

Air coolers FC38

Standard

Cu/Al-R404A/Coolants

GEA Heat Exchangers

Goedhart FC38S



Goedhart FC38D



Goedhart FC38L





Goedhart FC38

The range Goedhart FC38 standard ceiling mounted air coolers are standard air coolers for cooling and freezing applications (FC38S), working/preparation rooms and storage rooms for humidity sensitive products (FC38D) and for cold storage rooms with height limitation (FC38L).

The standard FC38 aircoolers are suitable for all known refrigerants and not corrosive coolants, with the exception of NH3.

Type description

FC38Si(dx) 6.2.40.7-230-E

FC38S = Ceiling mounted air coolers	2	= Number of fans
FC38D = Dual discharge air coolers		
FC38L = Extra low air cooler	40	= Fan diameter in cm
i = internally enhanced tubes	7	= Fin spacing
p = plain tubes		
	230	= 1x230V Fan tension
	400	= 3x400V Fan tension
(dx) = R404A		
(G) = coolant		
6 = number of tubes deep	E	= Electrical defrost
	H	= Hot gas defrost

General features

Coil block

- Tube distance : 38x33 mm versprongen
- Tubes : 12mm o.d copper tube
- : I= internally enhanced tubes for refrigerants (dx)
P= internally plain tubes for coolants(G) and refrigerants (dx)
- Fins : aluminium HT-fins
- Fin spacing : 4 mm : Suitable for applications with air temperatures above 0°C and with expected limited frost
: 7 mm : Suitable for applications with air temperatures below 0°C and expected frost
- A good thermal with the fins contact because the copper tubes are mechanically expanded into fully collared aluminium fins.
- The suction header is executed with a Schröder valve for testing applications
- All coil blocks for refrigerants are pressure tested to 40 bars. All coil blocks for coolants are pressure tested to 15 bars.
- FC38 aircoolers are supplied with a light overpressure charge.

General features

Casing

- Standard refrigerant connections are fixed on the left hand side of the unit when looking with the direction of the air flow.
- Construction suitable for mounting to the ceiling.
- The FC38 casing is made from galvanized sheet steel, with exception of:
 - FC38S drip tray is hinged and made from light aluminum.
 - FC38D has a fixed galvanized drip tray.
 - FC38L drip tray is hinged and made from light aluminum.
- Goedhart FC38L air cooler is executed with a short splash plate as standard.
- The casing has a corrosion resistant white epoxy spray finish (RAL 9003).
- Almost all fixing materials are made of stainless steel to prevent corrosion.
- A possible hot gas spiral or electric defrost elements will be fixed to the bottom side of the coil

Options

Extra opties	FC38S	FC38D	FC38L
Hot gas defrost	•		
Warm glycol defrost	•		
Fan heating	•		•
Splash plate	•		•
Zuigende uitvoering	•		
Draw through execution	•		
StSt tubes	•	•	•
StSt casing	•	•	•
Goldlack fins	•	•	•
Almg fins	•	•	•
Insulated drip tray	•		

P.E.D.

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

Guarantee

Goedhart gives in conformity with her general conditions of delivery the following guarantee periode on the Goedhart FC38 air coolers:

- within a 12 month period of product use
- at the latest within 18 months after the time of delivery.

Sound data

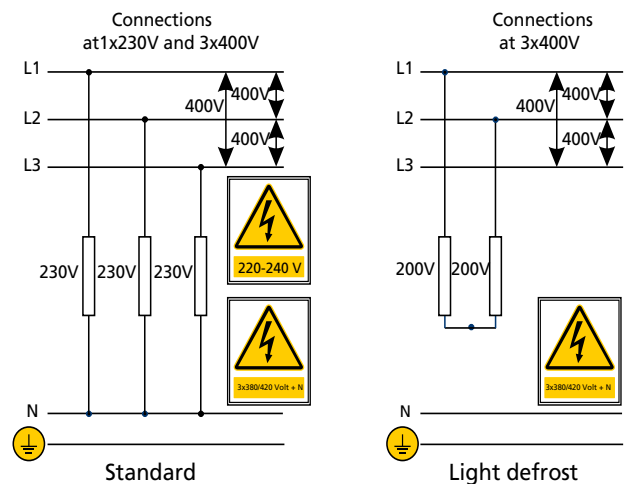
The mean sound pressure (LpA @ 3m ± 2 dB (A)) each air cooler is a calculated indication value according to the EN13487 standard parallel pipe. Goedhart uses the fan manufacturer's sound power level (LwA) at the inlet side of the fan. Changes to or by the fan or the product, affect the sound, in these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

