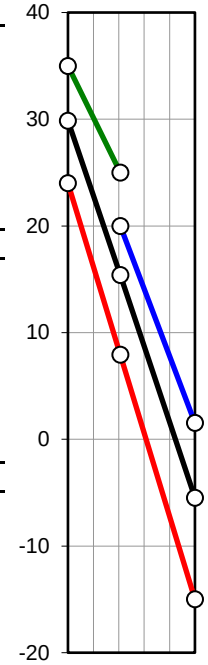
CC-System in winter		SA-He tandard plate-HE		RA-Co	Definition
Height over sea level	m				500.000
Pressure	hPa				954.276
Capacity	%	100.000	41.256	58.744	
Capacity sensible	kW	183.917	75.876	87.674	
Capacity latent	kW	---	---	19.630	
Capacity frost	kW	---	---	0.736	
Capacity total	kW	183.917	75.876	108.040	
Surface reserve	%	0.019		0.002	
Present surface	m2	1047.921		1047.921	

SA-He (ff = 0.00005 m2K/W)		Inlet	Outlet	Definition
Temp.	°C	-15.000	24.000	20.000
Rel. humidity	%	90.000	4.947	40.000
Abs. humidity	g/kg	0.961	0.961	6.145
Volume flow humid	m3/h	13100.203	15079.239	15000.000
Velocity	m/s	1.824	2.100	2.089
Pressure drop	Pa		113.764	

RA-Co (ff = 0.00005 m2K/W)		Inlet	Outlet	Definition
Temp.	°C	20.000	1.530	20.000
Rel. humidity	%	40.000	99.999	40.000
Abs. humidity	g/kg	6.145	4.491	6.145
Volume flow humid	m3/h	15000.000	14017.962	15000.000
Velocity	m/s	2.089	1.952	2.089
Pressure drop (dry 126 Pa)	Pa		134.497	

30 V% Et.glycol		SA-He tandard plate-HE		RA-Co
Temp. in	°C	29.859	15.389	-5.471
Temp. out	°C	-5.471	29.859	15.389
Volume flow	m3/h	4.936	4.952	4.927
Velocity	m/s	0.865		0.863
Reynolds	---	3794.452		3019.779
Pressure drop	kPa	121.981		129.240



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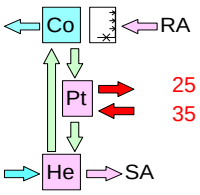
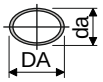
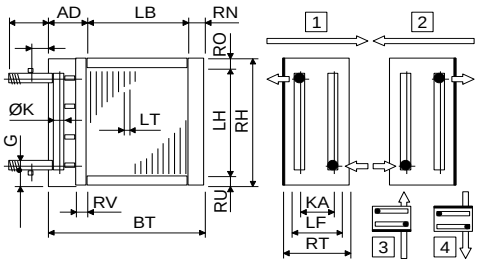


Software by www.zcs.ch

Technical data			SA-He	RA-Co		SA-He	RA-Co
Tubes total		Piece	600	600	Tubes:	Cu	Cu
Tubes blank		Piece	0	0	Tubes:	smooth	smooth
Int. vent./drains		Piece	9	9	Tubes:	in line	in line
Tube rows on the depth		Piece	20	20	Tubes:	circular	circular
Tube rows on the height		Piece	30	30	Collectors:	Cu	Cu
Tube coupling in series		Piece	40	40	Collectors:	0.67 m/s	0.67 m/s
Number of circuits (NC)		Piece	15	15	Connections:	Rg7	Rg7
Volume		l	133	133	Connections:	0.67 m/s	0.67 m/s
Weight		kg	464	464	Fins:	Al	Al
Connections	G	---	2"	2"	Fins:	smooth	smooth
Frame height	RH	mm	1130	1130	Frame:	AlMg3	AlMg3
Frame width	BT	mm	2096	2096	Air flow direction:	horizontal	horizontal
Frame depth	RT	mm	760	760	Protection:	without	without
Finned height	LH	mm	1050	1050	Protection:	---	---
Finned width	LB	mm	1900	1900			
Finned depth	LF	mm	700	700			
Frame on top	RO	mm	40	40			
Frame on bottom	RU	mm	40	40			
Frame in front	RV	mm	30	30			
Frame on back (~53/53mm)	RN	mm	53	53			
Collector-Diameter	K	mm	54	54			
Collector covering	AD	mm	143	143			
Collector distance	KA	mm	682	682			
Fin spacing	LT	mm	2.500	2.500			
Fin thickness	LD	mm	0.200	0.200			
Tube diameter	DA	mm	12.400	12.400	Delivery:		5-6 weeks
Tube diameter	da	mm	12.400	12.400	Validity:		12 weeks
Tube thickness	S	mm	0.400	0.400	Condit.:		net, prepaid address
Tube interval on the height	S1	mm	35.000	35.000	Payment:		30 days net
Tube interval on the depth	S2	mm	35.000	35.000			





