



Goedhart VCI

Industrial air coolers for cooling & freezing applications

Cu/Al

R404A - CO₂



Goedhart VCI

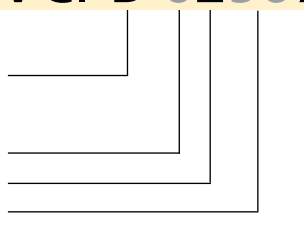
The extensive range Goedhart VCI single discharge ceiling mounted industrial air coolers are available with capacities between 2,8 and 264,4 kW. The Goedhart VCI air coolers are suitable for cooling and freezing applications and with a wide variety of accessories and options available. The coil block is standard build from aluminium end plates, copper tubes and aluminium fins. The fans are arranged for blow-through air configuration for the Goedhart VCI-B and draw-through for the Goedhart VCI-Z (please state which is required when ordering).. The modular design incorporates 5 different sizes of fan, with model options of up to 8 fans per cooler.

Type description

Goedhart VCI-B 62567

B=blow through
Z=draw through

Number of rows deep
Number of fans
Fan diameter [cm]
Fins spacing [mm]



Coil block

- Tube pitch : 50x50 mm straight
- Fin spacing : 4, 6, 7, 8, 10 and 12 mm
- Material : 15mm o.d copper tube
- : aluminium HT-lamellen
- Optimized cooling circuits
- Standard refrigerant connections are positioned on the left hand side of the unit when looking with the direction of the airflow.
- A good thermal contact 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 coolers are pressure tested to 30 bar (lower by cooling mediums) and are supplied with a light over pressure charge of dry nitrogen.
- Suitable for all known refrigerants and coolants, with the exception of NH3.

Casing

- Construction for ceiling mounting
- The flush mounting protects against and prevents accumulation of dust and dirt.
- Casing material of galvanized sheet steel
- Finishing is standard white epoxy spray (RAL 9003)
- Bend/header projection by end covers, easy removed for maintenance
- Defrost by hot gas spiral or electric defrost elements will be fixed to the bottom side of the coil.
- Stainless steel fasteners

General range features

Capacity

The listed nominal cooling capacities are based on R404A, DT1, RH of 85% and 4 pole 3 phase fans connected in Δ .

Influence of Coating on Capacity

The use of coated fins, or of a fully coated coil will result in a capacity decrease of approximately 3%

Capacity optimisation

Since Goedhart tries to limit stock products, we are capable of optimising the circuitry of our evaporators. In order to do this, the following information is needed :

- Design capacity
- Air volume
- Refrigerant
- Air on temperature
- Evaporating temperature
- Liquid temperature before expansion valve.

Sound data

The mean sound pressure (LpA @ 3m \pm 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.

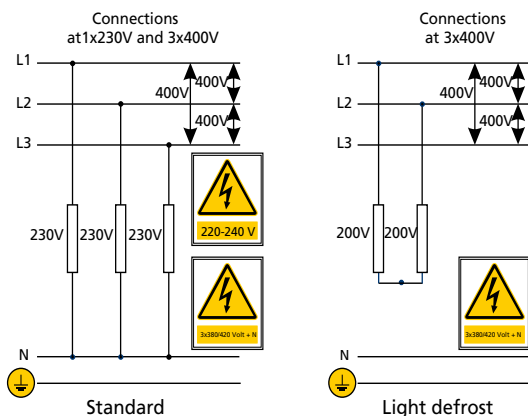
Defrostsystem:

For room temperatures where ice build-up can be expected and where the coilblock can not be defrosted by the room air, electric or hotgas defrost is necessary.

With low temperatures we also advise fan periphery heating.

Electrical defrost:

The Goedhart VRB and VRZ can be provided with electric defrost. A distinction can be made here between heavy defrost loads for low temperatures and light defrost load for higher temperatures (room temperature approximately 0 °C). The stainless steel heater elements are fitted in the coilblock in tubes, which forms a high conductive medium between the heaters and the fins. The driptray heaters are fitted to the underside of the aluminium inner tray with aluminium profiles. The heater elements which are rated for 220/240 V are connected for supply 380/415 V with neutral. The coilblock elements are removable from the end opposite to the refrigerant connections, whilst the tray heater elements can



be removed once the outer tray has been taken off.