Defrost systems

For room temperatures where ripe formation can be expected and where the coil can not be defrosted by the room air, electrical or hot gas defrost is necessary

Electrical defrost

On request FC38 can be provided with electrical defrost. FC38 is always delivered with heavy defrost. The heater elements are rated for 220/240 V and are 400/420 V with zero wire supply. The stainless steel heater elements are fitted in the coil block in inner tubes which form a highly conductive medium between the heaters and the fins. In the drip-tray, the heater elements are fitted to the bottom side of the underside of the aluminum inner tray. The heater elements in the coil block are removable from the header side of the unit, 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). The drip tray can be provided with a copper hot gas spiral, which is enclosed in special aluminum profiles, which are rigidly secured to underside of the aluminum inner tray.

Mounting & Maintenance

FC38 is delivered in a wooden crate. FC38S will be delivered with the separate drip-tray. When crated, FC38 can be handled by crane or fork-lift truck, which makes it very easy to mount. The drip tray of the FC38S is delivered separately. For maintenance and instructions see our manual delivered on order or can be downloaded from our web site www.goedhart.nl.



Fans

FC38 aircoolers are executed with 2 fan manufactures:
 EBM : Ø250, Ø300, Ø350, Ø400 and Ø450
 Ziehl Abegg : Ø500

(We reserve the right to alter the manufacturer)

The fans are suitable for operation in air temperatures between -30 °C to +40 °C. When the air temperature is lower then -30 °C , special fans are needed. These speciale fans have a longer delivery time. The protection class is IP44. The fans are neither available with stainless steel protection guards nor stainless steel arms.

The technical data in the table are the same as on the motor name plates and is valid for an air temperature of +20 oC. Also the data are given for working in an air temperature of 0 °C and -20 °C.

1x230V-50Hz

The standard connection tension for the EBM fans is 230V-50Hz-1 phase for the fan diameters Ø250, Ø300, Ø350, Ø400 en Ø450.

The fan motors are standard equipped with internally connected thermo-contacts.

3x400V-50Hz

The EBMØ450 fan is on request available in 230/400V-50Hz-3 phase. The fan is executed with a thermal contact.

The standard connection voltage for the Ziehl Abegg Ø500 is 400/690V-50Hz- 3phase (on request 230V-50Hz-1 phase). This fan is equipped with thermo contacts.

Fan type	Values at 1x230V-50Hz								Sound power indication ach fan LwA (+/-2dB(A))
	Speed	Input	+20°C		0°C		-20°C		
			FLC	Start	FLC	Start	FLC	Start	
rpm	[W]	[A]	[A]	[A]	[A]	[A]	[A]	[dBA]	
4 pole fans (1500 rpm nominal)									
S4E250	400	45	0,21	0,35	0,23	0,38	0,24	0,41	69
S4E300	1390	73	0,32	0,60	0,44	0,65	0,46	0,70	74
S4E350	1400	130	0,58	1,30	0,63	1,40	0,67	1,51	79
S4E400	1430	160	0,73	1,90	0,79	2,05	0,85	2,20	82
S4E450*	1390	245	1,10	2,70	1,19	2,92			85
S4E450	1350	480	2,20	5,80	2,27	6,26	2,44	3,13	85
FE050	1210	770	3,40	7,40	3,67	7,99	3,94	8,58	81

