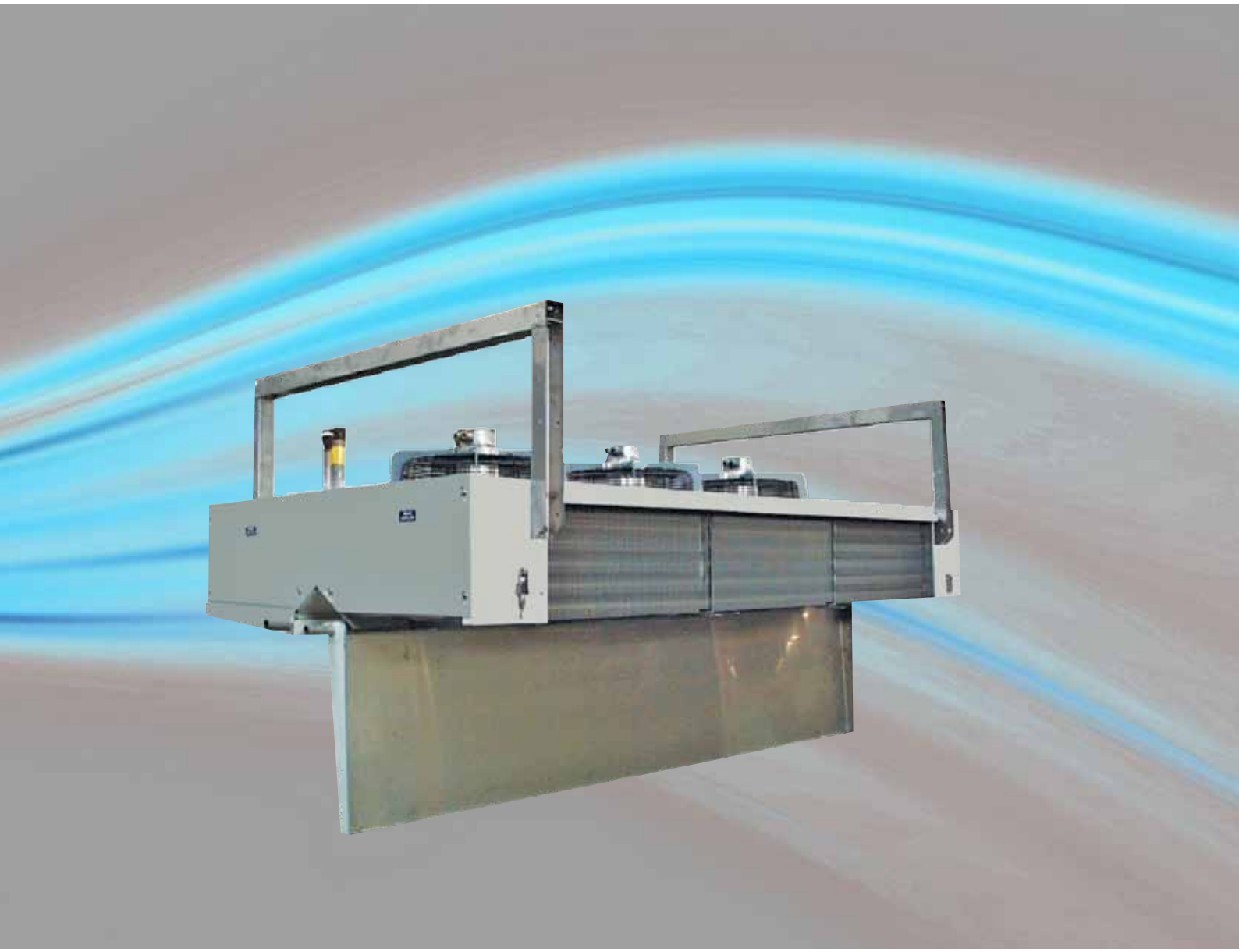


Goedhart PAC

Pleasant Atmosphere Cooler
Cu/Al

R404A - Coolants



Goedhart PAC

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)..