Hot gas defrost:

The coil block is suited for hot gas defrost (hot gas supply through the suction header). At an extra price the driptray can be provided with a hotgas/cooling medium spiral. The stainless steel tubes of the hotgas spiral are enclosed in special aluminium profiles that are rigidly secured to the underside of the aluminium inner tray, thus providing a good bond for maximum heat transfer. Just as with electric defrost a distinction is made with hotgas defrost between light defrost load (room temperature about 0°C) and heavy defrost load.

Accessories:

Standard accessories for the Goedhart VCI air coolers are:

- blow-through / draw-through air configuration
- Electric defrost, hot gas defrost and/or water defrost
- Fan periphery heating
- Hinged drip tray.
- Insulated drip tray
- Insulated hygienic polyester drip tray
- Goedhart VCI-Z supplied with bellmouth connection per fan for a longer air throw
- Goedhart VCI-B supplied with air diffusor for a longer air throw
- Goedhart VCI-B supplied with air diffusor with air operated damper to increase defrost efficiency (airvolume reduced to approx. 90% and capacity reduced to approx. 95%)

The accessories are included in the price list.

Optional extras:

Various optional extras for the VCI are available, price and delivery upon request:

- Isulation disks
- Feet for floor mounting
- Coating of the coil block
- Fan hood
- Hinged fan plates
- 60 Hz motors
- EC-fans
- Single phase motors
- Coolants (glycol, water, etc.)
- Pump system
- Other casing materials
- Other fin spacings
- Sea water resistant fins

Mounting and Maintenance

Goedhart VCI is delivered on a wooden frame. When on the frame, Goedhart VCI can be handled by forklift truck, which makes positioning and installation simple. Refer to our maintenance and installation manual.



Fans

Because of the flexible construction of the Goedhart VCI air cooler, 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 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.

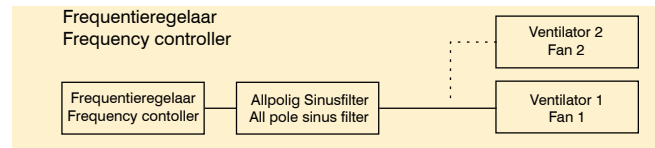
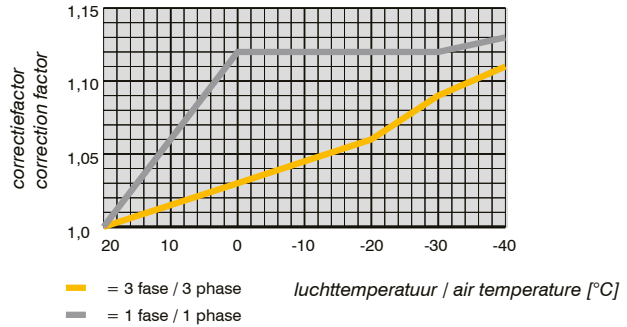
Execution

The fans meet the ErP 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 phase
 : 1x230V-50Hz-1 phase
 (60Hz execution on request)
- Protection class : IP44 / IP54
- Color : RAL9005 (black)
- Speed controlling : - 3 Phase motors are suitable for 2-speed regulation by Δ -Y reconnection.
 - 3 Phase motors are suitable for frequency controller with all-pole sinus filter.
 - 1 Phase motors are suitable for phase control and transformer.

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 $\rho = 1,2 \text{ kg/m}^3$). 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.



Three phase - 50 Hz

Fan type	Tension V	Δ				Y				Wiring diagram blow-through/ draw-through
		Speed min ⁻¹	Input Watt	FLC A	Sound power indication each fan LwA (+/-2dB(A)) dB(A)	Seed min ⁻¹	Input Watt	FLC A	Sound power indication each fan LwA (+/-2dB(A)) dB(A)	
4 pole (n=1500 min⁻¹ nom.)										
FN040	3x400/690	1370	230	0.44	76	1110	170	0.27	70,5	108B/108A
FN045	3x400/690	1250	350	0.64	78	950	220	0.35	70	108B/108A
FN050	3x400/690	1330	830	1.45	81	940	550	0.97	75	108B/108A
FN056	3x400/690	1280	1050	2.20	85	920	580	1.10	76	108B/108A
FE063	3x400/690	1330	1450	2.60	89	1080	980	1.60	84	108B/108A
6 pole (n=1000 min⁻¹ nom.)										
FN045	3x400/690	860	180	0.39	67	640	100	0.19	61	108B/108A
FN050	3x400/690	870	290	0.74	72	590	150	0.36	64	108B/108A
FN056	3x400/690	870	340	0.70	73	630	210	0.38	65	108B/108A
FN063	3x400/690	900	630	1.25	74	720	440	0.73	69	108B/108A

