

Luchtkoeler PAC

Pleasant Atmosphere Cooler

Cu/Al - Glycol

GEA Heat Exchangers



Goedhart



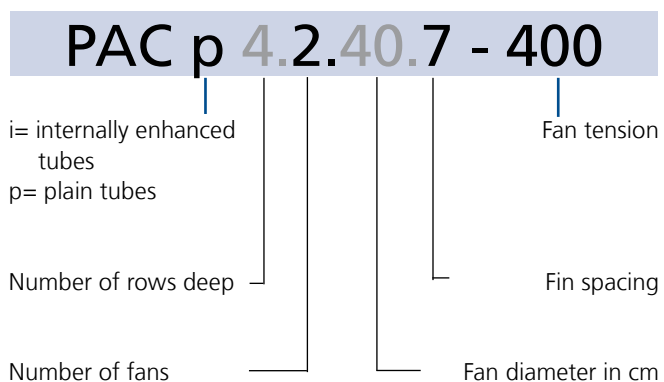
Goedhart PAC

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 4,9 and 54,2 kW. The modular design incorporates 3 different sizes of fans (400, 450 and 500 mm)..

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.

Type description



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 feet. 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.



Rekenvoorbeeld

Fin spacing	: 4 mm	• Correction factor = 1,057
Requested capacity	: 11 kW	• Multiply requested capacity with correction factor.
Air-on temperature	: +13°C	
Coolant	: E-glycol 28%	11 kW x 1,057 = 11,63 kW
Temp. in/out	: 0 / 5 °C	• 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 the resulting nominal capacity can be chosen from the selection tables.

Q nominal = faktor 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

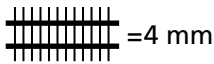
P-glycol 34%									
in/out °C	Air-on temperature (°C)								
	+8	+9	+10	+11	+12	+13	+14	+15	+16
-2 / 3	1,66	1,45	1,26	1,11	1,00	0,91	0,83	0,76	0,70
-1 / 4	2,00	1,65	1,42	1,24	1,11	1,01	0,90	0,81	0,77
0 / 5	2,48	1,94	1,65	1,41	1,23	1,14	1,00	0,91	0,85
1 / 6		2,46	1,97	1,64	1,42	1,29	1,12	0,10	0,92
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

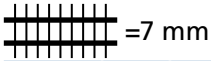
PAC Technical data

Air-on temperature 12°C 3x400V-50Hz-6 pole - Δ (1000 min ⁻¹ nom.)																	
Type	R404A	E-Glycol 28%			Water			P-Glycol 34%			Pekasol 50%			Freezium 24%			LpA @ 3 m (+/- 2 dB(A))*
	2 °C*	-2/3 °C (in/out temp.)		1/5 °C (in/out temp.)		-2/3 °C (in/out temp.)		-2/3 °C (in/out temp.)		-2/3 °C (in/out temp.)		-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	
PAC	kW	kW	m3/h	kPa	kW	m3/h	kPa	kW	m3/h	kPa	kW	m3/h	kPa	kW	m3/h	kPa	dB(A)



4.1.40.4	7,5	7,7	1,43	84,4	7,3	1,57	75,5	5,3	0,95	57,8	9,0	1,54	90,4	8,7	1,63	44,1	41
4.1.45.4	10,4	10,5	1,94	72,7	10,1	2,16	67,0	7,0	1,27	85,3	12,4	2,12	79,7	12,7	2,38	95,0	47
4.1.50.4	14,8	14,0	2,6	52,8	15,0	3,20	95,8	9,8	1,78	89,7	17,7	3,03	64,9	18,2	3,41	78,1	59
4.2.40.4	14,9	15,2	2,83	59,9	14,9	3,19	93,2	9,8	1,78	87,9	17,9	3,07	64,8	18,3	3,44	77,1	44
4.2.45.4	20,9	22,5	4,18	89,4	20,6	4,39	74,5	12,3	2,23	81,1	25,3	4,34	89,7	25,3	4,74	70,8	50
4.2.50.4	29,7	32,2	5,98	83,6	29,8	6,38	71,5	16,9	3,07	76,0	36,6	6,28	85,7	36,8	6,91	76,0	62
4.3.40.4	22,3	24,4	4,54	81,1	22,2	4,75	67,0	13,3	2,41	69,1	27,4	4,7	80,9	27,9	5,24	95,5	45
4.3.45.4	31,6	34,4	6,39	93,9	31,0	6,62	76,4	16,8	3,05	75,3	38,2	6,56	92,4	38,4	7,21	81,8	51
4.3.50.4	46,4	49,7	9,24	94,6	44,7	9,55	63,4	23,6	4,28	85,4	55,6	9,53	93,9	55,5	10,41	74,1	63
4.4.45.4	42,2	46,2	8,59	95,8	41,4	8,85	77,1	20,7	3,76	70,4	51,2	8,77	93,4	51,0	9,57	71,6	52
4.4.50.4	59,4	65,7	12,21	83,1	60,0	12,82	69,2	28,8	5,22	73,2	73,8	12,66	83,3	74,1	13,9	72,8	64

