

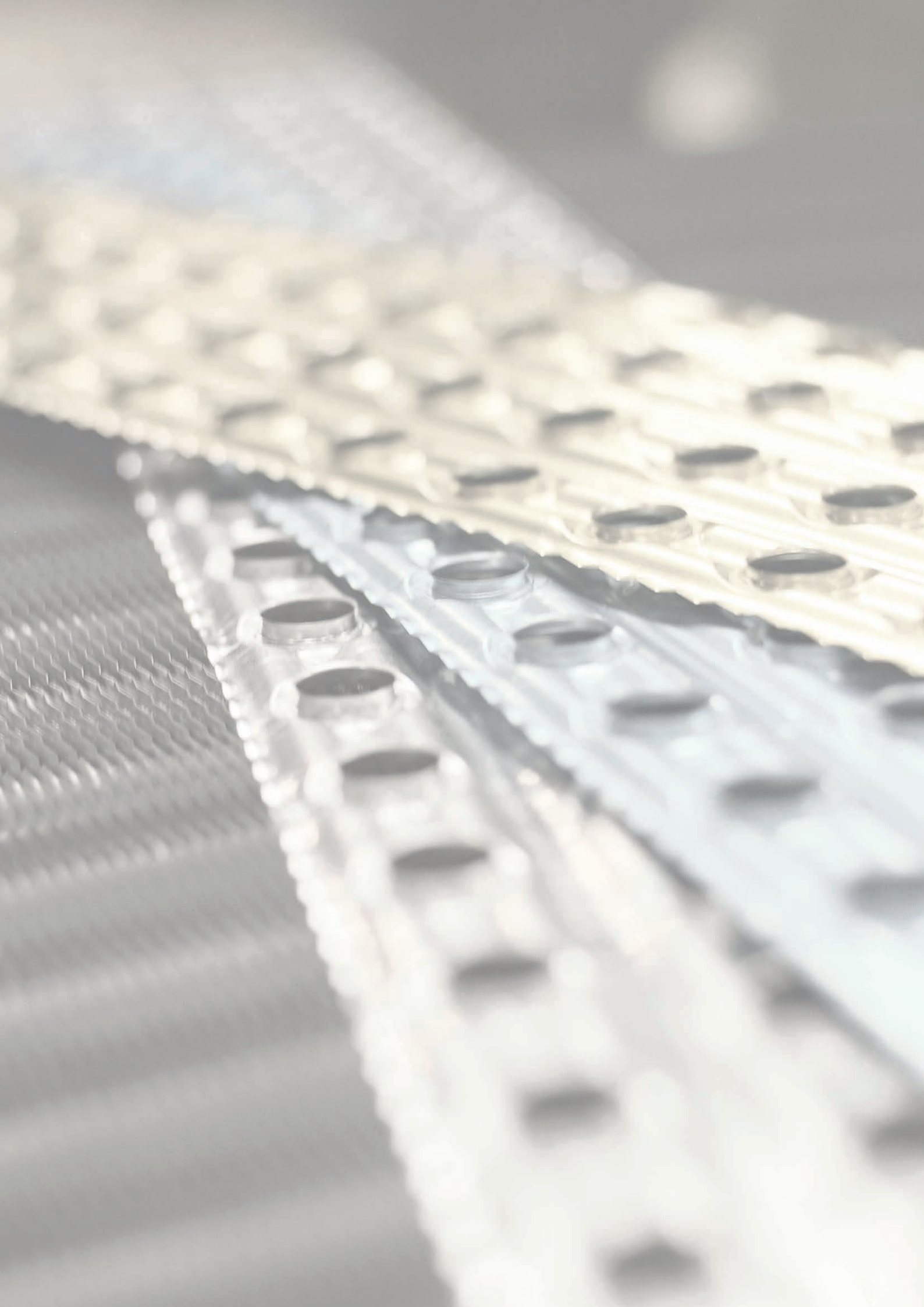
VENTILATION HEAT EXCHANGERS

Heatcraft® heat transfer coils



A03





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THE BEST IN HEAT EXCHANGERS

For nearly 70 years, Modine has been developing and manufacturing heat exchangers for air and fluid applications.

All of our products reflect our vast technical expertise and attention towards quality.

Modine sets the global standard for heat exchangers.

Supplying over 65000 industrial heat exchangers each year, Modine is a dependable supplier with considerable resources.

At Modine we work in partnership with our customers and by focusing on the result and ensuring reliability, we are a partner that customers can trust with their future.

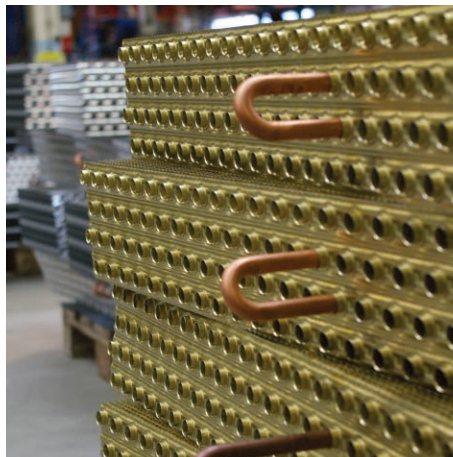
Always Innovating. Always Improving.

QUALITY AND THE ENVIRONMENT - PRIORITISED AREAS

We supply heat exchangers that are often components in large projects and therefore we are well accustomed to deliver on-time. Products must be delivered to the right place, at the right time and to the exact specification. Our continuous improvement, combined with our testing facilities, deliver products that are at the forefront of the market and that meet or often exceed regulatory standards.

Thanks to their function and performance, several of our products play an active role in recovering waste energy and improving indoor environments. In a structured and methodical way, we strive to safeguard the environment throughout a product's service life by optimising the use of materials and energy from its development, manufacture and application to its phase-out and recycling.

Modine's management system is certified according to ISO 9001:2015, ISO 14001:2015 and ISO 3834-2:2005.



Our catalogue includes our standard range of heat exchangers for indoor ventilation applications. The heat exchangers are designed for heating or cooling in ventilation systems, while some types are designed for heat recovery. Since each product is designed for a special need, there are rarely two identical heat exchangers. Although we have a wide range of standard products, we can also build special solutions just for you – that’s what we do best. Contact us for more information.

SELECT THE RIGHT HEAT EXCHANGER WITH THE HELP OF COILS

The product selection software COILS is a flexible and user friendly programme that makes choosing the right heat exchanger easy:

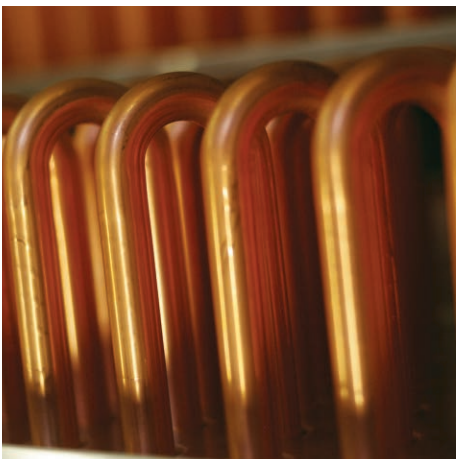
- Heat exchangers:
 - heating of air with hot water
 - cooling of air with cold water
 - cooling of air with evaporating medium or
 - heating of air with steam/other condensing media.
- Fluid connected heat recovery system ECOTERM®
- Air unit heaters/coolers
- Refrigerant coolers

Let COILS select the optimal dimensions or input the required length, width, fin spacing, etc. COILS offers:

- Eight different on-screen languages
- Print-out language can be chosen regardless of screen language.

- The air's moisture content can be stated in different units
- The airflow and fluid flow can be stated in different units
- Includes all available antifreeze fluids
- Consideration to the height above seal level
- Dimensioning for limitations on air and fluid pressure drop.
- Top surface and/or contamination factors with safety margins
- Price of many products
- Dimensional sketches for several products
- Possibility to choose accessories
- Print-outs include performance and data about the product's dimensions, material, weight and volume
- Possibility to save your calculations for another occasion
- Installation instructions and operating and maintenance guides.

Contact us for the COILS programme or for assistance in selecting an optimized cooler.



HEAT EXCHANGER DESIGN

Our heat exchangers are designed with a fin body, headers and casing and are manufactured in different materials and with different fin spacing. Intended for horizontal or vertical air direction. All heat exchangers conform to air tightness class B on the air side (EN1751).

Our heat exchangers are mainly designed for heating or cooling of air and other gases. Some types are especially designed for heat recovery - ECOTERM®.

The heat exchangers are built on a number of zigzag-mounted tubes in one or more rows, in the direction of the airflow. The tubes are interconnected into coils in lengths adapted for the different heat exchanger types. The heating medium or refrigerant flows through the coils and the air flows externally. This design means that the water which flows through the tubes can heat or cool the air that passes through the heat exchanger very efficiently. Warm or hot water, oil, process fluids or steam are used as the heating medium. Cooling water, evaporating refrigerant, oil or other fluids are used as the cooling medium.

PROFILED FINS

In order to produce sufficiently large heating or cooling areas and with that compensate the lower heat exchange coefficient on the air side, the tubes are fitted with profiled fins. The fins are attached to the tubes through the expansion of each tube. This produces a very good thermal transfer to the fins. The tube, which is usually made of copper, is fully protected by the fin, except for chilled beams where the tube is not protected by the fin.

The tubes are brazed to the header, which is fitted with male threaded connections as standard. Alternatively, the connection to be "flat" (without thread). The header is equipped with nipples with plugs for venting and drainage. The drainage nipple can be fitted with a sensor connecting to the freeze protection thermostat.

INSTALLATION OPTIONS

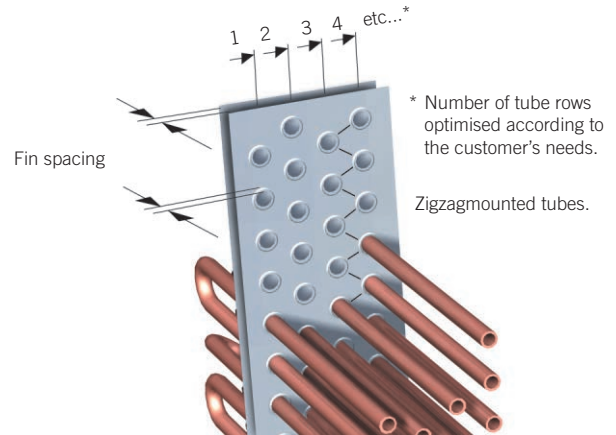
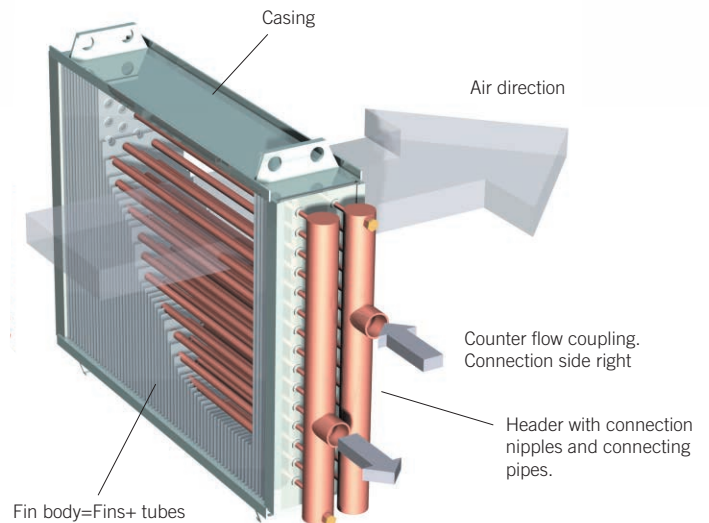
The heat exchangers are built in a casing with slip-clamp or flange connections on the air side. The slip-clamp casing is designed for installation in ducts. Heat exchangers installed on unit room walls use the N, O, Q or T casing.

SIZES

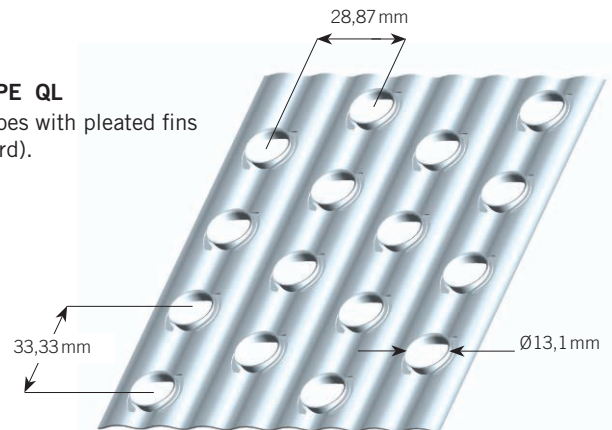
Our heat exchangers are manufactured as standard in sizes up to 3,5x2,4m. Our products can be ordered with a number of different accessories (see pages 94-96) and with other dimensions than standard. Contact us for more information.

DIMENSIONING

For dimensioning refer to the program Coils, see page 3.



FIN TYPE QL
1/2"-tubes with pleated fins (standard).

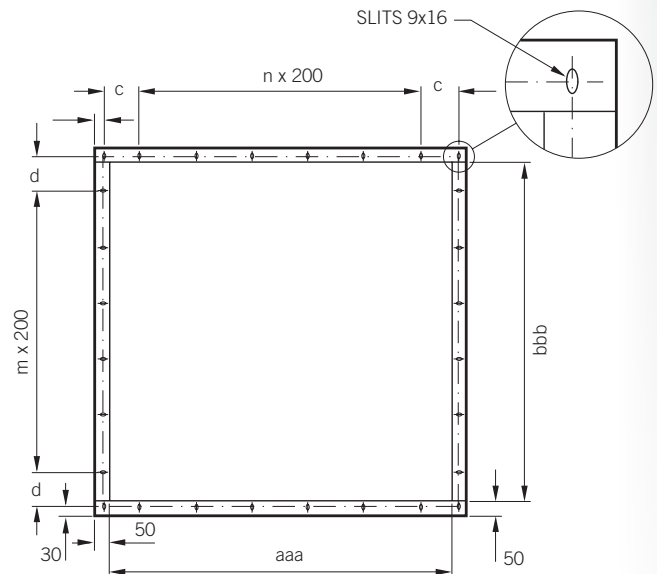


FIN TYPE QF
1/2"-tubes with plain fins.
Gives lower air pressure drop.



HOLE SPACING TABLE. The casing is available with a drilled frame as alternative according to RFHF, RVGL.

aaa (cm)	n	c	bbb (cm)	m	d
020	-	120	020	-	120
025	-	145	025	-	145
030	-	170	030	-	170
035	-	195	035	-	195
040	1	120	040	1	120
045	1	145	045	1	145
050	1	170	050	1	170
055	1	195	055	1	195
060	2	120	060	2	120
065	2	145	065	2	145
070	2	170	070	2	170
075	2	195	075	2	195
080	3	120	080	3	120
085	3	145	085	3	145
090	3	170	090	3	170
095	3	195	095	3	195
100	4	120	100	4	120
105	4	145	105	4	105
110	4	170	110	4	170
115	4	195	115	4	195
120	5	120	120	5	120
125	5	145	125	5	145
130	5	170	130	5	170
135	5	195	135	5	195
140	6	120	140	6	120
145	6	145	145	6	145
150	6	170	150	6	170
155	6	195	155	6	195
160	7	120	160	7	120
165	7	145	165	7	145
170	7	170	170	7	170
175	7	195	175	7	195
180	8	120	180	8	120
185	8	145	185	8	145
190	8	170	190	8	170
195	8	195	195	8	195
200	9	120	200	9	120
205	9	145	205	9	145
210	9	170	210	9	170
215	9	195	215	9	195
220	10	120	220	10	120
225	10	145	225	10	145
230	10	170	230	10	170
235	10	195	235	10	195
240	11	120	240	11	120
250	11	170			
260	12	120			
270	12	170			
280	13	120			
290	13	170			
300	14	120			



IMPERIAL SIZE TABLE

Size in "	=	Size in mm
1/2"	=	12,7 mm
7/8"	=	22,0 mm
1 1/8"	=	28,6 mm
1 3/8"	=	34,9 mm
1 5/8"	=	41,3 mm
2 1/8"	=	54,0 mm

NEW REFRIGERANTS HAVE HIGH DEMANDS ON THE HEAT EXCHANGER, DX.

Introduction of new refrigerants alter the requirements for heat exchanger design because of higher operation pressure. We have chosen to follow the SS-EN 378-2:2016 to meet today's new demands.

Modine now offers three different heat exchange variants depending on the refrigerant and the ambient temperature.

Test pressure, bar	29	42	62
Operating pressure, bar	22	29	43

To determine the design, maximum ambient temperature shall be notified before order, for the right heat exchanger to be manufactured.

Max. ambient temp.	≤32°C	≤38°C	≤43°C	≤55°C
Dim. condensing temp.	55°C	59°C	63°C	67°C

MATERIAL AND CORROSION PROTECTION

The standard heat exchangers support most comfort and unit installations, which is more than 90 % of all manufactured heat exchangers. If necessary we provide different methods of protection against corrosion, see the table. In the event a special design is not described here, do not hesitate to contact us.

MATERIAL	FIN	TUBE	HEADER	CASING
Aluminium	S			
Al/Mg	X			
Copper	X	S	X	
Copper el. tinned	X	X	X	
Copper nickel		X	X	
Corropaint epoxy-treated Al	X			
Heresite protective finish	X	X	X	X
Painted steel			S	
Hot-dip galvanized steel				S
Stainless steel				X

S = Standard design X = Special design on request

MATERIAL

Casing

Heat exchangers for ducts and unit rooms are as standard made of hot-dip galvanized or stainless steel sheet (EN 1.4301) but are available in austenitic stainless steel (EN 1.4436).

Tubes

Heat exchangers for ducts and unit rooms are as standard in copper, but also in copper/nickel.

Header

Heat exchangers for ducts and unit rooms are as standard in steel or copper but also in copper/nickel design.

Fins

Ventilation heat exchangers are as standard in aluminium, but are as an option available in copper, corropaint, electrically tinned copper and Heresite treated aluminium. The fins are normally pleated to give maximum efficiency, but are also available in a plain design, which is recommended when dust occurs in the airflow and where a low air pressure drop is sought.

Solder

Hard (brazing) solder to be used on all soldered joints. Copper to copper is soldered with low content silver solder 2 %. Copper to steel is soldered with high content silver solder. The heat exchangers for steam and in copper/nickel designs are always soldered using silver solder. In aggressive environments a 55 % silver solder can be used.

CORROSION PROTECTION

AlMg: An aluminium fin with magnesium alloy designed for coastal environments with chloride content in the air where aluminium normally corrodes. Heat transfer is not affected relative to aluminium. On cooling and exhaust air heat exchangers a droplet eliminator is required from an air velocity of 2,9 m/s.

Corrodip: Protection used in highly corrosive environments, for example, wastewater treatment plants, paper mills, acidic environments and dairies. Epoxy painting on the finished heat exchanger, the whole fin surface including the header is protected. The paint thickness is 100 µm. The paint is also available as foodstuff epoxy. Min. fin spacing is 4 mm, max. permitted temperature 60 °C. Impairs heat transfer by approx 20 % relative to aluminium. On cooling and exhaust air heat exchangers a droplet eliminator is required from an air velocity of 2,9 m/s.

Corropaint: Protection (epoxy coated aluminium with a thickness of 5 µm) that is used for moderately corrosive environments, for example dirty city air, laboratories and swimming halls, where it is believed that aluminium will be exposed to corrosion attack.

Max permitted temperature 120 °C. Impairs heat transfer by approx 10% relative to aluminium. On cooling and exhaust air heat exchangers a droplet eliminator is required from an air velocity of 1,6 m/s.

Copper electro tinned: A coating of tin is performed by electrolysis of a copper fin and/or tube. The corrosion protection is used in extremely corrosive marine environment, e.g. cruise ships and oil platforms. Heat transfer is not affected relative to aluminium. On cooling and exhaust air heat exchangers a droplet eliminator is required from an air velocity of 2,9 m/s.

E-coating: Protection used in corrosive environments, e.g. wastewater treatment plants, swimming halls with high chloride content (<100 ppm) and other acidic environments.

The products are manufactured according to good manufacturing practices for coatings, prepared, applied and treated in strict compliance to manufacturer specifications in according to technical data sheet conditions.

Heat exchanger is complete coating including the entire fin surface:

- epoxy paint with electroplating performed by immersion.
- top coat.
- retouching (with acrylic spray paint) if needed.

The color is black. Average paint thickness: 15-25 µm. Heat transfer is not affected. On cooling and exhaust air heat exchangers a droplet eliminator is required from an air velocity of 1,6 m/s.

Hydropaint: Protection (aluminium with 5 µm thickness coating) that is used for moderately corrosive environments, e.g. polluted city air, where aluminium may be exposed to corrosion. The hydrophilic fins handle 3,5 m/s air velocity (on cooling and exhaust air heat exchangers) before a droplet eliminator is required. Max permitted temperature 120 °C. Affects heat transfer by approx 10 % relative to aluminium.

Copper: Copper is used in corrosive marine environment, e.g. coastal areas and cruise ships where aluminium AlMg may be affected by corrosion. Heat transfer is not affected relative to aluminium. On cooling and exhaust air heat exchangers a droplet eliminator is required from an air velocity of 2,9 m/s.

COUPLINGS, VELOCITIES AND OUTPUT STAGES

COUPLINGS

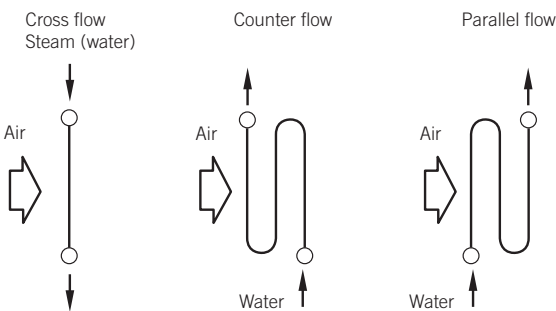
The tubes/coils can be connected so that the heating medium or refrigerant flows in different ways in relation to the airflow, see the figure below.

Cross flow coupling is used for condensing steam and on heat exchangers for heating with a small power output.

Counter flow coupling are common and are used on heat exchangers for cooling and heating with high output and with heat recovery. This coupling give the largest output.

Parallel flow coupling is sometimes used on heat exchangers for heating when it is necessary to prioritise the possibility of having a sensor for the freeze protection thermostat. In the event of an incorrectly installed heat exchanger for cooling where this coupling method has been used the output reduction can be up to 30 %.

In instances where the flow direction of the air or heat medium/refrigerant is decisive for the function of the heat exchanger the direction is marked on the heat exchanger.



VELOCITIES

Standard velocities for heat exchangers suggested

Velocity	Cooling	Heating
Air velocity, m/s	2–3 ¹⁾	2–5
Fluid velocity, m/s	0,2 ²⁾ – 2 ³⁾	0,2 ²⁾ – 1,5 ³⁾

- 1) A droplet eliminator should be fitted for velocities above 3 m/s.
- 2) Min. velocity depending on the fluid temperature.
- 3) Max. velocity for copper tubes depending on the erosion risk.
3 m/s should not be exceeded for heat exchanger with steel tubes in the coils.

OUTPUT STAGES

Heat exchangers for evaporating refrigerant can be delivered divided into one, two or several output stages depending on the height of the heat exchanger.

Two output stages (see figure 1) are normally coupled so that every other coil is coupled to output stage one and every other to output stage two ("interlaced coupling"). Connections and fluid pipes are equipped with marker tags that indicate the stage association. Three or more output stages (see figure 2) are normally divided vertically.

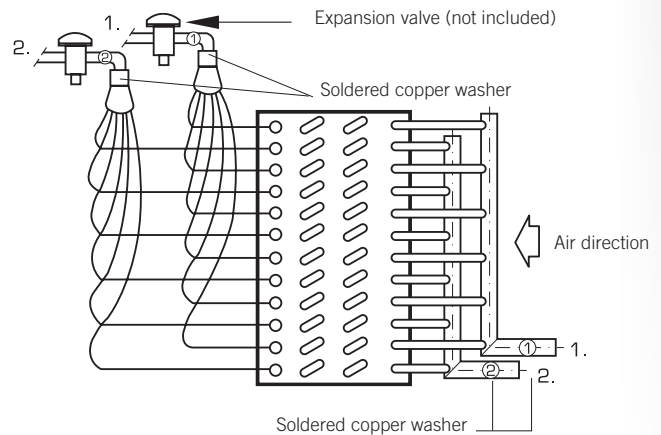


Figure 1. Two output stages with "interlace-coupling".

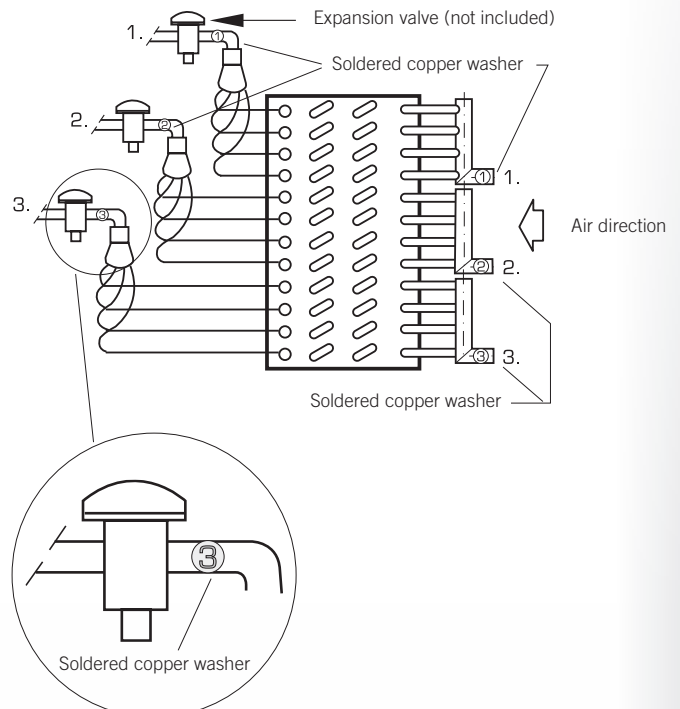


Figure 2. Two or three stages are normally divided vertically.