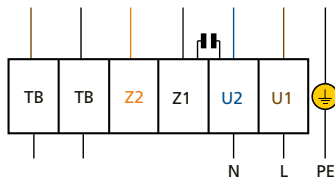
Single phase - 50 Hz

Fan type	Speed min ⁻¹	Input Watt	FLC A	Sound power indication each fan LwA (+/-2dB(A)) dB(A)	Wiring diagram blow-through/ draw-through
4 pole (n=1500 min⁻¹ nom.)					
FN040	1350	240	1.10	76	104B/104A
FN045	1290	390	1.75	80	104B/104A
FN050	1230	750	3.35	81,5	104B/104A
6 pole (n=1000 min⁻¹ nom.)					
FN040	950	130	0.58	68	104B/104A
FN045	860	180	0.82	68,5	104B/104A
FN050	910	300	1.30	71,5	104B/104A

Wiring diagram fans for blow-through air coolers

Ziehl Abegg 1x230V-50Hz (104XB)

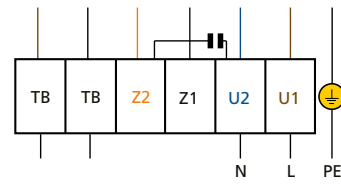
U1 = bruin
 U2 = blauw
 Z1 = zwart
 Z2 = oranje
 TB = wit



Wiring diagram fans for draw-through air coolers

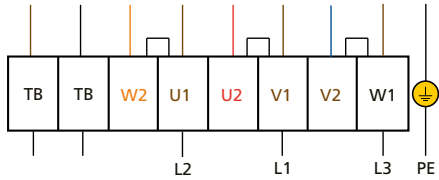
Ziehl Abegg 1x230V-50Hz (104XA)

U1 = bruin
 U2 = blauw
 Z1 = zwart
 Z2 = oranje
 TB = wit



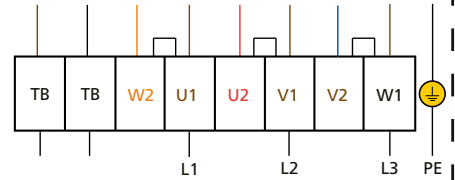
Ziehl Abegg 3x400V (Δ)-50Hz (108XB)

U1 = bruin
 V1 = blauw
 W1 = zwart
 U2 = rood
 V2 = grijs
 W2 = oranje
 TB = wit



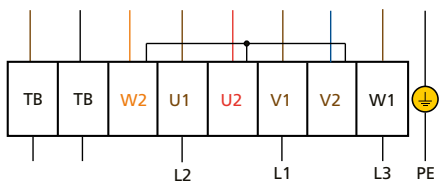
Ziehl Abegg 3x400V (Δ)-50Hz (108XA)

U1 = bruin
 V1 = blauw
 W1 = zwart
 U2 = rood
 V2 = grijs
 W2 = oranje
 TB = wit



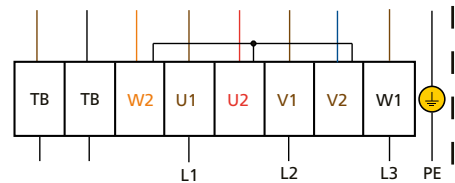
Ziehl Abegg 3x400V (Y)-50Hz (108XB)

U1 = bruin
 V1 = blauw
 W1 = zwart
 U2 = rood
 V2 = grijs
 W2 = oranje
 TB = wit



Ziehl Abegg 3x400V (Y)-50Hz (108XA)

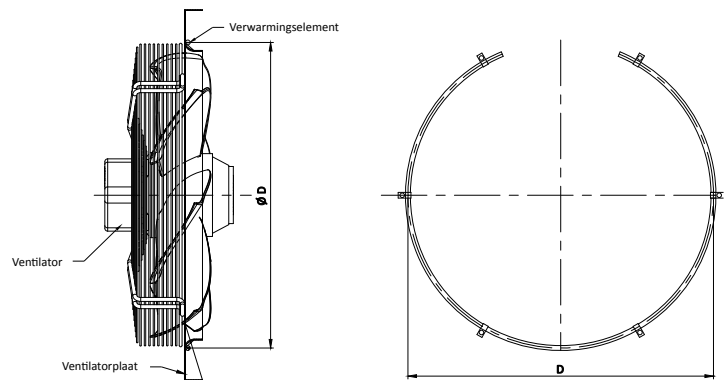
U1 = bruin
 V1 = blauw
 W1 = zwart
 U2 = rood
 V2 = grijs
 W2 = oranje
 TB = wit



Fan heating

To prevent the freezing of the impeller of the fan during the defrost cyclus of the air cooler, a fan heater can be used.