SA-He: 35/35/12-20R-30T-1900A-2.5PA-15C-Cu/Al/AlMg3 — **SA-He: EUR 7092.00**

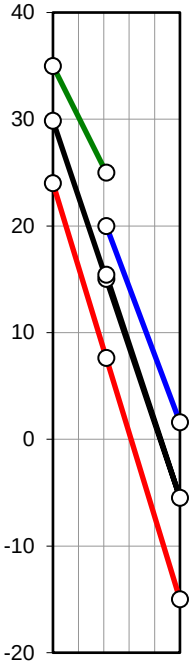
RA-Co: 35/35/12-20R-30T-1900A-2.5PA-15C-Cu/Al/AlMg3 — **RA-Co: EUR 7092.00**

CC-System in winter		SA-He tandard plate-HE		RA-Co	Definition
Height over sea level	m				500.000
Pressure	hPa				954.276
Capacity	%	100.000	41.982	58.018	
Capacity sensible	kW	183.917	77.211	87.345	
Capacity latent	kW	---	---	19.360	
Capacity frost	kW	---	---	0.000	
Capacity total	kW	183.917	77.211	106.706	
Surface reserve	%	0.019		0.165	
Present surface	m2	1047.921		1047.921	

SA-He (ff = 0.00005 m2K/W)		Inlet	Outlet	Definition
Temp.	°C	-15.000	24.000	20.000
Rel. humidity	%	90.000	4.947	40.000
Abs. humidity	g/kg	0.961	0.961	6.145
Volume flow humid	m3/h	13100.203	15079.239	15000.000
Velocity	m/s	1.824	2.100	2.089
Pressure drop	Pa		113.764	

RA-Co (ff = 0.00005 m2K/W)		Inlet	Outlet	Definition
Temp.	°C	20.000	1.600	20.000
Rel. humidity	%	40.000	100.000	40.000
Abs. humidity	g/kg	6.145	4.514	6.145
Volume flow humid	m3/h	15000.000	14022.043	15000.000
Velocity	m/s	2.089	1.952	2.089
Pressure drop (dry 126 Pa)	Pa		134.325	

30 V% Et.glycol		SA-He tandard plate-HE		RA-Co
Temp. in	°C	29.859	15.027	-5.471
Temp. out	°C	-5.471	29.859	15.420
Volume flow	m3/h	4.936	4.951	4.861
Velocity	m/s	0.865		0.852
Reynolds	---	3794.452		2927.843
Pressure drop	kPa	121.981		126.805



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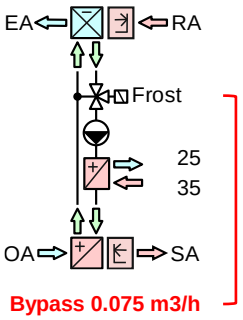

Bypass 0.075 m3/h

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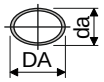
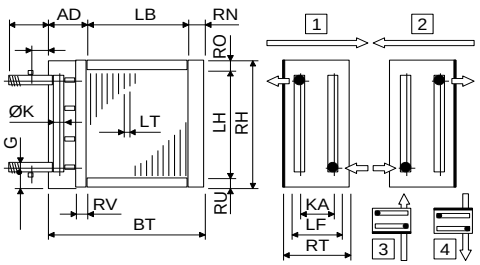
Technical data			SA-He	RA-Co		SA-He	RA-Co
Tubes total		Piece	600	600	Tubes:	Cu	Cu
Tubes blank		Piece	0	0	Tubes:	smooth	smooth
Int. vent./drains		Piece	9	9	Tubes:	in line	in line
Tube rows on the depth		Piece	20	20	Tubes:	circular	circular
Tube rows on the height		Piece	30	30	Collectors:	Cu	Cu
Tube coupling in series		Piece	40	40	Collectors:	0.67 m/s	0.66 m/s
Number of circuits (NC)		Piece	15	15	Connections:	Rg7	Rg7
Volume		l	133	133	Connections:	0.67 m/s	0.66 m/s
Weight		kg	464	464	Fins:	Al	Al
Connections	G	---	2"	2"	Fins:	smooth	smooth
Frame height	RH	mm	1130	1130	Frame:	AlMg3	AlMg3
Frame width	BT	mm	2096	2096	Air flow direction:	horizontal	horizontal
Frame depth	RT	mm	760	760	Protection:	without	without
Finned height	LH	mm	1050	1050	Protection:	---	---
Finned width	LB	mm	1900	1900			
Finned depth	LF	mm	700	700			
Frame on top	RO	mm	40	40			
Frame on bottom	RU	mm	40	40			
Frame in front	RV	mm	30	30			
Frame on back (~53/53mm)	RN	mm	53	53			
Collector-Diameter	K	mm	54	54			
Collector covering	AD	mm	143	143			
Collector distance	KA	mm	682	682			
Fin spacing	LT	mm	2.500	2.500			
Fin thickness	LD	mm	0.200	0.200			
Tube diameter	DA	mm	12.400	12.400	Delivery:		5-6 weeks
Tube diameter	da	mm	12.400	12.400	Validity:		12 weeks
Tube thickness	S	mm	0.400	0.400	Condit.:		net, prepaid address
Tube interval on the height	S1	mm	35.000	35.000	Payment:		30 days net
Tube interval on the depth	S2	mm	35.000	35.000			