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



4.1.40.7	5,5	4,4	0,83	22,1	5,4	1,14	43,5	4,0	0,78	47,0	6,5	1,11	51,3	6,7	1,26	61,8	41
4.1.45.7	7,9	5,7	1,06	17,8	7,9	1,68	95,2	5,4	1,06	71,1	9,2	1,57	47,2	9,5	1,78	57,1	47
4.1.50.7	11,1	10,8	2,01	55,7	10,9	2,33	55,1	8,0	1,47	74,1	13,3	2,29	65,5	13,7	2,57	78,3	59
4.2.40.7	11,0	11,6	2,16	61,5	10,9	2,34	54,0	8,0	1,47	72,2	13,5	2,31	65,1	13,8	2,58	77,1	44
4.2.45.7	15,8	17,4	3,23	87,1	15,7	3,36	71,1	9,8	1,89	68,7	19,4	3,33	86,2	19,3	3,63	64,0	50
4.2.50.7	22,4	25,0	4,64	99,2	22,4	4,78	79,9	14,6	2,68	90,3	27,7	4,75	97,0	27,7	5,20	80,4	62
4.3.40.7	16,6	18,1	3,37	69,4	16,8	3,59	90,5	11,0	2,1	86,5	20,4	3,5	69,9	20,8	3,90	82,4	45
4.3.45.7	23,6	26,0	4,84	77,1	23,8	5,09	89,1	14,8	2,71	91,2	29,1	4,99	76,5	29,6	5,56	90,2	51
4.3.50.7	33,8	37,4	6,95	87,8	33,9	7,24	91,5	20,4	3,75	94,6	41,5	7,12	86,1	41,8	7,84	79,9	63
4.4.45.7	31,7	35,9	6,67	97,3	31,7	6,77	76,3	18,3	3,36	79,4	39,3	6,74	93,1	39,5	7,41	84,5	52
4.4.50.7	45,2	49,8	9,25	82,1	45,1	9,62	80,3	25,7	4,71	95,1	55,8	9,58	97,9	56,3	10,56	95,0	64

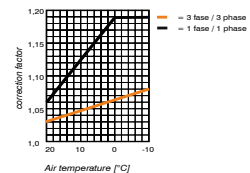
* = Sound pressure indication (LpA) at 3 m distance each air cooler (+/- 2 dB(A)), free field conditions, according EN13487

Fans

- Manufacturer : Süd Electric
- Diameter : 350, 400, 450 and 500 mm
- Electrical supply : 3x400V-50Hz or 1x230V-50Hz
- Protection class : IP44 (IP 66 on request)
- Frequency regulation : only in combination with sinus filter
- Temperature : between -40°C and +45°C
- Thermo contact : PTO

When the air temperature is lower than -40 °C, special fans are needed. 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 +40 °C. For air temperatures lower than +40 °C, the current amperage can be calculated by using the diagram multiplication factor, suitable thermal overloads can then be selected.



Fan type	Nominal values at 50Hz-3x400V-T=40°C							Nominal values at 50Hz-1x230V-T=40°C					Fan data
	Δ				Y			Fan type	Speed	Absorbed power	Absorbed FLC		
	Speed	Absorbed power	Absorbed FLC	Geluidvermogen per ventilator (LwA) (+/- 2 dBA)	Speed	Absorbed power	Absorbed FLC						
mm	min ⁻¹	Watt	A	dB(A)	min ⁻¹	Watt	A	mm	min ⁻¹	Watt	A		
400-32°	900	105	0,33	63	750	65	0,13	400-28°	900	250	1,10		
450-32°	900	180	0,40	69	750	120	0,20	450-32°	900	250	1,10		
500-40°	900	500	1,00	81	750	350	0,65	500-40°	900	400	1,75		

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
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
4.1.40.4	23	1874	6	91	1312	1150	280	650	1110	850		12/22	22	22	22	28	22
4.1.45.4	29	2782	8	107	1512	1150	280	650	1110	1050		12/22	22	28	22	28	28
4.1.50.4	39	4321	10	120	1512	1150	355	725	1110	1050		16/22	28	28	22	28	35
4.2.40.4	46	3749	10	148	2112	1150	280	650	1110	1650		12/22	28	28	22	28	35
4.2.45.4	58	5564	14	177	2512	1150	280	650	1110	2050		16/28	35	35	28	35	35
4.2.50.4	77	8641	18	198	2512	1150	355	725	1110	2050		16/35	42	42	28	42	42
4.3.40.4	70	5623	16	202	2962	1150	280	650	1110	2450		16/28	35	35	28	35	35
4.3.45.4	87	8346	20	248	3562	1150	280	650	1110	3050		16/35	42	42	28	42	42
4.3.50.4	116	12962	26	278	3562	1150	355	725	1110	3050		22/42	54	54	35	54	54
4.4.45.4	116	11128	26	320	4562	1150	280	650	1110	4050	2025	16/35	54	54	35	54	54
4.4.50.4	155	17283	34	360	4562	1150	355	725	1110	4050	2025	22/42	54	54	35	54	64
4.1.40.7	14	2010	6	86	1312	1150	280	650	1110	850		12/22	16	22	16	16	22
4.1.45.7	17	3176	8	101	1512	1150	280	650	1110	1050		12/22	22	22	16	22	22
4.1.50.7	23	4772	10	113	1512	1150	355	725	1110	1050		12/22	22	28	22	28	28
4.2.40.7	28	4022	10	137	2112	1150	280	650	1110	1650		12/22	22	28	22	28	28
4.2.45.7	35	6352	14	166	2512	1150	280	650	1110	2050		12/22	28	28	22	28	35
4.2.50.7	46	9545	18	185	2512	1150	355	725	1110	2050		16/28	35	35	28	35	35
4.3.40.7	42	6033	16	189	2962	1150	280	650	1110	2450		16/28	35	35	22	35	35
4.3.45.7	52	9528	20	231	3562	1150	280	650	1110	3050		16/28	35	35	28	35	42
4.3.50.7	69	14317	26	257	3562	1150	355	725	1110	3050		16/35	42	42	35	42	54
4.4.45.7	69	12704	26	299	4562	1150	280	650	1110	4050	2025	16/35	42	42	28	42	42
4.4.50.7	93	19090	34	332	4562	1150	355	725	1110	4050	2025	22/42	54	54	35	54	54