Type description

PAC p 4.2.40.7 - 400

- i= internally enhanced tubes / p= plain tubes
- Number of rows deep
- Number of fans
- Fin diameter in cm
- Fin spacing
- Fan tension

Execution

- Tube pitch : 38x33 mm staggered
- Tubes : 12mm e.d copper tubes
  i= internally enhanced tubes for refrigerants
  p= internally plain tubes for coolants
- Fin spacings : 4 mm: for applications with air temperatures from +4°C.
  7 mm: for applications with air temperatures from +4°C or with expected frost.
- Fins : aluminium HT-fins
- A good thermal contact with the fins because the copper tubes are mechanically expanded into fully collared aluminium fins.
- All coils for refrigerants are pressure tested to 40 bars.
- All coils for coolants are pressure tested to 15 bars.
- Construction suitable for ceiling mounting.
- Casing is made from galvanized sheet steel. (Stainless steel optional)
- Corrosion resistant white spray finish (RAL 9003)
- PAC will be delivered under a little angle, so the condensation always carry away to the drains at one side.
- The end covers can be easily removed for maintenance.
- The drip trays are hinged.
- Almost all fixing materials are made of stainless steel.

General range features

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

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.

Mounting and Maintenance

Goedhart PAC is delivered on a wooden frame or on transport feets. Transport feet are available against extra price.
Goedhart PAC can be handled by crane or fork-lift truck, which makes it very easy to mount. See the maintenance- and instruction manual.





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 42404-S =14,0 kW)

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

R404A

°C	Air-on temperature (°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 °C	Air-on temperature (°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 °C	Air-on temperature (°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 °C	Air-on temperature (°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 °C	Air-on temperature (°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 °C	Air-on temperature (°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

PAC Technical data

Air-on temperature 12°C
Ø 400mm 1x230V-50Hz-6 pole, Ø 450 & 500mm 3x400V-50Hz-6 pole - 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	7,7	5,3	0,98	29,37	7,3	1,55	29,37	5,0	0,91	29,37	8,7	1,49	29,37	9,1	1,70	29,37	46,3
4.1.45.4	11,0	11,1	2,07	41,63	10,7	2,28	41,63	6,7	1,21	41,63	13,0	2,24	41,63	12,1	2,28	41,63	45,3
4.1.50.4	15,0	13,9	2,59	46,75	14,5	3,10	46,75	9,8	1,77	46,75	17,6	3,02	46,75	18,1	3,40	46,75	50,1
4.2.40.4	15,5	16,0	2,98	29,35	15,2	3,25	29,35	10,1	1,82	29,35	18,6	3,20	29,35	19,1	3,58	29,35	49,0
4.2.45.4	22,1	22,1	4,11	41,64	21,3	4,54	41,64	12,0	2,18	41,64	26,0	4,46	41,64	26,6	5,00	41,64	47,9
4.2.50.4	30,0	32,1	5,96	46,75	29,8	6,36	46,75	16,3	2,95	46,75	36,5	6,27	46,75	36,1	6,78	46,75	52,7
4.3.40.4	23,2	25,5	4,75	29,35	23,1	4,94	29,35	13,6	2,46	29,35	28,5	4,89	29,35	28,1	5,26	29,35	52,3
4.3.45.4	33,3	33,0	6,13	41,63	31,9	6,81	41,63	16,5	2,99	41,63	38,9	6,68	41,63	39,9	7,49	41,63	49,4
4.3.50.4	46,3	49,5	9,21	46,75	44,2	9,44	46,75	22,8	4,14	46,75	55,4	9,50	46,75	55,3	10,38	46,75	54,1
4.4.45.4	44,5	47,4	8,82	41,64	43,3	9,24	41,64	20,5	3,72	41,64	53,2	9,13	41,64	53,2	9,97	41,64	50,3
4.4.50.4	59,9	63,8	11,87	46,75	59,4	12,69	46,75	28,7	5,21	46,75	72,9	12,50	46,75	73,3	13,75	46,75	55,0

