



Goedhart ZFB / ZFZ

Industrial air coolers for cooling & freezing applications

FeZn

NH₃



Goedhart ZFB/ZFZ

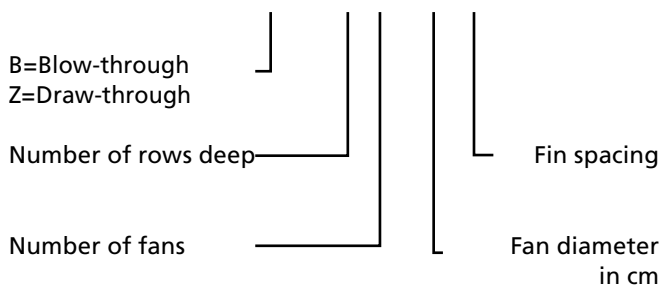
The range Goedhart ZFB/ZFZ single discharge ceiling mounted industrial air coolers consists of 406 types with capacities between 2,8 and 72,7 kW. The Goedhart ZFB/ZFZ air coolers are suitable for cooling and freezing applications and with a wide variety of accessories and options available. The coil block is standard build from steel end plates, tubes and fins and will be hot dipped galvanized totally. The fans are arranged for blow-through air configuration for the Goedhart ZFB and draw-through for the Goedhart ZFZ (please state which is required when ordering).. The modular design incorporates 5 different sizes of fan, with model options of up to 4 fans per cooler

Coil block

- Tube pitch : 60x60 mm straight
- Fin spacings : 6, 8, 10 and 12 mm
- Material : 22mm o.d steel tubes
- : heavy-gauge steel fins
- The coil will be hot dipped galvanized
- Optimized cooling circuits
- Standard refrigerant connections are positioned on the left hand side of the unit when looking with the direction of the airflow.
- All coolers are pressure tested to 30 bar (lower by cooling mediums) and are supplied with a light over pressure charge of dry nitrogen.
- Standard the air coolers are suitable for NH₃-pumpcirculation (ratio 2/4) and coolants.

Type-description

ZFB 63457



Casing

- Construction for ceiling mounting
- The flush mounting protects against and prevents accumulation of dust and dirt.
- Casing material of galvanized sheet steel
- Standard the casing is not spray painted
- Bend/header protection 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 NH₃ pump system, DT1, a RH of 85% with a frost layer of 0.2mm and 4 pole 3 phase fans connected in Δ.

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 ± 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 ZFB and ZFZ 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.

Hotgas defrost:

The coilblock can be made suitable for hotgas. 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 ZFB/ZFZ air coolers are:

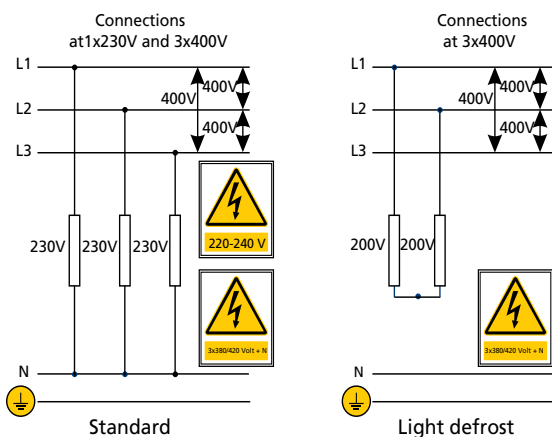
- Electric, hotgas and/or water defrost system.
- Fan periphery heating.
- Insulation within the driptray.
- Insulated hygienic polyester driptray.
- Goedhart ZFZ supplied with bellmouth connection per fan for a longer air throw
- Goedhart ZFB supplied with air diffusor for a longer air throw
- Goedhart ZFB supplied with air diffusor with air operated damper to increase defrost efficiency (air volume reduced to approx. 90% and capacity reduced to approx. 95%)
- Hinged drip tray.

The accessories are included in the price list.

Optional extras:

Various optional extras for the ZFB/ZFZ are available, price and delivery upon request:

- Insulation discs
- Feet for floor mounting
- Fan hood
- 60 Hz motors
- EC-fans
- Single phase motors
- Glycol/water/etc. cooling mediums
- NH₃ dx, R22 dx/pumpsystem.
- Other casing materials
- Other fin spacings



Mounting and Maintenance

Goedhart ZFB/ZFZ is delivered on a wooden frame. When on the frame, Goedhart ZFB/ZFZ 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 ZFB/ZFZ 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 ZFB/ZFZ 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.