FORMULAS

AIR

FOR HEATING AND HOT WATER

Output: $P \text{ (kW)} = q \text{ (m}^3\text{/s)} \cdot \Delta t \text{ (}^\circ\text{C)} \cdot 1,2$

Airflow: $q \text{ (m}^3\text{/s)} = \frac{P \text{ (kW)}}{\Delta t \text{ (}^\circ\text{C)} \cdot 1,2}$

Temp. difference: $\Delta t \text{ (}^\circ\text{C)} = \frac{P \text{ (kW)}}{q \text{ (m}^3\text{/s)} \cdot 1,2}$

Efficiency: $n = \frac{t_u - t_i}{t_r - t_i}$

FOR COOLING

Output: $P \text{ (kW)} = q \text{ (m}^3\text{/s)} \cdot \Delta i \text{ (kJ/kg)} \cdot 1,2$

Airflow: $q \text{ (m}^3\text{/s)} = \frac{P \text{ (kW)}}{\Delta i \text{ (kJ/kg)} \cdot 1,2}$

Enthalpy diff: $\Delta i \text{ (kJ/kg)} = \frac{P \text{ (kW)}}{q \text{ (m}^3\text{/s)} \cdot 1,2}$

Power requirement, fan: $P \text{ (kW)} = \frac{q \text{ (m}^3\text{/s)} \cdot \Delta p \text{ (Pa)}}{\sim 0,65 (n) \cdot 1000}$

MIXTURE OF AIR

Mixing temperature:

$$t \text{ (}^\circ\text{C)} = \frac{q_1 \text{ (m}^3\text{/s)} \cdot t_1 \text{ (}^\circ\text{C)} + q_2 \text{ (m}^3\text{/s)} \cdot t_2 \text{ (}^\circ\text{C)}}{q_{\text{tot}}}$$

WATER

Output: $P \text{ (kW)} = q_r \text{ (l/s)} \cdot \Delta t_r \text{ (}^\circ\text{C)} \cdot 4,2$

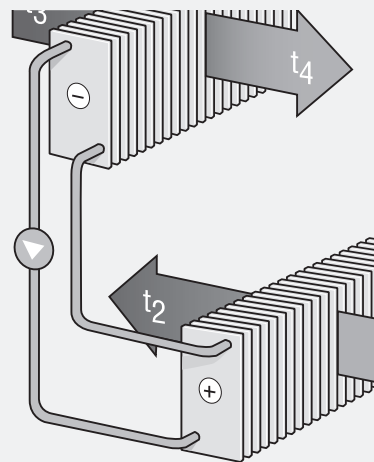
Water flow: $q_r \text{ (l/s)} = \frac{P \text{ (kW)}}{\Delta t_r \text{ (}^\circ\text{C)} \cdot 4,2}$

Temperature difference: $\Delta t_r \text{ (}^\circ\text{C)} = \frac{P \text{ (kW)}}{q_r \text{ (l/s)} \cdot 4,2}$

Power requirement, pump: $P \text{ (kW)} = \frac{q_r \text{ (l/s)} \cdot \Delta p_r \text{ (kPa)}}{\sim 0,75 (n) \cdot 1000}$

HEAT RECOVERY

Temperature efficiency: $\eta_t = \frac{t_2 - t_1}{t_3 - t_1}$

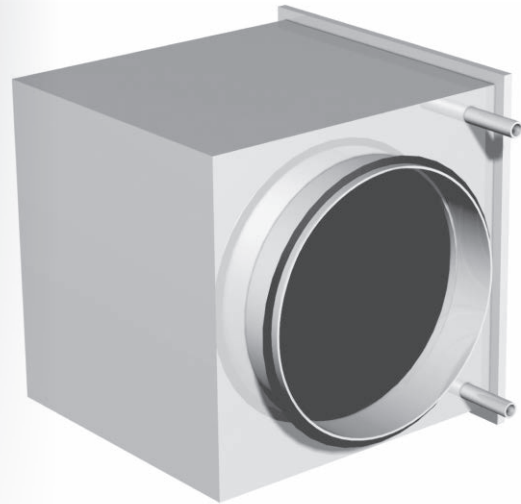


Optimal brine flow: $q_r \text{ (l/s)} = \frac{q_1 \text{ (m}^3\text{/s)} + q_2 \text{ (m}^3\text{/s)}}{6}$

CIRCULAR HEAT EXCHANGER FOR HEATING WATER

QJHD

The heat exchanger QJHD is designed to heat air in ventilation systems with warm and hot water and can also be used to heat individual rooms (zones). Available in eight different standard sizes. Mounted on ducts or on the wall of the unit room.



QJHD - circular heat exchanger with integrated header.

GENERAL

- Can be fitted in horizontal or vertical ducts with optional air direction.
- The casing is equipped with a circular sleeve which fits the circular duct standard according to SIS 82 72 06.
- There is a hatch on the heat exchanger connection side that can be opened for cleaning and inspection.
- Circular duct connections with rubber seals.
- The casing conforms to tightness class C according to EN 1751.

OPERATING DATA

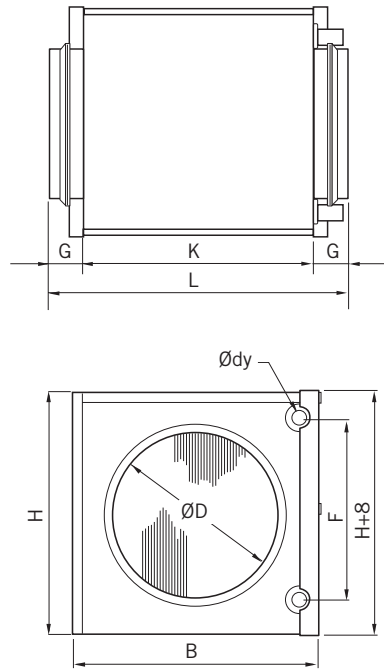
- Max operating pressure 1,0 MPa at max operating temperature 150 °C.
- All heat exchangers are leakage tested using dry air under water.

MATERIAL

The heat exchanger is designed using copper tubes and aluminium fins. The casing is manufactured of aluzinc coated steel sheet. The connection pipes on the fluid side are of copper.

SIZES & CAPACITY

Available in 8 different standard sizes; 100, 125, 160, 200, 250, 315, 400, 500 (circular duct, mm). See the size table below. Also see capacity tables on pages 11-13.



QJHD (mm)	ØD	Ødy	B	H	F	G	L	K	Weight (kg)
100	100	10	238	180	137	40	356	276	3,8
125	125	10	238	180	137	40	356	276	3,8
160	160	10	313	255	212	40	356	276	5,8
200	200	10	313	255	212	40	356	276	5,8
250	250	22	398	330	250	40	356	276	8,2
315	315	22	473	405	325	40	356	276	10,6
400	400	22	557	504	400	65	406	276	14,0
500	500	22	707	529	425	65	460	330	17,2

Size table indicating dimensions and weights for each duct size.



CAPACITY QJHD 100

Water temperature		in/out 80°C/60°C					in/out 60°C/40°C				in/out 55°C/45°C			
Air flow	Pressure drop air	Air in	Air out	Output	Water flow	Pressure drop water	Air out	Output	Water flow	Pressure drop water	Air out	Output	Water flow	Pressure drop water
m³/h	Pa	°C	°C	kW	l/s	kPa	°C	kW	l/s	kPa	°C	kW	l/s	kPa
55	5	-15	31,3	1,0	0,01	<0,5	14,7	0,6	0,01	<0,5	21,5	0,8	0,02	1
55	5	-7,5	34,3	0,9	0,01	<0,5	17,2	0,5	0,01	<0,5	24,5	0,7	0,02	1
55	5	0	37,2	0,7	0,01	<0,5	22,9	0,5	0,01	<0,5	27,3	0,5	0,01	<0,5
55	5	7,5	39,7	0,6	0,01	<0,5	26,1	0,4	0,01	<0,5	29,8	0,4	0,01	<0,5
55	5	15	41,7	0,5	0,01	<0,5	29,8	0,3	0,01	<0,5	31,6	0,3	0,01	<0,5
100	14	-15	24,3	1,5	0,02	1	11,5	1,0	0,01	<0,5	16,1	1,2	0,03	2
100	14	-7,5	28,1	1,3	0,02	1	14,7	0,8	0,01	<0,5	19,9	1,0	0,03	1
100	14	0	31,8	1,1	0,01	<0,5	17,4	0,6	0,01	<0,5	23,5	0,8	0,02	1
100	14	7,5	35,3	1,0	0,01	<0,5	22,3	0,5	0,01	<0,5	26,9	0,7	0,02	1
100	14	15	38,6	0,8	0,01	<0,5	26,9	0,4	0,01	<0,5	30,1	0,5	0,01	<0,5
145	26	-15	20,1	1,9	0,03	1	8,9	1,3	0,02	1	12,9	1,5	0,04	3
145	26	-7,5	24,3	1,7	0,02	1	12,7	1,1	0,01	<0,5	17,0	1,3	0,03	2
145	26	0	28,4	1,5	0,02	1	16,7	0,9	0,01	<0,5	21,1	1,1	0,03	1
145	26	7,5	32,4	1,3	0,02	<0,5	20,0	0,6	0,01	<0,5	24,9	0,9	0,02	1
145	26	15	36,2	1,1	0,01	<0,5	25,1	0,5	0,01	<0,5	28,7	0,7	0,02	1

CAPACITY QJHD 125

85	11	-15	26,2	1,3	0,02	1	12,6	0,9	0,01	<0,5	17,6	1,1	0,03	1
85	11	-7,5	29,8	1,2	0,01	<0,5	15,4	0,7	0,01	<0,5	21,1	0,9	0,02	1
85	11	0	33,3	1,0	0,01	<0,5	17,1	0,5	0,01	<0,5	24,5	0,8	0,02	1
85	11	7,5	36,6	0,9	0,01	<0,5	23,6	0,5	0,01	<0,5	27,8	0,6	0,01	<0,5
85	11	15	39,6	0,7	0,01	<0,5	27,6	0,4	0,01	<0,5	30,7	0,5	0,01	<0,5
150	28	-15	19,8	2,0	0,03	1	8,6	1,4	0,02	1	12,6	1,6	0,04	3
150	28	-7,5	24,0	1,8	0,02	1	12,5	1,1	0,01	<0,5	16,8	1,4	0,03	2
150	28	0	28,1	1,5	0,02	1	16,6	0,9	0,01	<0,5	20,8	1,1	0,03	2
150	28	7,5	32,1	1,3	0,02	1	20,0	0,7	0,01	<0,5	24,8	0,9	0,02	1
150	28	15	35,9	1,1	0,01	<0,5	25,0	0,5	0,01	<0,5	28,5	0,7	0,02	1
215	51	-15	15,9	2,5	0,03	2	6,0	1,7	0,02	1	9,6	2,0	0,05	5
215	51	-7,5	20,5	2,2	0,03	1	10,6	1,4	0,02	1	14,2	1,7	0,04	3
215	51	0	25,0	1,9	0,03	1	15,2	1,2	0,01	<0,5	18,6	1,4	0,04	2
215	51	7,5	29,3	1,7	0,02	1	19,4	0,9	0,01	<0,5	22,9	1,2	0,03	2
215	51	15	33,8	1,4	0,02	1	22,8	0,6	0,01	<0,5	27,1	0,9	0,02	1

CAPACITY QJHD 160

145	6	-15	34,5	2,7	0,03	4	21,3	2,0	0,03	2	23,3	2,1	0,05	9
145	6	-7,5	37,8	2,4	0,03	3	24,4	1,7	0,02	2	26,5	1,8	0,04	7
145	6	0	41,0	2,1	0,03	2	27,3	1,4	0,02	1	29,6	1,6	0,04	5
145	6	7,5	44,0	1,9	0,02	2	30,1	1,2	0,01	1	32,6	1,3	0,03	3
145	6	15	47,0	1,6	0,02	1	32,8	0,9	0,01	<0,5	35,5	1,0	0,03	2
250	15	-15	27,6	4,1	0,05	8	16,1	3,0	0,04	4	18,1	3,2	0,08	19
250	15	-7,5	31,5	3,6	0,04	6	19,9	2,5	0,03	3	21,9	2,7	0,07	14
250	15	0	35,2	3,2	0,04	5	23,5	2,1	0,03	2	25,6	2,3	0,06	10
250	15	7,5	38,9	2,8	0,03	4	27,0	1,7	0,02	2	29,2	1,9	0,05	7
250	15	15	42,5	2,4	0,03	3	30,7	1,3	0,02	1	32,7	1,5	0,04	5
355	27	-15	23,3	5,2	0,06	13	12,9	3,8	0,05	7	14,9	4,1	0,10	31
355	27	-7,5	27,5	4,6	0,06	10	17,0	3,2	0,04	5	19,0	3,5	0,09	23
355	27	0	31,7	4,1	0,05	8	21,0	2,7	0,03	4	23,1	3,0	0,07	17
355	27	7,5	35,7	3,5	0,04	6	25,2	2,2	0,03	3	27,0	2,4	0,06	12
355	27	15	39,7	3,0	0,04	4	29,3	1,7	0,02	2	30,9	1,9	0,05	7

QJHD

CAPACITY QJHD 200

Water temperature		in/out 80°C/60°C					in/out 60°C/40°C				in/out 55°C/45°C			
Air flow	Pressure drop air	Air in	Air out	Output	Water flow	Pressure drop water	Air out	Output	Water flow	Pressure drop water	Air out	Output	Water flow	Pressure drop water
m ³ /h	Pa	°C	°C	kW	l/s	kPa	°C	kW	l/s	kPa	°C	kW	l/s	kPa
225	12	-15	28,9	3,8	0,05	7	17,1	2,8	0,03	4	19,1	2,9	0,07	16
225	12	-7,5	32,6	3,4	0,04	6	20,7	2,4	0,03	3	22,8	2,5	0,06	12
225	12	0	36,3	3,0	0,04	4	24,2	2,0	0,03	2	26,3	2,1	0,05	9
225	12	7,5	39,9	2,6	0,03	3	27,5	1,6	0,02	1	29,8	1,8	0,04	6
225	12	15	43,3	2,2	0,03	2	31,1	1,2	0,01	1	33,2	1,4	0,03	4
390	32	-15	22,2	5,5	0,07	14	12,1	4,0	0,05	8	14,0	4,3	0,11	35
390	32	-7,5	26,5	4,9	0,06	12	16,3	3,4	0,04	6	18,3	3,7	0,09	26
390	32	0	30,8	4,3	0,05	9	20,4	2,9	0,04	4	22,4	3,2	0,08	19
390	32	7,5	34,9	3,8	0,05	7	24,7	2,4	0,03	3	26,5	2,6	0,06	13
390	32	15	38,9	3,2	0,04	5	28,9	1,9	0,02	2	30,5	2,1	0,05	8
555	57	-15	18,1	7,0	0,09	23	9,1	5,1	0,06	13	11,0	5,5	0,13	55
555	57	-7,5	22,8	6,3	0,08	18	13,6	4,4	0,05	9	15,6	4,8	0,11	42
555	57	0	27,4	5,5	0,07	14	18,3	3,7	0,04	7	20,1	4,0	0,10	30
555	57	7,5	31,9	4,8	0,06	11	22,9	3,0	0,04	5	24,5	3,3	0,08	21
555	57	15	36,3	4,0	0,05	8	27,5	2,4	0,03	3	28,8	2,6	0,06	13

CAPACITY QJHD 250

360	10	-15	30,4	6,2	0,08	4	18,1	4,6	0,06	2	20,2	4,8	0,12	9
360	10	-7,5	34,0	5,6	0,07	3	21,6	3,9	0,05	2	23,8	4,2	0,10	7
360	10	0	37,5	4,9	0,06	2	24,9	3,2	0,04	1	27,2	3,5	0,09	5
360	10	7,5	40,9	4,2	0,05	2	28,0	2,6	0,03	1	30,5	2,9	0,07	3
360	10	15	44,2	3,6	0,04	1	31,3	2,0	0,03	<0,5	33,7	2,3	0,06	2
630	25	-15	23,5	9,3	0,11	8	13,0	6,7	0,08	4	15,0	7,2	0,18	19
630	25	-7,5	27,7	8,2	0,10	6	17,1	5,7	0,07	3	19,2	6,2	0,15	14
630	25	0	31,8	7,2	0,09	5	21,0	4,8	0,06	2	23,2	5,3	0,13	10
630	25	7,5	35,8	6,3	0,08	4	25,1	3,9	0,05	2	27,1	4,3	0,11	7
630	25	15	39,7	5,3	0,07	3	29,1	3,0	0,04	1	30,9	3,4	0,08	5
900	46	-15	19,4	11,8	0,14	13	9,9	8,6	0,11	7	11,9	9,3	0,23	30
900	46	-7,5	23,9	10,5	0,13	10	14,3	7,3	0,09	5	16,4	8,0	0,19	23
900	46	0	28,4	9,2	0,11	8	18,8	6,1	0,08	4	20,8	6,7	0,16	17
900	46	7,5	32,7	8,0	0,10	6	23,3	5,0	0,06	3	25,0	5,6	0,13	11
900	46	15	37,0	6,8	0,08	4	27,7	3,9	0,05	2	29,2	4,4	0,11	7

CAPACITY QJHD 315

560	9	-15	30,8	9,8	0,12	4	18,6	7,2	0,09	2	20,6	7,6	0,18	9
560	9	-7,5	34,5	8,7	0,11	3	22,0	6,1	0,08	2	24,1	6,6	0,16	7
560	9	0	38,0	7,7	0,09	3	25,3	5,1	0,06	1	27,5	5,6	0,14	5
560	9	7,5	41,3	6,7	0,08	2	28,4	4,1	0,05	1	30,8	4,6	0,11	4
560	9	15	44,6	5,7	0,07	1	31,7	3,2	0,04	1	34,0	3,6	0,09	2
985	24	-15	23,9	14,6	0,18	9	13,4	10,7	0,13	5	15,3	11,4	0,28	20
985	24	-7,5	28,1	13,0	0,16	7	17,4	9,1	0,11	4	19,4	9,8	0,24	15
985	24	0	32,2	11,4	0,14	5	21,3	7,6	0,09	3	23,4	8,3	0,20	11
985	24	7,5	36,1	9,9	0,12	4	25,4	6,2	0,08	2	27,3	6,9	0,17	8
985	24	15	40,0	8,4	0,10	3	29,4	4,9	0,06	1	31,1	5,4	0,13	5
1410	45	-15	19,7	18,7	0,23	14	10,2	13,6	0,16	8	12,1	14,6	0,36	33
1410	45	-7,5	24,2	16,6	0,20	11	14,6	11,6	0,14	6	16,6	12,6	0,31	25
1410	45	0	28,7	14,6	0,18	9	19,1	9,7	0,12	4	21,0	10,7	0,26	18
1410	45	7,5	33,0	12,7	0,16	6	23,6	8,0	0,10	3	25,2	8,8	0,21	12
1410	45	15	37,3	10,8	0,13	5	28,0	6,3	0,08	2	29,4	7,0	0,17	8

CAPACITY QJHD 400

Water temperature		in/out 80°C/60°C					in/out 60°C/40°C				in/out 55°C/45°C			
Air flow	Pressure drop air	Air in	Air out	Output	Water flow	Pressure drop water	Air out	Output	Water flow	Pressure drop water	Air out	Output	Water flow	Pressure drop water
m ³ /h	Pa	°C	°C	kW	l/s	kPa	°C	kW	l/s	kPa	°C	kW	l/s	kPa
900	11	-15	29,9	15,4	0,19	6	17,9	11,3	0,14	3	19,8	12,0	0,29	14
900	11	-7,5	33,6	13,7	0,17	5	21,5	9,7	0,12	3	23,4	10,3	0,25	10
900	11	0	37,2	12,1	0,15	4	24,9	8,1	0,10	2	26,9	8,8	0,21	8
900	11	7,5	40,7	10,5	0,13	3	28,1	6,5	0,08	1	30,3	7,2	0,18	5
900	11	15	44,0	9,0	0,11	2	31,6	5,1	0,06	1	33,6	5,7	0,14	3
1590	29	-15	22,9	23,0	0,28	12	12,7	16,8	0,21	7	14,5	17,9	0,44	30
1590	29	-7,5	27,2	20,5	0,25	10	16,9	14,4	0,18	5	18,7	15,5	0,38	23
1590	29	0	31,4	18,0	0,22	8	20,9	12,0	0,14	4	22,8	13,1	0,32	16
1590	29	7,5	35,5	15,6	0,19	6	25,1	9,8	0,12	3	26,9	10,8	0,26	11
1590	29	15	39,5	13,3	0,16	4	29,2	7,8	0,09	2	30,8	8,6	0,21	7
2280	53	-15	18,7	29,4	0,36	20	9,6	21,4	0,26	11	11,4	23,0	0,56	48
2280	53	-7,5	23,4	26,1	0,32	16	14,1	18,3	0,22	8	15,9	19,8	0,48	36
2280	53	0	27,9	23,0	0,28	12	18,7	15,4	0,19	6	20,4	16,8	0,41	26
2280	53	7,5	32,4	19,9	0,24	9	23,3	12,7	0,15	4	24,8	13,8	0,34	18
2280	53	15	36,7	17,0	0,21	7	27,8	10,0	0,12	3	29,1	11,0	0,27	12

CAPACITY QJHD 500

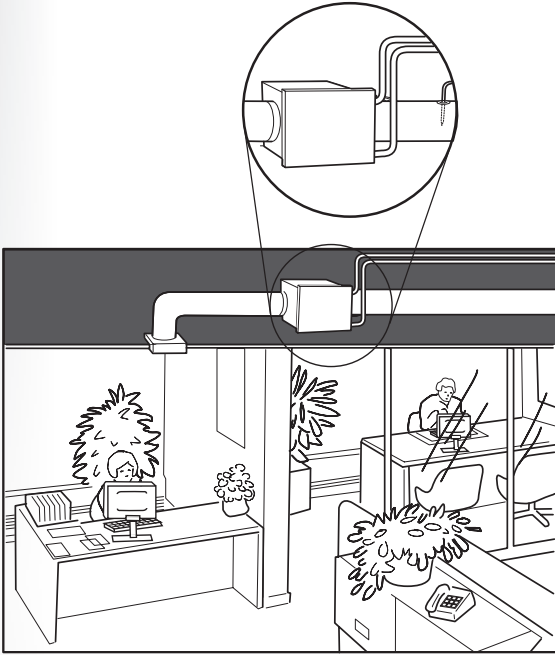
1400	11	-15	30,2	24,2	0,30	7	18,2	17,8	0,22	4	20,0	18,7	0,46	17
1400	11	-7,5	33,9	21,5	0,26	6	21,8	15,2	0,19	3	23,6	16,2	0,39	13
1400	11	0	37,5	19,0	0,23	5	25,2	12,7	0,16	2	27,1	13,7	0,33	9
1400	11	7,5	40,9	16,5	0,20	4	28,4	10,3	0,13	2	30,5	11,3	0,28	7
1400	11	15	44,3	14,1	0,17	3	31,9	8,1	0,10	1	33,8	9,0	0,22	4
2450	28	-15	23,3	35,9	0,44	15	13,1	26,3	0,32	9	14,8	27,9	0,68	37
2450	28	-7,5	27,6	31,9	0,39	12	17,2	22,5	0,27	6	19,0	24,1	0,59	28
2450	28	0	31,7	28,1	0,34	10	21,2	18,8	0,23	5	23,1	20,4	0,49	20
2450	28	7,5	35,8	24,4	0,30	7	25,3	15,4	0,19	3	27,1	16,9	0,41	14
2450	28	15	39,8	20,8	0,26	5	29,5	12,1	0,15	2	31,0	13,4	0,33	9
3500	50	-15	19,2	45,7	0,56	24	10,0	33,4	0,41	14	11,7	35,7	0,87	58
3500	50	-7,5	23,8	40,7	0,50	19	14,4	28,5	0,35	10	16,2	30,8	0,75	44
3500	50	0	28,3	35,8	0,44	15	18,9	23,9	0,29	7	20,7	26,1	0,63	32
3500	50	7,5	32,7	31,0	0,38	12	23,5	19,7	0,24	5	25,0	21,5	0,52	22
3500	50	15	37,0	26,4	0,33	9	28,0	15,6	0,19	3	29,3	17,1	0,41	14

The tables give examples of capacities for each size. If sufficient output is not attained, go up a size.

QJHD

INSTALLATION

On the fluid side pipes are connected using compression couplings (not supplied). The inlet is normally on the lower pipe to facilitate bleeding. The heater can be mounted on the air side either horizontally or vertically, with optional bleeding, *see the figure below*.



CODE KEY

QJH_ – aaa

QJHD = Circular heat exchanger with integrated header.

aaa = Size (circular duct, mm):
100, 125, 160, 200, 250, 315, 400, 500.

Number of tube rows: 2

Fin spacing: 2,5 mm

ACCESSORIES

Additional accessories are available, *see pages 94-96*.

MAINTENANCE

Operating and maintenance instructions are available via the production selection program Coils or from our website.

DIMENSIONING VIA COILS

Dimensioning is performed using the product selection program Coils, which can be downloaded from our website. Coils shows, among others, dimension drawings and the following data:

Air side:	Air temperature out	°C
	Output	kW
	Air velocity	m/s
	Air pressure drop	Pa
Water side:	Return temperature	°C
	Fluid flow	l/s
	Fluid velocity	m/s
	Fluid pressure drop	kPa

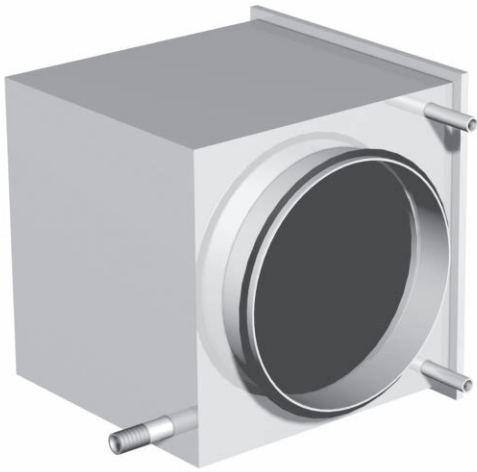


Our products can be ordered with a number of different accessories and with other dimensions and materials than standard. Contact us for more information.

CIRCULAR HEAT EXCHANGER FOR COOLING WATER

QJCD

The heat exchanger QJCD is designed to cool air in ventilation systems with cooling water and can also be used to cool the air in individual rooms (zones). Available in seven different standard sizes. Mounted on ducts or on the wall of the unit room.



QJCD - circular heat exchanger with integrated header.

GENERAL

- Installed in horizontal duct.
- The casing is equipped with a circular sleeve which fits the circular duct standard according to SIS 82 72 06.
- There is a hatch on the heat exchanger connection side that can be opened for cleaning and inspection.
- Circular duct connections with rubber seals.
- Stainless drip collector for condensation water with drain connection (R1/2).
- The casing conforms to tightness class C according to EN 1751.