* 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	5,7	4,4	0,81	18,05	5,3	1,14	18,05	4,2	0,76	18,05	6,2	1,06	18,05	6,6	1,24	18,05	46,3
4.1.45.7	8,2	5,9	1,09	26,25	7,9	1,68	26,25	5,6	1,02	26,25	9,6	1,64	26,25	9,9	1,85	26,25	45,3
4.1.50.7	11,2	7,8	1,45	29,74	10,7	2,28	29,74	8,1	1,48	29,74	12,8	2,20	29,74	13,3	2,50	29,74	50,1
4.2.40.7	11,7	8,0	1,48	18,06	11,3	2,41	18,06	8,4	1,52	18,06	13,7	2,35	18,06	14,1	2,65	18,06	49,0
4.2.45.7	16,5	18,2	3,38	26,25	16,3	3,49	26,25	10,2	1,85	26,25	20,2	3,47	26,25	19,7	3,69	26,25	47,9
4.2.50.7	22,7	13,7	2,55	29,75	22,6	4,84	29,75	14,9	2,70	29,75	28,0	4,80	29,75	27,6	5,17	29,75	52,7
4.3.40.7	17,6	17,7	3,29	18,06	17,8	3,79	18,06	11,5	2,08	18,06	21,1	3,62	18,06	21,6	4,05	18,06	52,3
4.3.45.7	24,7	25,7	4,78	26,25	24,8	5,30	26,25	15,3	2,77	26,25	29,7	5,10	26,25	30,4	5,70	26,25	49,4
4.3.50.7	34,3	37,8	7,03	29,75	33,9	7,25	29,75	20,8	3,77	29,75	42,0	7,20	29,75	41,8	7,84	29,75	54,1
4.4.45.7	33,0	36,2	6,73	26,25	32,6	6,97	26,25	18,9	3,42	26,25	40,3	6,92	26,25	41,1	7,70	26,25	50,3
4.4.50.7	45,7	50,4	9,37	29,75	45,2	9,66	29,75	26,1	4,74	29,75	55,9	9,59	29,75	56,9	10,68	29,75	55,0

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

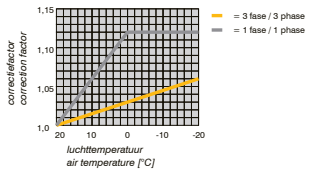
Air cooler data

Fans

- Manufacturer : Ziehl Abegg
- Diameter : 400, 450 and 500 mm
- Electrical supply : AC-3x400V-50Hz or 1x230V-50Hz
- Protection class : IP44 and IP54
- Frequency regulation : only in combination with sinus filter
- Temperature : 1x230V between -25°C and +45°C
- : 3x400V between -40°C and +45°C
- Thermo contact : PTO

When lower room temperatures are desired, special fans are need.

These special fans have a longer delivery time. The technical data in the selection table are the same as on the motor name plates and is valid for an air temperature of +20 °C. 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.



EC fans and a an execution with stainless steel guards are available against extra delivery times and price.

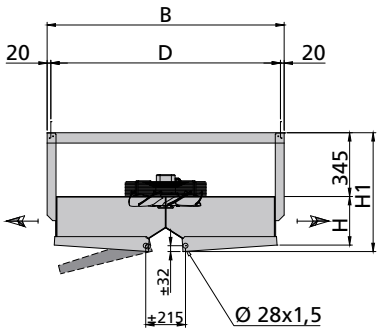
Fan type	Nominal values at 50Hz-3x400V-Tnom=20°C Δ Speed	Absorbed power	Absorbed FLC	Sound power indication each fan (LwA) (+/-2 dBA)	Y Speed	Absorbed power	Absorbed FLC	Sound power indication each fan (LwA) (+/-2 dBA)	Nominal values at 50Hz-1x230V-Tnom=20°C Fan type	Speed	Absorbed power	Absorbed FLC	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	68
FN045	860	180	0,39	67	640	100	0,19	61	**FN045**	860	180	0,82	67,5
FN050	870	290	0,74	72	590	150	0,36	64	**FN050**	910	300	1,30	71,5

