



Heat exchanger selection for air handling units

For air handling units, the maximum dimensions BT and RH for the finned heat exchanger including the frame are known.

One would like to determine the optimum finned heat exchanger from a number of diverse geometries.

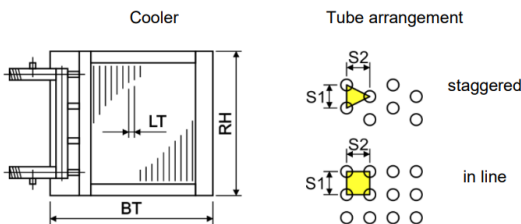
The **HES** applications offer this selection by first calculating 8 different finned heat exchangers with a macro and displaying the relevant selection criteria. The optimum finned heat exchanger can be selected from these.

- The following applications are available:
- Air heater with liquid media
 - Air cooler with liquid media
 - Refrigerant condenser
 - Refrigerant injection evaporator
 - Refrigerant pump circulation evaporator

The following example is representative of an air cooler with liquid media. The quality level indicates the optimum finned heat exchanger.

Of course, any of the 8 finned heat exchangers can be selected provided other criteria are considered.

Cooler - Selection



The dimensions for each 4 geometries for staggered and in line tube arrangement must be entered in cells D23 to K27. If fewer geometries are available, the same geometry must be entered several times.

Remove all results from an earlier calculation with the macro 1. Go to the "Evaluation" sheet and set all input data. Come back to the "Selection" sheet and calculate all fin coil heat exchanger with the macro 2.

Displays the quality in cells D20 through K20. Select the desired fin coil heat exchanger in cell B21. Go to the "Evaluation" sheet and use the macro to calculate the desired fin coil heat exchanger.

Frame height	RH	mm	1000
Frame width	BT	mm	1500

Quality	Max.	5	4	3	1	2	5	3	2	1
Cooler - Type	5	No	1	2	3	4	5	6	7	8
Tube arrangement	---	---	staggered	staggered	staggered	staggered	in line	in line	in line	in line
Fin thickness	LD	mm	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
Tube diameter	DA	mm	10.400	12.400	12.400	16.400	10.400	12.400	12.400	16.400
Tube diameter	da	mm	10.400	12.400	12.400	16.400	10.400	12.400	12.400	16.400
Tube thickness	S	mm	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400
Tube interval on the height	S1	mm	25.000	30.000	35.000	40.000	25.000	30.000	35.000	40.000
Tube interval on the depth	S2	mm	21.651	25.981	30.311	34.641	25.000	30.000	35.000	40.000

Surface reserve	---	%	2.001	1.419	1.839	2.282	2.533	1.510	1.811	1.610
Volume	---	l	36	52	46	55	36	52	46	55
Weight	---	kg	114	128	136	138	125	140	151	155
Price	---	EUR	2202	2343	2261	2057	2297	2436	2377	2185
Fin spacing	LT	mm	2.800	4.500	4.000	2.800	2.600	4.100	3.700	2.600
Air humid	c	m/s	2.179	2.259	2.223	2.348	2.179	2.259	2.223	2.348
Air humid	Δp	Pa	73.822	82.254	70.358	89.469	57.905	62.811	55.210	75.897
Reynolds	---	---	2203.207	2515.081	2494.144	3115.258	2201.590	2514.469	2492.414	3111.067
25 V% Et.glycol	c	m/s	0.953	0.900	0.892	0.829	0.952	0.900	0.892	0.828
25 V% Et.glycol	Δp	kPa	40.162	40.676	34.863	26.396	40.111	40.658	34.821	26.332
25 V% Et.glycol	T/C	---	10.379	10.275	8.825	6.559	10.381	10.276	8.826	6.560
Tubes total	---	Piece	304	310	270	184	304	310	270	184
Tubes blank	---	Piece	4	2	6	2	4	2	6	2
Tubes blank	---	%	1.316	0.645	2.222	1.087	1.316	0.645	2.222	1.087

The following page shows the detailed calculation of the selected finned heat exchanger.