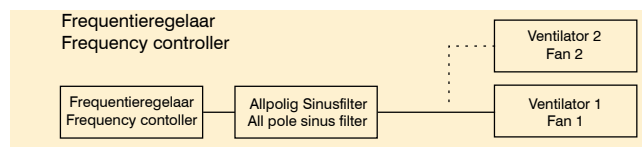
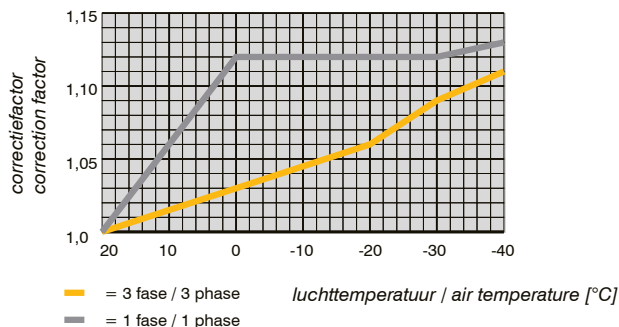
Execution

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)	Speed 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

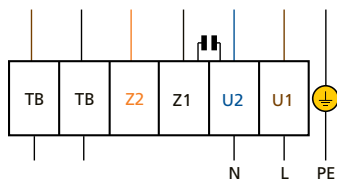
Single phase - 50 Hz

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)

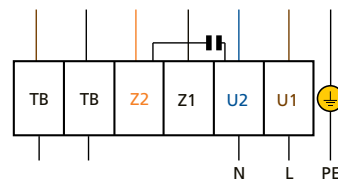
U1 =bruin
 U2 =blauw
 Z1 =zwart
 Z2 =oranje
 TB =wit



Wiring diagram fans for draw-through air coolers

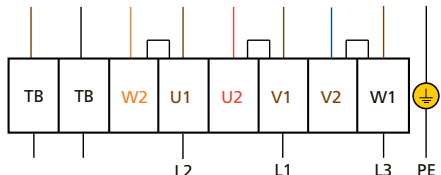
Ziehl Abegg 1x230V-50Hz (104XA)

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



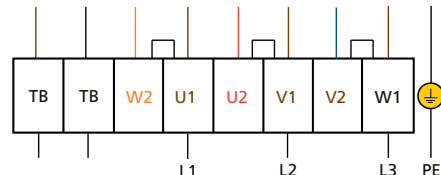
Ziehl Abegg 3x400V (Δ)-50Hz (108XB)

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



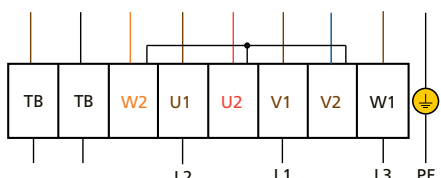
Ziehl Abegg 3x400V (Δ)-50Hz (108XA)

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



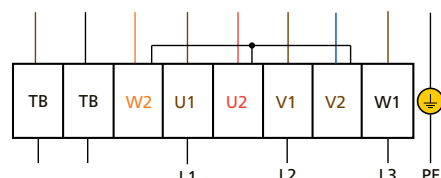
Ziehl Abegg 3x400V (Y)-50Hz (108XB)

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



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

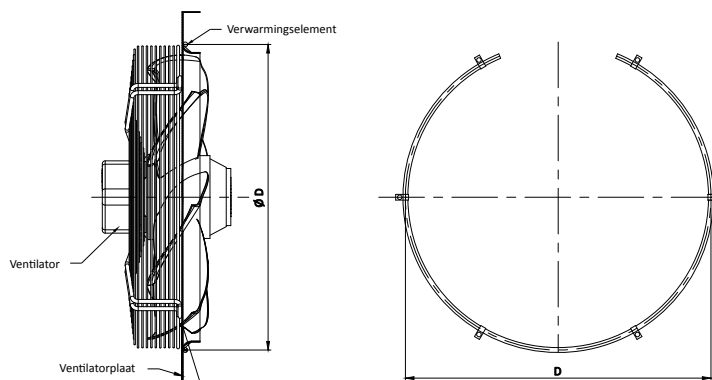
U1 =bruin
 V1 =blauw
 W1 =zwart
 U2 =rood
 V2 =grijs
 W2 =oranje
 TB =wit