SA-He: 35/35/12-20R-30T-1900A-2.5PA-15C-Cu/Al/AlMg3 — **SA-He: EUR 7092.00**

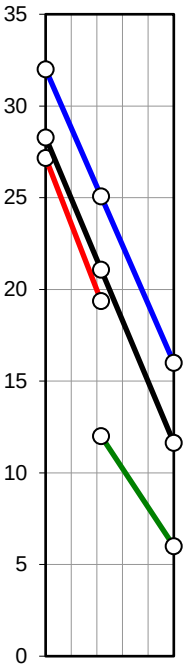
RA-Co: 35/35/12-20R-30T-1900A-2.5PA-15C-Cu/Al/AlMg3 — **RA-Co: EUR 7092.00**

CC-System in summer		RA-Hy tandard plate-HE		SA-Co	Definition
Height over sea level	m				500.000
Pressure	hPa				954.276
Capacity	%	43.275	56.725	100.000	
Capacity sensible	kW	37.755	49.489	76.992	
Capacity latent	kW	0.000	---	10.252	
Capacity frost	kW	---	---	0.000	
Capacity total	kW	37.755	49.489	87.244	
Surface reserve	%	0.421		0.342	
Present surface	m2	1047.921		1047.921	

RA-Hy (ff = 0.00005 m2K/W)		Inlet	Outlet	Definition
Temp. (26.000)	°C	19.371	27.172	20.000
Rel. humidity (54.865)	%	100.000	62.499	40.000
Abs. humidity (12.225)	g/kg	14.984	14.984	6.145
Volume flow humid	m3/h	15178.376	15583.142	15000.000
Velocity	m/s	2.113	2.170	2.089
Pressure drop (dry 128 Pa)	Pa		128.204	

SA-Co (ff = 0.00005 m2K/W)		Inlet	Outlet	Definition
Temp.	°C	32.000	16.000	20.000
Rel. humidity	%	40.000	97.441	40.000
Abs. humidity	g/kg	12.608	11.752	6.145
Volume flow humid	m3/h	15774.593	14927.347	15000.000
Velocity	m/s	2.196	2.078	2.089
Pressure drop (dry 131 Pa)	Pa		136.367	

30 V% Et.glycol		RA-Hy tandard plate-HE		SA-Co
Temp. in	°C	28.283	21.093	11.637
Temp. out	°C	21.093	11.637	28.283
Volume flow	m3/h	4.952	4.946	4.952
Velocity	m/s	0.868		0.868
Reynolds	---	5422.330		4786.460
Pressure drop	kPa	112.347		115.600



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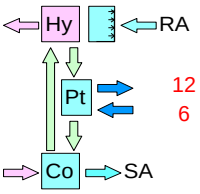
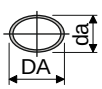
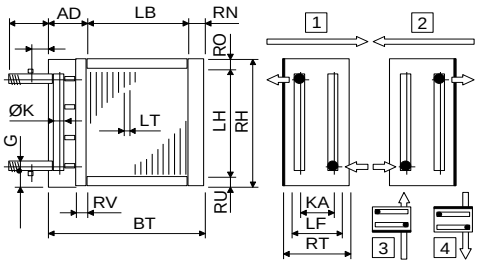


Software by www.zcs.ch

Technical data			RA-Hy	SA-Co		RA-Hy	SA-Co
Tubes total		Piece	600	600	Tubes:	Cu	Cu
Tubes blank		Piece	0	0	Tubes:	smooth	smooth
Int. vent./drains		Piece	9	9	Tubes:	in line	in line
Tube rows on the depth		Piece	20	20	Tubes:	circular	circular
Tube rows on the height		Piece	30	30	Collectors:	Cu	Cu
Tube coupling in series		Piece	40	40	Collectors:	0.67 m/s	0.67 m/s
Number of circuits (NC)		Piece	15	15	Connections:	Rg7	Rg7
Volume		l	133	133	Connections:	0.67 m/s	0.67 m/s
Weight		kg	464	464	Fins:	Al	Al
Connections	G	---	2"	2"	Fins:	smooth	smooth
Frame height	RH	mm	1130	1130	Frame:	AlMg3	AlMg3
Frame width	BT	mm	2096	2096	Air flow direction:	horizontal	horizontal
Frame depth	RT	mm	760	760	Protection:	without	without
Finned height	LH	mm	1050	1050	Protection:	---	---
Finned width	LB	mm	1900	1900			
Finned depth	LF	mm	700	700			
Frame on top	RO	mm	40	40			
Frame on bottom	RU	mm	40	40			
Frame in front	RV	mm	30	30			
Frame on back (~53/53mm)	RN	mm	53	53			
Collector-Diameter	K	mm	54	54			
Collector covering	AD	mm	143	143			
Collector distance	KA	mm	682	682			
Fin spacing	LT	mm	2.500	2.500			
Fin thickness	LD	mm	0.200	0.200			
Tube diameter	DA	mm	12.400	12.400	Delivery:		5-6 weeks
Tube diameter	da	mm	12.400	12.400	Validity:		12 weeks
Tube thickness	S	mm	0.400	0.400	Condit.:		net, prepaid address
Tube interval on the height	S1	mm	35.000	35.000	Payment:		30 days net
Tube interval on the depth	S2	mm	35.000	35.000			