Capacity	kW	47.510	----- sensible:	40.229
Surface reserve	%	2.533	latent:	6.430
Present surface	m2	181.784	frost:	0.850
Required surface	m2	177.294		
k-coeff.	W/m2K	33.012		
Average temp. diff. (93.77 %)	K	8.117		

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Air humid (ff = 0.00005 m2K/W)		Inlet	Outlet	Definition
Height over sea level	m			0.000
Pressure	hPa			1013.250
Temp.	°C	10.000	-2.000	20.000
Rel. humidity	%	50.000	94.702	40.000
Abs. humidity	g/kg	3.792	3.022	5.784
Density humid	kg/m3	1.244	1.299	1.200
Enthalpy humid	kJ/kg	19.615	5.532	34.805
Volume flow humid	m3/h	9628.254	9208.872	10000.000
Mass flow dry	kg/h	11927.808	11927.808	11927.808
Condensate flow	kg/h		9.190	
Surface temperature	°C	3.682	-5.159	
Velocity	m/s	2.098	2.006	2.179
Pressure drop (dry 55 Pa)	Pa		57.905	

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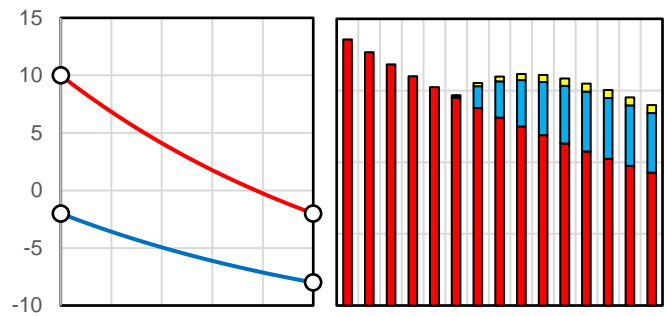
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Plant
Object
Position

25 V% Et.glycol (ff = 0.00005 m2K/W)

Temp. Inlet	°C	-8.000
Temp. Outlet	°C	-2.000
Temp. Selection	°C	-5.810
Density	kg/m3	1045.326
Spec. heat	kJ/kgK	3.665
Heat cond.	W/mK	0.439
Viscosity	Pas	4.339E-03
Volume flow	m3/h	7.441
Velocity	m/s	0.952
Reynolds	---	2201.590
Pressure drop (T/C = 10.381)	kPa	40.111

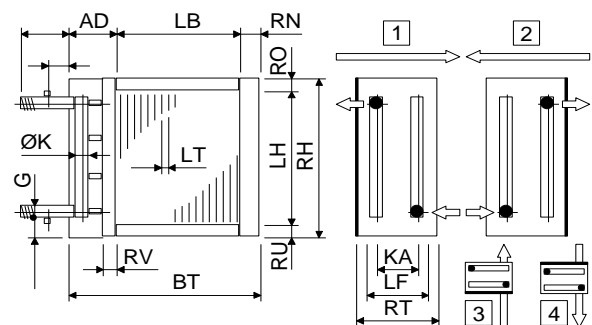
Temp. (°C)