6 pole fans (1000 rpm nominal) *

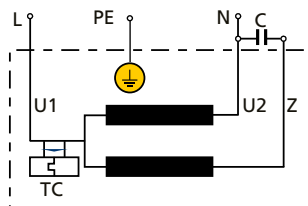
S6E400	950	120	0,55	0,90	0,59	0,97			72
S6E450	920	165	0,80	1,36	0,85	1,47			77

Fan type	Values at 3x230/400V-50Hz								Sound pressure level each fan **
	Speed	Input	+20°C		0°C		-20°C		
			FLC	Start	FLC	Start	FLC	Start	
rpm	[W]	[A]	[A]	[A]	[A]	[A]	[A]	[dBA]	
4 pole fans (1500 rpm nominal)									
S4D450	1330	585	1,10	3,00	1,18	3,24	1,28	3,48	85
FE050	1330	790	1,45	5,20	1,57	5,62	1,68	6,03	83

* = Only FC38D

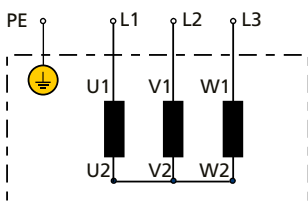
ebm-papst 1x230V-50Hz

L= blue
 N=black
 Z=brown



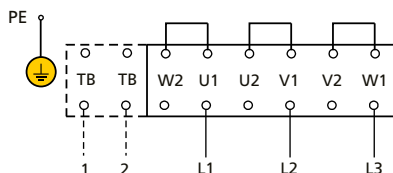
ebm-papst 3x230/400V-50Hz

U1=black
 V1=blue
 W1=brown
 U2=green
 V2=white
 W2=yellow



Ziehl Abegg 3x400/690V

U1 =brown
 V1 =blue
 W1=black
 U2 =red
 V2 =grey
 W2=orange
 TB =white



Correction factors

Correction factors DT1 (=Air-on)

The nominal capacities of the Goedhart FC38i(dx) and FC38p(dx) air coolers 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 saturated temperature corresponding to the pressure at the suction outlet of the cooler.

The nominal capacities:

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

Correction factors for various evaporation temperatures and temperature differences (DT1) 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 = factor x Q requested

R404A										
DT1	Evaporation temperature (°C)									
K	+7	+6	+5	+4	+3	+2	+1	0	-1	-2
6	1,81	1,81	1,82	1,82	1,83	1,83	1,84	1,84	1,84	1,85
7	1,49	1,50	1,50	1,50	1,51	1,51	1,52	1,52	1,52	1,53
8	1,27	1,28	1,28	1,29	1,29	1,29	1,30	1,30	1,30	1,31
9	1,10	1,10	1,11	1,11	1,12	1,12	1,13	1,13	1,13	1,14
10	0,97	0,98	0,98	0,99	0,99	0,99	1,00	1,00	1,00	1,01
11	0,88	0,88	0,88	0,89	0,89	0,90	0,90	0,90	0,90	0,91
12	0,79	0,79	0,79	0,80	0,80	0,81	0,81	0,81	0,81	0,82

SC1 DT1 = 10K
Air on = 10°C (0/+10°C)

R404A										
DT1	Evaporation temperature (°C)									
K	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12
6	1,30	1,34	1,38	1,42	1,42	1,43	1,43	1,43	1,44	1,44
7	1,04	1,07	1,10	1,14	1,17	1,18	1,18	1,18	1,19	1,19
8	0,86	0,88	0,91	0,94	0,97	1,00	1,00	1,01	1,01	1,01
9	0,75	0,75	0,77	0,79	0,82	0,84	0,87	0,87	0,87	0,88
10	0,66	0,66	0,66	0,68	0,70	0,72	0,74	0,77	0,77	0,77
11	0,59	0,59	0,59	0,59	0,61	0,63	0,65	0,67	0,69	0,69
12	0,54	0,54	0,54	0,54	0,54	0,55	0,57	0,58	0,60	0,62

SC2 DT1 = 8K
Air on = 0°C (-8/0°C)