OPERATING DATA

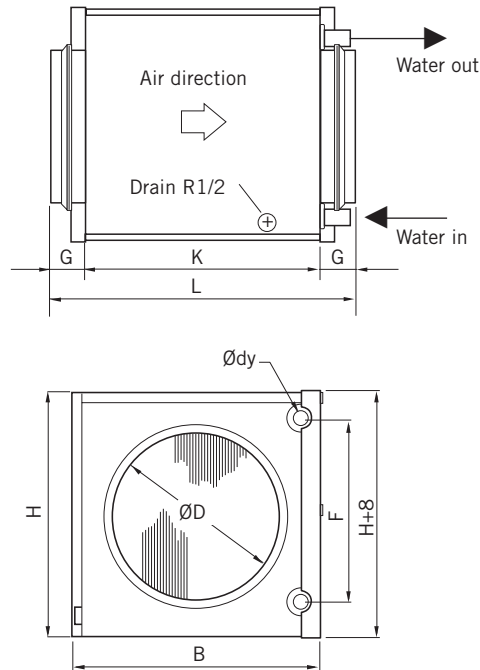
- Operating pressure 1,0 MPa at max operating temperature 150 °C.
- All heat exchangers are leakage tested using dry air under water.

MATERIAL

The heat exchanger is designed using copper tubes and aluminium fins. The outer casing is manufactured of hot-dip galvanized steel sheet, with a stainless steel tray. The connection pipes on the fluid side are of copper.

SIZES & CAPACITY

Available in 7 different standard sizes; 100, 125, 160, 200, 250, 315, 400 (circular duct, mm). See the size table below. Also see the capacity tables on pages 16.



QJCD (mm)	ØD	Ødy	B	H	F	G	L	K	Weight (kg)
100	100	10	251	180	100	40	356	276	4,4
125	125	10	326	255	175	40	356	276	6,8
160	160	10	326	255	175	40	356	276	6,7
200	200	22	411	330	250	40	356	276	9,7
250	250	22	486	405	325	40	356	276	13
315	315	22	560	504	400	40	356	276	16
400	400	22	710	529	425	65	460	330	21,4

Size table indicating dimensions and weights for each duct size.

QJCD

CAPACITY QJCD 100. WATER TEMPERATURE 6/12°C

Air flow	Pressure drop	Air in	Air in	Air out	Output	Water flow	Pressure water
m ³ /h	Pa	°C	%RH	°C	kW	l/s	kPa
54	11	25	50	15,2	0,2	0,01	<0,5
54	11	30	45	17,2	0,3	0,01	1
100	30	25	50	16,9	0,4	0,01	1
100	30	30	45	19,5	0,5	0,02	1
145	55	25	50	17,9	0,4	0,02	1
145	55	30	45	20,4	0,7	0,03	2

CAPACITY QJCD 250. WATER TEMPERATURE 6/12°C

Air flow	Pressure drop	Air in	Air in	Air out	Output	Water flow	Pressure water
m ³ /h	Pa	°C	%RH	°C	kW	l/s	kPa
360	8	25	50	14,6	1,8	0,07	3
360	8	30	45	16,1	2,6	0,10	5
630	21	25	50	15,8	2,8	0,11	6
630	21	30	45	17,8	4,0	0,16	11
900	37	25	50	16,5	3,7	0,14	9
900	37	30	45	18,9	5,2	0,21	18

CAPACITY QJCD 125. WATER TEMPERATURE 6/12°C

Air flow	Pressure drop	Air in	Air in	Air out	Output	Water flow	Pressure water
m ³ /h	Pa	°C	%RH	°C	kW	l/s	kPa
85	5	25	50	13,9	0,4	0,02	2
85	5	30	45	15,1	0,7	0,03	4
150	13	25	50	15,0	0,7	0,03	5
150	13	30	45	16,7	1,0	0,04	9
215	23	25	50	15,7	1,0	0,04	8
215	23	30	45	17,8	1,4	0,06	15

CAPACITY QJCD 315. WATER TEMPERATURE 6/12°C

Air flow	Pressure drop	Air in	Air in	Air out	Output	Water flow	Pressure water
m ³ /h	Pa	°C	%RH	°C	kW	l/s	kPa
560	9	25	50	14,6	2,8	0,11	3
560	9	30	45	16,2	4,0	0,16	7
985	22	25	50	15,8	4,4	0,17	8
985	22	30	45	17,9	6,2	0,25	15
1410	41	25	50	16,6	5,7	0,23	12
1410	41	30	45	19,0	8,1	0,32	24

CAPACITY QJCD 160. WATER TEMPERATURE 6/12°C

Air flow	Pressure drop	Air in	Air in	Air out	Output	Water flow	Pressure water
m ³ /h	Pa	°C	%RH	°C	kW	l/s	kPa
145	12	25	50	14,9	0,7	0,03	4
145	12	30	45	16,6	1,0	0,04	9
250	29	25	50	16,1	1,1	0,04	9
250	29	30	45	18,2	1,5	0,06	18
355	52	25	50	16,8	1,4	0,06	15
355	52	30	45	19,3	2,0	0,08	30

CAPACITY QJCD 400. WATER TEMPERATURE 6/12°C

Air flow	Pressure drop	Air in	Air in	Air out	Output	Water flow	Pressure water
m ³ /h	Pa	°C	%RH	°C	kW	l/s	kPa
900	11	25	50	14,9	4,4	0,17	4
900	11	30	45	16,6	6,3	0,25	7
1590	26	25	50	16,1	6,8	0,27	8
1590	26	30	45	18,3	9,7	0,38	16
2280	50	25	50	16,9	8,8	0,35	13
2280	50	30	45	19,4	12,6	0,50	26

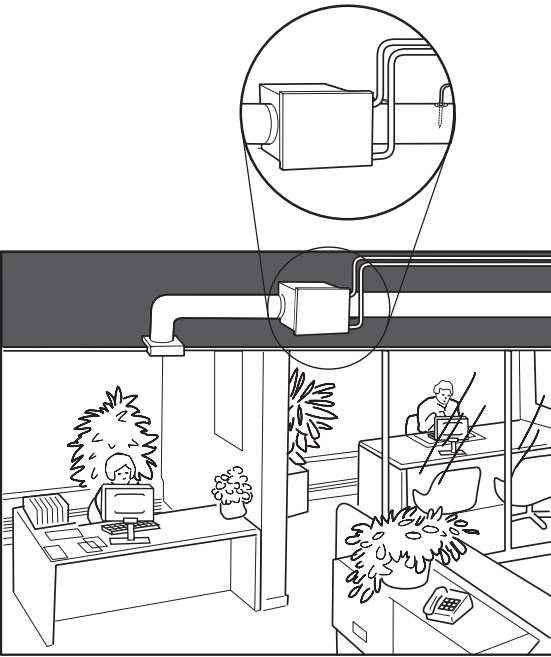
The tables give examples of capacities for each size.
If sufficient output is not attained, go up a size.

CAPACITY QJCD 200. WATER TEMPERATURE 6/12°C

Air flow	Pressure drop	Air in	Air in	Air out	Output	Water flow	Pressure water
m ³ /h	Pa	°C	%RH	°C	kW	l/s	kPa
225	9	25	50	14,8	1,1	0,04	2
225	9	30	45	16,2	1,6	0,06	4
390	21	25	50	15,8	1,7	0,07	5
390	21	30	45	17,8	2,5	0,10	10
555	38	25	50	16,6	2,2	0,09	8
555	38	30	45	18,9	3,2	0,13	16

INSTALLATION

On the fluid side pipes are connected using compression couplings (not supplied). The inlet is normally on the lower pipe to facilitate bleeding. On the air side the cooler is connected horizontally with the air direction according to the fitted arrow, *see the figure below*.

**DIMENSIONING VIA COILS**

Dimensioning is performed using the product selection program Coils, which can be downloaded from our website. Coils shows, among others, dimension drawings and the following data:

Air side:	Air temperature out	°C
	Output	kW
	Air velocity	m/s
	Air pressure drop	Pa
Water side:	Return temperature	°C
	Fluid flow	l/s
	Fluid velocity	m/s
	Fluid pressure drop	kPa

CODE KEY**QJC_ – aaa**

QJCD = Circular heat exchanger with integrated header.

aaa = Size (circular duct, mm):
100, 125, 160, 200, 250, 315, 400.

Number of tube rows: 3

Fin spacing: 2,5 mm

ACCESSORIES

Additional accessories are available, *see pages 94-96*.

MAINTENANCE

Operating and maintenance instructions are available via the production selection program Coils or from our website.



Our products can be ordered with a number of different accessories and with other dimensions and materials than standard. Contact us for more information.

HEAT EXCHANGERS FOR HEATING

QLHG, QLHF, QLHB, QLHH

The heat exchangers QLHG, QLHF, QLHB and QLHH are designed for heating air with heat or fluid as the heat carrier. Mounted on ducts or on the wall of the unit room. The design conforms with the Pressure Equipment Directive PED 2014/68/EU.

GENERAL

- The design consists of a fin body, headers and casing.
- The heat exchanger is equipped with nipples for bleeding and drainage and at least one of the nipples can be equipped with a sensor for a freeze protection thermostat (does not apply to connection DN 15).
- As standard the casing is available in a PG-slip clamp design alternative with a drilled frame according to RFHF, RVGL.
- Heat exchangers over 25 kilograms are equipped with lifting lugs.
- All connections are fitted with male pipe threads (SS-EN ISO 228-1).
- The casing conforms to tightness class B according to VVS AMA98/EN 1751.
- AMA-code: QFC.1.
- Materials for aggressive environments are available as standard.
- If a specific connection size is required, the following fluid flow restrictions apply:

Connection	Flow (max)
DN 15	0,7 l/s
DN 25	1,6 l/s
DN 32	2,8 l/s
DN 50	7,0 l/s
DN 80	14,0 l/s
2 x DN 80	28,0 l/s

Operating data

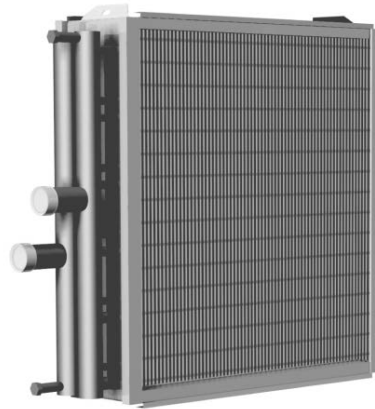
- Max fluid velocity: 1,5 m/s in tubes.
- Normal velocity should be 3-4 m/s.
- Max air velocity: 5,0 m/s.
- For air flows up to 40 m³/s.
- Operating pressure:

Header	Max/Min temp	Max operating pressure
Fe	100/-20 °C	1,6 Mpa
Cu (DN 80)	110/0 °C	1,0 Mpa
Cu (DN 15-50)	110/0 °C	1,6 Mpa

- All heat exchangers are leakage tested using dry air under water.



QLHH with flanged casing and integrated header.



QLHG with slip-clamp casing and exposed header.

MATERIAL & SIZE (see the code key for more info)

The heat exchangers are normally designed using copper tubes and aluminium fins and casing of hot-dip galvanized steel sheet. As standard the header is designed of steel, a part from DN 15 and DN 25 which are of copper with brass connections. Standard sizes are from 200 x 200 mm to 3500 x 2400 mm.

Materials for aggressive environments are available, *see page 6*.

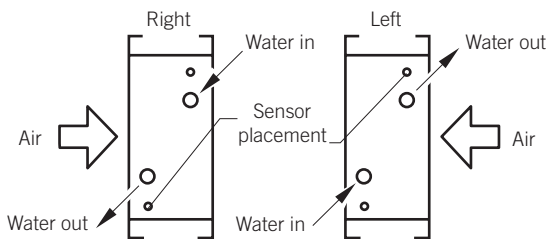
DIMENSIONING VIA COILS

Dimensioning is performed using the product selection program Coils, which can be downloaded from our website. Coils shows, among others, dimension drawings and the following data:

Air side:	Air temperature out	°C
	Output	kW
	Air velocity	m/s
	Air pressure drop	Pa
Water side:	Return temperature	°C
	Fluid flow	l/s
	Fluid velocity	m/s
	Fluid pressure drop	kPa

INSTALLATION

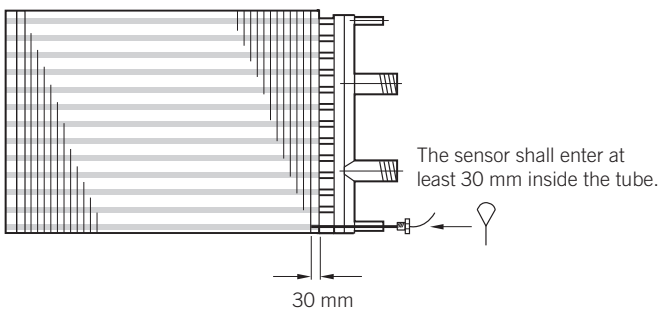
The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. If the heat exchanger is ordered without specifying right/left-hand design, a right-hand design is delivered. Heat exchangers for heating are reversible. The system must be fully bled to give optimal performance.



Counter flow coupling.

FREEZE PROTECTION

At least one of the heat exchanger's nipples can be equipped with a sensor for a freeze protection thermostat. If, after draining, the heat exchanger is exposed to a risk of freezing it should be blown through with air to ensure that all water has been removed.



ACCESSORIES

Additional accessories are available, see pages 94-96.

MAINTENANCE

Operating and maintenance instructions are available via the production selection program Coils or from our website.

CODE KEY

QLH_ – aaa – bbb – cc – dd – ee – f – g

QLHG = Slip-clamp casing with exposed header.

QLHF = Flanged casing with exposed header.

QLHB = Slip-clamp casing with integrated header.

QLHH = Flanged casing with integrated header.

aaa = Duct width (cm) 020-350

bbb = Duct height (cm) 020-240

cc = No. of tube rows 01, 02, 03, 04, 06, 08, 10, 12

dd = Fin spacing (mm x 10) 18, 20, 25, 30, 40, 50, 60

ee = Number of fluid paths 02, 04, 06, 08, 10, etc.

f = Connection side 1=right, 2=left

g = Material

g=Material	Casing	Header	Fin
A	Galv	Steel (conn 15+25=Cu)	Al
B	Galv	Cu	Cu
D	Galv	Cu	Al
E	Galv	Steel (conn 15+25=Cu)	Corropaint
F	Galv	Cu	Cu tinned
K	Galv	Cu	Corropaint
L	SS	Steel (conn 15+25=Cu)	Al
M	SS	Cu	Cu
N	SS	Cu	Al
O	SS	Steel (conn 15+25=Cu)	Corropaint
P	SS	Cu	Cu tinned
Q	SS	Steel (conn 15+25=Cu)	Al corrodip
R	SS	Cu	Corropaint

Galv=galvanized steel sheet, SS=stainless steel sheet
Cu=copper, Al=aluminium

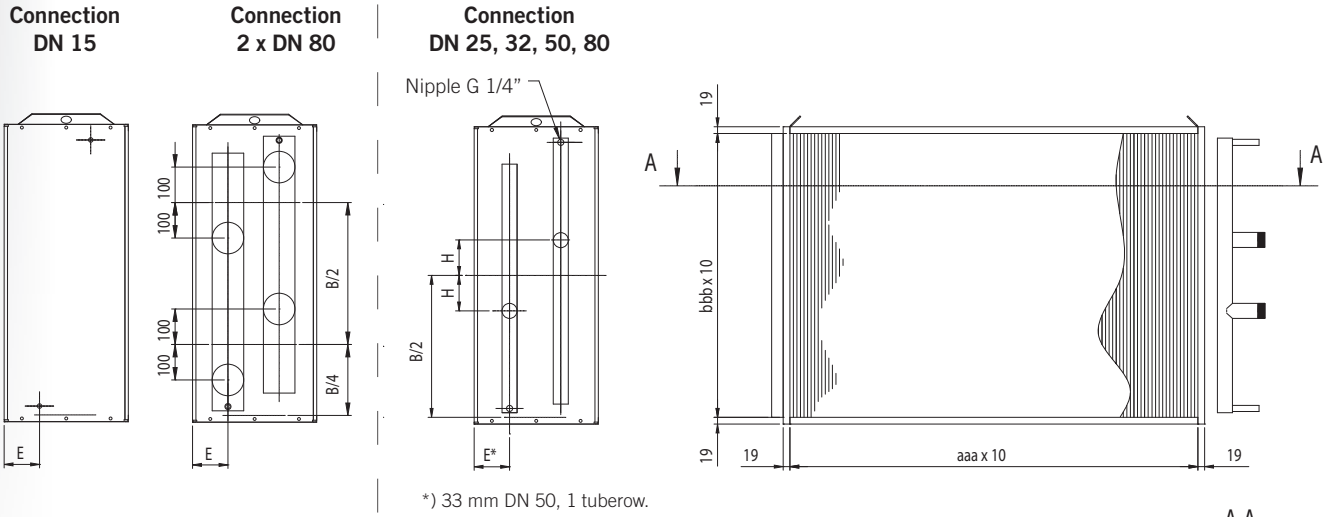


Our products can be ordered with a number of different accessories and with other dimensions and materials than standard. Contact us for more information.

QLHG, QLHF, QLHB, QLHH

DIMENSION DRAWING QLHG: Slip-clamp casing with exposed header.

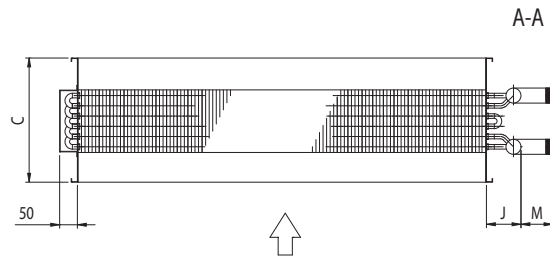
Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



All dimensions in mm unless otherwise indicated.

$B = bbb \times 10$

bbb (cm)	H (mm)
<040	60
≥040	100



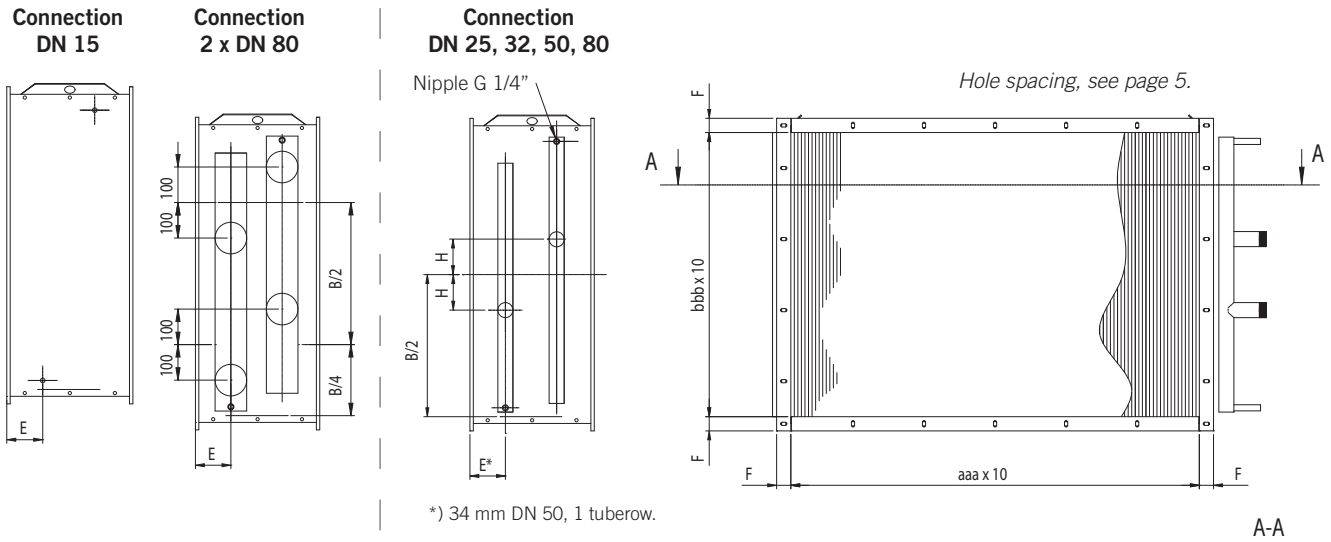
Connection	J (mm)	M (mm)
DN 15 (Cu)	(J+M) 115	
DN 25 (Cu)	89	90
DN 32 (Fe)	98	90
DN 50 (Fe)	115	100
DN 80 (Fe)	144	110
2 x DN 80 (Fe)	144	110

No. of rows (cc)	C (mm)
01	150
02	150
03	150
04	300
06	350
08	400
10	460
12	520

No. of rows (cc)	E (mm)
01	43
02	43
03	43
04	100
06	100
08	97
10	97
12	100

DIMENSION DRAWING QLHF: Flanged casing with exposed header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.

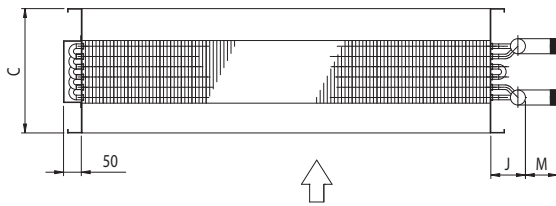


All dimensions in mm unless otherwise indicated.

$B = bbb \times 10$

bbb (cm)	H (mm)
<040	60
≥040	100

aaa (cm)	F (mm)
≤240	40
>240	50



Connection	J (mm)	M (mm)
DN 15 (Cu)	(J+M) 115	
DN 25 (Cu)	89	90
DN 32 (Fe)	98	90
DN 50 (Fe)	115	100
DN 80 (Fe)	144	110
2 x DN 80 (Fe)	144	110

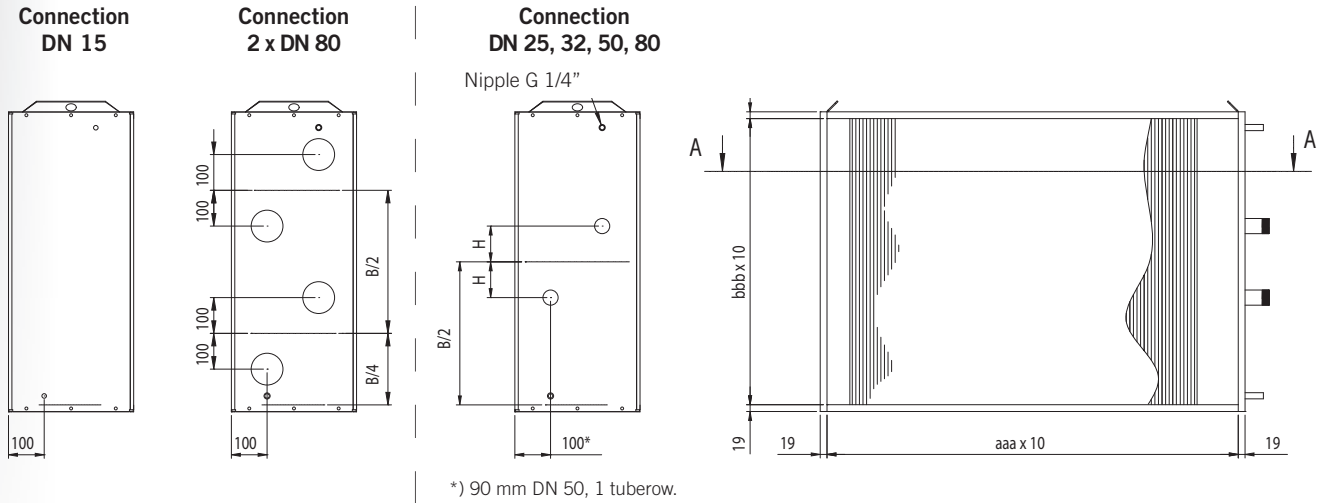
No. of rows (cc)	C (mm)
01	150
02	150
03	150
04	300
06	350
08	400
10	460
12	520

No. of rows (cc)	E (mm)
01	44
02	44
03	44
04	101
06	101
08	98
10	98
12	101

QLHG, QLHF, QLHB, QLHH

DIMENSION DRAWING QLHB: Slip-clamp casing with integrated header.

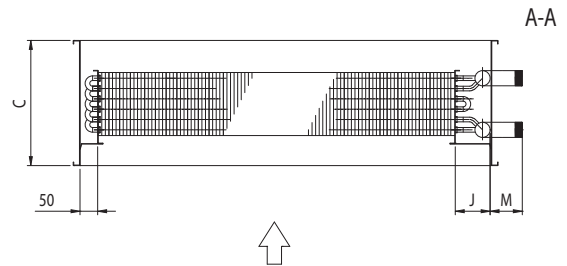
Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



All dimensions in mm unless otherwise indicated.

$B = bbb \times 10$

bbb (cm)	H (mm)
<040	60
≥040	100



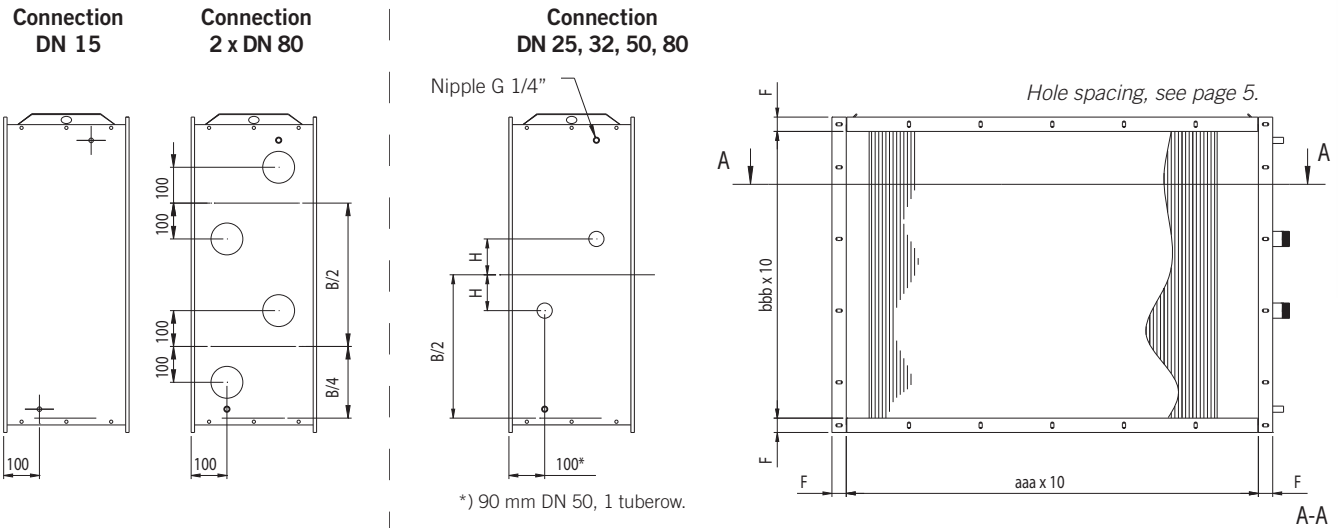
Connection	J (mm)	M (mm)
DN 15 (Cu)	(J+M) 115	
DN 25 (Cu)	89	90
DN 32 (Fe)	98	90
DN 50 (Fe)	115	100
DN 80 (Fe)	144	110
2 x DN 80 (Fe)	144	110

No. of rows (cc)	C (mm)
01	300
02	300
03	300
04	300
06	350
08	400
10	460
12	520

QLHG, QLHF, QLHB, QLHH

DIMENSION DRAWING QLHH: Flanged casing with integrated header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



All dimensions in mm unless otherwise indicated.