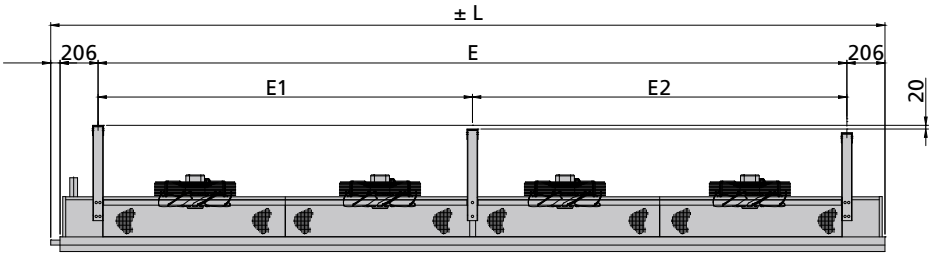
Fan data

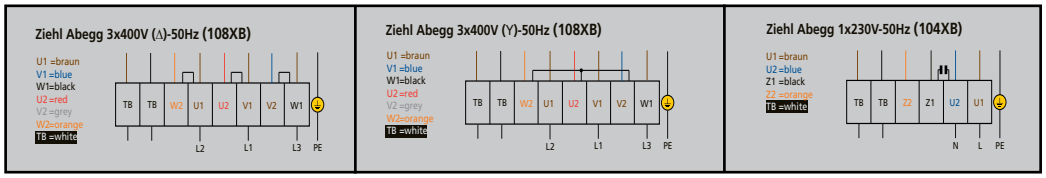
PAC Technical data

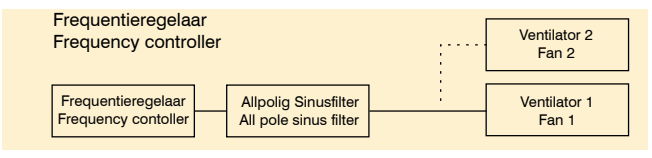
Type	Surface	Airvolume	Internal volume	Weight	Dimensions							Connections					
					L	B	H	H1	D	E	E1 E2	R404A	E-Glycol 28%	Water	P-Glycol 34%	Pekasol	Freezium 24%
												In/Out	In/Out	In/Out	In/Out	In/Out	In/Out
PAC	m²	m³/h	dm³	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
4.1.40.4	23	1995	6	91	1312	1150	280	664	1110	850		12/22	22/22	22/22	15/15	22/22	22/22
4.1.45.4	29	3025	8	107	1512	1150	280	664	1110	1050		12/22	28/28	28/28	22/22	28/28	28/28
4.1.50.4	39	4301	10	120	1512	1150	355	740	1110	1050		16/22	28/28	28/28	22/22	28/28	35/35
4.2.40.4	46	3988	10	148	2112	1150	280	664	1110	1650		12/22	28/28	28/28	22/22	28/28	35/35
4.2.45.4	58	6051	14	177	2512	1150	280	669	1110	2050		16/28	35/35	35/35	28/28	35/35	35/35
4.2.50.4	77	8603	18	198	2512	1150	355	740	1110	2050		16/35	42/42	42/42	28/28	42/42	42/42
4.3.40.4	70	5982	16	202	2912	1150	280	664	1110	2450		16/28	35/35	35/35	28/28	35/35	42/42
4.3.45.4	87	9076	20	248	3512	1150	280	669	1110	3050		16/35	42/42	42/42	28/28	42/42	42/42
4.3.50.4	116	12903	26	278	3512	1150	355	740	1110	3050		22/42	54/54	54/54	35/35	54/54	54/54
4.4.45.4	116	12102	26	320	4512	1150	280	669	1110	4050	2025	16/35	54/54	54/54	35/35	54/54	54/54
4.4.50.4	155	17204	34	360	4512	1150	355	760	1110	4050	2025	22/42	54/54	54/54	42/42	54/54	64/64
4.1.40.7	14	2215	6	86	1312	1150	280	664	1110	850		12/22	15/15	22/22	15/15	22/22	22/22
4.1.45.7	17	3407	8	101	1512	1150	280	664	1110	1050		12/22	22/22	22/22	22/22	22/22	22/22
4.1.50.7	23	4868	10	113	1512	1150	355	740	1110	1050		12/22	22/22	28/28	22/22	28/28	28/28
4.2.40.7	28	4431	10	137	2112	1150	280	664	1110	1650		12/22	22/22	28/28	22/22	28/28	28/28
4.2.45.7	35	6813	14	166	2512	1150	280	669	1110	2050		12/22	35/35	35/35	22/22	35/35	35/35
4.2.50.7	46	9737	18	185	2512	1150	355	740	1110	2050		16/28	28/28	35/35	28/28	35/35	35/35
4.3.40.7	42	6646	16	189	2912	1150	280	664	1110	2450		16/28	28/28	35/35	28/28	35/35	35/35
4.3.45.7	52	10220	20	231	3512	1150	280	669	1110	3050		16/28	35/35	42/42	28/28	35/35	42/42
4.3.50.7	69	14605	26	257	3512	1150	355	740	1110	3050		16/35	42/42	42/42	35/35	42/42	54/54
4.4.45.7	69	13627	26	299	4512	1150	280	669	1110	4050	2025	16/35	42/42	42/42	35/35	42/42	42/42
4.4.50.7	93	19474	34	332	4512	1150	355	760	1110	4050	2025	22/42	54/54	54/54	35/35	54/54	54/54

