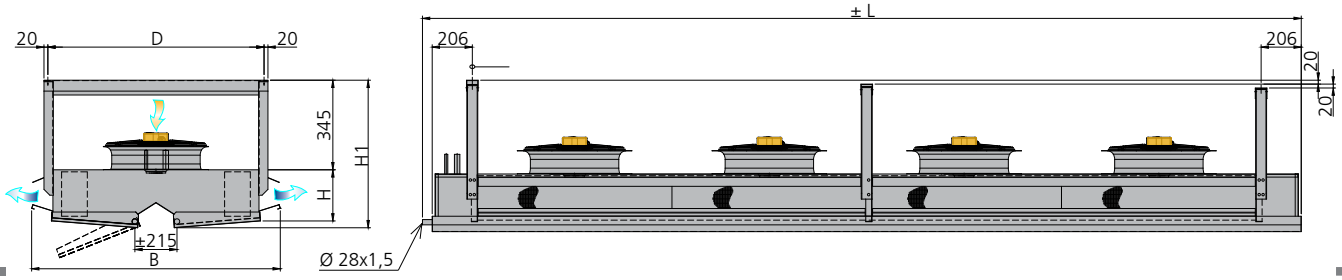
Air cooler data

Dimensions

Type	Surface	Airvolume	Internal volume	Weight	Dimensions							Connections					
					L	B	H	H1	D	E	E1 E2	R404A	E-Glycol 28%	Water	P-Glycol 34%	Pekasol	Freezium 24%
												In/Out	In/Out	In/Out	In/Out	In/Out	In/Out
PAC	**m²**	**m³/h**	**dm³**	**kg**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**
4.1.40.4	23	1995	5	91	1312	1150	280	760	1280	850		12/22	22/22	22/22	15/15	22/22	22/22
4.1.45.4	29	3266	6	107	1512	1150	280	760	1280	1050		12/22	28/28	28/28	22/22	28/28	28/28
4.1.50.4	39	4475	8	120	1512	1150	355	830	1280	1050		16/22	28/28	28/28	22/22	28/28	35/35
4.2.40.4	46	3988	9	148	2112	1150	280	760	1280	1650		12/22	28/28	28/28	22/22	28/28	35/35
4.2.45.4	58	6533	11	177	2512	1150	280	760	1280	2050		16/28	35/35	35/35	28/28	35/35	35/35
4.2.50.4	77	8950	15	198	2512	1150	355	830	1280	2050		16/35	42/42	42/42	28/28	42/42	42/42
4.3.40.4	70	5982	13	248	2912	1150	280	760	1280	2450		16/28	35/35	35/35	28/28	35/35	42/42
4.3.45.4	87	9799	16	248	3512	1150	280	760	1280	3050		16/35	42/42	42/42	28/28	42/42	42/42
4.3.50.4	116	13425	22	278	3512	1150	355	830	1280	3050		22/42	54/54	54/54	35/35	54/54	54/54
4.4.45.4	116	13066	22	320	4512	1150	280	760	1280	4050	2025	16/35	54/54	54/54	35/35	54/54	54/54
4.4.50.4	155	17900	29	360	4512	1150	355	830	1280	4050	2025	22/42	54/54	54/54	42/42	54/54	64/64
4.1.40.7	14	2215	5	86	1312	1150	280	760	1280	850		12/22	15/15	22/22	15/15	22/22	22/22
4.1.45.7	17	3845	6	101	1512	1150	280	760	1280	1050		12/22	22/22	22/22	22/22	22/22	22/22
4.1.50.7	23	5149	8	113	1512	1150	355	830	1280	1050		12/22	22/22	28/28	22/22	28/28	28/28
4.2.40.7	28	4431	9	137	2112	1150	280	760	1280	1650		12/22	22/22	28/28	22/22	28/28	28/28
4.2.45.7	35	7691	11	166	2512	1150	280	760	1280	2050		12/22	35/35	35/35	22/22	35/35	35/35
4.2.50.7	46	10297	15	185	2512	1150	355	830	1280	2050		16/28	28/28	35/35	28/28	35/35	35/35
4.3.40.7	42	6646	13	189	2912	1150	280	760	1280	2450		16/28	28/28	35/35	28/28	35/35	35/35
4.3.45.7	52	11536	16	231	3512	1150	280	760	1280	3050		16/28	35/35	42/42	28/28	35/35	42/42
4.3.50.7	69	15446	22	257	3512	1150	355	830	1280	3050		16/35	42/42	42/42	35/35	42/42	54/54
4.4.45.7	69	15381	21	299	4512	1150	280	760	1280	4050	2025	16/35	42/42	42/42	35/35	42/42	42/42
4.4.50.7	93	20595	29	332	4512	1150	355	830	1280	4050	2025	22/42	54/54	54/54	35/35	54/54	54/54

Dimensions





CHANGING
GEA HEAT EXCHANGERS

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