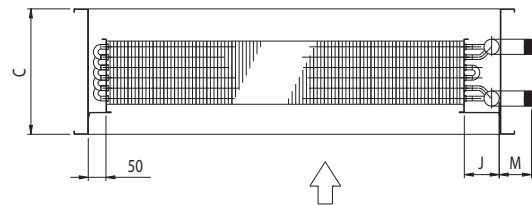
$B = bbb \times 10$

bbb (cm)	H (mm)
<040	60
≥040	100

aaa (cm)	F (mm)
≤240	40
>240	50

Connection	J (mm)	M (mm)
DN 15 (Cu)	(J+M) 115	
DN 25 (Cu)	89	90
DN 32 (Fe)	98	90
DN 50 (Fe)	115	100
DN 80 (Fe)	144	110
2 x DN 80 (Fe)	144	110

No. of rows (cc)	C (mm)
01	300
02	300
03	300
04	300
06	350
08	400
10	460
12	520



HEAT EXCHANGERS FOR COOLING

QLCG, QLCF, QLCH, QLCH

The heat exchangers QLCG, QLCF, QLCH and QLCH are designed for cooling of air with fluid and are mounted on ducts or on the wall of the unit room. The design conforms with the Pressure Equipment Directive PED 2017/68/EC.

GENERAL

- The design consists of a fin body, headers and casing.
- The heat exchanger is equipped with nipples for bleeding and drainage and at least one of the nipples can be equipped with a sensor for a freeze protection thermostat (does not apply to connection DN 15).
- As standard the casing is available in a PG-slip clamp design alternative with a drilled frame according to RFHF, RVGL.
- As standard the drip tray is made of stainless steel with vertical drainage, but can be ordered with horizontal drainage (QLAZ-30).
- Heat exchangers over 25 kilograms are equipped with lifting lugs.
- All connections are fitted with male pipe threads (SS-EN ISO 228-1).
- The casing conforms to tightness class B according to VVS AMA98/EN 1751.
- AMA-code QFC.21.
- Materials for aggressive environments are available as standard.
- If a specific connection size is required, the following fluid flow restrictions apply:

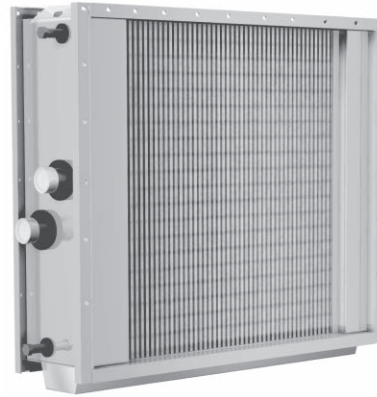
Connection	Flow (max)
DN 15	0,7 l/s
DN 25	1,6 l/s
DN 32	2,8 l/s
DN 50	7,0 l/s
DN 80	14,0 l/s
2 x DN 80	28,0 l/s

OPERATING DATA

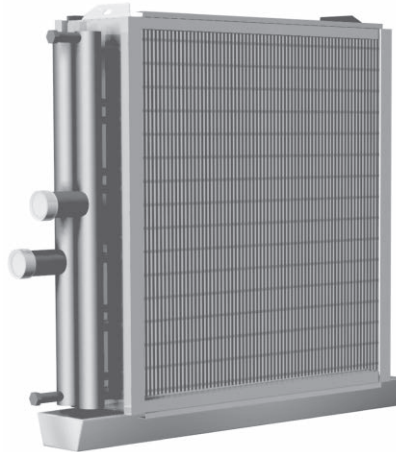
- Max fluid velocity: 2,0 m/s in tubes.
- Normal air velocity should be 2-3 m/s.
- Max air velocity without droplet eliminator: 2,9 m/s.
- Max air velocity with droplet eliminator: 5,0 m/s.
- At duct pressures above 300 Pa an integrated header is recommended.
- For air flows up to 40 m³/s.
- Operating pressure:

Header	Max/Min temp	Max operating pressure
Fe	100/-20 °C	1,6 Mpa
Cu (DN 80)	110/0 °C	1,0 Mpa
Cu (DN 15-50)	110/0 °C	1,6 Mpa

- All heat exchangers are leakage tested using dry air under water.



QLCH with flanged casing and integrated header.



QLCG with slip-clamp casing and exposed header.

MATERIAL & SIZE (see the code key for more info)

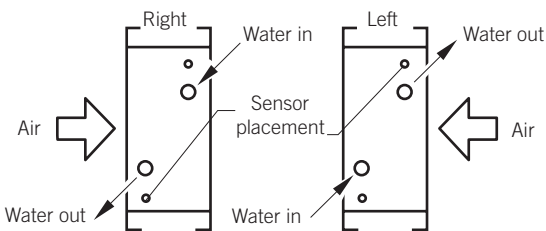
The heat exchangers are normally designed using copper tubes and aluminium fins. Casing of hot-dip galvanized steel sheet with drip tray of stainless steel sheet. As standard the header is designed of steel, a part from DN 15 and DN 25 which are of copper

with brass connections. Standard sizes are from 200x200 mm to 3500x2400 mm. Materials for aggressive environments are available, *see page 6*.



INSTALLATION

The heat exchanger is equipped with signs (label) that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchanger must be ordered in either a right or left-hand design. The system must be fully bled to give optimal performance.



Counter flow coupling.

DIMENSIONING VIA COILS

Dimensioning is performed using the product selection program Coils, which can be downloaded from our website. Coils shows, among others, dimension drawings and the following data:

Air side:	Air temperature out	°C
	Output	kW
	Air velocity	m/s
	Air pressure drop	Pa
Water side:	Return temperature	°C
	Fluid flow	l/s
	Fluid velocity	m/s
	Fluid pressure drop	kPa

ACCESSORIES

Additional accessories are available, see pages 94-96.

MAINTENANCE

Operating and maintenance instructions are available via the production selection program Coils or from our website.

CODE KEY

QLC_ – aaa – bbb – cc – dd – ee – f – g

QLCG = Slip-clamp casing with exposed header.

QLCF = Flanged casing with exposed header.

QLCB = Slip-clamp casing with integrated header.

QLCH = Flanged casing with integrated header

aaa = Duct width (cm) 020-350

bbb = Duct height (cm) 020-240

cc = No. of tube rows 01, 02, 03, 04, 06, 08, 10, 12

dd = Fin spacing (mm x 10) 18, 20, 25, 30, 40, 50, 60

ee = Number of fluid paths 02, 04, 06, 08, 10, etc.

f = Connection side 1=right, 2=left

g = Material

Material	Casing	Header	Fin
A	Galv	Steel (conn15+25=Cu)	Al
B	Galv	Cu	Cu
D	Galv	Cu	Al
E	Galv	Steel (conn 15+25=Cu)	Corropaint
F	Galv	Cu	Cu tinned
K	Galv	Cu	Corropaint
L	SS	Steel (conn 15+25=Cu)	Al
M	SS	Cu	Cu
N	SS	Cu	Al
O	SS	Steel (conn 15+25=Cu)	Corropaint
P	SS	Cu	Cu tinned
Q	SS	Steel (conn 15+25=Cu)	Al corrodip
R	SS	Cu	Corropaint

Galv=galvanized steel sheet, SS=stainless steel sheet

Cu=copper, Al=aluminium



Our products can be ordered with a number of different accessories and with other dimensions and materials than standard. Contact us for more information.

QLCG, QLCF, QLCB, QLCH

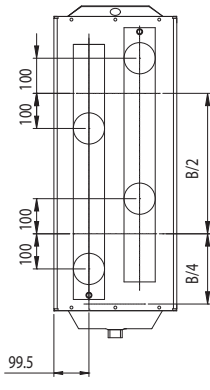
DIMENSION DRAWING QLCG: Slip-clamp casing with exposed header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.

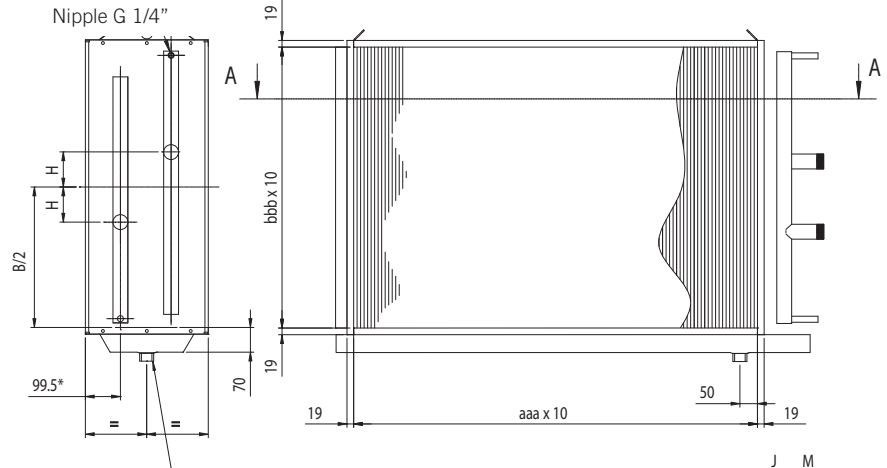
**Connection
DN 15**



**Connection
2 x DN 80**



**Connection
DN 25, 32, 50, 80**



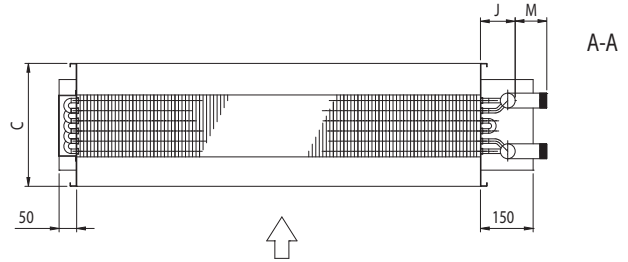
Outside drainage DN32

*) 89,5 mm DN 50, 1 tuberow.

All dimensions in mm unless otherwise indicated.

$B = bbb \times 10$

bbb (cm)	H (mm)
<040	60
≥040	100



Connection	J (mm)	M (mm)
DN 15 (Cu)	(J+M) 115	
DN 25 (Cu)	89	90
DN 32 (Fe)	98	90
DN 50 (Fe)	115	100
DN 80 (Fe)	144	110
2 x DN 80 (Fe)	144	110

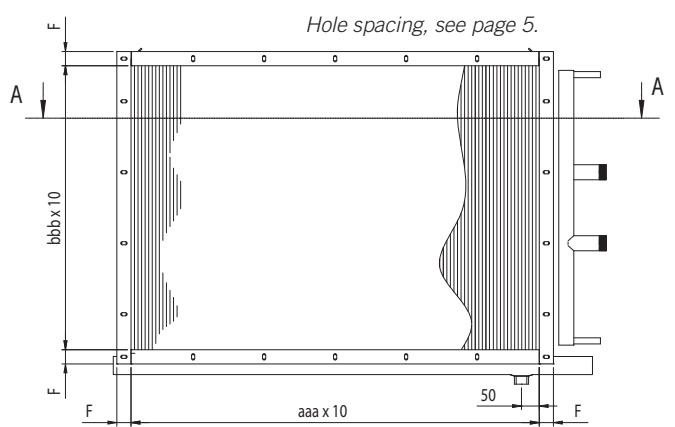
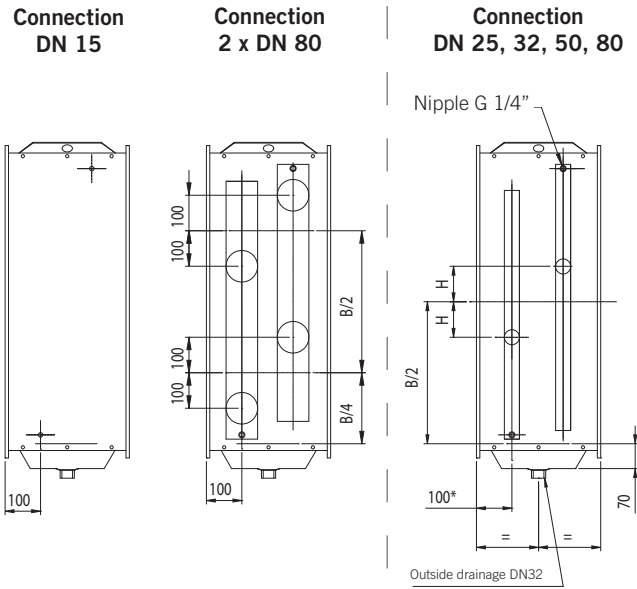
No. of rows (cc)	Droplet eliminator C (mm)	
	WITHOUT	WITH
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580



QLCG, QLCF, QLCH, QLCH

DIMENSION DRAWING QLCF: Flanged casing with exposed header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



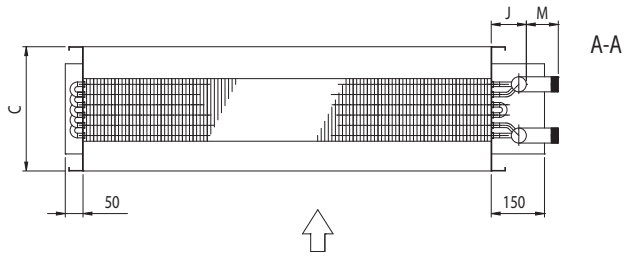
All dimensions in mm unless otherwise indicated.

$B = bbb \times 10$

bbb (cm)	H (mm)
<040	60
≥040	100

aaa (cm)	F (mm)
≤240	40
>240	50

*) 90 mm DN 50, 1 tuberow.



Connection	J (mm)	M (mm)
DN 15 (Cu)	(J+M) 115	
DN 25 (Cu)	89	90
DN 32 (Fe)	98	90
DN 50 (Fe)	115	100
DN 80 (Fe)	144	110
2 x DN 80 (Fe)	144	110

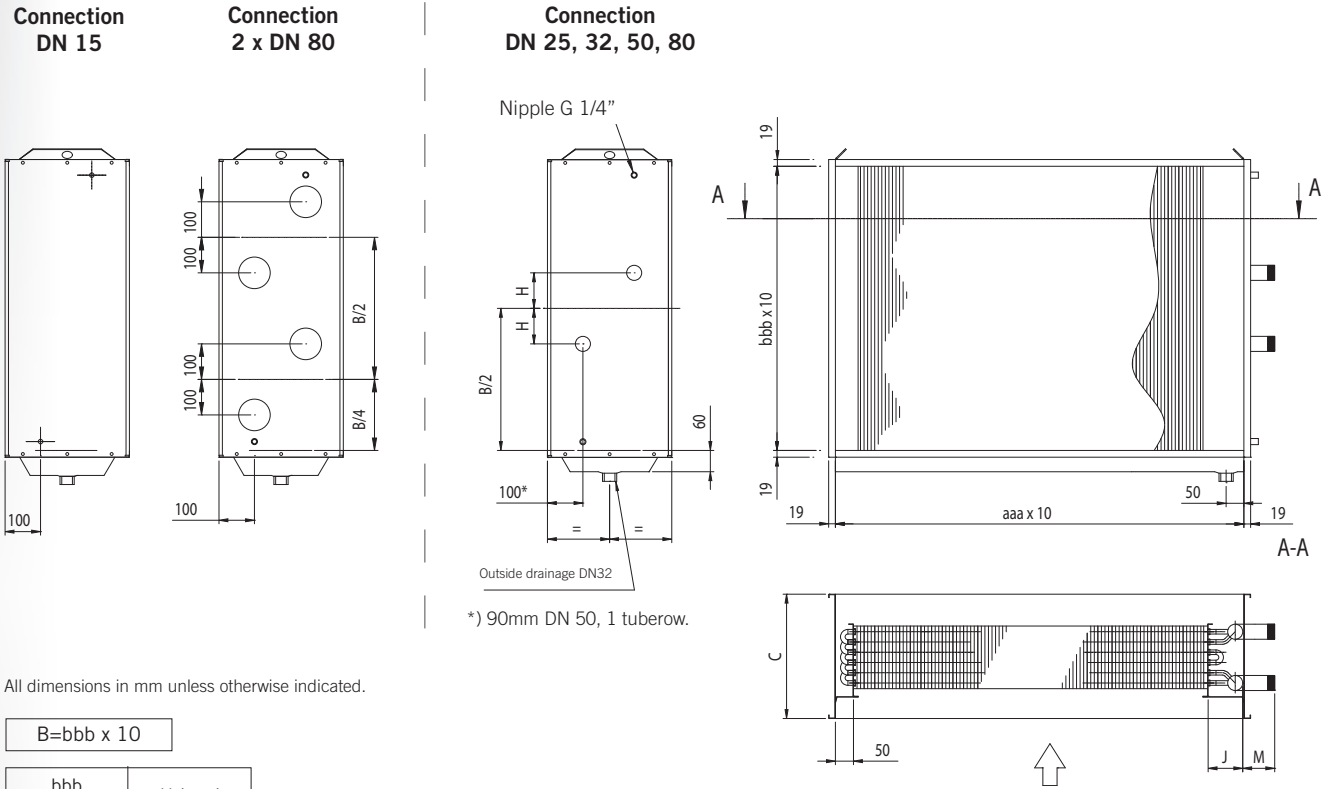
No. of rows (cc)	Droplet eliminator C (mm)	
	WITHOUT	WITH
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580



QLCG, QLCF, QLCB, QLCH

DIMENSION DRAWING QLCB: Slip-clamp casing with integrated header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



All dimensions in mm unless otherwise indicated.

$B = bbb \times 10$

bbb (cm)	H (mm)
<040	60
≥040	100

Connection	J (mm)	M (mm)
DN 15 (Cu)	(J+M) 115	
DN 25 (Cu)	89	90
DN 32 (Fe)	98	90
DN 50 (Fe)	115	100
DN 80 (Fe)	144	110
2 x DN 80 (Fe)	144	110

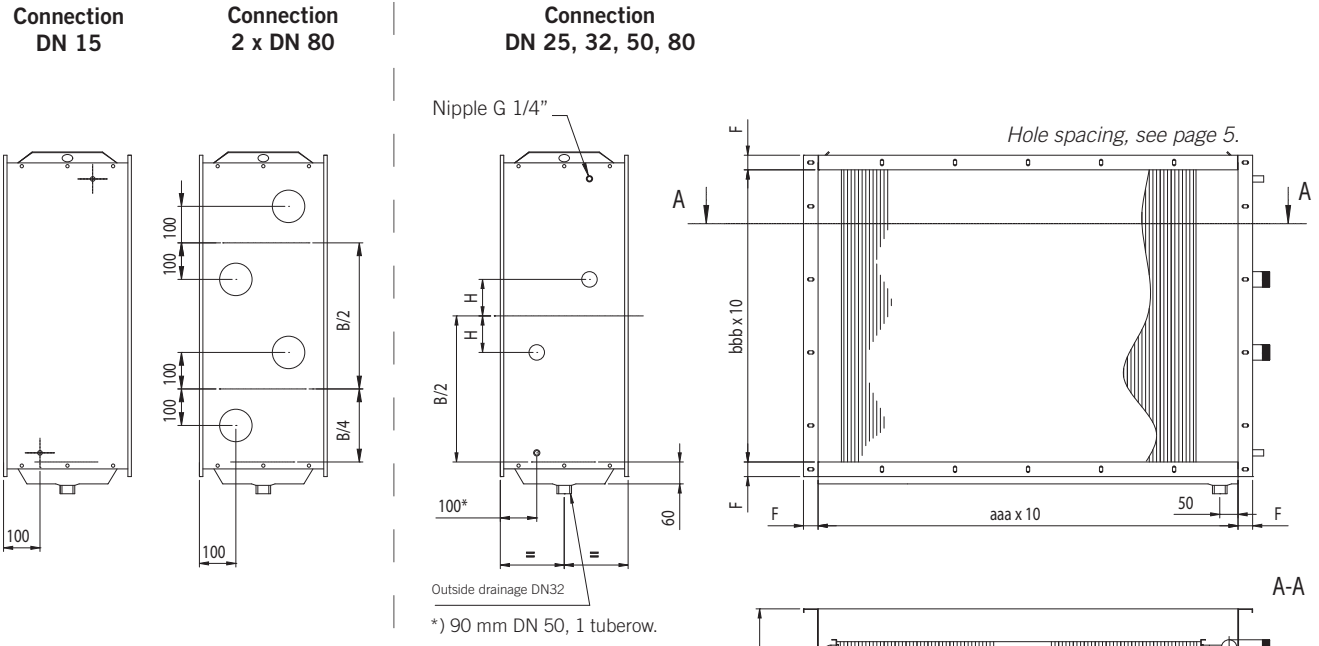
No. of rows (cc)	Droplet eliminator C (mm)	
	WITHOUT	WITH
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580



QLCG, QLCF, QLCH, QLCH

DIMENSION DRAWING QLCH: Flanged casing with integrated header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



All dimensions in mm unless otherwise indicated.

$B = bbb \times 10$

bbb (cm)	H (mm)
<040	60
≥040	100

aaa (cm)	F (mm)
≤240	40
>240	50

Connection	J (mm)	M (mm)
DN 15 (Cu)	(J+M) 115	
DN 25 (Cu)	89	90
DN 32 (Fe)	98	90
DN 50 (Fe)	115	100
DN 80 (Fe)	144	110
2 x DN 80 (Fe)	144	110

No. of rows (cc)	Droplet eliminator C (mm)	
	WITHOUT	WITH
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580

HEAT EXCHANGER FOR HEAT RECOVERY - SUPPLY AIR

The heat exchangers Q(L,F)TG, Q(L,F)TF, Q(L,F)TB and Q(L,F)TH are designed for heating the supply air, via a circulating antifreeze fluid, which recovers energy from the exhaust air. Mounted on ducts or on the wall of the unit room. The design conforms with the Pressure Equipment Directive PED 2014/68/EC.

GENERAL

- The design consists of a fin body, headers and casing.
- QL= 1/2" tubes with pleated fins
QF= 1/2" tubes with plain fins
- The header is equipped with plugged nipples for bleeding and draining. The plug is designed as a manual bleeding valve.
- As standard the casing is available in a PG-slip clamp design alternative with a drilled frame according to RFHF, RVGL.
- Heat exchangers over 25 kilograms are equipped with lifting lugs.
- All connections are fitted with male pipe threads (SS-EN ISO 228-1).
- The casing conforms to tightness class B according to VVS AMA98/EN 1751.
- AMA-code QFC.
- Materials for aggressive environments are available as.
- If a specific connection size is required, the following fluid flow restrictions apply:

Connection	Flow (max)
DN 15	0,7 l/s
DN 25	1,6 l/s
DN 32	2,8 l/s
DN 50	7,0 l/s
DN 80	14,0 l/s
2 x DN 80	28,0 l/s

OPERATING DATA

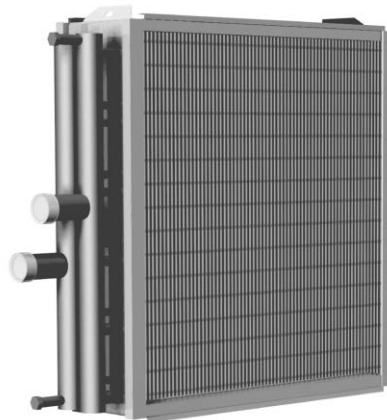
- Max fluid velocity: 2,0 m/s in tubes.
- Normal air velocity should be 2-3 m/s.
- Max air velocity 5,0 m/s.
- At duct pressures above 300 Pa an integrated header is recommended.
- For air flows up to 40 m³/s.
- Operating pressure:

Header	Max/Min temp	Max operating pressure
Fe	100/-20 °C	1,6 Mpa
Cu (DN 80)	110/0 °C	1,0 Mpa
Cu (DN 15-50)	110/0 °C	1,6 Mpa

- All heat exchangers are leakage tested using dry air under water.



QLTH with flanged casing and integrated header.



QLTG with slip-clamp casing and exposed header.

MATERIAL & SIZE (see the code key for more info)

The casing is made of hot-dip galvanized steel sheet. As standard the header is designed of steel, a part from DN 15 and DN 25 which are of copper with brass connections. Standard sizes are from 200 x 200 mm to 3500 x 2400 mm.

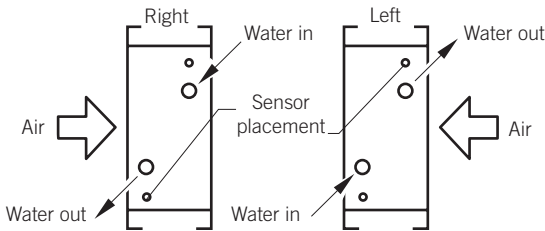
Materials for aggressive environments are available, *see page 6*.



Q(L,F)TG, Q(L,F)TF, Q(L,F)TB, Q(L,F)TH - ECOTERM®

INSTALLATION

The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchanger must be ordered in either a right or left-hand design. The system must be fully bled to give optimal performance.

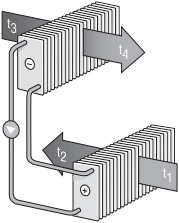


Counter flow coupling.

DIMENSIONING VIA COILS

Dimensioning is performed using the product selection program Coils, which can be downloaded from our website. Coils shows, among others, dimension drawings and the following data:

Temperature efficiency %:



$$n_t = \frac{t_2 - t_1}{t_3 - t_1}$$

Air side: Air temperature out °C
Output kW
Air velocity m/s
Air pressure drop Pa

Water side: Return temperature °C
Fluid flow l/s
Fluid velocity m/s
Fluid pressure drop kPa

ANTI-FREEZE (BRINES)

Glycols, ethanols, salt solutions, oils, etc. In order to gain good performance it is extremely important that the system is filled with the same brine solution and concentration that it is designed for. Different types of brine are included in the calculation program Coils, which gives the correct pressure drop depending on the brine and concentration. Examples of normal mixtures of ethylene glycol are 20-35% and propylene glycol 25-35%, depending which temperature the system works at. A concentration of 20% could eliminate frost tension in the heat exchanger.

CODE KEY**Q(L,F)T – aaa – bbb – cc – dd – ee – f – g**

Q(L,F)TG = Slip-clamp casing with exposed header.

Q(L,F)TF = Flanged casing with exposed header.

Q(L,F)TB = Slip-clamp casing with integrated header.