R404A										
DT1	Evaporation temperature (°C)									
K	-21	-22	-23	-24	-25	-26	-27	-28	-29	-30
6	1,20	1,20	1,21	1,21	1,21	1,22	1,22	1,23	1,23	1,23
7	0,99	0,99	0,99	1,00	1,00	1,00	1,00	1,01	1,01	1,02
8	0,84	0,84	0,84	0,85	0,85	0,85	0,85	0,86	0,86	0,86
9	0,73	0,73	0,73	0,73	0,73	0,74	0,74	0,74	0,74	0,75
10	0,64	0,64	0,64	0,64	0,65	0,65	0,65	0,65	0,66	0,66
11	0,57	0,57	0,57	0,58	0,58	0,58	0,58	0,58	0,59	0,59
12	0,52	0,52	0,52	0,52	0,52	0,52	0,53	0,53	0,53	0,53

SC3 DT1 = 7K
Air on = -18°C (-25/-18°C)

Capacity optimization

To achieve the best possible combination of application, refrigerant and capacity, Goedhart can optimise the coil circuiting, depending on the specific conditions under which the products will be used. FC38 is a standard product to ensure shorter delivery times. The circuiting of these evaporators has been optimized according to the most commonly used coolants/refrigerants and conditions. Specific applications can vary from this, our sales department is there to assist you in selecting the best circuiting for your application.

Correction factors for coolants

The nominal capacities of the Goedhart FC38p(G) air coolers are based on an air-on temperature of 12°C, a RH of 85% and:

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

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	

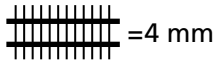
E-Glycol 28%										
in/out	Air-on temperature (°C)									
°C	+8	+9	+10	+11	+12	+13	+14	+15	+16	
-2 / 3	1,81	1,46	1,34	1,16	1,00	0,88	0,82	0,81	0,69	
-1 / 4	2,35	1,72	1,41	1,28	1,10	0,96	0,85	0,79	0,75	
0 / 5	2,43	2,30	1,64	1,40	1,24	1,06	0,93	0,84	0,76	
1 / 6		2,38	2,28	1,59	1,37	1,21	1,05	0,92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

P-Glycol 28%										
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	1,00	0,92	
2 / 7			2,45	1,96	1,63	1,42	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	

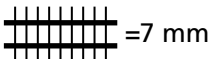
Freezium 24%										
in/out	Air-on temperature (°C)									
°C	+8	+9	+10	+11	+12	+13	+14	+15	+16	
-2 / 3	1,66	1,44	1,25	1,11	1,00	0,91	0,83	0,77	0,71	
-1 / 4	1,94	1,62	1,42	1,23	1,09	0,98	0,89	0,82	0,76	
0 / 5	2,38	1,91	1,59	1,39	1,21	1,07	0,97	0,88	0,81	
1 / 6		2,34	1,88	1,57	1,37	1,20	1,06	0,95	0,86	
2 / 7			2,30	1,86	1,55	1,35	1,18	1,05	0,94	

F38Di(dx) - R404A



Type	Fan diameter	1x230V-50Hz-4 pole				1x230V-50Hz-6 pole				Surface	Connections		Weight	Internal volume
		SC1	SC2			SC1	SC2				I	K		
FC38D	mm	DT1 = 10K Air on =10°C 0 / +10	DT1 = 8K Air on =0°C -8 / 0	Air volume	LpA @ 3 m (+/- 2 dB(A))*	DT1 = 10K Air on =10°C 0 / +10	DT1 = 8K Air on =0°C -8 / 0	Air volume	LpA @ 3 m (+/- 2 dB(A))*	m ²	mm	mm	kg	dm ³
6.1.30.4	1x300	4,6	3,1	1048	52					16	12	28	54	4
6.1.35.4	1x350	6,8	4,6	1644	57					20	12	28	66	6
6.2.30.4	2x300	8,9	6,1	2045	55					30	12	28	82	8
6.2.35.4	2x350	12,2	8,3	3060	60					34	16	28	92	8
6.2.40.4	2x400	20,2	13,8	4890	63	15,6	10,8	3434	53	61	16	35	123	14
6.2.45.4	2x450	34,4	23,4	8674	68	25,4	17,6	5669	58	95	16	42	161	20
6.3.30.4	3x300	13,7	9,5	3155	57					48	16	28	114	10
6.3.35.4	3x350	17,2	11,7	4343	62					48	16	28	116	10
6.3.40.4	3x400	30,2	20,7	7339	64	23,4	16,2	5156	54	91	16	35	169	20
6.3.45.4	3x450	52,4	35,7	13139	69	38,3	26,5	8600	60	146	22	42	228	32
6.4.30.4	4x300	17,7	12,2	4095	58					61	16	28	138	14
6.4.35.4	4x350	22,1	15,1	5609	63					61	16	28	139	14
6.4.40.4	4x400	37,5	25,6	9240	65	28,7	19,8	6439	55	110	16	42	200	24