RA-Hy: 35/35/12-20R-30T-1900A-2.5PA-15C-Cu/Al/AlMg3 **RA-Hy: EUR 7092.00**

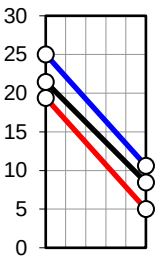
SA-Co: 35/35/12-20R-30T-1900A-2.5PA-15C-Cu/Al/AlMg3 **SA-Co: EUR 7092.00**

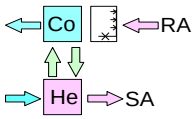
CC-System (DIN EN 308)		SA-He	RA-Co	Definition
Height over sea level	m			500.000
Pressure	hPa			954.276
Efficiency	%	71.934	71.919	
Capacity sensible	kW	67.738	67.737	
Capacity latent	kW	---	---	
Capacity frost	kW	---	---	
Capacity total	kW	67.738	67.737	
Surface reserve	%	0.005	0.088	
Present surface	m2	1047.921	1047.921	

SA-He (ff = 0.00005 m2K/W)		Inlet	Outlet	Definition
Temp.	°C	5.000	19.387	20.000
Rel. humidity	%	0.000	0.000	40.000
Abs. humidity	g/kg	0.000	0.000	6.145
Volume flow humid	m3/h	14093.320	14822.246	15000.000
Velocity	m/s	1.962	2.064	2.089
Pressure drop	Pa		117.895	

RA-Co (ff = 0.00005 m2K/W)		Inlet	Outlet	Definition
Temp.	°C	25.000	10.616	20.000
Rel. humidity	%	0.000	0.000	40.000
Abs. humidity	g/kg	0.000	0.000	6.145
Volume flow humid	m3/h	15106.644	14377.869	15000.000
Velocity	m/s	2.103	2.002	2.089
Pressure drop (dry 121 Pa)	Pa		121.111	

30 V% Et.glycol			SA-He	RA-Co
Temp.	in	°C	21.444	8.462
Temp.	out	°C	8.462	21.444
Volume flow		m3/h	4.940	4.942
Velocity		m/s	0.866	0.866
Reynolds		---	4144.906	4081.027
Pressure drop		kPa	119.418	119.958





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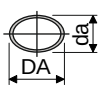
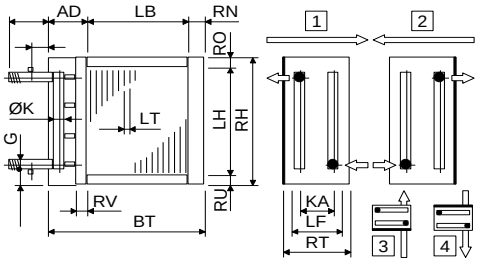
Technical data			SA-He	RA-Co		SA-He	RA-Co
Tubes total		Piece	600	600	Tubes:	Cu	Cu
Tubes blank		Piece	0	0	Tubes:	smooth	smooth
Int. vent./drains		Piece	9	9	Tubes:	in line	in line
Tube rows on the depth		Piece	20	20	Tubes:	circular	circular
Tube rows on the height		Piece	30	30	Collectors:	Cu	Cu
Tube coupling in series		Piece	40	40	Collectors:	0.67 m/s	0.67 m/s
Number of circuits (NC)		Piece	15	15	Connections:	Rg7	Rg7
Volume		l	133	133	Connections:	0.67 m/s	0.67 m/s
Weight		kg	464	464	Fins:	Al	Al
Connections	G	---	2"	2"	Fins:	smooth	smooth
Frame height	RH	mm	1130	1130	Frame:	AlMg3	AlMg3
Frame width	BT	mm	2096	2096	Air flow direction:	horizontal	horizontal
Frame depth	RT	mm	760	760	Protection:	without	without
Finned height	LH	mm	1050	1050	Protection:	---	---
Finned width	LB	mm	1900	1900			
Finned depth	LF	mm	700	700			
Frame on top	RO	mm	40	40			
Frame on bottom	RU	mm	40	40			
Frame in front	RV	mm	30	30			
Frame on back (~53/53mm)	RN	mm	53	53			
Collector-Diameter	K	mm	54	54			
Collector covering	AD	mm	143	143			
Collector distance	KA	mm	682	682			
Fin spacing	LT	mm	2.500	2.500			
Fin thickness	LD	mm	0.200	0.200			
Tube diameter	DA	mm	12.400	12.400	Delivery:		5-6 weeks
Tube diameter	da	mm	12.400	12.400	Validity:		12 weeks
Tube thickness	S	mm	0.400	0.400	Condit.:		net, prepaid address
Tube interval on the height	S1	mm	35.000	35.000	Payment:		30 days net
Tube interval on the depth	S2	mm	35.000	35.000			