Fan diameter	Diameter element	Power (230V)
mm	D in mm	kW
400	435	0,50
450	485	0,63
500	535	0,63
560	595	0,76
630	665	0,89



Correction factors

Correction factors DT1 (=air-on)

The capacities are based on R-404A direct expansion, DT1 and a RH of 85 %. DT1 is the difference between air-on temperature and the evaporation temperature of the cooler. The evaporation temperature is the saturate temperature corresponding to the pressure at the suction outlet of the cooler.

The nominal capacities:

- (SC1) $t_o=0^{\circ}\text{C}$ and $\text{DT1}=10\text{K}$
- (SC2) $t_o=-8^{\circ}\text{C}$ and $\text{DT1}=8\text{K}$
- (SC3) $t_o=-25^{\circ}\text{C}$ and $\text{DT1}=7\text{K}$

Correction factors for various air-on temperatures and temperature differences (DT1) are as indicated in the table 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.

$Q_{\text{nominal}} = \text{factor} \times Q_{\text{requested}}$

Cooling

DT1	SC1-DT1 =10K-Air-on=10°C (0/+10)									
	Evaporation temperature (°C)									
K	+7	+6	+5	+4	+3	+2	+1	0	-1	-2
6	1,87	1,87	1,87	1,88	1,88	1,89	1,89	1,89	1,89	1,90
7	1,53	1,53	1,54	1,54	1,54	1,55	1,55	1,55	1,55	1,56
8	1,28	1,28	1,28	1,29	1,29	1,30	1,30	1,30	1,30	1,31
9	1,11	1,11	1,11	1,12	1,12	1,13	1,13	1,13	1,13	1,14
10	0,98	0,98	0,98	0,99	0,99	0,99	1,00	1,00	1,00	1,01
11	0,89	0,89	0,89	0,90	0,90	0,91	0,91	0,91	0,91	0,92
12	0,78	0,79	0,79	0,79	0,80	0,80	0,80	0,80	0,80	0,81

Cooling / Freezing

DT1	SC2-DT1 =8K-Air-on=0°C (-8/0)									
	Evaporation temperature (°C)									
K	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12
6	1,32	1,34	1,39	1,43	1,46	1,46	1,47	1,47	1,48	1,49
7	1,05	1,08	1,12	1,15	1,18	1,19	1,19	1,20	1,20	1,21
8	0,86	0,88	0,91	0,94	0,97	1,00	1,00	1,01	1,01	1,02
9	0,76	0,76	0,78	0,80	0,82	0,86	0,86	0,87	0,87	0,88
10	0,66	0,67	0,69	0,71	0,73	0,74	0,74	0,75	0,75	0,76
11	0,58	0,59	0,59	0,60	0,62	0,64	0,64	0,65	0,66	0,67
12	0,55	0,54	0,54	0,54	0,55	0,55	0,56	0,57	0,58	0,59

Freezing

DT1	SC3-DT1 =7K-Air-on=-18°C (-25/-18)									
	Evaporation temperature (°C)									
K	-21	-22	-23	-24	-25	-26	-27	-28	-29	-30
6	1,20	1,20	1,21	1,21	1,22	1,22	1,23	1,23	1,24	1,24
7	0,99	0,99	0,99	1,00	1,00	1,00	1,01	1,01	1,02	1,02
8	0,83	0,84	0,84	0,84	0,85	0,85	0,85	0,85	0,86	0,86
9	0,72	0,72	0,72	0,73	0,73	0,73	0,73	0,74	0,74	0,74
10	0,63	0,63	0,63	0,64	0,64	0,64	0,64	0,65	0,65	0,65
11	0,56	0,56	0,56	0,57	0,57	0,57	0,50	0,58	0,58	0,58
12	0,50	0,51	0,51	0,51	0,51	0,51	0,52	0,52	0,52	0,52

Calculation example

Fin spacing	: 6 mm	-	DT1 = +3- (+10) = 7K
Required capacity	: 30 kW	-	Correction factor = 1,54
Air-on temperature	: +10 °C	-	Multiply required capacity with correction factor.
Refrigeration temp.	: +3 °C		30 kW x 1,54 = 46,2 kW
Condition	: SC1		
Refrigerant	: R-404A	-	Select air cooler from the table (SC1 type VCI-B 63506=47,5 kW)

Attention!