Q(L,F)TH = Flanged casing with integrated header

QL= 1/2" tubes with pleated fins

QF= 1/2" tubes with plain fins

aaa = Duct width (cm) 020-350

bbb = Duct eight (cm) 020-240

cc = Number of tube rows 01, 02, 03, 04, 06, 08, 10, 12, 14, 16

dd = Fin spacing (mm x 10) 18, 20, 25, 30, 40, 50, 60

ee = Number of fluid paths 02, 04, 06, 08, 10, etc.

f = Connection side 1=right, 2=left

g = Material

Material	Casing	Header	Fin
A	Galv	Steel (conn 15+25=Cu)	Al
B	Galv	Cu	Cu
D	Galv	Cu	Al
E	Galv	Steel (conn 15+25=Cu)	Corropaint
F	Galv	Cu	Cu tinned
K	Galv	Cu	Corropaint
L	SS	Steel (conn 15+25=Cu)	Al
M	SS	Cu	Cu
N	SS	Cu	Al
O	SS	Steel (conn 15+25=Cu)	Corropaint
P	SS	Cu	Cu tinned
Q	SS	Steel (conn 15+25=Cu)	Al corrodip
R	SS	Cu	Corropaint

Galv=galvanized steel sheet, SS= stainless steel sheet,
Cu=copper, Al=aluminium

ACCESSORIES

Additional accessories are available, see pages 94-96.

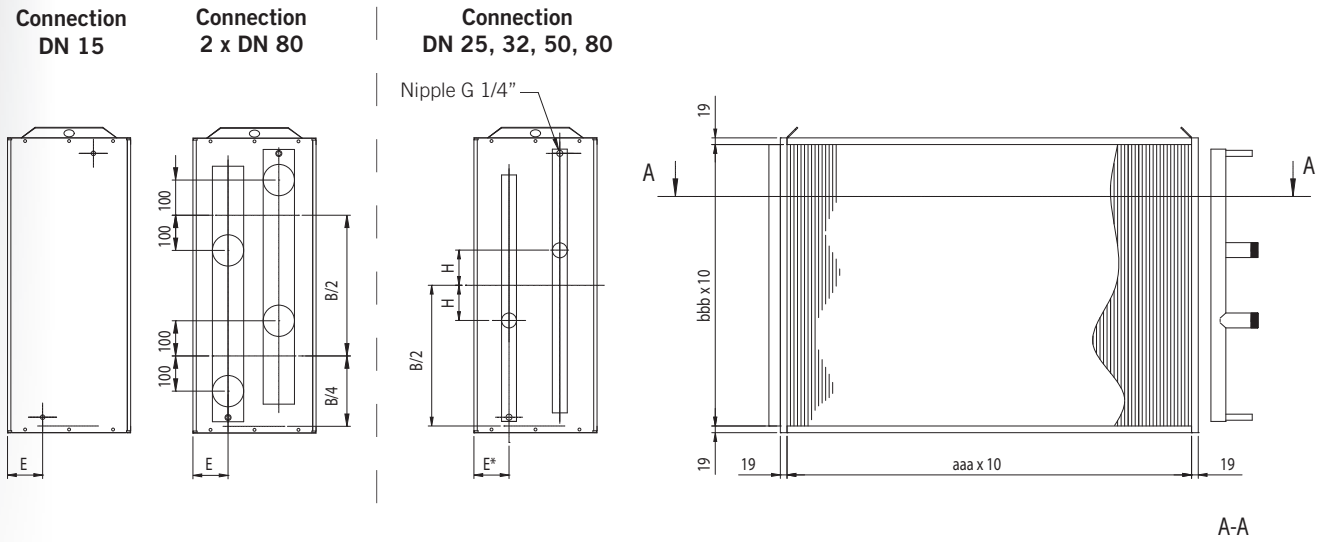
MAINTENANCE

Operating and maintenance instructions are available via the production selection program Coils or from our website.

Q(L,F)TG, Q(L,F)TF, Q(L,F)TB, Q(L,F)TH - ECOTERM®

DIMENSION DRAWING Q(L,F)TG: Slip-clamp casing with exposed header.

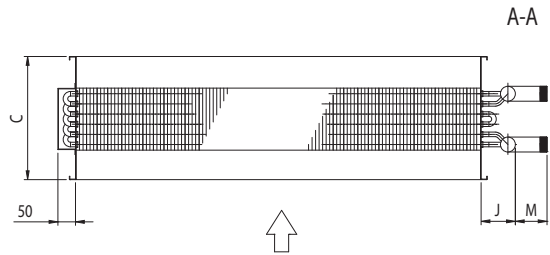
Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



All dimensions in mm unless otherwise indicated.

$B = bbb \times 10$

bbb (cm)	H (mm)
<040	60
≥040	100



Connection	J (mm)	M (mm)
DN 15 (Cu)	(J+M) 115	
DN 25 (Cu)	89	90
DN 32 (Fe)	98	90
DN 50 (Fe)	115	100
DN 80 (Fe)	144	110
2 x DN 80 (Fe)	144	110

No. of rows (cc)	C (mm)
01	300
02	300
03	300
04	300
06	350
08	400
10	460
12	520

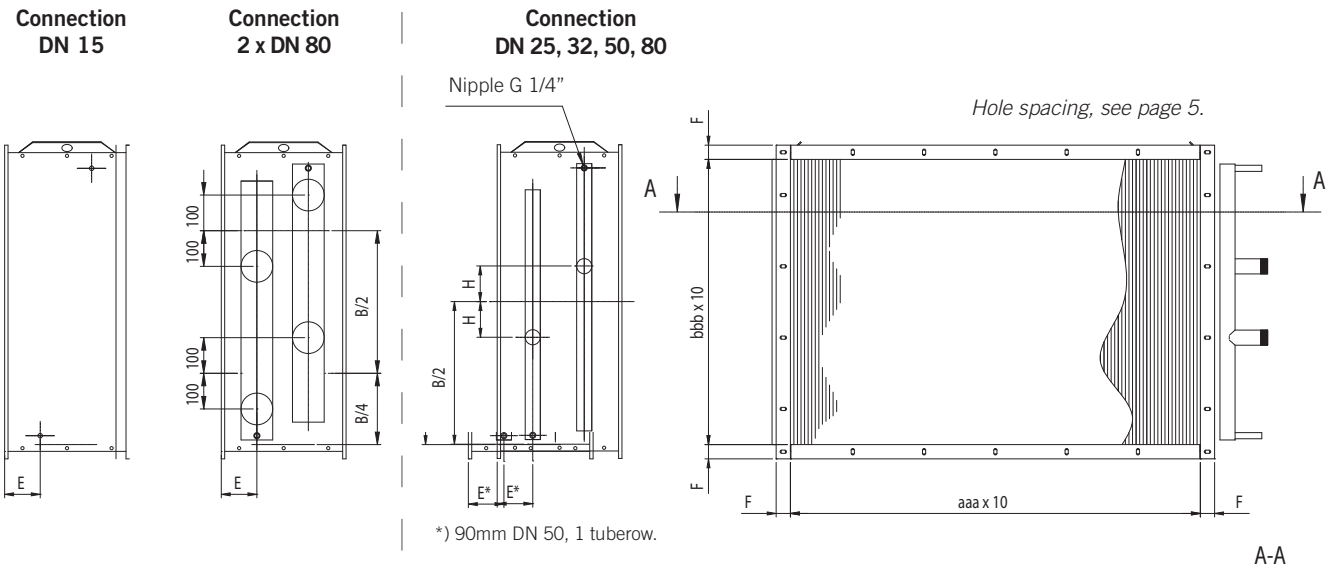
No. of rows (cc)	E (mm)
01	100
02	100
03	100
04	100
06	100
08	97
10	97
12	100



Q(L,F)TG, Q(L,F)TF, Q(L,F)TB, Q(L,F)TH - ECOTERM®

DIMENSION DRAWING Q(L,F)TF: Flanged casing with exposed header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.

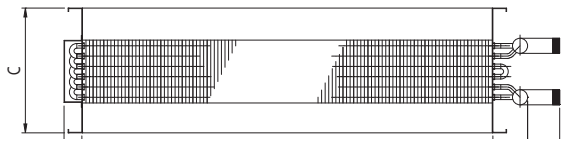


All dimensions in mm unless otherwise indicated.

$B = bbb \times 10$

bbb (cm)	H (mm)
<040	60
≥040	100

aaa (cm)	F (mm)
≤240	40
>240	50



Connection	J (mm)	M (mm)
DN 15 (Cu)	(J+M) 115	
DN 25 (Cu)	89	90
DN 32 (Fe)	98	90
DN 50 (Fe)	115	100
DN 80 (Fe)	144	110
2 x DN 80 (Fe)	144	110

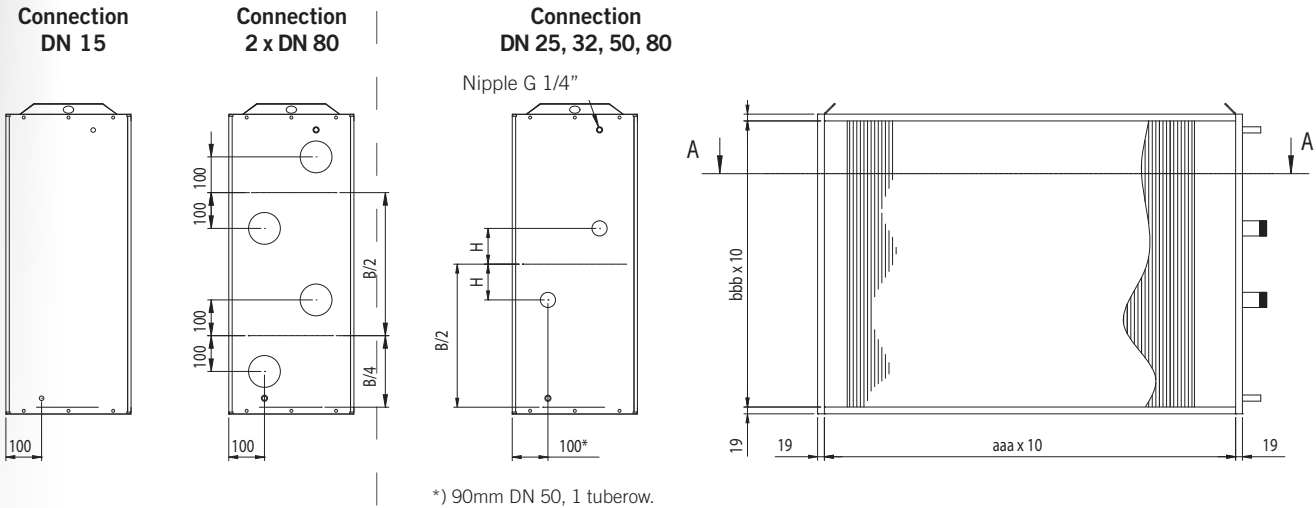
No. of rows (cc)	C (mm)
01	300
02	300
03	300
04	300
06	350
08	400
10	460
12	520

No. of rows (cc)	E (mm)
01	100
02	100
03	100
04	100
06	100
08	98
10	98
12	100

Q(L,F)TG, Q(L,F)TF, Q(L,F)TB, Q(L,F)TH - ECOTERM®

DIMENSION DRAWING Q(L,F)TB: Slip-clamp casing with integrated header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



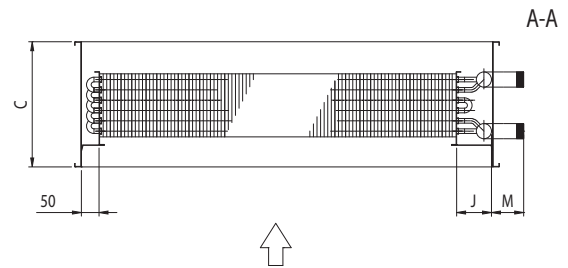
*) 90mm DN 50, 1 tuberow.

All dimensions in mm unless otherwise indicated.

B=bbb x 10	
bbb (cm)	H (mm)
<040	60
≥040	100

Connection	J (mm)	M (mm)
DN 15 (Cu)	(J+M) 115	
DN 25 (Cu)	89	90
DN 32 (Fe)	98	90
DN 50 (Fe)	115	100
DN 80 (Fe)	144	110
2 x DN 80 (Fe)	144	110

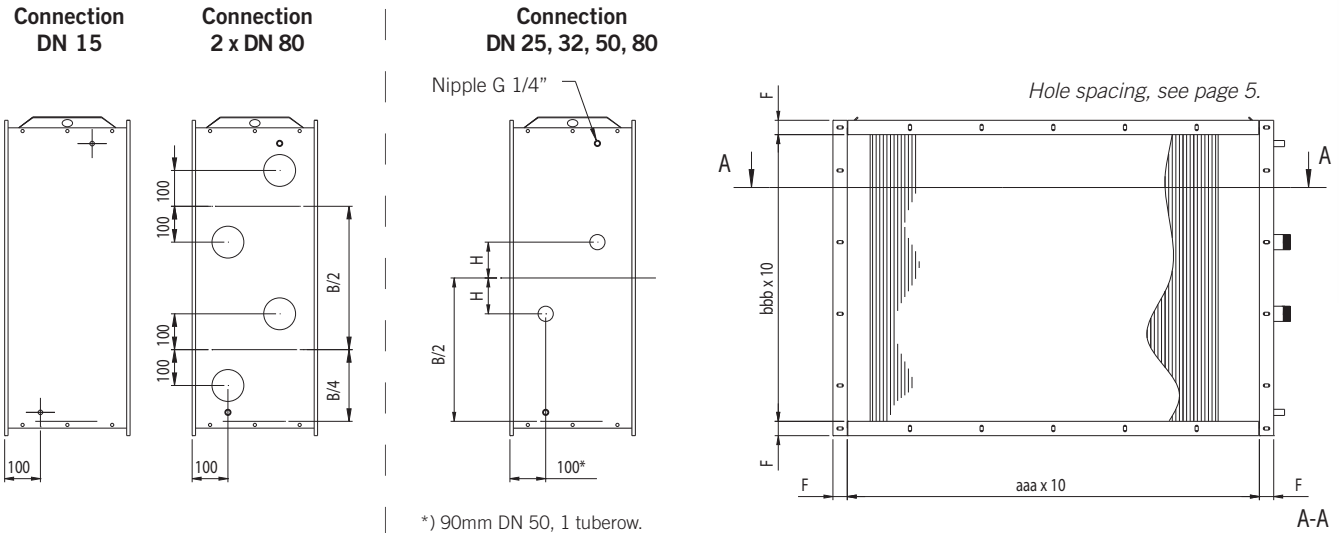
No. of rows (cc)	C (mm)
01	300
02	300
03	300
04	300
06	350
08	400
10	460
12	520



Q(L,F)TG, Q(L,F)TF, Q(L,F)TB, Q(L,F)TH - ECOTERM®

DIMENSION DRAWING Q(L,F)TH: Flanged casing with integrated header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



All dimensions in mm unless otherwise indicated.

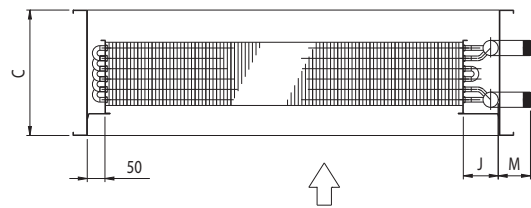
$B = bbb \times 10$

bbb (cm)	H (mm)
<040	60
≥040	100

aaa (cm)	F (mm)
≤240	40
>240	50

Connection	J (mm)	M (mm)
DN 15 (Cu)	(J+M) 115	
DN 25 (Cu)	89	90
DN 32 (Fe)	98	90
DN 50 (Fe)	115	100
DN 80 (Fe)	144	110
2 x DN 80 (Fe)	144	110

No. of rows (cc)	C (mm)
01	300
02	300
03	300
04	300
06	350
08	400
10	460
12	520



HEAT EXCHANGER FOR HEAT RECOVERY - EXHAUST AIR

The heat exchangers Q(L,F)FG, Q(L,F)FF, Q(L,F)FB and Q(L,F)FH are designed for heating the exhaust air, via a circulating antifreeze fluid, which recovers energy from the supply air. Mounted on ducts or on the wall of the unit room. The design conforms with the Pressure Equipment Directive PED 2014/68/EC.

GENERAL

- The design consists of a fin body, headers and casing.
- QL= 1/2" tubes with pleated fins
QF= 1/2" tubes with plain fins
- The header is equipped with plugged nipples for bleeding and draining. The plug is designed as a manual bleeding valve.
- As standard the casing is available in a PG-slip clamp design alternative with a drilled frame according to RFHF, RVGL.
- As standard the drip tray is made of stainless steel with vertical drainage, but can be ordered with horizontal drainage (QLAZ-30).
- Heat exchangers over 25 kilograms are equipped with lifting lugs.
- All connections are fitted with male pipe threads (SS-EN ISO 228-1).
- The casing conforms to tightness class B according to VVS AMA98/EN 1751.
- AMA-code QFC.
- Materials for aggressive environments are available as standard.
- If a specific connection size is required, the following fluid flow restrictions apply:

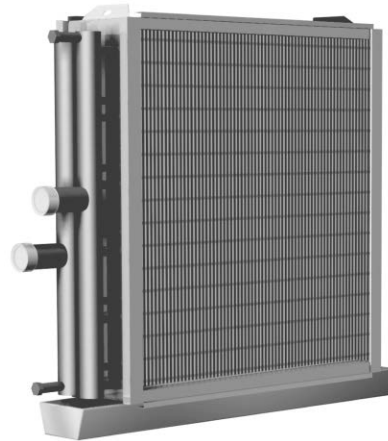
Connection	Flow (max)
DN 15	0,7 l/s
DN 25	1,6 l/s
DN 32	2,8 l/s
DN 50	7,0 l/s
DN 80	14,0 l/s
2 x DN 80	28,0 l/s

OPERATING DATA

- Max air velocity: 1,5 m/s in tubes.
- Normal air velocity should be 2-3 m/s.
- Max air velocity without droplet eliminator: 2,9 m/s.
- Max air velocity with droplet eliminator: 5,0 m/s.
- At duct pressures above 300 Pa an integrated header is recommended.
- For air flows up to 40 m³/s.



QLFH with flanged casing and integrated header.



QLFG with slip-clamp casing and exposed header.

- Operating pressure:

Header	Max/Min temp	Max operating pressure
Fe	100/-20 °C	1,6 Mpa
Cu (DN 80)	110/0 °C	1,0 Mpa
Cu (DN 15-50)	110/0 °C	1,6 Mpa

- All heat exchangers are leakage tested using dry air under water.

MATERIAL & SIZE (see the code key for more info)

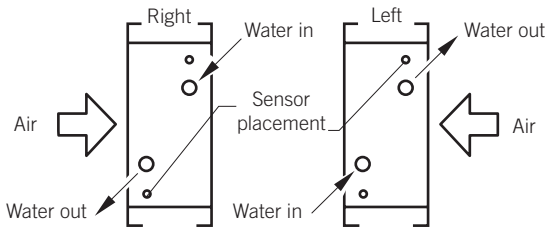
The heat exchangers are designed using copper tubes and aluminium fins. The casing is made of hot-dip galvanized steel sheet. Stainless steel drip tray. As standard the header is designed of steel, a part from DN 15 and DN 25 which are of copper with brass connections. Standard sizes are from 200 x 200 mm to 3500 x 2400 mm. Materials for aggressive environments are available, see page 6.



Q(L,F)FG, Q(L,F)FF, Q(L,F)FB, Q(L,F)FH - ECOTERM®

INSTALLATION

The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchanger must be ordered in either a right or left-hand design. The system must be fully bled to give optimal performance.

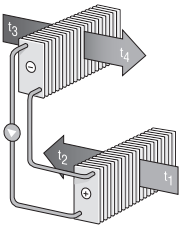


Counter flow coupling.

DIMENSIONING VIA COILS

Dimensioning is performed using the product selection program Coils, which can be downloaded from our website. Coils shows, among others, dimension drawings and the following data:

Temperature efficiency %:



$$\eta_t = \frac{t_2 - t_1}{t_3 - t_1}$$

Air side: Air temperature out °C
Output kW
Air velocity m/s
Air pressure drop Pa

Water side: Return temperature °C
Fluid flow l/s
Fluid velocity m/s
Fluid pressure drop kPa

ANTI-FREEZE (BRINES)

Glycols, ethanols, salt solutions, oils, etc. In order to gain good performance it is extremely important that the system is filled with the same brine solution and concentration that it is designed for. Different types of brine are included in the calculation program Coils, which gives the correct pressure drop depending on the brine and concentration. Examples of normal mixtures of ethylene glycol are 20-35% and propylene glycol 25-35%, depending which temperature the system works at. A concentration of 20% could eliminate frost tension in the heat exchanger.

CODE KEY**Q(L,F)F_ - aaa - bbb - cc - dd - ee - f - g**

Q(L,F)FG = Slip-clamp casing with exposed header.

Q(L,F)FF = Flanged casing with exposed header.

Q(L,F)FB = Slip-clamp casing with integrated header.

Q(L,F)FH = Flanged casing with integrated header.

QL= 1/2" tubes with pleated fins

QF= 1/2" tubes with plain fins

aaa = Duct width (cm) 020-350

bbb = Duct eight (cm) 020-240

cc = Number of tube rows 01, 02, 03, 04, 06, 08, 10, 12, 14, 16

dd = Fin spacing (mm x 10) 18, 20, 25, 30, 40, 50, 60

ee = Number of fluid paths 02, 04, 06, 08, 10, etc.

f = Connection side 1=right, 2=left

g = Material

Material	Casing	Header	Fin
A	Galv	Steel (conn 15+25=Cu)	Al
B	Galv	Cu	Cu
D	Galv	Cu	Al
E	Galv	Steel (conn15+25=Cu)	Corropaint
F	Galv	Cu	Cu tinned
K	Galv	Cu	Corropaint
L	SS	Steel (conn15+25=Cu)	Al
M	SS	Cu	Cu
N	SS	Cu	Al
O	SS	Steel (conn 15+25=Cu)	Corropaint
P	SS	Cu	Cu tinned
Q	SS	Steel (conn15+25=Cu)	Al corrodip
R	SS	Cu	Corropaint

Galv=galvanized steel sheet, SS= stainless steel sheet,
Cu=copper, Al=aluminium

ACCESSORIES

Additional accessories are available, see pages 94-96.

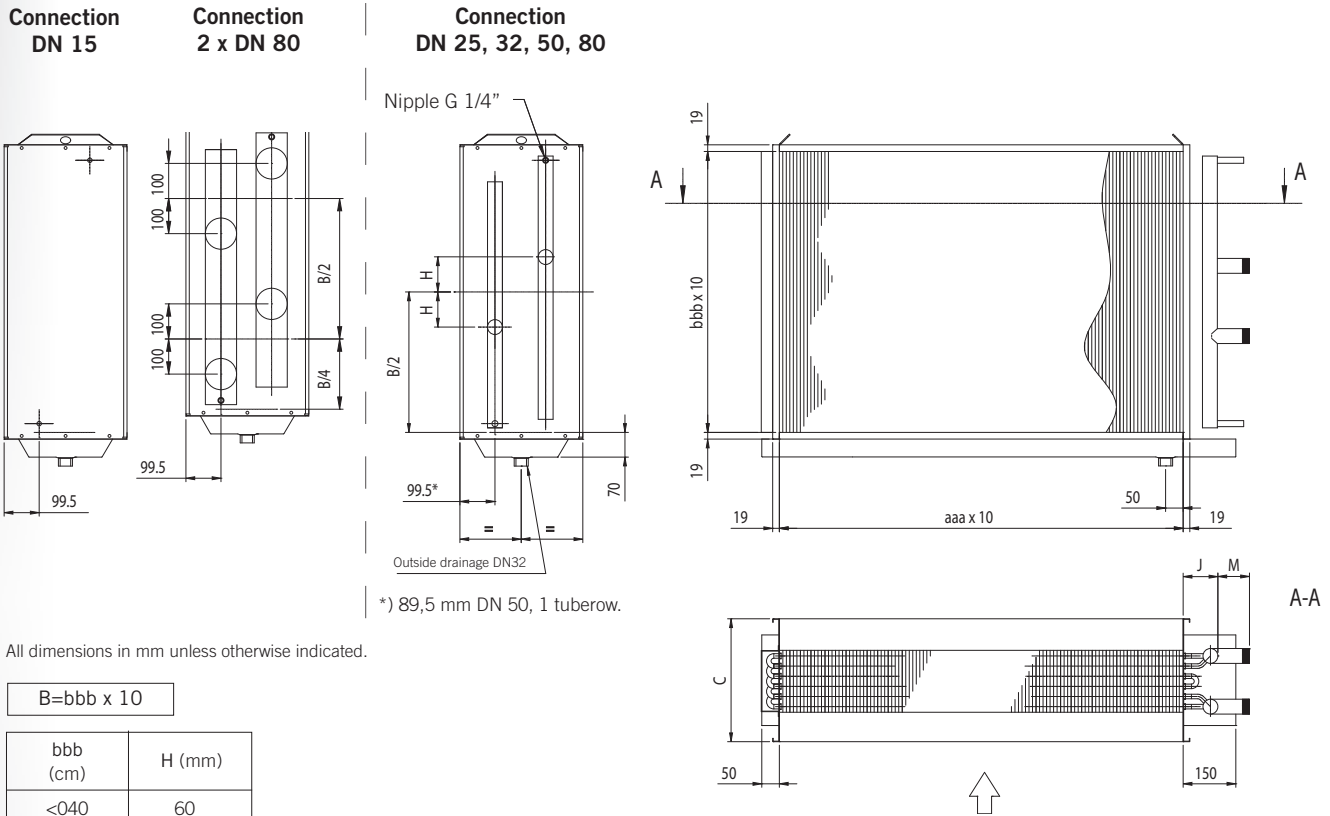
MAINTENANCE

Operating and maintenance instructions are available via the production selection program or from our website.

Q(L,F)FG, Q(L,F)FF, Q(L,F)FB, Q(L,F)FH - ECOTERM®

DIMENSION DRAWING Q(L,F) FG: Slip-clamp casing with exposed header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



All dimensions in mm unless otherwise indicated.