Dimensions

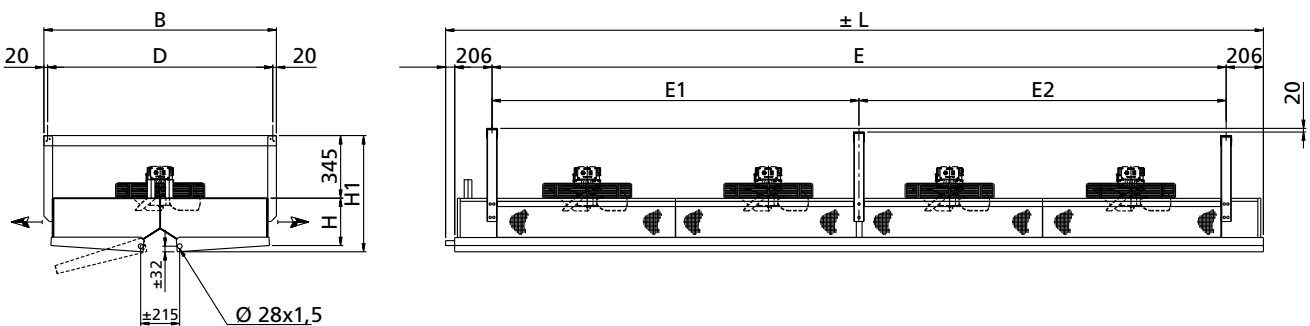
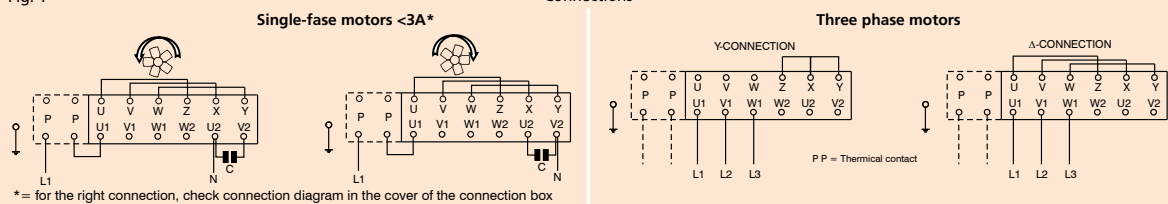


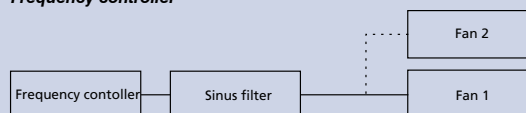
Fig. 1



* = for the right connection, check connection diagram in the cover of the connection box

Frequency controller

Fig. 2





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	Tube configuration	Fin material
Copper (Cu)	38x33, 50x50, 60x60	Aluminium (Al)
Stainless steel (Stst)	38x33, 50x50, 60x60	Aluminium (Al)
Stainless steel (Stst)	50x50	Stainless steel (Stst)
Aluminium (Al)	60x60	Aluminium (Al)
Hot dipped galvanized steel (FeZn)	60x60, 75x75	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.

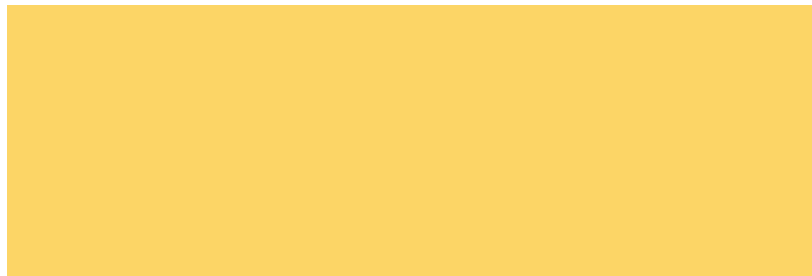




GEA Heat Exchangers

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