Moisture carry over from the coil block:

When you select VCI-B with a Ø500 mm fan in an application with a high relative humidity and/or defrost with room air, Goedhart advises the use of a fan with a low pitch angle or the draw-through execution VCI-Z. Thus, you will avoid the risk of moisture carry over from the coil block. The fan with a low pitch angle give a reducing of the capacity of approx. 5% and a reduction of the air volume of approx. 10%.

Air throw** (only draw-through execution)

The air throw mentioned in the selection table indicated with ** is based on an air temperature of 20°C, blowing under a flat ceiling without any obstruction. The height and air circulation fold of the room can influence the air throw. The air speed at the end of the throw-length is 0,25 m/sec

Goedhart VCI 10mm

Type VCI	3x400V-50H-4pole (1500 min ⁻¹ nom.)						Surface	Internal volume	Weight	Dimensions								Connections			
	R404A			Air volume	LpA @ 3 m (+/- 2 dB(A))*	L				B	H	C	E1	E2	E3	D1	D2	Refrigerant			
	DT1 = 10K (SC1) air on= 0°C (0/+10)	DT1 = 8K (SC2) air on= 0°C (-8/0)	DT1 = 7K (SC3) air on= -18°C (-25/-18)															In	Uit	Hot gas	Air throw**
	kW	kW	kW															m ³ /h	dB(A)	m ²	dm ³
 4x	6.4.45.10	26,0	18,5	20998	61,3	131	45	283	3656	710	720	600	1628	1628		914	1828	16	35	35	22,5
	8.4.45.10	30,7	22,5	20230	61,3	175	60	332	3656	810	720	700	1628	1628		914	1828	16	42	35	22,5
	1.4.45.10	35,9	25,5	19504	61,3	219	75	380	3656	910	720	800	1628	1628		914	1828	16	42	35	22,5
	6.4.50.10	34,7	24,7	29492	64,0	164	57	384	4456	830	720	700	2028	2028		1114	2228	16	42	35	25
	8.4.50.10	42,5	30,1	28618	64,0	219	75	444	4456	930	720	800	2028	2028		1114	2228	16	42	35	25
	1.4.50.10	48,9	34,3	27801	64,0	274	94	503	4456	1030	720	900	2028	2028		1114	2228	22	42	35	25
	6.4.56.10	49,6	35,5	41615	67,7	241	83	511	4856	930	920	800	2228	2228		1214	2428	16	42	35	27,5
	8.4.56.10	60,5	40,9	40597	67,7	321	110	595	4856	1030	920	900	2228	2228		1214	2428	22	54	35	27,5
	1.4.56.10	70,0	48,1	39673	67,7	401	137	676	4856	1130	920	1000	2228	2228		1214	2428	22	54	35	27,5
	6.4.63.10	64,2	45,5	51237	71,5	328	113	686	5256	945	1120	800	2428	2428		1314	2628	22	54	42	27,5
 5x	8.4.63.10	76,9	55,2	50412	71,5	438	150	794	5256	1045	1120	900	2428	2428		1314	2628	22	54	42	27,5