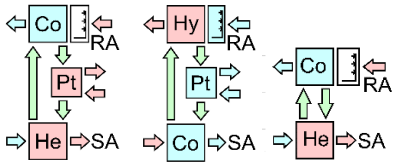


SA-He: 35/35/12-20R-30T-1900A-2.5PA-15C-Cu/Al/AlMg3 **SA-He:** **EUR** **7092.00**

RA-Co: 35/35/12-20R-30T-1900A-2.5PA-15C-Cu/Al/AlMg3 **RA-Co:** **EUR** **7092.00**

Economy with CC-System

Base value		Definition
Height over sea level	m	500.000
Pressure	bar	0.954
Volume flow humid at	°C	20.000
Volume flow humid at	%	40.000



CC-System		Winter	Summer	DIN EN 308	
Efficiency Supply air	**%**	**---**	**---**	**71.934**	
Capacity	kW	183.917	87.244	67.738	***A***
Surface reserve	%	0.019	0.342	0.005	
Present surface	m2	1047.921	1047.921	1047.921	

Supply air		Winter	Summer	DIN EN 308	
Temp. in	°C	-15.000	32.000	5.000	
Temp. out	°C	24.000	16.000	19.387	
Volume flow humid	m3/h	15000.000	15000.000	15000.000	***B***
Pressure drop	Pa	113.764	136.367	117.895	***C***
Fan efficiency	---	0.700	0.700	0.700	***D***
Fan power	kW	0.677	0.812	0.702	***E***

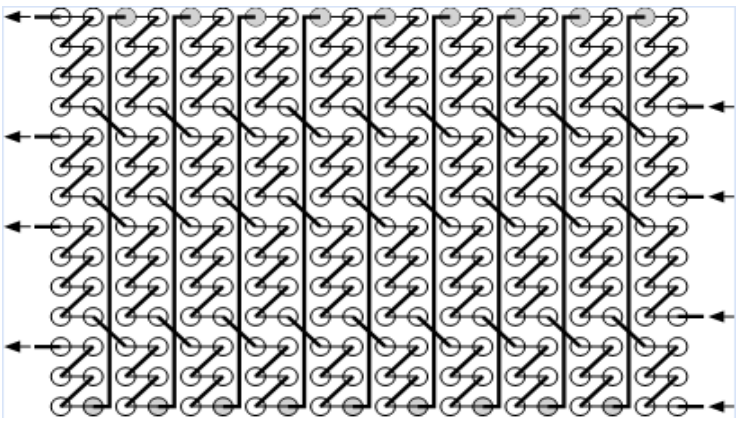
Return air		Winter	Summer	DIN EN 308	
Temp. in	°C	-15.000	19.371	25.000	
Temp. out	°C	90.000	27.172	10.616	
Volume flow humid	m3/h	15000.000	15000.000	15000.000	***F***
Pressure drop	Pa	134.497	128.204	121.111	***G***
Fan efficiency	---	0.700	0.700	0.700	***H***
Fan power	kW	0.801	0.763	0.721	***I***

30 V% Et.glycol		Winter	Summer	DIN EN 308	
Volume flow	m3/h	4.936	4.952	4.940	***J***
Pressure drop Supply air	bar	1.220	1.156	1.194	***K***
Pressure drop Return air	bar	1.292	1.123	1.200	***L***
Pressure drop Hydraulics	bar	2.000	2.000	2.000	***M***
Pressure drop Total	bar	4.512	4.279	4.394	***N***
Pump efficiency	---	0.800	0.800	0.800	***O***
Pump power	kW	0.773	0.736	0.754	***P***

Economy		Winter	Summer	DIN EN 308	
Gross useful ratio with CC-System	kW	---	---	67.738	***A***
Need of energy with CC-System	kW	2.251	2.311	2.176	***Q***
Net useful ratio with CC-System	kW	---	---	65.561	***R***
Coefficient of performance (COP)	**---**	**---**	**---**	**31.124**	***S***

Economy		Winter	Summer	DIN EN 308	
Volume flow humid Total	m3/h	30000.000	30000.000	30000.000	***T***
Need of energy with CC-System	kW	2.251	2.311	2.176	***Q***
Specific Recovery Power (SRP)	**Ws/m3**	**270.125**	**277.279**	**261.165**	***U***