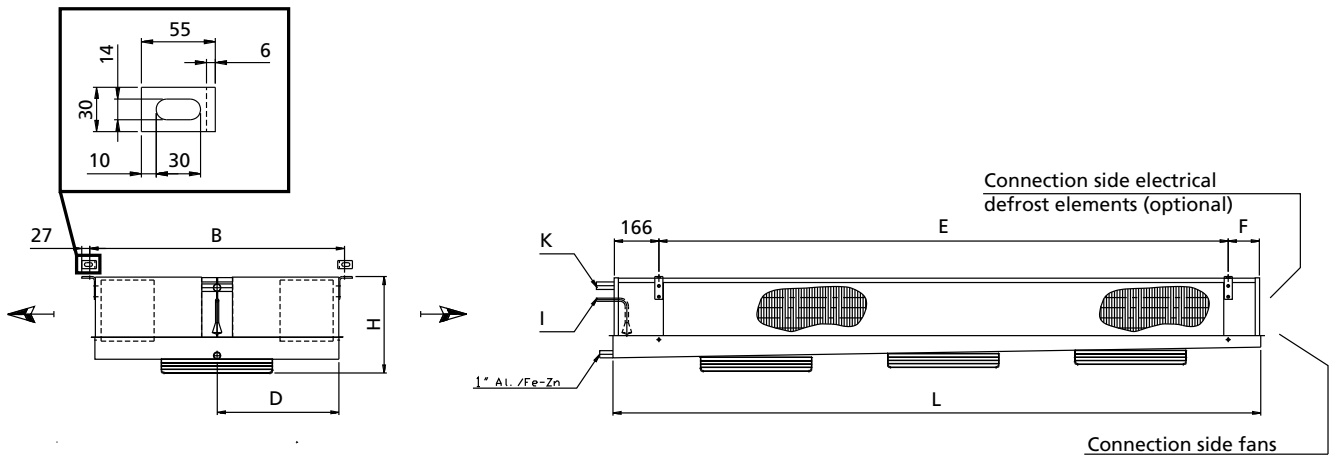
* = Sound pressure indication (LpA) at 3 m distance each air cooler (+/- 2 dB(A)), free field conditions, according EN13487



Type	Fan diameter	1x230V-50Hz-4 pole				1x230V-50Hz-6 pole				Surface	Connections		Weight	Internal volume
		SC1	SC2			SC1	SC2				I	K		
FC38D	mm	DT1 = 10K Air on =10°C 0 / +10	DT1 = 8K Air on =0°C -8 / 0	Air volume	LpA @ 3 m (+/- 2 dB(A))*	DT1 = 10K Air on =10°C 0 / +10	DT1 = 8K Air on =0°C -8 / 0	Air volume	LpA @ 3 m (+/- 2 dB(A))*	m ²	mm	mm	kg	dm ³
6.1.30.7	1x300	3,9	2,6	1262	52					10	12	28	51	4
6.1.35.7	1x350	5,6	3,8	2004	57					12	12	28	62	6
6.2.30.7	2x300	7,5	5,1	2480	55					18	12	28	77	8
6.2.35.7	2x350	10,0	6,8	3706	60					21	12	28	87	8
6.2.40.7	2x400	16,6	11,2	5793	63	13,5	9,3	4197	53	36	16	28	114	14
6.2.45.7	2x450	27,6	18,7	10019	68	21,5	14,7	6703	58	57	16	35	145	20
6.3.30.7	3x300	11,7	7,9	3795	57					29	16	28	107	10
6.3.35.7	3x350	14,3	9,7	5320	62					29	12	28	109	10
6.3.40.7	3x400	24,9	16,9	8695	64	20,3	13,9	6299	54	55	16	35	154	20
6.3.45.7	3x450	41,7	28,2	15125	69	32,8	22,5	10128	60	88	16	42	203	32
6.4.30.7	4x300	15,1	10,2	4964	58					36	16	28	128	14
6.4.35.7	4x350	18,4	12,4	6912	63					36	16	28	129	14
6.4.40.7	4x400	31,0	20,9	11135	65	25,4	17,4	7999	55	66	16	35	181	24