	1.4.63.10	89,4	63,2	49586	71,5	547	187	899	5256	1145	1120	1000	2428	2428		1314	2628	22	54	42	27,5
	6.4.45.10	32,5	23,0	26246	62,1	164	57	346	4456	710	720	600	1628	2428		1114	2228	16	42	35	22,5
	8.4.45.10	39,5	27,7	25286	62,1	219	75	406	4456	810	720	700	1628	2428		1114	2228	16	42	35	22,5
	1.4.45.10	45,0	31,9	24377	62,1	274	94	466	4456	910	720	800	1628	2428		1114	2228	22	42	35	22,5
	6.4.50.10	43,7	30,2	36863	64,7	205	71	470	5456	830	720	700	2028	3028		1364	2728	16	42	35	25
	8.4.50.10	53,4	37,4	35769	64,7	274	94	545	5456	930	720	800	2028	3028		1364	2728	22	54	35	25
	1.4.50.10	61,2	43,4	34749	64,7	342	117	619	5456	1030	720	900	2028	3028		1364	2728	22	54	35	25
	6.4.63.10	80,7	56,5	64044	72,1	410	141	843	6456	945	1120	800	2428	2428	1200	1076	2x2152	22	54	35	27,5
	8.4.63.10	98,8	70,0	63012	72,1	547	187	976	6456	1045	1120	900	2428	2428	1200	1076	2x2152	28	64	42	27,5
1.4.63.10	113,5	81,3	61979	72,1	684	234	1106	6456	1145	1120	1000	2428	2428	1200	1076	2x2152	28	64	42	27,5	
 6x	6.6.45.10	39,1	27,7	31493	62,6	197	68	408	5256	710	720	600	2428	2428		1314	2628	16	42	35	22,5
	8.6.45.10	47,2	33,8	30341	62,6	263	90	480	5256	810	720	700	2428	2428		1314	2628	22	42	35	22,5
	1.6.45.10	53,5	38,7	29250	62,6	410	113	551	5256	910	720	800	2428	2428		1314	2628	22	54	35	22,5
	6.6.50.10	51,0	37,0	44235	65,2	246	85	556	6456	830	720	700	2028	2028	2000	1076	2x2152	22	54	35	25
	8.6.50.10	62,9	45,1	42921	65,2	328	113	644	6456	930	720	800	2028	2028	2000	1076	2x2152	22	54	35	25
	1.6.50.10	73,6	52,1	41697	65,2	328	141	731	6456	1030	720	900	2028	2028	2000	1076	2x2152	22	54	35	25
	6.6.63.10	96,7	68,3	76853	72,6	492	169	999	7656	945	1120	800	2428	2428	2400	1276	2x2552	28	64	35	27,5
	8.6.63.10	118,2	84,3	75613	72,6	656	225	1158	7656	1045	1120	900	2428	2428	2400	1276	2x2552	28	64	42	27,5
	1.6.63.10	136,3	97,7	74373	72,6	820	281	1314	7656	1145	1120	1000	2428	2428	2400	1276	2x2552	28	64	42	27,5
	 7x	6.7.63.10	112,4	79,9	89662	73,2	574	197	1118	7456	945	1320	800	2028	2028	3000	1243	2x2485	28	64	35
8.7.63.10		137,1	98,5	88215	73,2	766	262	1296	7456	1045	1320	900	2028	2028	3000	1243	2x2485	28	64	42	27,5
1.7.63.10		159,5	113,9	86769	73,2	957	327	1472	7456	1145	1320	1000	2028	2028	3000	1243	2x2485	28	76	42	27,5