Adiabatic return air cooling



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$$E = \frac{B * C}{D * 3600 * 1000}$$

$$I = \frac{F * G}{H * 3600 * 1000}$$

$$N = K + L + M$$

$$P = \frac{J * N * 100000}{O * 3600 * 1000}$$

$$Q = E + I + P$$

$$R = A - Q$$

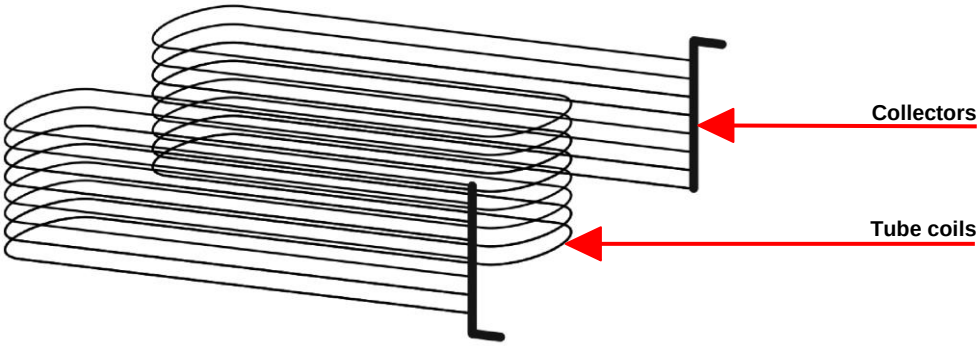
$$S = \frac{A}{Q}$$

$$T = B + F$$

$$U = \frac{Q * 3600 * 1000}{T}$$

Optimal pressure drop distribution on the tube coils and the collectors

With the optimal pressure drop distribution on the tube coils and the collectors, it is important that all tube coils receive the same amount of liquid. This is the only way to achieve optimum performance of the heat exchanger. This can only be achieved if the pressure drop in the tube coils is significantly higher than in the collectors. So it's about the pressure ratio (T/C), see below.



Typical applications			Heater	Cooler	CC-System
Pressure drop total	---	kPa	10.000	40.000	200.000
Coil pressure drop	T	kPa	6.500	33.000	193.000
Pressure drop collectors	C	kPa	3.500	7.000	7.000
Pressure ratio	**T/C**	**---**	**1.857**	**4.714**	**27.571**

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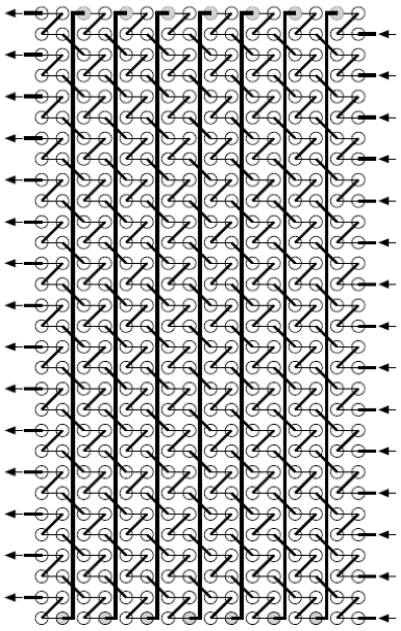
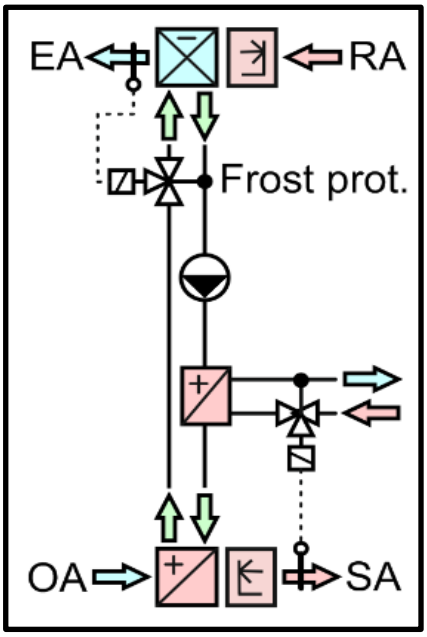
So if you really want to worry about optimal liquid distribution, turn to the air heater and air cooler, but certainly not to the heat exchangers in heat recovery! And yet there are absolute idiots who have applied for patents on an injection for heat recovery, i.e. exactly where it is totally superfluous.

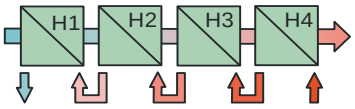
www.maag.com

An optimal CC-System must therefore have a pressure drop of 2 bar per heat exchanger in order to achieve maximum performance. In addition, there is the hydraulic system with a further 2 bar pressure drop. In total, a pressure drop of 6 bar is up for debate, which is not a problem when choosing the right pump. Idiots choose centrifugal pumps with a non-linear characteristic. Those familiar with the subject choose gear pumps from www.maag.com with absolutely linear characteristics. This means, for example, that when the speed is reduced to 50 %, the flow rate is exactly 50 %, so regulation is very easy.