$B = bbb \times 10$

bbb (cm)	H (mm)
<040	60
≥040	100

Connection	J (mm)	M (mm)
DN 15 (Cu)	(J+M) 115	
DN 25 (Cu)	89	90
DN 32 (Fe)	98	90
DN 50 (Fe)	115	100
DN 80 (Fe)	144	110
2 x DN 80 (Fe)	144	110

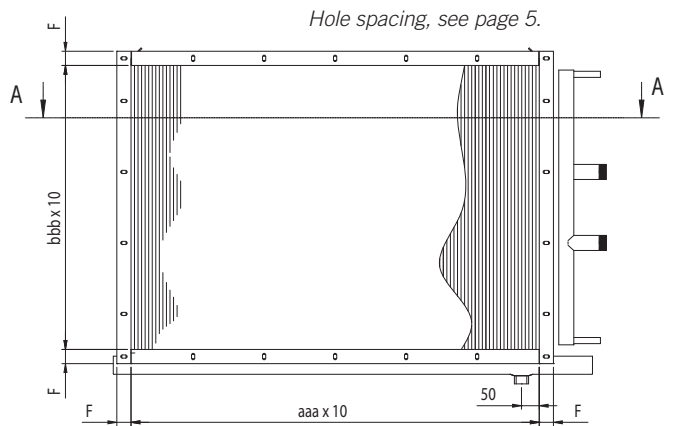
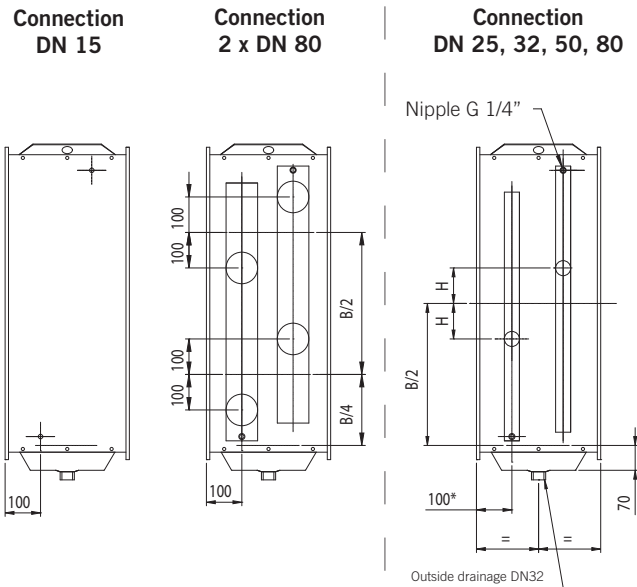
No. of rows (cc)	C (mm)	C with droplet eliminator
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580



Q(L,F)FG, Q(L,F)FF, Q(L,F)FB, Q(L,F)FH - ECOTERM®

DIMENSION DRAWING Q(L,F) FF: Flanged casing with exposed header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



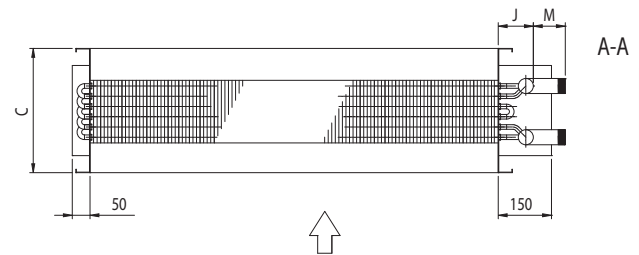
All dimensions in mm unless otherwise indicated.

$B = bbb \times 10$

bbb (cm)	H (mm)
<040	60
≥040	100

aaa (cm)	F (mm)
≤240	40
>240	50

*) 90 mm DN 50, 1 tuberow.



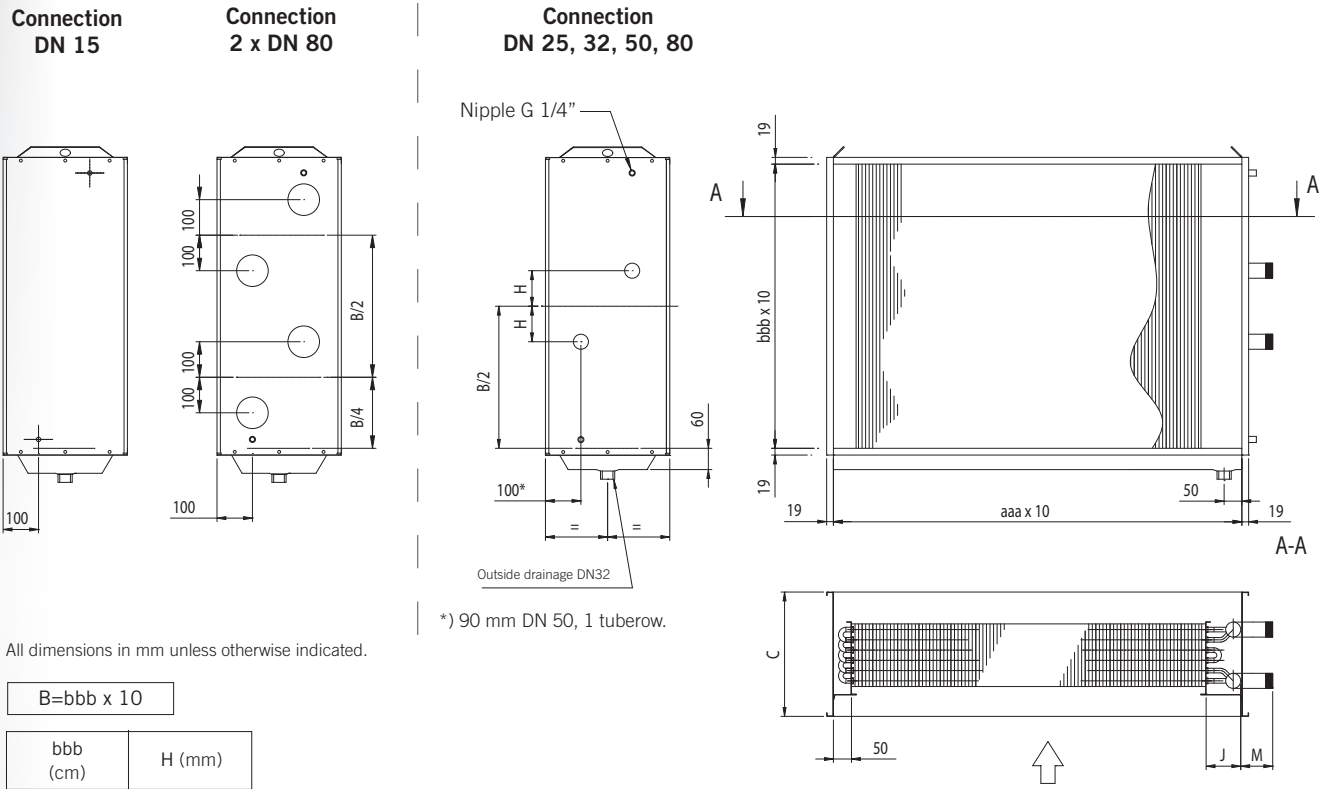
Connection	J (mm)	M (mm)
DN 15 (Cu)	(J+M) 115	
DN 25 (Cu)	89	90
DN 32 (Fe)	98	90
DN 50 (Fe)	115	100
DN 80 (Fe)	144	110
2 x DN 80 (Fe)	144	110

No. of rows (cc)	Droplet eliminator C (mm)	
	WITHOUT	WITH
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580

Q(L,F)FG, Q(L,F)FF, Q(L,F)FB, Q(L,F)FH - ECOTERM®

DIMENSION DRAWING Q(L,F) FB: Slip-clamp casing with integrated header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils



All dimensions in mm unless otherwise indicated.

$B = bbb \times 10$

bbb (cm)	H (mm)
<040	60
≥040	100

*) 90 mm DN 50, 1 tuberow.

Connection	J (mm)	M (mm)
DN 15 (Cu)	(J+M) 115	
DN 25 (Cu)	89	90
DN 32 (Fe)	98	90
DN 50 (Fe)	115	100
DN 80 (Fe)	144	110
2 x DN 80 (Fe)	144	110

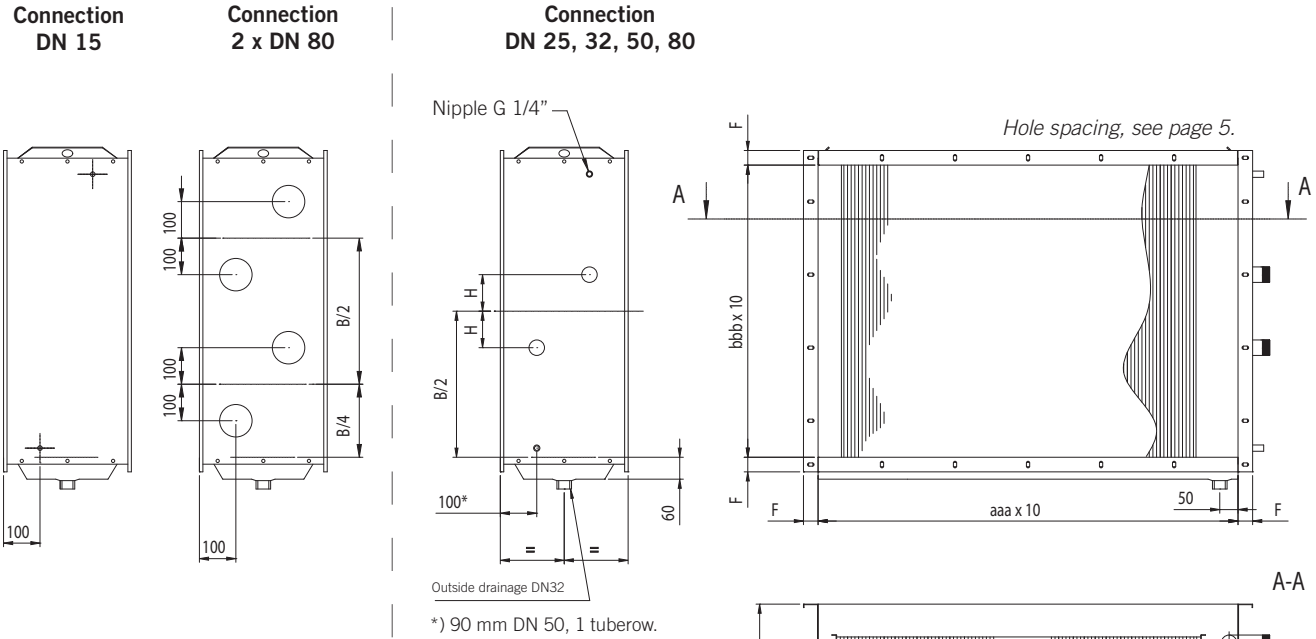
No. of rows (cc)	Droplet eliminator C (mm)	
	WITHOUT	WITH
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580



Q(L,F)FG, Q(L,F)FF, Q(L,F)FB, Q(L,F)FH - ECOTERM®

DIMENSION DRAWING Q(L,F) FH: Flanged casing with integrated header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils



All dimensions in mm unless otherwise indicated.

$B = bbb \times 10$

bbb (cm)	H (mm)	aaa (cm)	F (mm)
<040	60	≤240	40
≥040	100	>240	50

Connection	J (mm)	M (mm)
DN 15 (Cu)	(J+M) 115	
DN 25 (Cu)	89	90
DN 32 (Fe)	98	90
DN 50 (Fe)	115	100
DN 80 (Fe)	144	110
2 x DN 80 (Fe)	144	110

No. of rows (cc)	Droplet eliminator C (mm)	
	WITHOUT	WITH
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580



HEAT EXCHANGERS FOR EVAPORATING REFRIGERANT (DX)

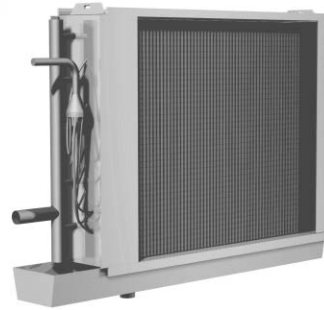
The heat exchangers QLEG, QLEF, QLEB and QLEH are designed for cooling of air with an evaporating medium and designed for horizontal air flow. Mounted on ducts or on the wall of the unit room. The design conforms with the Pressure Equipment Directive 2014/68/EC.

GENERAL

- The design consists of a fin body, headers/distributor and casing.
- As standard the casing is available in a PG-slip clamp design alternative with a drilled frame according to RFHF, RVGL.
- The heat exchangers are designed with a distributor for incoming refrigerant and a header for outgoing.
- The tubes are zigzag mounted in the fin body to give, together with the pleated fins, maximum output.
- As standard the drip tray is made of stainless steel with vertical drainage, but can be ordered with horizontal drainage (QLAZ-30).
- Available in several output stages.
- Heat exchangers over 25 kilograms are equipped with lifting lugs.
- The casing conforms to tightness class B according to VVS AMA98/EN 1751.
- AMA-code QFC.22.
- Materials for aggressive environments are available as standard.
- For the greatest cleanliness the heat exchangers are shield gas soldered and filled with nitrogen gas before delivery.

OPERATING DATA

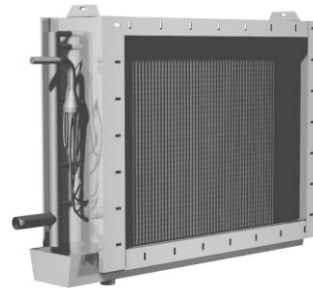
- Normal air velocity should be 2-3 m/s.
- Max air velocity without droplet eliminator: 2,9 m/s.
- Max air velocity with droplet eliminator: 5,0 m/s.
- At duct pressures above 300 Pa an integrated header is recommended.
- For air flows up to 40 m³/s.
- Max operating pressure 2,2 MPa at max operating temperature 100 °C.
- All heat exchangers are leakage tested using dry air under water.
- If reversible operation or hot-gas defrosting are used, the max. operating pressure should be observed.



QLEG with slip-clamp casing and exposed header.



QLEB with slip-clamp casing and integrated header.



QLEF with flanged casing and exposed header.



QLEH with flanged casing and integrated header.

MATERIAL & SIZE (see the code key for more info)

The heat exchanger is designed using copper tubes and aluminium fins. The casing is made of hot-dip galvanized steel sheet with drip tray of stainless steel. The header and distributor pipes are made of copper while the distributor is made of brass. Standard sizes are from 200 x 200 mm to 3500 x 2400 mm. Materials for aggressive environments are available, *see page 6*.

DIMENSIONING VIA COILS

Dimensioning is performed using the product selection program Coils, which can be downloaded from our website. Coils shows, among others, dimension drawings and the following:

Air side:	Air temperature out	°C
	Output	kW
	Air velocity	m/s
	Air pressure drop wet and dry	Pa
	Outgoing air humidity	%
	Condensate	g/s
Refrigerant side:	Refrigerant pressure drop	kPa

OUTPUT STAGES

Heat exchangers for evaporating refrigerant can be delivered divided into one, two or several output stages depending on the height of the heat exchanger. Heat exchangers with two output stages are normally coupled so that every other coil is coupled to output stage 1 and every other to output stage 2 ("interlaced coupling"), see figure 1. Connections and fluid pipes are equipped with copper washers that indicate the stage association. Heat exchangers with three or more output stages are normally divided vertically, see figure 2.

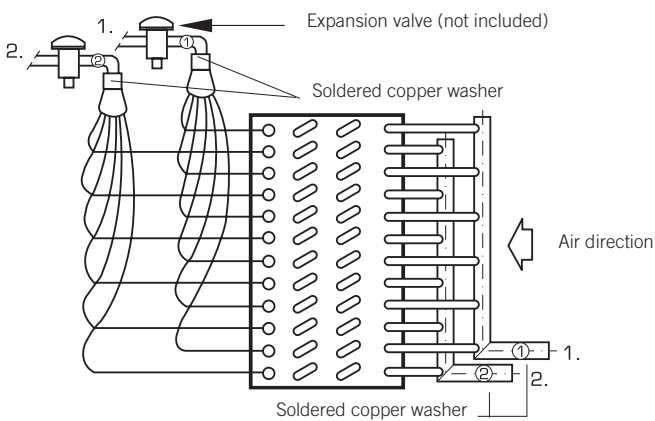


Figure 1. Two output stages with "interlace coupling".

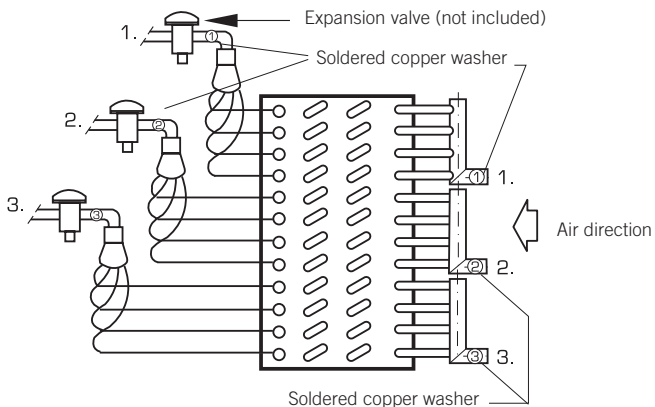


Figure 2. Three or more output stages are normally divided vertically.

CODE KEY

QLE_ – aaa – bbb – cc – dd – ee – f – g

QLEG = Slip-clamp casing with exposed header.

QLEF = Flanged casing with exposed header.

QLEB = Slip-clamp casing with integrated header.

QLEH = Flanged casing with integrated header.

aaa = Duct width (cm) 020-350

bbb = Duct eight (cm) 020-240

cc = Number of tube rows 01, 02, 03, 04, 06, 08, 10, 12

dd = Fin spacing (mm x 10) 20, 25, 30, 40, 50, 60

ee = Number of fluid paths 02, 04, 06, 08, 10, etc.

f = Connection side

1=right, 2=left

3=right shared circuit 1/2+1/2

4=left shared circuit 1/2+1/2

5=right shared circuit 1/3+2/3

6=left shared circuit 1/3+2/3

7=right 3 equal stages

8=left 3 equal stages

g = Material

Material	Casing	Header	Fin
A	Galv	Cu	Al
B	Galv	Cu	Cu
E	Galv	Cu	Corropaint
F	Galv	Cu	Cu tinned
L	SS	Cu	Al
M	SS	Cu	Cu
O	SS	Cu	Corropaint
P	SS	Cu	Cu tinned
Q	SS	Cu	Al corrodip

Galv=galvanized steel sheet, SS=stainless steel sheet,
Cu=copper, Al=aluminium

INSTALLATION

The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is ordered in either a right or left-hand design.

ACCESSORIES

Additional accessories are available, see pages 94-96.

MAINTENANCE

Operating and maintenance instructions are available via the production selection program Coils or from our website.



Our products can be ordered with a number of different accessories and with other dimensions and materials than standard. Contact us for more information.

QLEG, QLEF, QLEB, QLEH

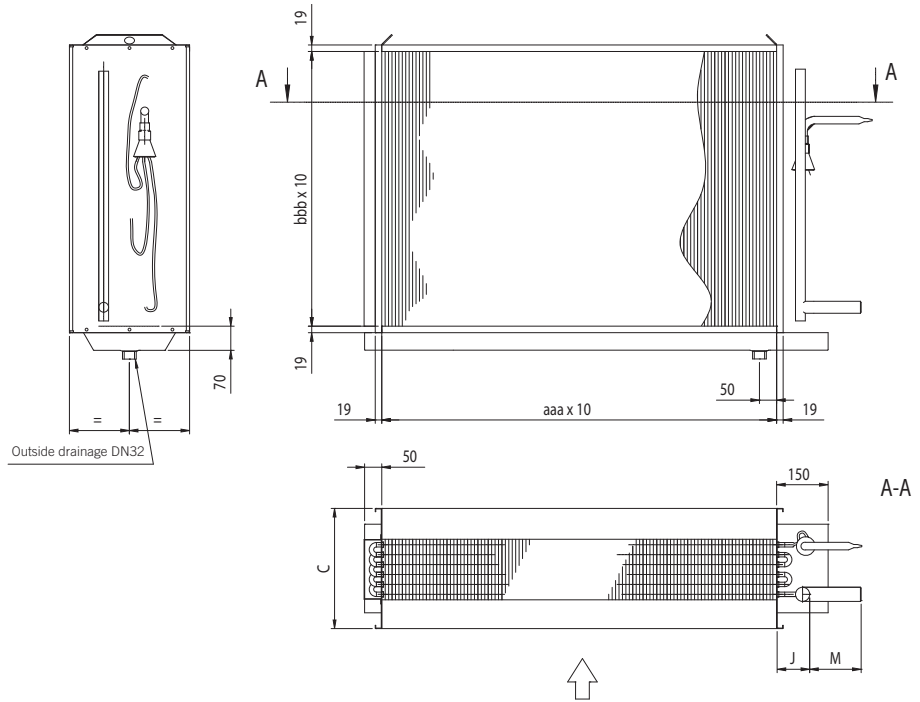
DIMENSION DRAWING QLEG: Slip-clamp casing with exposed header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.

All dimensions in mm unless otherwise indicated.

No. of rows (cc)	Droplet eliminator C (mm)	
	WITHOUT	WITH
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580

Connection OUT	J (mm)	M (mm)	Connection IN
1 1/8"	84	150	5/8" or 7/8"
1 3/8"	90	150	7/8"
1 5/8"	96	150	7/8"
2 1/8"	109	150	7/8"



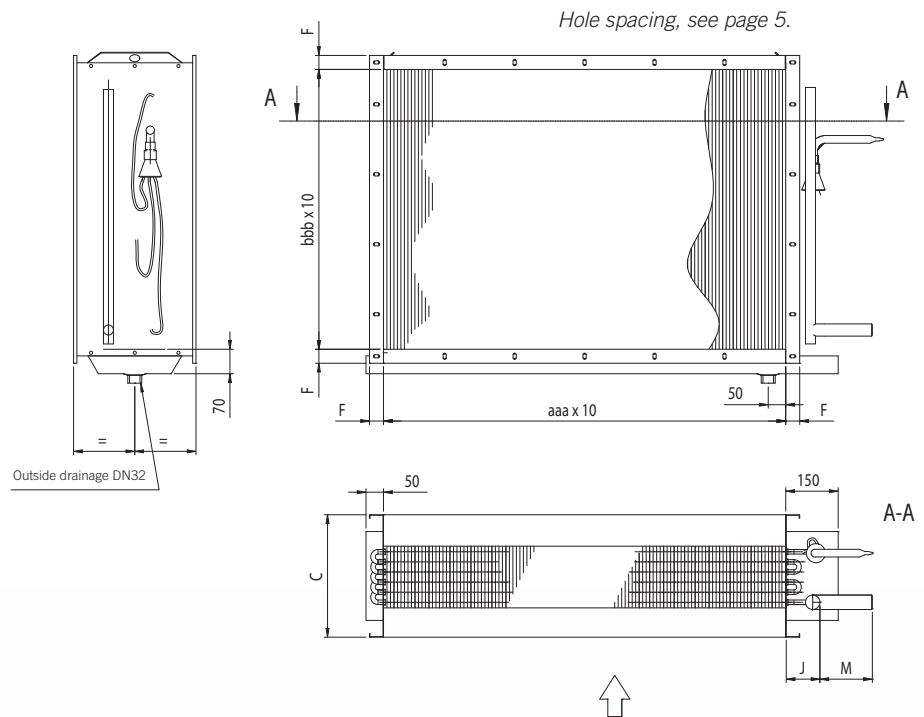
DIMENSION DRAWING QLEF: Flanged casing with exposed header.

All dimensions in mm unless otherwise indicated.

aaa (cm)	F (mm)
≤240	40
>240	50

No. of rows (c)	Droplet eliminator C (mm)	
	WITHOUT	WITH
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580

Connection OUT	J (mm)	M (mm)	Connection IN
1 1/8"	84	150	5/8" or 7/8"
1 3/8"	90	150	7/8"
1 5/8"	96	150	7/8"
2 1/8"	109	150	7/8"



QLEG, QLEF, QLEB, QLEH

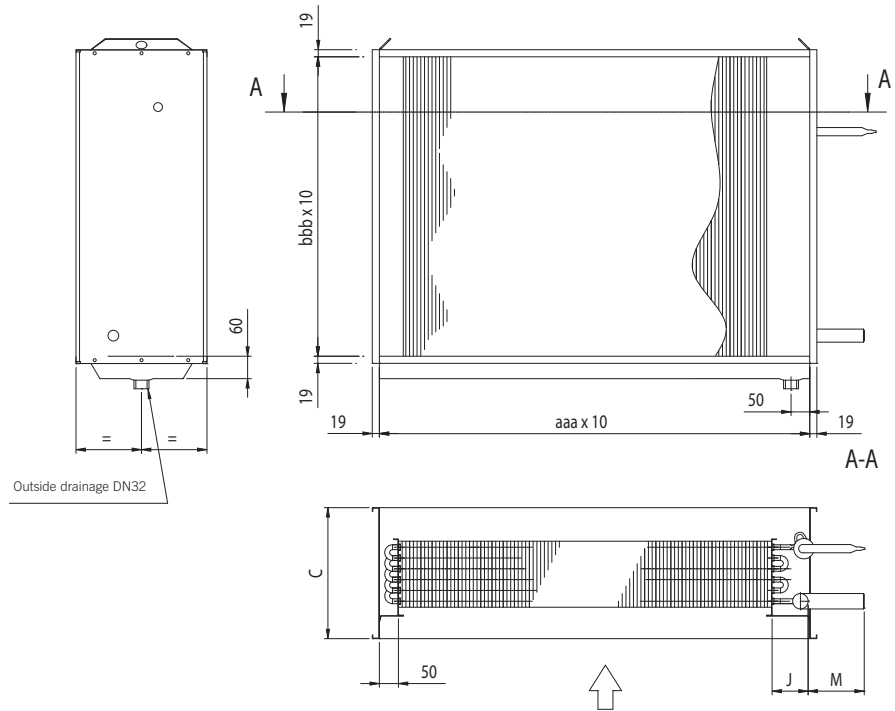
DIMENSION DRAWING QLEB: Slip-clamp casing with integrated header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.

All dimensions in mm unless otherwise indicated.