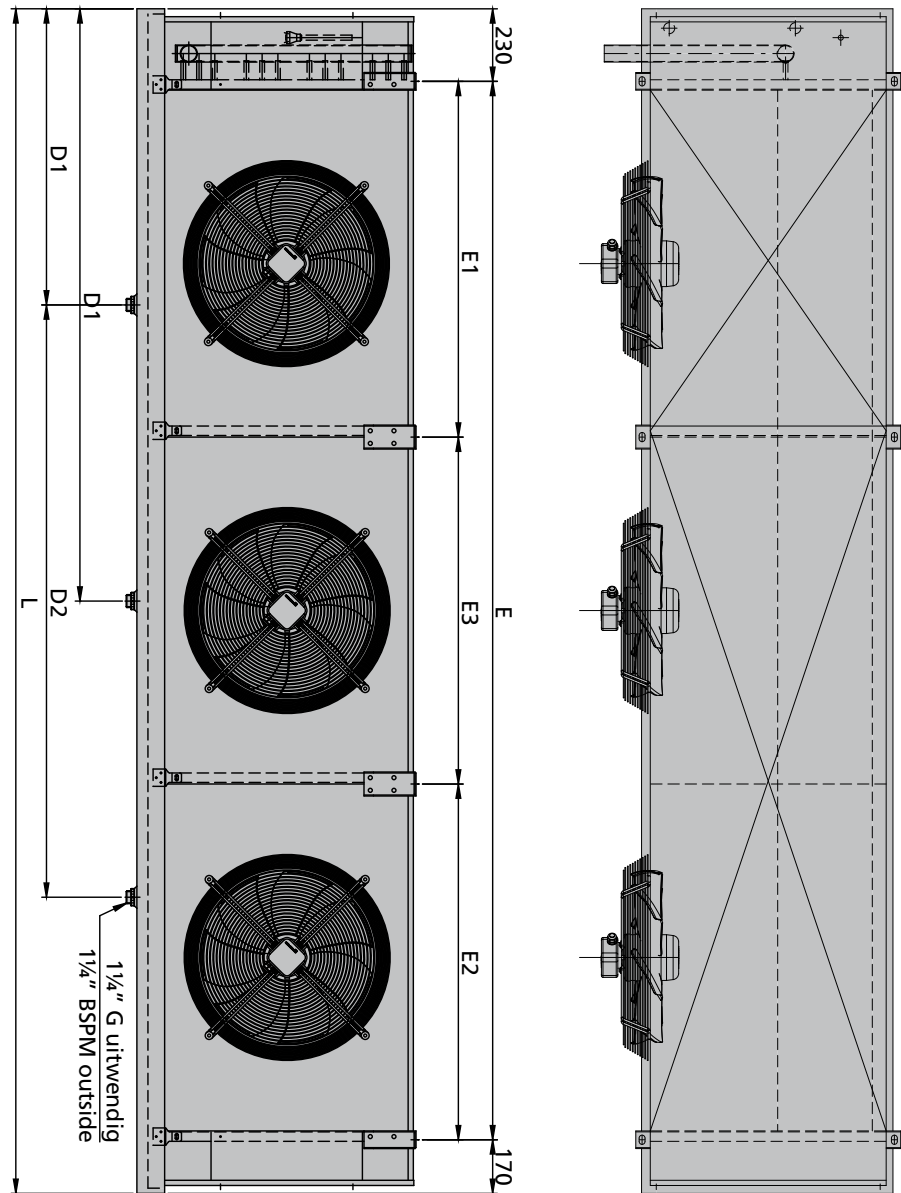
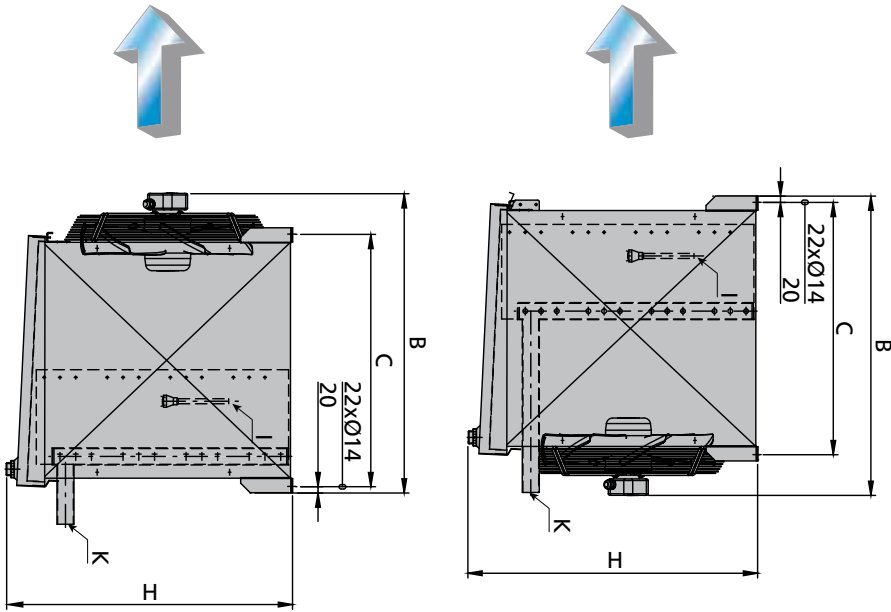
* = Sound pressure indication (LpA) at 3 m distance each air cooler (+/- 2 dB(A)), free field conditions, according EN13487