Definition		
Height over sea level	m	500.000
Pressure	hPa	954.276
Temp.	°C	20.000
Rel. humidity	%	40.000
Air humid	m3/h	15000.000
30 V% Et.glycol	m3/h	4.936



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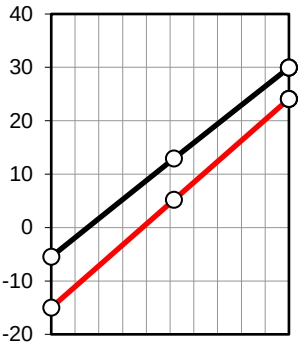
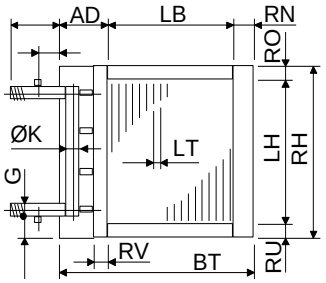
Air humid		Heater 1	Heater 2	Heater 3	Heater 4
Temp. Inlet	°C	-15.000	5.200	24.100	24.100
Rel. humidity Inlet	%	90.000	16.624	4.917	4.917
Temp. Outlet	°C	5.200	24.100	24.100	24.100
Rel. humidity Outlet	%	16.624	4.917	4.917	4.917
Pressure drop (103.01 %)	Pa	55.750	61.442	0.000	0.000

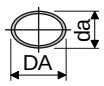
30 V% Et.glycol		Heater 1	Heater 2	Heater 3	Heater 4
Temp. Inlet	°C	12.944	29.945	29.945	29.945
Temp. Outlet	°C	-5.471	12.944	29.945	29.945
Pressure drop (101.91 %)	kPa	66.175	58.138	0.000	0.000

Heat exchanger		Heater 1	Heater 2	Heater 3	Heater 4
Capacity	kW	95.237	89.152	0.000	0.000
Surface reserve	%	0.158	0.442	0.000	0.000
Present surface	m2	534.200	534.200	0.000	0.000
Required surface	m2	533.359	531.851	0.000	0.000
k-coeff.	W/m2K	21.417	25.964	0.000	0.000
Average temp. diff.	K	8.337	6.456	0.000	0.000

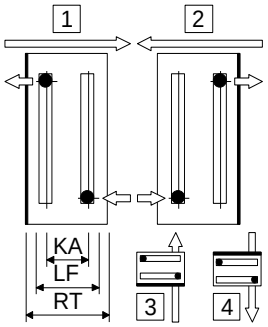


Tubes blank	Piece	0	0	0	0
Int. vent./drains	Piece	4	4	0	0
Tube rows on the depth	Piece	10	10	0	0
Tube rows on the height	Piece	30	30	0	0
Number of circuits (NC)	Piece	15	15	0	0
Volume	l	69	69	0	0
Weight	kg	240	240	0	0
Connections	G	2"	2"	0	0
Frame height	RH	1130	1130	0	0
Frame width	BT	2096	2096	0	0
Frame depth	RT	410	410	0	0
Finned height	LH	1050	1050	0	0
Finned width	LB	1900	1900	0	0
Frame on top	RO	40	40	0	0
Frame on bottom	RU	40	40	0	0
Frame in front	RV	30	30	0	0
Frame on back (~53/53/0/0)	RN	53	53	0	0
Collector covering	AD	143	143	0	0



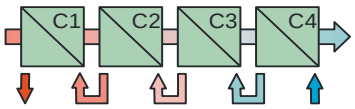


Tubes	Type	circular	circular	---	---
Tubes	DA / da	12.40 / 12.40	12.40 / 12.40	---	---
Tubes	S1 / S2	35.00 / 35.00	35.00 / 35.00	---	---
Tubes	---	in line	in line	---	---
Tubes	---	Cu	Cu	---	---
Tubes	---	smooth	smooth	---	---
Collector	---	Cu	Cu	---	---
Connections	---	Rg7	Rg7	---	---
Fins	LT / LD	2.45 / 0.20	2.45 / 0.20	---	---
Fins	---	Al	Al	---	---
Fins	---	smooth	smooth	---	---
Frame	---	AlMg3	AlMg3	---	---
Protection	---	without	without	---	---
Protection	---	---	---	---	---
Air flow direction	---	horizontal	horizontal	---	---



Heater 1: 35/35/12-10R-30T-1900A-2.5PA-15C-Cu/Al/AlMg3	EUR	3716.00	Delivery:	5-6 weeks
Heater 2: 35/35/12-10R-30T-1900A-2.5PA-15C-Cu/Al/AlMg3	EUR	3716.00	Validity:	12 weeks
Heater 3: ---	EUR	0.00	Condit.:	net, prepaid address
Heater 4: ---	EUR	0.00	Payment:	30 days net
Total	**EUR**	**7432.00**		