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

F38Di(dx) - R404A



Declarations

Connection \leq 35 mm	: Declaration of incorporation (SEP)
Connection 42mm and 54 mm	: module A
Group of fluid	: 2
PS	: 28 bar
TS	: +55 / -40 °C

Type	Dimensions						Electrical defrost at 3x400V-50Hz				Standard	Light	Dimensions & Electrical defrost		
	L	B	H	D	E	F	Coil block		Drip tray					kW	kW**
	mm	mm	mm	mm	mm	mm	number	O [mm]	number	O [mm]					
FC38D	mm	mm	mm	mm	mm	mm	number	O [mm]	number	O [mm]	kW	kW**			
6.1.30.*	925	850	280	405	575	166	2x L=1600	132	2x L=1600	150	2,5				
6.1.35.*	1080	850	280	405	730	166	2x L=1900	132	2x L=1900	150	3,0				
6.2.30.*	1425	850	280	405	1075	166	2x L=2500	132	2x L=2500	150	4,1				
6.2.35.*	1570	850	280	405	1220	166	2x L=2800	132	2x L=2800	150	4,6				
6.2.40.*	1775	950	390	455	1425	166	4x L=3100	132	2x L=3400	150	8	6,1			
6.2.45.*	2025	1000	465	480	1675	166	4x L=3700	132	2x L=3700	150	9,3	7,0			
6.3.30.*	2025	850	280	405	1675	166	2x L=3700	132	2x L=3700	150	6,2				
6.3.35.*	2025	850	280	405	1675	166	2x L=3700	132	2x L=3700	150	6,2				
6.3.40.*	2475	950	390	455	2125	166	4x L=4600	132	2x L=4600	150	11,6	8,8			
6.3.45.*	2850	1000	465	480	2550	116	4x L=5500	132	2x L=5500	150	14,0	10,6			
6.4.30.*	2475	850	280	405	2125	166	2x L=4600	132	2x L=4600	150	7,8				
6.4.35.*	2475	850	280	455	2125	166	2x L=4600	132	2x L=4600	150	7,8				
6.4.40.*	2850	950	390	480	2550	116	4x L=5500	132	2x L=5500	150	14,0	10,6			



GEA Heat Exchangers

GEA Goedhart B.V.

Nijverheidsweg 6, 4695 RC Sint Maartensdijk
the Netherlands
Phone +31 (0)166 665 665, Fax+31 (0)166 663 698
www.goedhart.nl
info.goedhart.nl@geagroup.com

GEA Heat Exchangers

GEA Goedhart s.r.o.

Kostomlátecká 180, 288 26 Nymburk
Czech Republic
Phone +420 (0)325 819 951, Fax+420 (0)325 519 952
www.goedhart.cz
goedhart.cz@geagroup.com

02.01.2.011.dok/2010-02 / Subject to modification

All offers, contracts, deliveries and other legal relations from GEA Goedhart B.V. are subject to the latest version of our general sales and delivery conditions as filed at the Chamber of Commerce in Middelburg - The Netherlands

Applicability of the general conditions put forward by any buyer is rejected explicitly by GEA Goedhart B.V.