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

Capacities at DT1:

Hereby the capacities are based on NH₃ pump system and DT1. DT1 is the difference between air-on temperature and the evaporation temperature of the cooler. The evaporation temperature is the saturated temperature corresponding to the pressure at the suction outlet of the cooler. The nominal capacities are based on evaporation temperatures of -8°C and DT1=8K and -25°C and DT1=7K and light frosting. Capacities for other mediums and systems are available upon request.

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.

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

NH₃ light frost = 0.2 mm RH = 85%

DT1 K	Verdampingstemperatuur (°C)													
	0	-2,5	-5	-7,5	-10	-12,5	-15	-20	-22,5	-25	-27,5	-30	-32,5	-35
5	1.63	1.69	1.75	1.80	1.85	1.90	1.95	1.48	1.51	1.54	1.57	1.60	1.63	1.65
6	1.29	1.34	1.39	1.43	1.47	1.50	1.54	1.17	1.20	1.22	1.24	1.26	1.29	1.31
7	1.06	1.11	1.14	1.17	1.21	1.24	1.26	0.97	0.99	1.00	1.02	1.04	1.06	1.07
8	0.90	0.94	0.97	1.00	1.02	1.04	1.06	0.82	0.83	0.85	0.86	0.88	0.89	0.91
9	0.78	0.80	0.84	0.86	0.88	0.90	0.92	0.70	0.72	0.73	0.75	0.76	0.77	0.78
10	0.68	0.70	0.74	0.76	0.78	0.79	0.80	0.62	0.63	0.64	0.65	0.66	0.67	0.69

 = gerekend zonder berijping

NH₃ normal frost = 0.5 mm RH= 85%

DT1 K	Verdampingstemperatuur (°C)													
	0	-2,5	-5	-7,5	-10	-12,5	-15	-20	-22,5	-25	-27,5	-30	-32,5	-35
5		1.86	1.92	1.98	2.03	2.08	2.13	1.68	1.71	1.73	1.74	1.76	1.79	1.80
6		1.48	1.52	1.57	1.61	1.65	1.68	1.33	1.34	1.35	1.37	1.38	1.39	1.40
7		1.22	1.26	1.29	1.33	1.36	1.39	1.08	1.09	1.10	1.11	1.12	1.13	1.14
8		1.04	1.07	1.09	1.12	1.14	1.16	0.91	0.92	0.93	0.95	0.96	0.97	0.98
9			0.92	0.95	0.97	0.99	1.00	0.79	0.80	0.81	0.81	0.82	0.83	0.84
10			0.81	0.83	0.85	0.86	0.88	0.69	0.70	0.71	0.71	0.72	0.74	0.74
11			0.72	0.74	0.76									

Attention!





Moisture carry over from the coil block:

When you select **ZGB** 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 ZGZ. 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%.

ATTENTION !!!

When making your selection, pay attention to the ratio between the airvolume and capacity. A low volume to capacity ratio results in a wide temperature drop across the coil which cause to dry out (especially on coils with a high number of rows deep).