Definition		
Height over sea level	m	500.000
Pressure	hPa	954.276
Temp.	°C	20.000
Rel. humidity	%	40.000
Air humid	m3/h	15000.000
30 V% Et.glycol	m3/h	4.929



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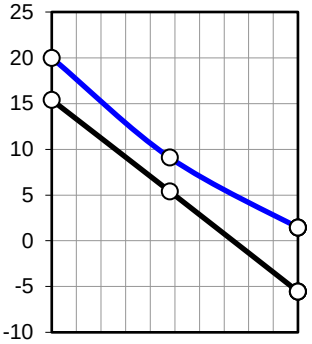
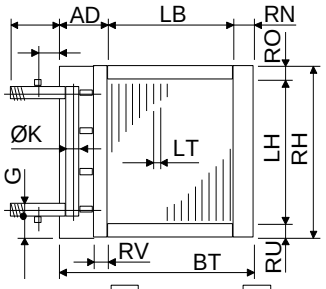
Air humid		Cooler 1	Cooler 2	Cooler 3	Cooler 4
Temp. Inlet	°C	20.000	9.100	1.450	1.450
Rel. humidity Inlet	%	40.000	80.747	100.000	100.000
Temp. Outlet	°C	9.100	1.450	1.450	1.450
Rel. humidity Outlet	%	80.747	100.000	100.000	100.000
Pressure drop	Pa	71.811	85.505	0.000	0.000

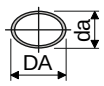
30 V% Et.glycol		Cooler 1	Cooler 2	Cooler 3	Cooler 4
Temp. Inlet	°C	5.406	-5.540	-5.540	-5.540
Temp. Outlet	°C	15.389	5.406	-5.540	-5.540
Pressure drop (101.04 %)	kPa	62.731	68.601	0.000	0.000

Heat exchanger		Cooler 1	Cooler 2	Cooler 3	Cooler 4
Capacity	kW	51.902	56.436	0.000	0.000
Surface reserve	%	0.138	0.470	0.000	0.000
Present surface	m2	605.642	605.642	0.000	0.000
Required surface	m2	604.810	602.809	0.000	0.000
k-coeff.	W/m2K	22.460	20.522	0.000	0.000
Average temp. diff.	K	3.821	4.562	0.000	0.000

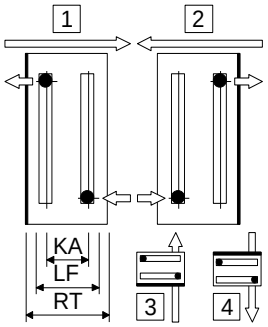


Tubes blank	Piece	0	0	0	0
Int. vent./drains	Piece	4	4	0	0
Tube rows on the depth	Piece	10	10	0	0
Tube rows on the height	Piece	30	30	0	0
Number of circuits (NC)	Piece	15	15	0	0
Volume	l	69	69	0	0
Weight	kg	259	259	0	0
Connections	G	2"	2"	0	0
Frame height	RH	1130	1130	0	0
Frame width	BT	2096	2096	0	0
Frame depth	RT	410	410	0	0
Finned height	LH	1050	1050	0	0
Finned width	LB	1900	1900	0	0
Frame on top	RO	40	40	0	0
Frame on bottom	RU	40	40	0	0
Frame in front	RV	30	30	0	0
Frame on back (~53/53/0/0)	RN	53	53	0	0
Collector covering	AD	143	143	0	0





Tubes	Type	circular	circular	---	---
Tubes	DA / da	12.40 / 12.40	12.40 / 12.40	---	---
Tubes	S1 / S2	35.00 / 35.00	35.00 / 35.00	---	---
Tubes	---	in line	in line	---	---
Tubes	---	Cu	Cu	---	---
Tubes	---	smooth	smooth	---	---
Collector	---	Cu	Cu	---	---
Connections	---	Rg7	Rg7	---	---
Fins	LT / LD	2.15 / 0.20	2.15 / 0.20	---	---
Fins	---	Al	Al	---	---
Fins	---	smooth	smooth	---	---
Frame	---	AlMg3	AlMg3	---	---
Protection	---	without	without	---	---
Protection	---	---	---	---	---
Air flow direction	---	horizontal	horizontal	---	---



Cooler 1: 35/35/12-10R-30T-1900A-2.2PA-15C-Cu/Al/AlMg3	EUR	3883.00	Delivery:	5-6 weeks
Cooler 2: 35/35/12-10R-30T-1900A-2.2PA-15C-Cu/Al/AlMg3	EUR	3883.00	Validity:	12 weeks
Cooler 3: ---	EUR	0.00	Condit.:	net, prepaid address
Cooler 4: ---	EUR	0.00	Payment:	30 days net
Total	**EUR**	**7766.00**		