Technical data

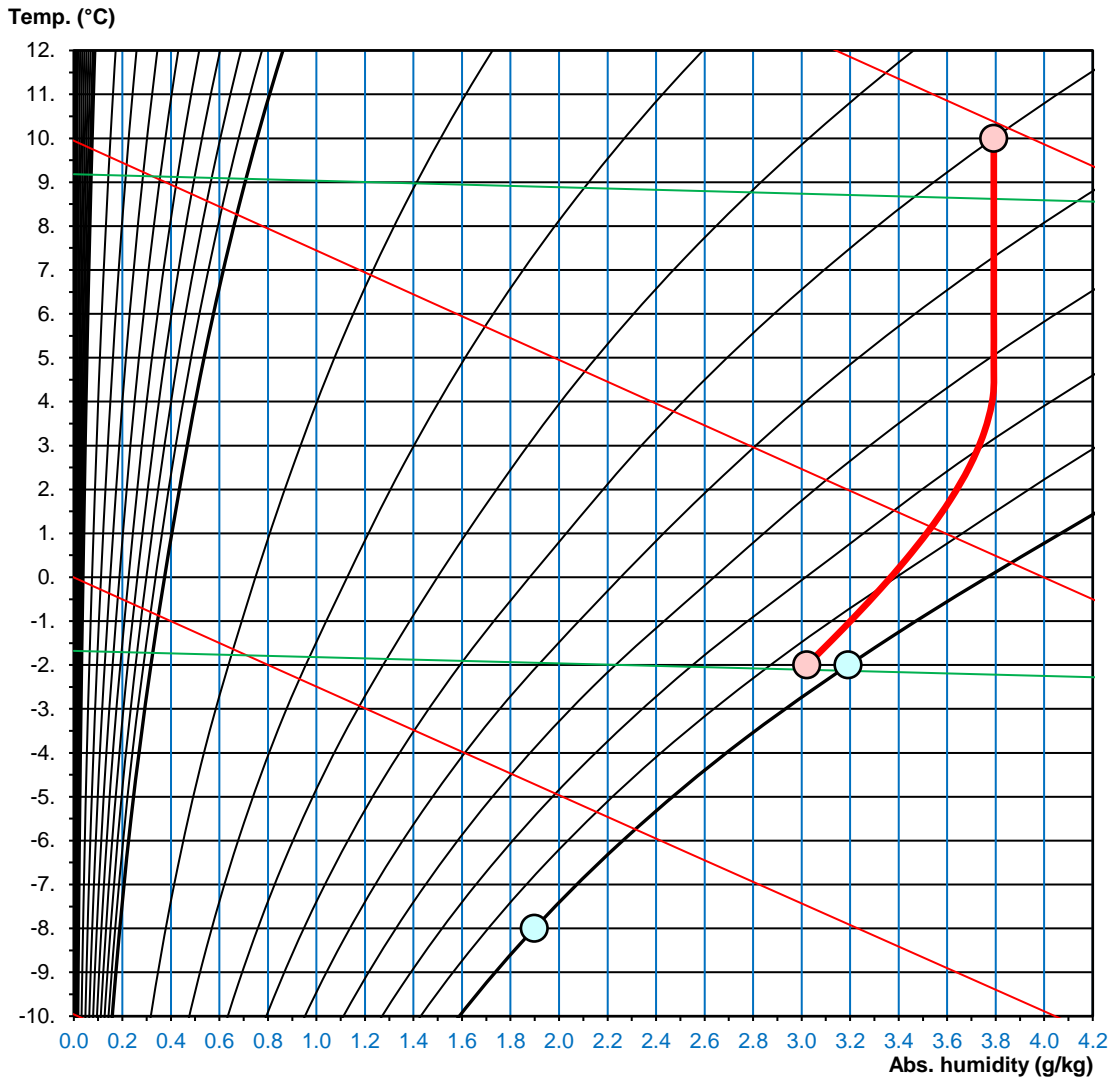
Tubes total	Piece	304	
Tubes blank	Piece	4	
Int. vent./drains	Piece	0	
Tube rows on the depth	Piece	8	
Tube rows on the height	Piece	38	
Tube coupling in series	Piece	10	
Number of circuits (NC)	Piece	30	
Volume	l	36	
Weight	kg	125	
Connections	G	2"	
Frame height	RH	mm	1000
Frame width	BT	mm	1500
Frame depth	RT	mm	260
Finned height	LH	mm	950
Finned width	LB	mm	1342
Finned depth	LF	mm	200
Frame on top	RO	mm	25
Frame on bottom	RU	mm	25
Frame in front	RV	mm	30
Frame on back	RN	mm	44
Collector-Diameter	K	mm	54
Collector covering	AD	mm	114
Collector distance	KA	mm	175
Fin spacing	LT	mm	2.600
Fin thickness	LD	mm	0.200
Tube diameter	DA	mm	10.400
Tube diameter	da	mm	10.400
Tube thickness	S	mm	0.400
Tube interval on the height	S1	mm	25.000
Tube interval on the depth	S2	mm	25.000

Tubes:	Cu
Tubes:	smooth
Tubes:	in line
Tubes:	circular
Collectors:	1.01 m/s Cu
Connections:	1.01 m/s Rg7
Fins:	Al
Fins:	smooth
Circulations:	1 Default
Frame:	2.0 mm AISI 304
Protection:	without
Protection:	---
Air flow direction:	horizontal



Delivery: 5-6 weeks
Validity: 12 weeks
Condit.: net, prepaid address
Payment: 30 days net
Price net: EUR 2297.00





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 Position

Temperature lines: Black
 Abs. Humidity lines: Blue
 Rel. Humidity curves: Black
 Enthalpy curves: Red
 Density curves: Green

Cooler		Inlet	Outlet
Air humid	t	10.000	-2.000
	x	3.792	3.022
25 V% Et.glycol		t	-8.000
			-2.000