No. of rows (cc)	Droplet eliminator C (mm)	
	WITHOUT	WITH
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580

Connection OUT	J (mm)	M (mm)	Connection IN
1 1/8"	84	150	5/8" or 7/8"
1 3/8"	90	150	7/8"
1 5/8"	96	150	7/8"
2 1/8"	109	150	7/8"



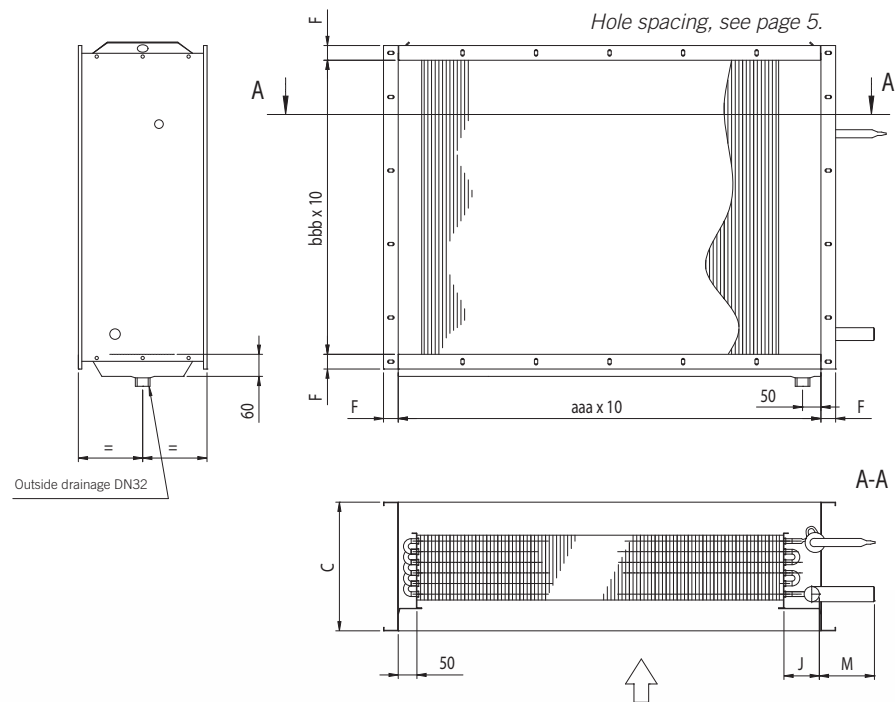
DIMENSION DRAWING QLEH: Flanged casing with integrated header.

All dimensions in mm unless otherwise indicated.

aaa (cm)	F (mm)
≤ 240	40
> 240	50

No. of rows (cc)	Droplet eliminator C (mm)	
	WITHOUT	WITH
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580

Connection OUT	J (mm)	M (mm)	Connection IN
1 1/8"	84	150	5/8" or 7/8"
1 3/8"	90	150	7/8"
1 5/8"	96	150	7/8"
2 1/8"	109	150	7/8"



HEAT EXCHANGERS FOR CONDENSATION REFRIGERANT

The heat exchangers QLOG, QLOF, QLOB and QLOH are designed for heating air with condensing medium and are mounted on ducts or on the wall of the unit room. The design conforms with the Pressure Equipment Directive PED 2014/68/EC.

GENERAL

- The design consists of a fin body, headers and casing.
- As standard the casing is available in a PG-slip clamp design alternative with a drilled frame according to RFHF, RVGL.
- Heat exchangers over 25 kilograms are equipped with lifting lugs.
- The tubes are zigzag mounted in the fin body to give, together with the pleated fins, maximum output.
- Available in several output stages.
- The casing conforms to tightness class B according to VVS AMA98/EN 1751.
- AMA-code QFC.1.
- Materials for aggressive environments are available as standard.
- For the greatest cleanliness the heat exchangers are shield gas soldered and filled with nitrogen gas before delivery.

OPERATING DATA

- Normal air velocity should be 3-4 m/s.
- Max air velocity: 5.0 m/s.
- Max operating pressure: 2.2 MPa at max operating temperature 100°C.
- For air flows up to 40 m³/s.

MATERIAL & SIZE (see the code key for more info)

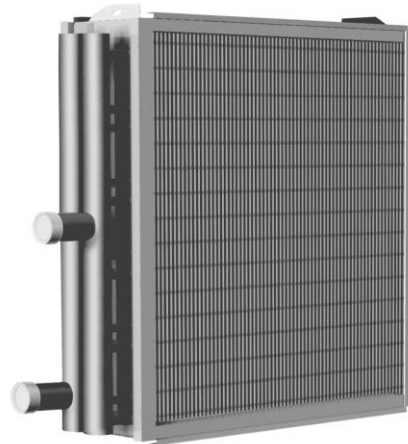
The heat exchanger is designed using copper tubes and aluminium fins. The casing is made of hot-dip galvanized steel sheet. The headers are made of copper. Standard sizes are from 200 x 200 mm to 3500 x 2400 mm. Materials for aggressive environments are available, see page 6.

INSTALLATION

The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchanger must be ordered in either a right or left-hand design.



QLOH with flanged casing and integrated header.



QLOG with slip-clamp casing and exposed header.

DIMENSIONING VIA COILS

Dimensioning is performed using the product selection program Coils, which can be downloaded from our website. Coils shows, among others, dimension drawings and the following data:

Air side:	Air temperature out	°C
	Outout	kW
	Air velocity	m/s
	Air pressure drop	Pa
Water side:	Return temperature	°C
	Media flow	l/s
	Media pressure drop	kPa

QLOG, QLOF, QLOB, QLOH

OUTPUT STAGES

The heat exchangers can be delivered divided into one, two or several output stages depending on the height of the heat exchanger. Two output stages are normally coupled so that every other coil is coupled to output stage 1 and every other to output stage 2 ("interlaced coupling"), see figure 1. Connections and fluid pipes are equipped with copper washers that indicate the stage association. Heat exchanger with three or more output stages are normally divided vertically, see figure 2.

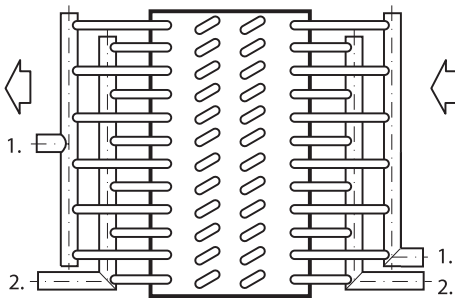


Figure 1. Two output stages with "interlace coupling".

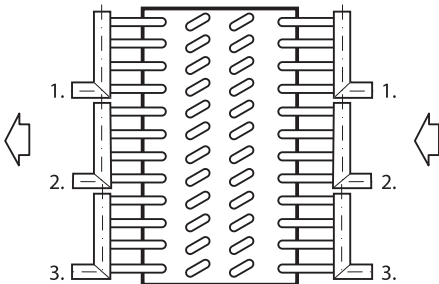


Figure 2. Three or more output stages are normally divided vertically.

ACCESSORIES

Additional accessories are available, see pages 94-96.

MAINTENANCE

Operating and maintenance instructions are available via the production selection program Coils or from our website.

CODE KEY

QLO_ – aaa – bbb – cc – dd – ee – f – g

QLOG = Slip-clamp casing with exposed header.

QLOF = Flanged casing with exposed header.

QLOB = Slip-clamp casing with integrated header.

QLOH = Flanged casing with integrated header.

aaa = Duct width (cm) 020-350

bbb = Duct height (cm) 020-240

cc = No. of tube rows 01, 02, 03, 04, 06, 08, 10, 12

dd = Fin spacing (mm x 10) 18, 20, 25, 30, 40, 50, 60

ee = Number of fluid paths 02, 04, 06, 08, 10, etc.

f = Connection side

1=right, 2=left,

3=right shared circuit 1/2+1/2

4=left shared circuit 1/2+1/2

5=right shared circuit 1/3+2/3

6=left shared circuit 1/3+2/3

7=right 3 equal stages

8=left 3 equal stages

g = Material

Material	Casing	Header	Fin
A	Galv	Cu	Al
B	Galv	Cu	Cu
E	Galv	Cu	Corropaint
F	Galv	Cu	Cu tinned
L	SS	Cu	Al
M	SS	Cu	Cu
O	SS	Cu	Corropaint
P	SS	Cu	Cu förtennet
Q	SS	Cu	Al corrodip

Galv=galvanized steel sheet, SS= stainless steel

Cu=copper, Al=aluminium

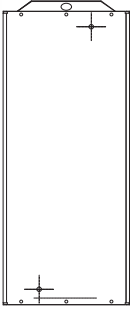


Our products can be ordered with a number of different accessories and with other dimensions and materials than standard. Contact us for more information.

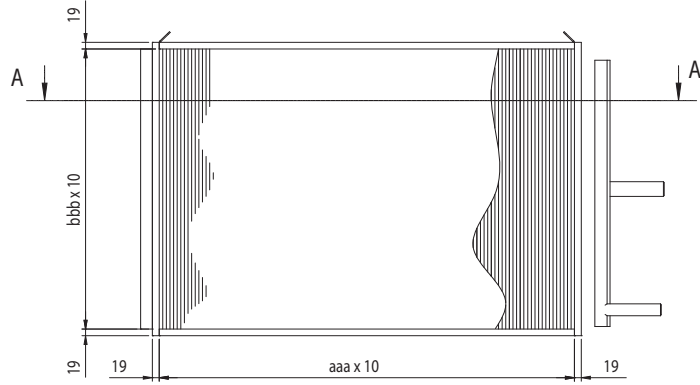
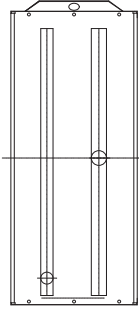
QLOG, QLOF, QLOB, QLOH

DIMENSION DRAWING QLOG: Slip-clamp casing with exposed header.

Connection for brazing 1/2"



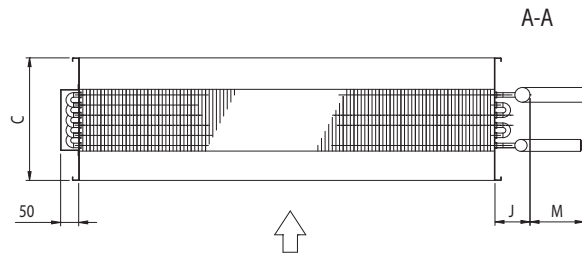
Connection for brazing 1 1/8", 1 3/8", 1 5/8", 2 1/8"



All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

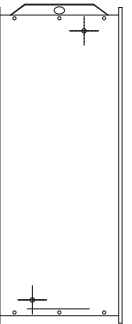
No. of rows (cc)	C (mm)	Conn.	J + M
01	150	1/2"	265
02	150		
03	150		
04	300		
06	350		
08	400		
10	460		
12	520		

Conn. IN	J (mm)	M (mm)	Conn. OUT
1 1/8"	84	150	7/8"
1 3/8"	90	150	1 1/8"
1 5/8"	96	150	1 3/8"
2 1/8"	109	150	1 5/8"

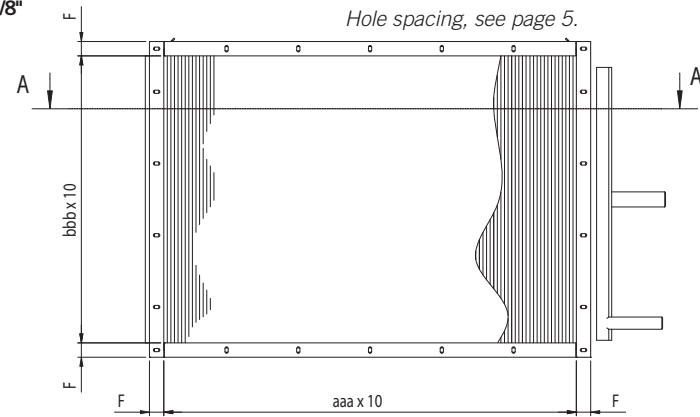
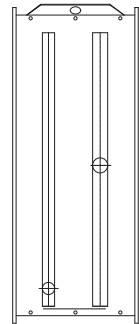


DIMENSION DRAWING QLOF: Flanged casing with exposed header.

Connection for brazing 1/2"



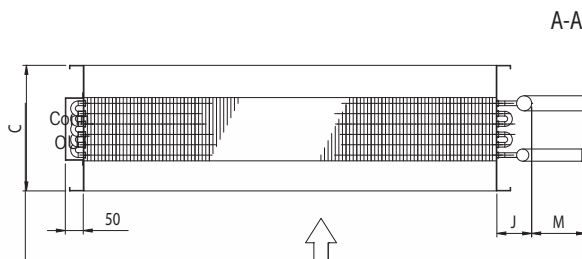
Connection for brazing 1 1/8", 1 3/8", 1 5/8", 2 1/8"



All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

No. of rows (cc)	C (mm)	aaa (cm)	F (mm)	Connection	J + M
01	150	≤240	40	1/2"	265
02	150	>240	50		
03	150				
04	300				
06	350				
08	400				
10	460				
12	520				

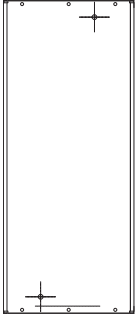
Conn. IN	J (mm)	M (mm)	Conn. OUT
1 1/8"	84	150	7/8"
1 3/8"	90	150	1 1/8"
1 5/8"	96	150	1 3/8"
2 1/8"	109	150	1 5/8"



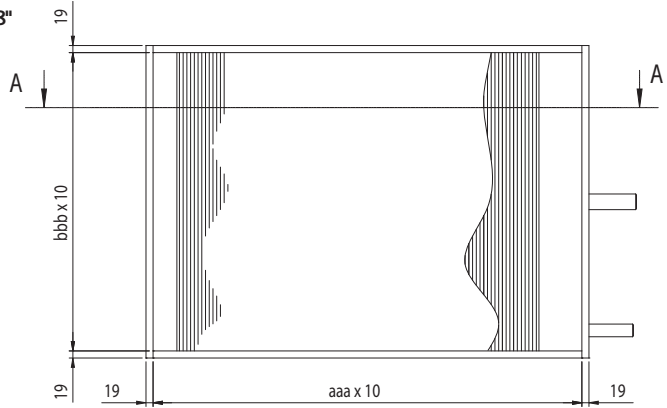
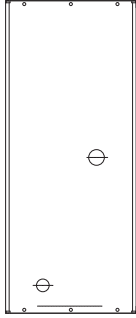
QLOG. QLOF, QLOB, QLOH

DIMENSION DRAWING QLOB: Slip-clamp casing with integrated header.

Connection for brazing 1/2"



Connection for brazing 1 1/8", 1 3/8", 1 5/8", 2 1/8"

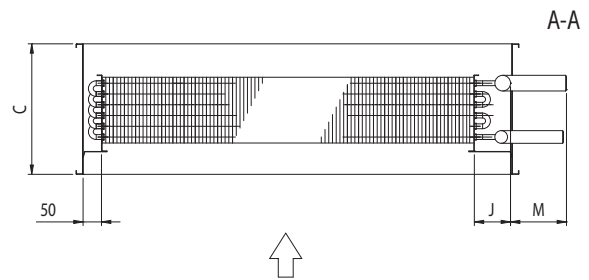


All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

No. of rows (cc)	C (mm)
01	300
02	300
03	300
04	300
06	350
08	400
10	460
12	520

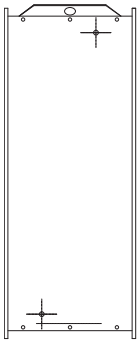
Conn.	J + M
1/2"	265

Conn. IN	J (mm)	M (mm)	Conn. OUT
1 1/8"	84	150	7/8"
1 3/8"	90	150	1 1/8"
1 5/8"	96	150	1 3/8"
2 1/8"	109	150	1 5/8"

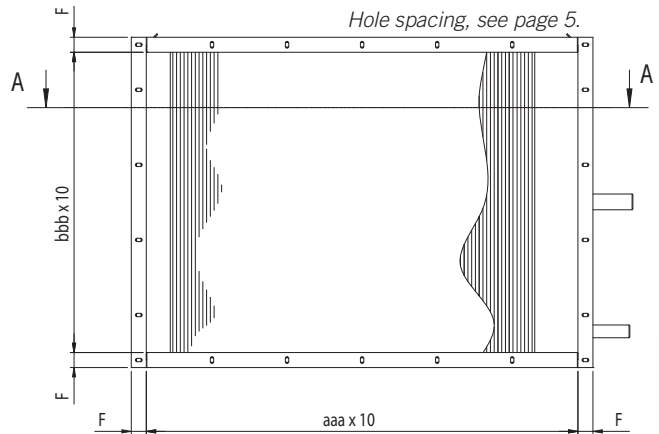
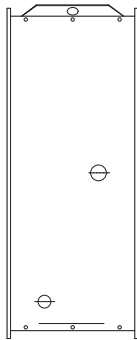


DIMENSION DRAWING QLOH: Flanged casing with integrated header.

Connection for brazing 1/2"



Connection for brazing 1 1/8", 1 3/8", 1 5/8", 2 1/8"



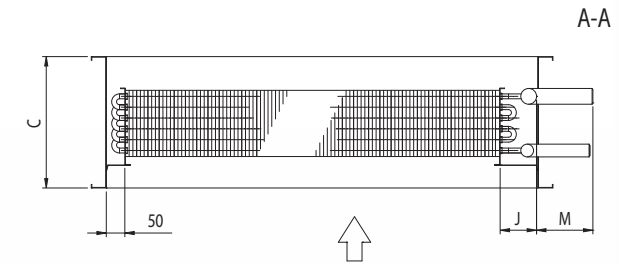
All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

No. of rows (cc)	C (mm)
01	150
02	150
03	150
04	300
06	350
08	400
10	460
12	520

aaa (cm)	F (mm)
≤240	40
>240	50

Conn.	J + M
1/2"	265

Conn. IN	J (mm)	M (mm)	Conn. OUT
1 1/8"	84	150	7/8"
1 3/8"	90	150	1 1/8"
1 5/8"	96	150	1 3/8"
2 1/8"	109	150	1 5/8"



HEAT EXCHANGERS FOR STEAM

QLSG, QLSF

The heat exchangers QLSG and QLSF are designed for heating air with steam and intended for vertical steam transfer. Mounted on ducts or on the wall of the unit room. The design conforms with the Pressure Equipment Directive PED 2014/68/EU.

GENERAL

- The design consists of a fin body, headers and casing.
- As standard the casing is available in a PG-slip clamp design alternative with a drilled frame according to RFHF, RVGL.
- The tubes are zigzag mounted in the fin body to give, with the pleated fins, the highest output.
- The header is equipped with soldered and welded flanges.
- Heat exchangers over 25 kilograms are equipped with lifting lugs.
- Low pressure drop on the air side.
- AMA-code QFC.
- Materials for aggressive environments are available as standard.

OPERATING DATA

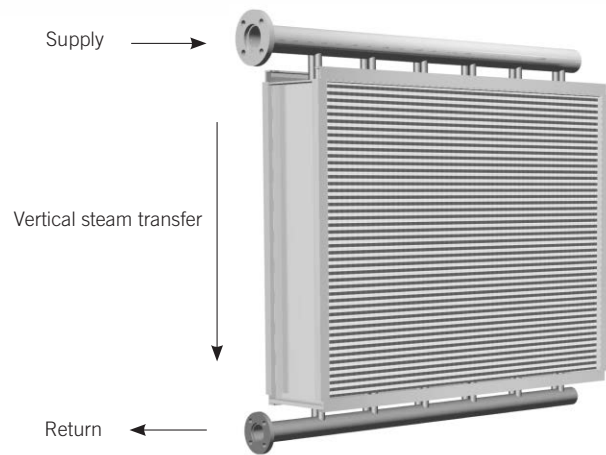
- Normal air velocity should be 3-4 m/s.
- Max air velocity: 5,0 m/s.
- Max operating pressure: 1,0 MPa at max operating temperature 185°C.
- For air flows up to 34 m³/s.
- All heat exchangers are leakage tested using dry air under water.

STEAM CLEANLINESS

The steam's pH-value should be between 8,8 and 9,2. The oxygen (O₂) content must not exceed 0.01 mg/kg. Ammonia content (NH₃) must not exceed 0,3 mg/kg.

MATERIAL & SIZE (see the code key for more info)

The heat exchanger is designed using copper tubes and aluminium fins. The casing is made of hot-dip galvanized steel sheet. The header on the steam side is made of steel (DN 25 is made of copper) and on the condensate side of copper. The weld flanges are designed of steel and the soldered flanges are of brass with loose ring of steel. Standard sizes are from 200 x 200 mm to 3500 x 800 mm. Materials for aggressive environments are available, *see page 6*.



QLSG with slip-clamp casing and exposed header. The heat exchanger is connected with steam to the upper pipe and the return to the lower pipe.

DIMENSIONING VIA COILS

Dimensioning is performed using the product selection program Coils, which can be downloaded from our website. Coils shows, among others, dimension drawings and the following data:

Air side:	Air temperature in	°C
	Outout	kW
	Air velocity	m/s
	Air pressure drop	Pa
Steam side:	Steam flow	kg/s

INSTALLATION

The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected with steam to the upper pipe and the return to the lower pipe, see figure above.

FREEZE PROTECTION

If there is a risk of freezing it is appropriate to fit a freeze protection sensor in the air stream, alternatively an electric heater can preheat the air.

ACCESSORIES

Additional accessories are available, *see pages 94-96*.

MAINTENANCE

Operating and maintenance instructions are available via the production selection program Coils or from our website.



CODE KEY

QLS_ - aaa - bbb - c - dd - ee - ff - g

QLSG = Slip-clamp casing with exposed header.
 QLSF = Flanged casing with exposed header.

- aaa = Duct height (cm)** 020-350
- bbb = Duct width (cm)** 020-180
- c = No. of tube rows** 01, 02
- dd = Fin spacing (mm x 10)** 18, 20, 25, 30, 40, 50, 60
- ee = Connection size, steam side** 32, 50
- ff = Connection, condensate side** 25
- g = Material**

Material	Casing	Header	Fin
A	Galv	Steel (conn 25 Cu)	Al
B	Galv	Cu	Cu
D	Galv	Cu	Al
F	Galv	Cu	Cu tinned
L	SS	Steel (conn 25 Cu)	Al
M	SS	Cu	Cu
N	SS	Cu	Al
P	SS	Cu	Cu tinned

Galv=galvanized steel sheet, SS= stainless steel
 Cu=copper, Al=aluminium

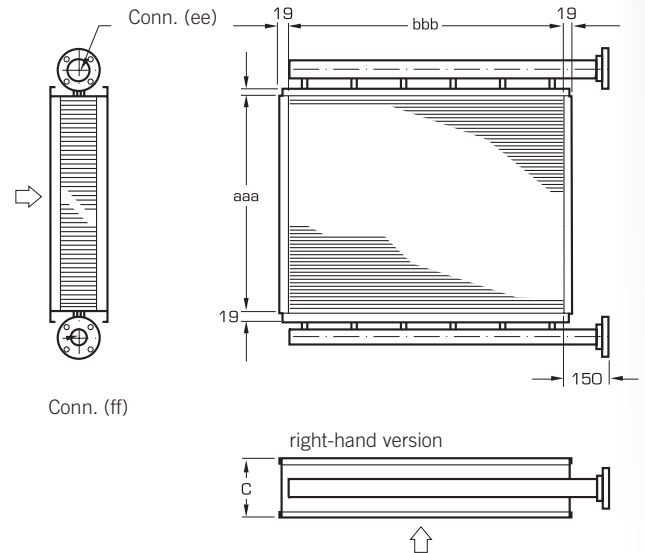


Our products can be ordered with a number of different accessories and with other dimensions and materials than standard. Contact us for more information.

DIMENSION DRAWING QLSG:

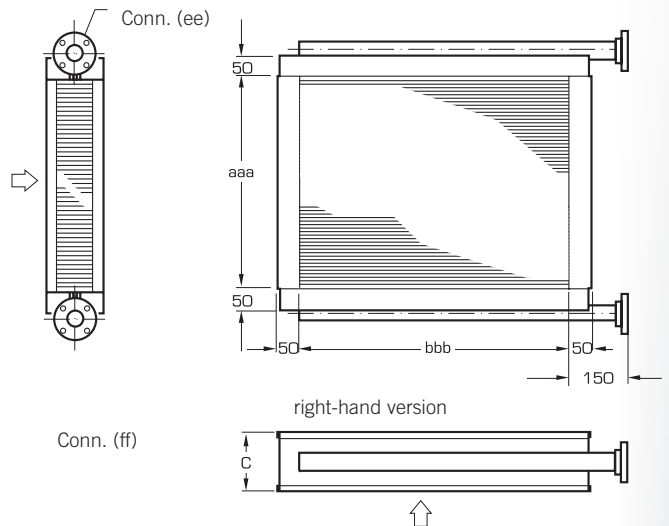
Slip-clamp casing with exposed header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



DIMENSION DRAWING QLSF:

Flanged casing with exposed header.



All dimensions in mm unless otherwise indicated.

No. of rows (cc)	C (mm)
01	132
02	161

HEAT EXCHANGERS FOR INSTALLATION IN UNITS

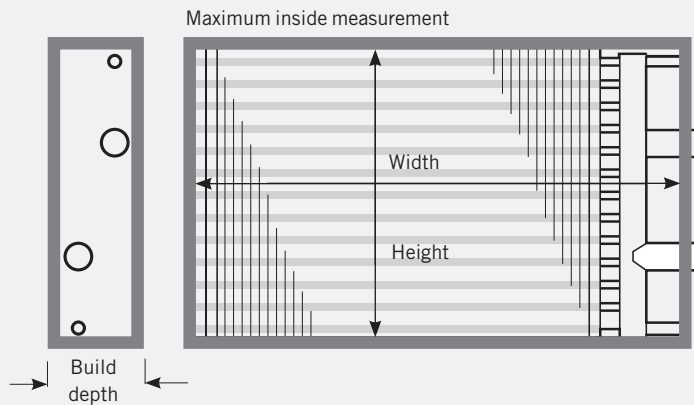


Figure. 1

SELECTION OF THE HEAT EXCHANGER FOR REPLACEMENT IN THE UNIT

1. Measure

- the inside measurement in the existing unit
- width
- height
- build depth.

2. On the cooling and exhaust air coil, check whether the drip tray belonging to the heat exchanger or is fitted in the bottom of the unit.

Cooling and exhaust air coils can be ordered with or without a drip tray, the drain is always fitted horizontally.

3. Dimension a new heat exchanger in the calculation software Coils.

If there is no dimensioning data: Count the number of tube rows and fin spacing. (Due to development the new heat exchanger often provides a better capacity with the same number of pipe rows and fin spacing).

4. The software also gives dimensional sketches. Check using the measured dimensions. Note that the connection size affects the total width measurement.

5. During installation the placement of connections usually differs, depending on the manufacturer and the year of manufacture.

Drill new holes in the panel and cover the old holes. Any flanges on the water side are always ordered unassembled.

Heat exchangers for installation in units are always manufactured with long connections and nipples to reach through the unit casing.

Width measurement: Available in cm increments from 20 cm to 350 cm.

Height measurement: Available in 3,33 cm increments from 20 cm to 240 cm.



HEAT EXCHANGERS FOR AIR HANDLING UNITS

QLHN, QLHT, QLHO, QLHQ

The heat exchangers QLHN, QLHT, QLHO and QLHQ are designed for heating air with fluid as the heat carrier and are mounted in the unit. The design conforms with the Pressure Equipment Directive PED 2014/68/EU.