Goedhart ZFB/ZFZ 8mm

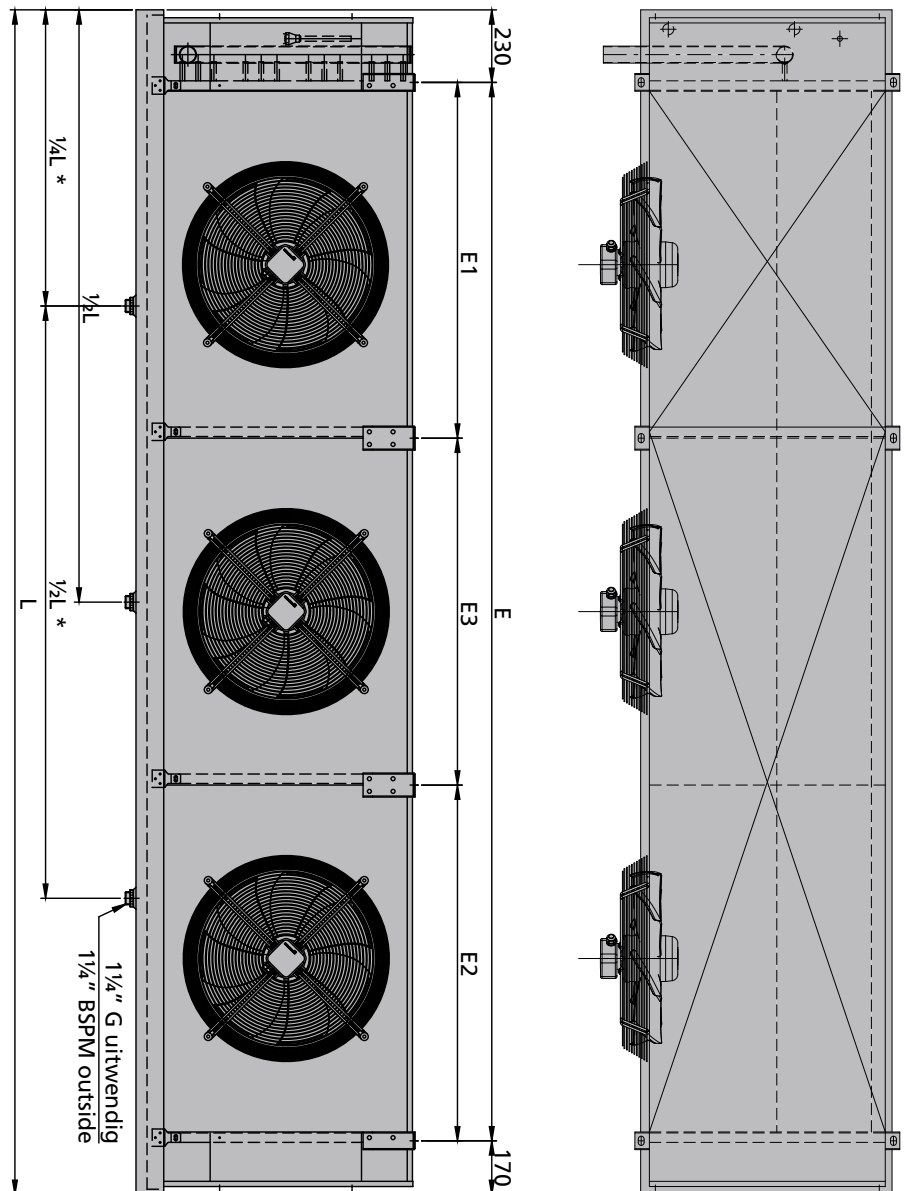
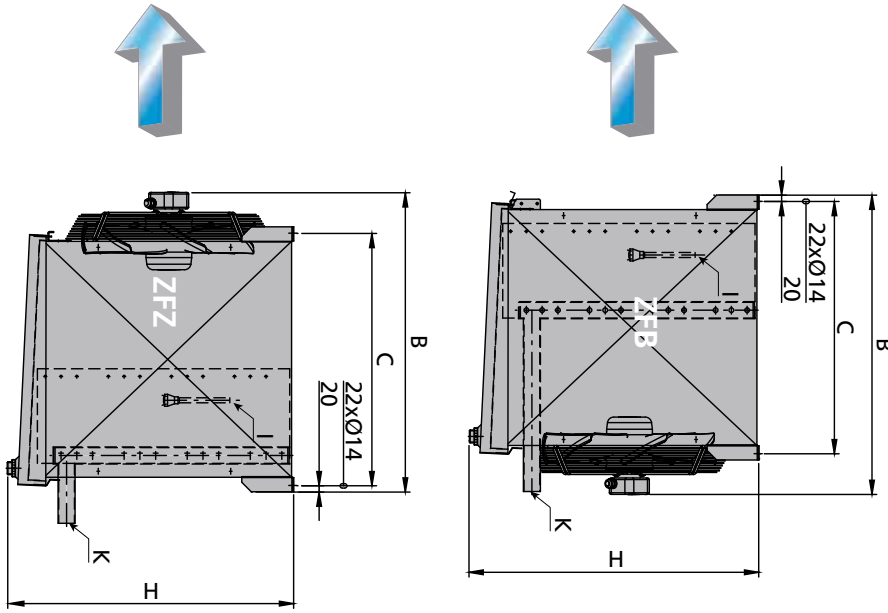
	Type ZFB ZFZ	3x400V-50H-4pole (1500 min ⁻¹ nom.)						Dimensions									Connections					
		NH3		Air volume	LpA @ 3 m (+/- 2 dB(A))	Surface	Internal volume	Weight	L	B	H	C	E	E1	E2	E3	Refrigerant			Drain	Water-defrost	
		DT1 = 8K (SC2) air on= 0°C	DT1 = 7K (SC3) air on= -18°C														In	Out	Hotgas		In	Drain
		kW	kW	m ³ /h	dB(A)	m ²	dm ³	kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	NW"	NW"	NW"
	4.1.40.8	3,9	2,8	3352	54,3	18	8	115	1056	655	600	540	656				21,3	21,3	22	1¼	1¼	1¼
	6.1.40.8	5,2	3,7	3140	54,3	27	12	151	1056	775	600	660	656				21,3	21,3	22	1¼	1¼	1¼
	8.1.40.8	6,2	4,4	2951	54,3	36	17	189	1056	895	600	780	656				21,3	21,3	22	1¼	1¼	1¼
	4.1.45.8	6,1	4,4	5243	56,2	28	12	154	1206	680	720	540	806				21,3	21,3	22	1¼	1¼	2
	6.1.45.8	8,2	5,9	4952	56,2	42	18	205	1206	800	720	660	806				21,3	21,3	22	1¼	1¼	2
	8.1.45.8	9,7	7,0	4685	56,2	56	24	257	1206	920	720	780	806				21,3	26,9	22	1¼	1¼	2
	4.1.50.8	8,2	5,9	7390	59,1	36	15	201	1256	775	840	640	856				21,3	21,3	22	1¼	1¼	2
	6.1.50.8	11,1	8,1	7064	59,1	54	23	265	1256	895	840	760	856				21,3	26,9	22	1¼	1¼	2
	8.1.50.8	13,3	9,5	6770	59,1	71	30	324	1256	1015	840	880	856				21,3	26,9	22	1¼	1¼	2
	4.1.56.8	11,3	8,4	10315	62,8	49	19	257	1556	890	840	740	1156				21,3	26,9	22	1¼	1¼	2
	6.156.8	15,4	10,9	9905	62,8	74	29	338	1556	1010	840	860	1156				21,3	26,9	22	1¼	1¼	2
	8.1.56.8	18,5	13,5	9549	62,8	98	39	417	1556	1130	840	980	1156				21,3	33,7	22	1¼	1¼	2
	4.1.83.8	15,3	10,9	12831	66,6	71	28	355	1656	885	1080	740	1256				21,3	26,9	22	1¼	1¼	2
	6.1.63.8	20,8	15,2	12522	66,6	107	41	467	1656	1005	1080	860	1256				21,3	33,7	22	1¼	1¼	2