** = Air throw see remark page 5

For moisture carry over see remark pag 5

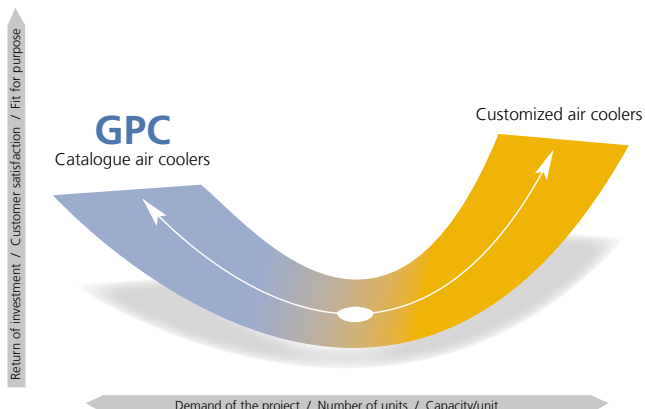
Capacities and air volumes with 60 Hz fans on request or in our GPC selection program available.

Goedhart VCI Drawing





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 VCI 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!



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.)

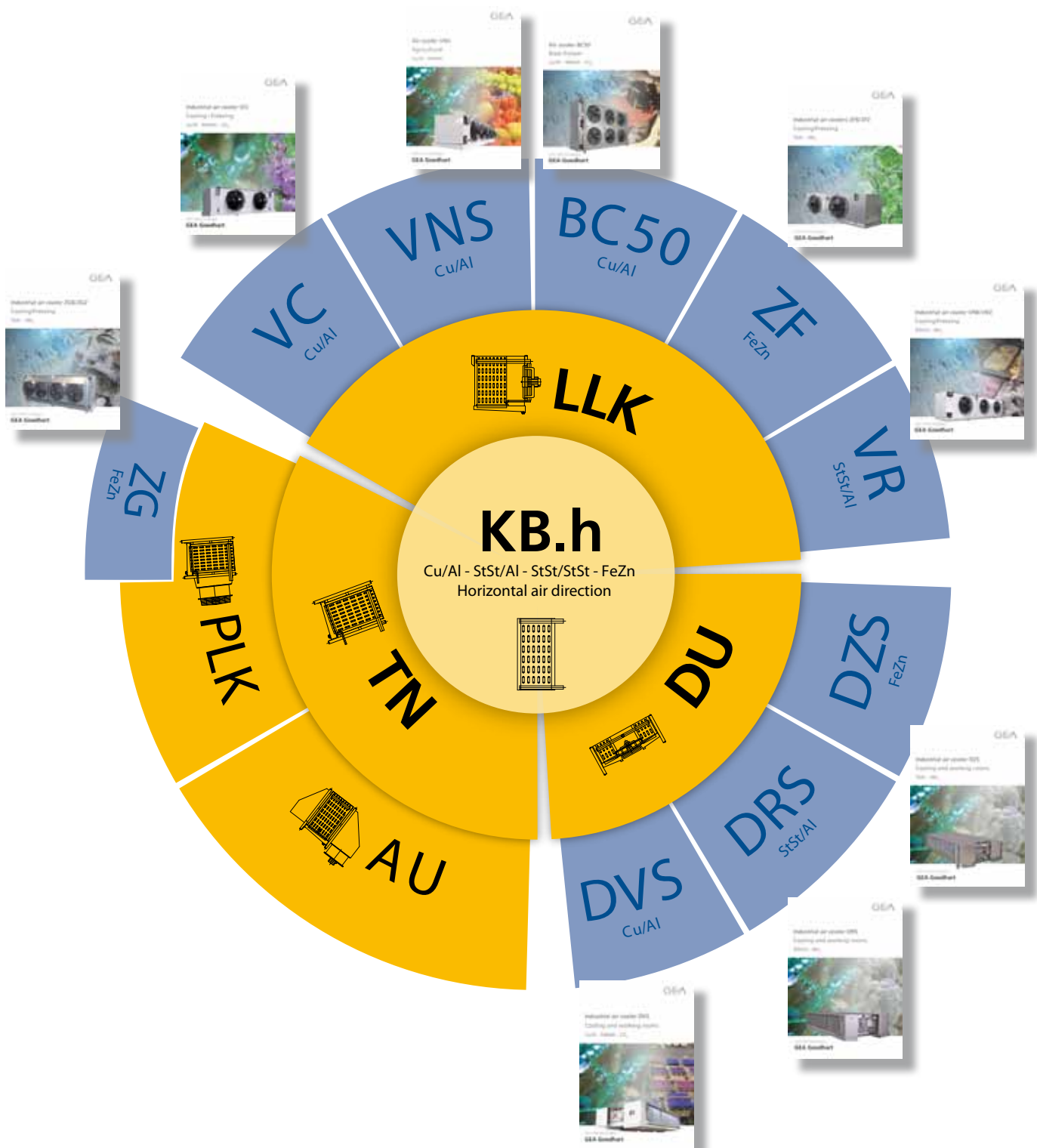
All aircoolers produced by Goedhart comply with the Pressure Equipment Directive 97/23/EC. PED certificates can be downloaded from www.goedhart.nl.

GEA Goedhart air coolers for every application



Goedhart industrial air coolers

Catalogue ranges





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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