Dimensions



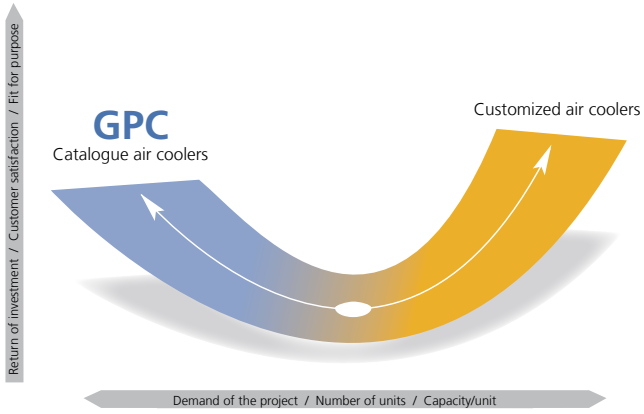








Best of both worlds



One question which always is in the mind of an industrial refrigeration engineer is the following:
Do I ask for standard or shall I go for tailor made?

There are good reasons for both choices. In some cases, the solution needed is beyond the boundaries of the standard program. In other occasions, tailor made can even offer a more economical solution. In again other situations standard would be the logical choice to go for.

In any of the cases GEA Goedhart can offer you the right solution. With the standard selection software GPC finding the right heat exchanger is just a few mouse clicks away. On other cases the GEA Goedhart engineers are happy to help you out!

Goedhart GPC Program, **your selection software** for air coolers and air cooled condensers!

Goedhart PAC air cooler selections are available in the Goedhart Product Catalogue or GPC.
On the tool section of **www.goedhart.nl** you will find the download button for the latest version of the GPC.

The GPC program is an easy to use tool for contractors, consultants and every other thinkable user and gives you access to many advantages such as:

- Multilingual
- The whole range of GEA Goedhart standard air coolers and air cooled condensers
- Pre-select buttons to application
- Selections including drawings and an extensive list of accessories
- Spare parts
- Accurate capacities: Under the GPC shell hides a sophisticated capacity calculation program which optimizes circuits to the design conditions as you work!



GEA Goedhart
air coolers
for every application

For Contractors and Original Equipment Manufacturers (OEM) related to the industrial refrigeration industry, GEA Goedhart B.V. offers an unlimited range of air coolers and air cooled condensers in several configurations.

Depending on the application, the optimum configuration will be selected in close cooperation with our customers.

Configurations
The following material combinations are available in various tube pitches and various fin spacing:

Tube material	Fin material
Copper (Cu)	Aluminium (Al)
Stainless steel (Stst)	Aluminium (Al)
Stainless steel (Stst)	Stainless steel (Stst)
Aluminium (Al)	Aluminium (Al)
Hot dipped galvanized steel (FeZn)	Hot dipped galvanized steel (FeZn)

Options on aluminium fins
- Goldlack coated fins
- Seawater resistant aluminium fins (AlMg)

Applications

Cooling	Freezing
Cold stores / Distribution centres	Cold stores / Distribution centres
Food processing rooms	Tunnel / spiral freezers
Fruit storage	Slaughter houses
Banana ripening storage	Automotive testing rooms
Greenhouse conditioning	Ski domes

Pressure Equipment Directive (P.E.D.)
All aircoolers produced by Goedhart comply with the Pressure Equipment Directive 97/23/EC. PED certificates can be downloaded from www.goedhart.nl.







LLOYD'S REGISTER QUALITY ASSURANCE · ISO9001

Lloyd's Register
PRESSURE EQUIPMENT

Excellence Passion Integrity Responsibility GEA-versity

GEA Group is a global mechanical engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881 the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX Europe 600 Index.



GEA Heat Exchangers

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