8.1.63.8	25,0	17,8	12213	66,6	142	55	579	1656	1125	1080	980	1256				21,3	33,7	22	1¼	1¼	3	
	4.2.40.8	7,8	5,6	6696	57,0	36	14	181	1656	655	600	540	1256				21,3	21,3	22	1¼	1¼	2
	6.2.40.8	10,4	7,6	6268	57,0	53	21	242	1656	775	600	660	1256				21,3	26,9	22	1¼	1¼	2
	8.2.40.8	12,3	8,7	5890	57,0	71	28	303	1656	895	600	780	1256				21,3	26,9	22	1¼	1¼	2
	4.2.45.8	12,2	8,9	10478	58,9	56	21	260	1956	680	720	540	1556				21,3	26,9	22	1¼	1¼	2
	6.2.45.8	16,4	11,8	9888	58,9	83	31	351	1956	800	720	660	1556				21,3	33,7	22	1¼	1¼	2
	8.2.45.8	19,4	14,0	9355	58,9	111	41	443	1956	920	720	780	1556				21,3	33,7	22	1¼	1¼	2
	4.2.50.8	16,4	11,7	14769	61,7	71	26	341	2056	775	840	640	1656				21,3	33,7	22	1¼	1¼	2
	6.2.50.8	22,1	16,1	14114	61,7	107	40	456	2056	895	840	760	1656				21,3	33,7	22	1¼	1¼	2
	8.2.50.8	26,5	19,2	13525	61,7	142	53	569	2056	1015	840	880	1656				21,3	42,4	22	1¼	1¼	3
	4.2.56.8	22,6	16,7	20620	65,4	98	35	448	2656	890	840	740	2256				21,3	33,7	22	1¼	1¼	2
	6.2.56.8	30,7	22,4	19796	65,4	147	52	596	2656	1010	840	860	2256				21,3	42,4	22	1¼	1¼	3
	8.2.56.8	37,0	26,9	19085	65,4	195	70	742	2656	1130	840	980	2256				21,3	42,4	34	1¼	1¼	3
	4.2.63.8	30,6	21,8	25658	69,2	142	50	626	2856	885	1080	740	2456				21,3	42,4	22	1¼	2x1¼	3
	6.2.63.8	41,6	30,3	25036	69,2	213	75	835	2856	1005	1080	860	2456				26,9	42,4	34	1¼	2x1¼	3
8.2.63.8	50,0	35,6	24414	69,2	284	100	1042	2856	1125	1080	980	2456				26,9	42,4	34	1¼	2x1¼	3	
	4.3.45.8	18,3	13,4	15713	60,4	83	30	357	2706	680	720	540	2306				21,3	33,7	22	1¼	1¼	2
	6.3.45.8	24,5	17,6	14826	60,4	125	45	484	2706	800	720	660	2306				21,3	33,7	22	1¼	1¼	2x2
	8.3.45.8	29,0	20,7	14025	60,4	167	60	613	2706	920	720	780	2306				21,3	42,4	22	1¼	1¼	2x2
	4.3.50.8	24,5	17,9	22148	63,1	107	38	469	2856	775	840	640	2456				21,3	33,7	22	1¼	2x1¼	2x2
	6.3.50.8	33,1	24,1	21165	63,1	160	57	630	2856	895	840	760	2456				21,3	42,4	22	1¼	2x1¼	2x2
	8.3.50.8	39,8	28,9	20279	63,1	213	76	790	2856	1015	840	880	2456				21,3	42,4	34	1¼	2x1¼	2x2
	4.356.8	33,9	25,0	30925	66,8	146	51	639	3756	890	840	740	3356	1128	1128	1100	21,3	42,4	22	2x1¼	2x1¼	2x2
	6.356.8	46,0	33,4	29689	66,8	220	76	854	3756	1010	840	860	3356	1128	1128	1100	26,9	42,4	34	2x1¼	2x1¼	2x2
	8.3.56.8	55,5	40,3	28620	66,8	293	101	1069	3756	1130	840	980	3356	1128	1128	1100	26,9	48,3	34	2x1¼	2x1¼	3
	4.3.63.8	46,0	33,8	38484	70,6	213	76	899	4056	885	1080	740	3656	1228	1228	1200	26,9	42,4	34	2x1¼	2x1¼	2x2
6.3.63.8	62,4	45,4	37548	70,6	320	114	1202	4056	1005	1080	860	3656	1228	1228	1200	26,9	48,3	34	2x1¼	2x1¼	3	
	4.4.45.8	24,4	17,8	20947	61,3	111	39	462	3456	680	720	540	3056				21,3	33,7	22	1¼	2x1¼	2x2
	6.4.45.8	32,7	23,7	19763	61,3	166	58	630	3456	800	720	660	3056				21,3	42,4	22	1¼	2x1¼	2x2
	8.4.45.8	38,7	28,0	18695	61,3	222	77	801	3456	920	720	780	3056				21,3	42,4	34	1¼	2x1¼	2x2
	4.4.50.8	32,7	24,1	29527	64,0	142	49	622	3656	775	840	640	3256	1628	1628		21,3	42,4	22	2x1¼	2x1¼	2x2
	6.4.50.8	44,2	32,1	28214	64,0	213	74	838	3656	895	840	760	3256	1628	1628		26,9	42,4	34	2x1¼	2x1¼	2x2
	8.4.50.8	53,0	38,4	27033	64,0	284	98	1050	3656	1015	840	880	3256	1628	1628		26,9	48,3	34	2x1¼	2x1¼	3

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

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 ZFB/ZFZ Drawing



* = type .3.56.
 type .3.63.
 type .4.50.



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





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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