GENERAL

- The design consists of a fin body, headers and casing.
- The heat exchanger is equipped with nipples for bleeding and drainage and at least one of the nipples can be equipped with a sensor for a freeze protection thermostat (does not apply to connection DN 15).
- The zigzag tubes are mounted in the fin body in a falling coil so the heat exchanger can be drained.
- All connections are fitted with male pipe threads (SS-EN ISO 228-1).
- AMA-code QFC.1.
- Materials for aggressive environments are available as standard.
- If a specific connection size is required, the following fluid flow restrictions apply:

Connection	Flow (max)
DN 15	0,7 l/s
DN 25	1,6 l/s
DN 32	2,8 l/s
DN 50	7,0 l/s
DN 80	14,0 l/s
2 x DN 80	28,0 l/s

OPERATING DATA

- Max fluid velocity: 1,5 m/s in tubes.
- Normal air velocity should be 3-4 m/s.
- Max air velocity: 5,0 m/s.
- Max operating pressure: 1,6 MPa at max operating temperature 100 °C.
- Max operating pressure: 1,0 MPa at max operating temperature 150 °C.
- For air flows up to 40 m³/s.
- All heat exchangers are leakage tested using dry air under water.

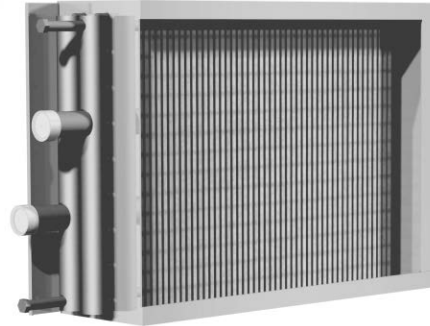
MATERIAL & SIZE (see the code key for more info)

The heat exchanger is designed using copper tubes and aluminium fins. The casing is made of hot-dip galvanized steel sheet and possible drip tray of stainless steel. As standard the header is designed of steel, a part from DN 15 and DN 25 which are of copper with brass connections.

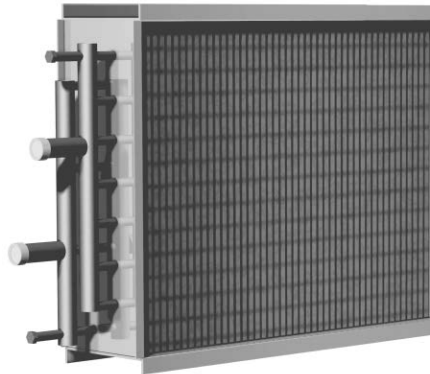
QLHN: Standard sizes from 200 x 200 mm–3500 x 2400 mm.

QLHT: Standard sizes from 200 x 200 mm–1200 x 1000 mm.

Materials for aggressive environments are available, *see page 6*.



QLHN casing with inward folded edges on the top and bottom plates as well as cover plates for the header and elbows.



QLHT with basic casing without cover plate.

DIMENSIONING VIA COILS

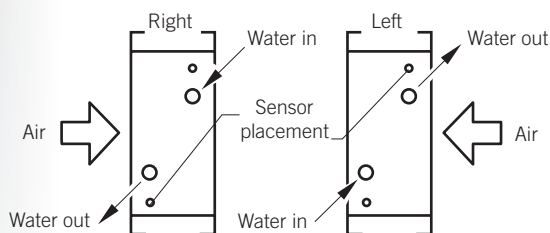
Dimensioning is performed using the product selection program Coils, which can be downloaded from our website. Coils shows, among others, dimension drawings and the following data:

Air side:	Air temperature out	°C
	Outout	kW
	Air velocity	m/s
	Air pressure drop	Pa
Water side:	Return temperature	°C
	Fluid flow	l/s
	Fluid velocity	m/s
	Fluid pressure drop	kPa

QLHN, QLHT, QLHO, QLHQ

INSTALLATION

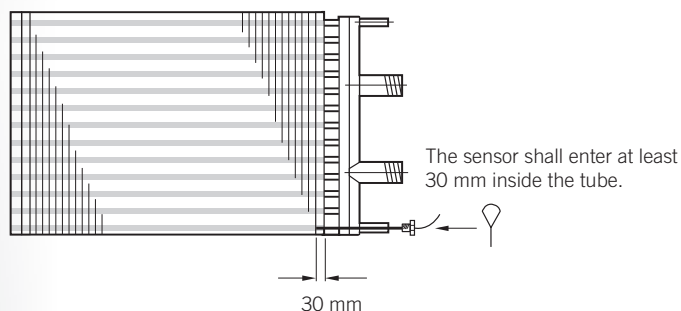
The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchangers are not in right/left designs but are reversible. The system must be fully bled to give optimal performance.



Counter flow coupling.

FREEZE PROTECTION

At least one of the heat exchangers' nipples can be equipped with a sensor for a freeze protection thermostat, see the figure below. If, after draining, the heat exchanger is exposed to a risk of freezing it should be blown through with air to ensure that all water has been removed.



ACCESSORIES

Additional accessories are available, see pages 94-96.

MAINTENANCE

Operating and maintenance instructions are available via the production selection program Coils or from our website.

CODE KEY

QLH_ – aaa – bbb – cc – dd – ee – fff

QLHN = Casing with inward folded edges on the top and bottom plates. Cover plate for the header.

QLHT = Basic casing without cover plate.

QLHO = Casing with outward folded edges on the top and bottom plates.

QLHQ = Casing with outward folded edges on the top and bottom plates. Cover plate for the header.

aaa = Width (cm)

QLHN, QLHO, QLHQ: 020-350

QLHT: 020-120 (Fin width excl. header and elbows)

bbb = Height (cm)

QLHN, QLHO, QLHQ: 020-240

QLHT: 020-100 (Fin height excl. plates)

cc = No. of tube rows

QLHN, QLHO, QLHQ: 01, 02, 03, 04, 06, 08, 10, 12

QLHT: 01, 02, 03, 04, 06

dd = Fin spacing (mm x 10)

18, 20, 25, 30, 40, 50, 60

ee = Number of fluid paths 02-98

f-- = Connection side

QLHO, QLHQ: 1=right, 2=left

-ff = Edge height on top and bottom plate (mm)

QLHO, QLHQ: 17-99



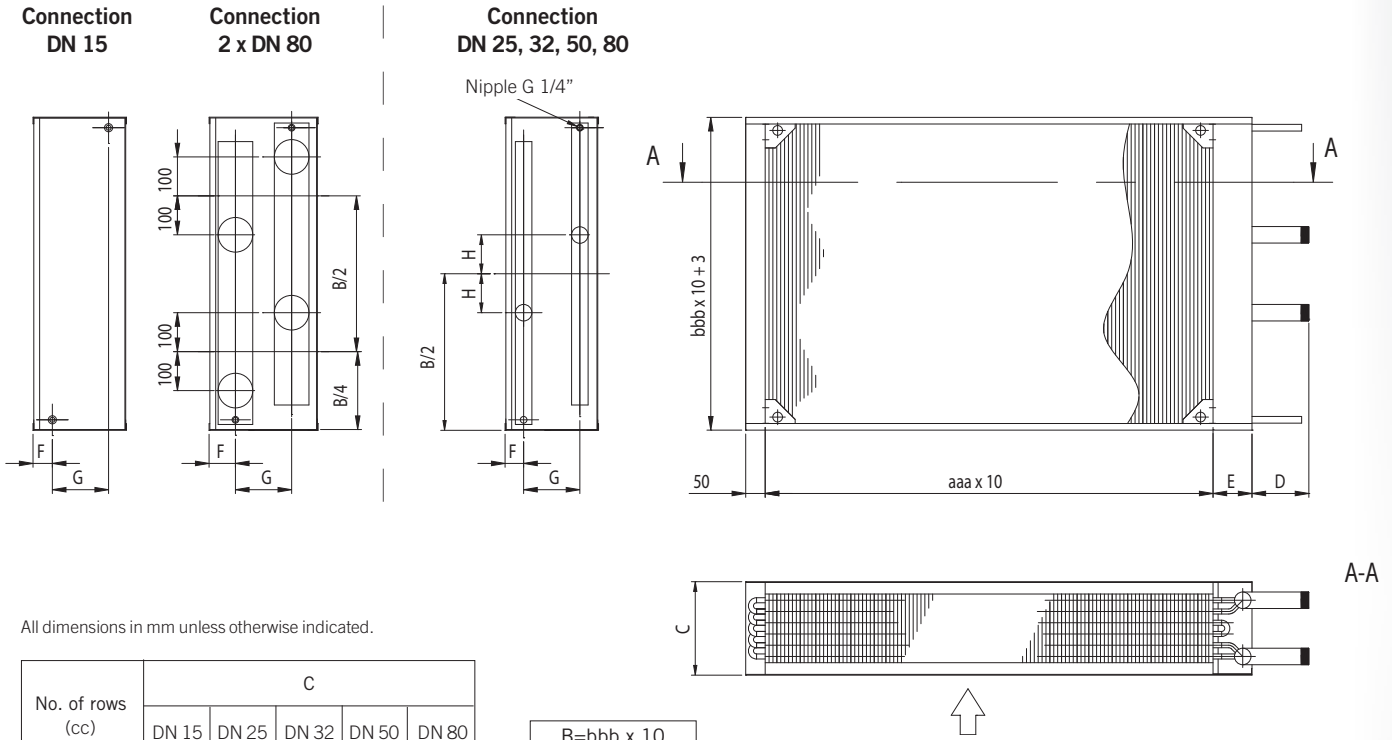
Our products can be ordered with a number of different accessories and with other dimensions and materials than standard. Contact us for more information.



QLHN, QLHT, QLHO, QLHQ

DIMENSION DRAWING QLHN: Casing with inward folded edges on the top and bottom plates. Cover plate for the header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



All dimensions in mm unless otherwise indicated.

No. of rows (cc)	C				
	DN 15	DN 25	DN 32	DN 50	DN 80
01	96	102	112	136	-
02	125	125	127	146	206
03	154	154	154	154	206
04	183	183	183	183	213
06	240	240	240	240	260
08	298	298	298	298	318
10	356	356	356	356	376
12	414	414	414	414	434

bbb (cm)	H (mm)
<040	60
≥040	100

Header Size	D	E	F	G	No of rows (cc)							
					1	2	3	4	6	8	10	12
DN 15 (Cu)	195	50	48	0	29	-	-	-	-	-	-	-
DN 25 (Cu)	139	100	48	36	58	58	87	144	205	263	321	
DN 32 (Fe)	146	100	48	43	58	58	87	144	205	263	321	
DN 50 (Fe)	125	150	48*	68	68	68	87	144	205	263	321	
DN 80 (Fe)	145	150	68	-	94	94	101	144	205	263	321	

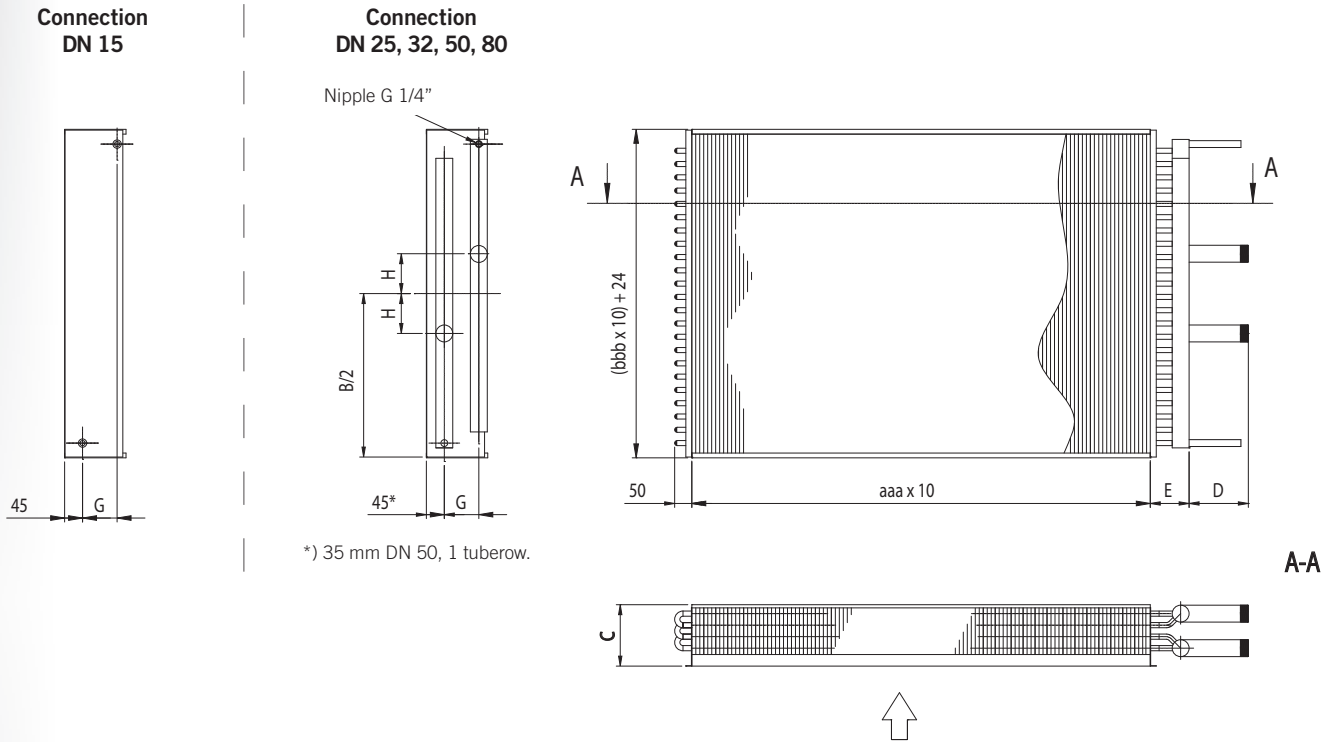
*) 38 by 1 tuberow.



QLHN, QLHT, QLHO, QLHQ

DIMENSION DRAWING QLHT: Basic casing without cover plate.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



*) 35 mm DN 50, 1 tubewow.

All dimensions in mm unless otherwise indicated.

$B = bbb \times 10$

bbb (cm)	H (mm)
<040	60
≥040	100

No. of rows (cc)	C
01	125
02	125
03	125
04	154
06	221

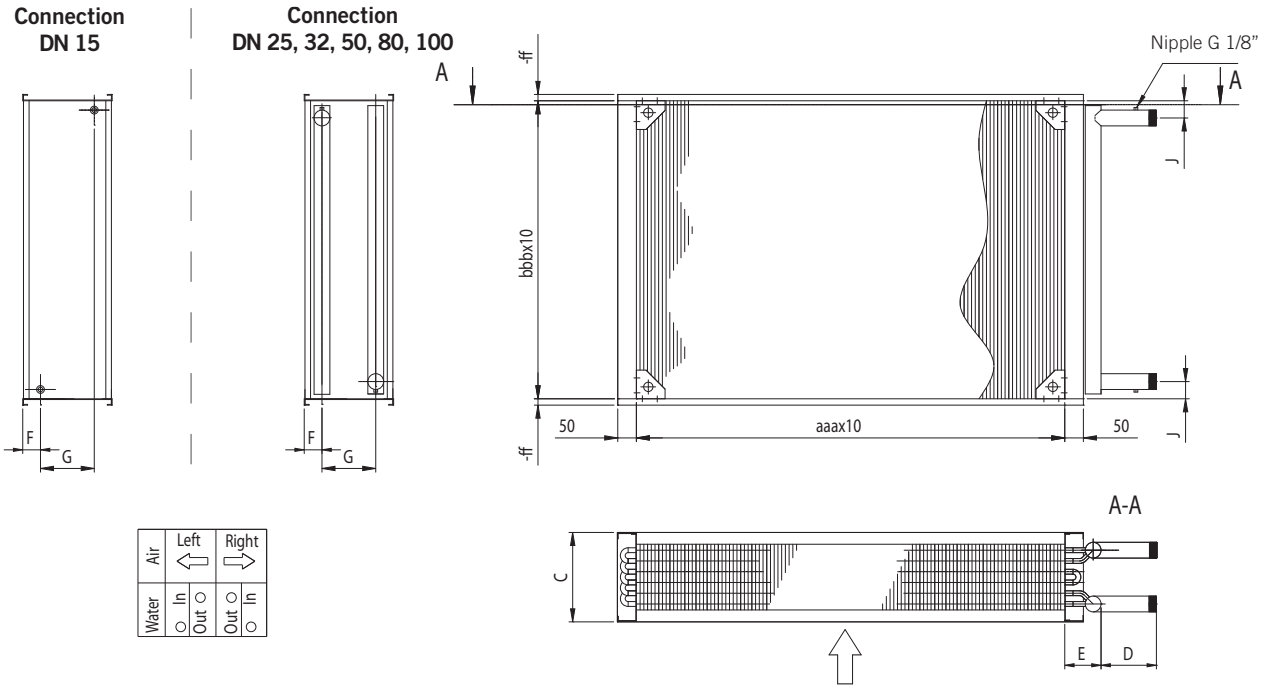
Header Size	D	E	No. of rows (cc)				
			G	1	2	3	4
DN 15 (Cu)	-	-	0	29	-	-	-
DN 25 (Cu)	150	90	36	58	58	87	144
DN 32 (Fe)	149	97	43	58	58	87	144
DN 50 (Fe)	160	115	68	68	68	87	144
DN 80 (Fe)	151	144	-	94	94	101	144



QLHN, QLHT, QLHO, QLHQ

DIMENSION DRAWING QLHO: Casing with outward folded edges on the top and bottom plates.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



Air	Left	Right
Water	In	Out
	Out	In

All dimensions in mm unless otherwise indicated.

Header Size	D	E	J	F	G	No. of rows (cc)						
						1	2	3	4	6	8	10
DN 15 (Cu)	-	-	-	48	0	29	-	-	-	-	-	-
DN 25 (Cu)	150	90	27	48	36	58	58	87	144	205	263	321
DN 32 (Fe)	149	97	46	48	43	58	58	87	144	205	263	321
DN 50 (Fe)	160	115	55	48*	68	68	68	87	144	205	263	321
DN 80 (Fe)	151	144	69	68	-	94	94	101	144	205	263	321
DN 100 (Fe)	150	169	84	68	-	-	-	-	144	205	263	321

*) 38 mm by 1 tubew.ow.

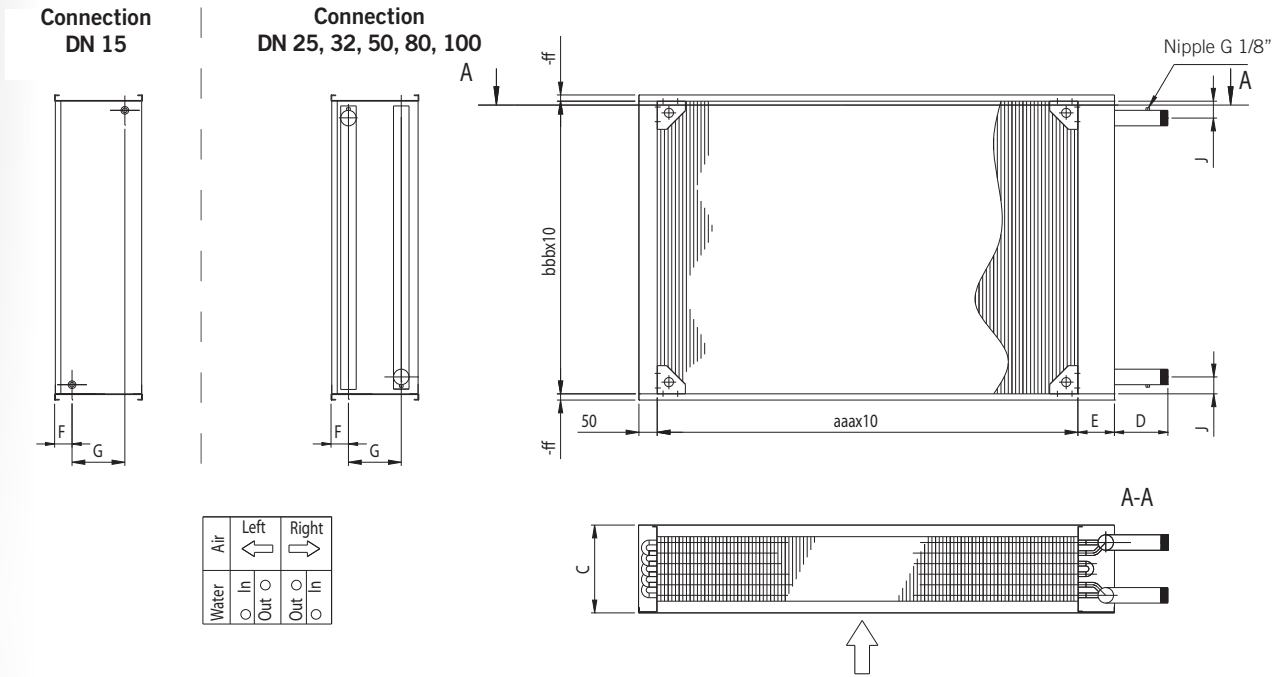
No. of rows (cc)	C					
	DN 15	DN 25	DN 32	DN 50	DN 80	DN 100
01	96	102	112	136	-	-
02	125	125	127	146	206	-
03	154	154	154	154	206	-
04	183	183	183	183	213	-
06	240	240	240	240	260	269
08	298	298	298	298	318	327
10	356	356	356	356	376	385
12	414	414	414	414	434	443



QLHN, QLHT, QLHO, QLHQ

DIMENSION DRAWING QLHQ: Casing with outward folded edges on the top and bottom plates.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



All dimensions in mm unless otherwise indicated.

No. of rows (cc)	C					
	DN 15	DN 25	DN 32	DN 50	DN 80	DN 100
01	96	102	112	136	-	-
02	125	125	127	146	206	-
03	154	154	154	154	206	-
04	183	183	183	183	213	-
06	240	240	240	240	260	269
08	298	298	298	298	318	327
10	356	356	356	356	376	385
12	414	414	414	414	434	443

Header Size	D	E	J	F	G	No. of rows (cc)						
						1	2	3	4	6	8	10
DN 15 (Cu)	195	50	-	48	0	29	-	-	-	-	-	-
DN 25 (Cu)	140	100	27	48	36	58	58	87	144	205	263	321
DN 32 (Fe)	146	100	46	48	43	58	58	87	144	205	263	321
DN 50 (Fe)	125	150	55	48*	68	68	68	87	144	205	263	321
DN 80 (Fe)	145	150	69	68	-	94	94	101	144	205	263	321
DN 100 (Fe)	139	180	84	68	-	-	-	-	144	205	263	321

*) 38 by 1 tuberow.



HEAT EXCHANGERS FOR COOLING

QLCN, QLCT, QLCO, QLCQ

The heat exchangers QLCN, QLCT, QLCO and QLCQ are designed for cooling of air with cooling water and are intended for installation in units. The design conforms with the Pressure Equipment Directive PED 2014/68/EU.

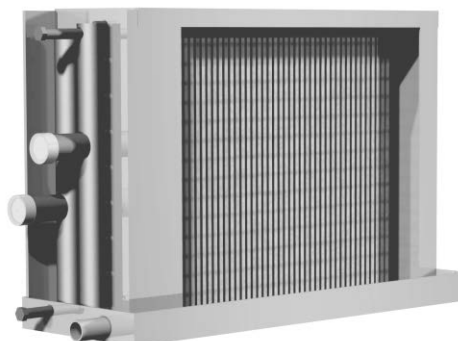
GENERAL

- The design consists of a fin body, headers and casing.
- The QLCN casing has inward folded edges on the top and bottom plates and cover plates for the header and elbows. Available with or without drip tray (horizontal drain 32 mm).
- QLCT has a basic casing without a cover plate for the header. The advantage is a smaller built-in depth. Cannot be selected with drip tray.
- The zigzag tubes are mounted in the fin body in a falling coil so the heat exchanger can be drained.
- The heat exchanger is equipped with nipples for bleeding and draining. The plug is designed as a manual bleeding valve.
- All connections are fitted with male pipe threads (SS-EN ISO 228-1).
- AMA-code QFC.21.
- Materials for aggressive environments are available.
- If a specific connection size is required, the following fluid flow restrictions apply:

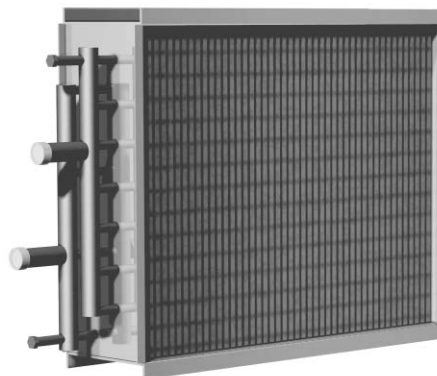
Connection	Flow (max)
DN 15	0,7 l/s
DN 25	1,6 l/s
DN 32	2,8 l/s
DN 50	7,0 l/s
DN 80	14,0 l/s
2 x DN 80 (QLCN, QLCT)	28,0 l/s
DN 100 (QLCO, QLCQ)	23,5 l/s

OPERATING DATA

- Max fluid velocity: 2,0 m/s in tubes.
- Normal air velocity should be 2-3 m/s.
- Max air velocity without droplet eliminator: 2,9 m/s.
- Max air velocity with droplet eliminator: 5,0 m/s.
- Max operating pressure: 1,6 MPa at max operating temperature 100 °C.
- Max operating pressure: 1,0 MPa at max operating temperature 150 °C.
- For air flows up to 40 m³/s.
- All heat exchangers are leakage tested using dry air under water.



QLCN with inward folded top and bottom plates and cover plate for the header and elbows. Available with or without drip tray.



QLCT has a basic casing without a cover plate for the header. Cannot be selected with drip tray.

MATERIAL & SIZE (see the code key for more info)

The heat exchanger is designed using copper tubes and aluminium fins. The casing is made of hot-dip galvanized steel sheet and possible drip tray of stainless steel. As standard the header is designed of steel, a part from DN 15 and DN 25 which are of copper with brass connections. QLCN, QLCO, QLCQ: Standard sizes are from 200 x 200 mm to 3500 x 2400 mm.

QLCT: Standard sizes are from 200 x 200 mm to 1200 x 1000 mm. Materials for aggressive environments are available, see page 6.

QLCN, QLCT, QLCO, QLCQ

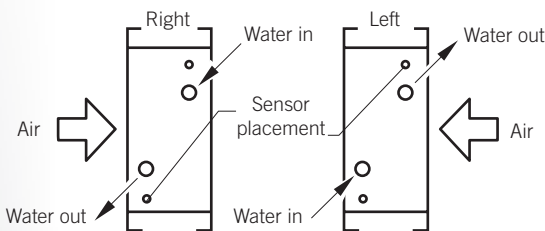
DIMENSIONING VIA COILS

Dimensioning is performed using the product selection program Coils, which can be downloaded from our website. Coils shows, among others, dimension drawings and the following data:

Air side:	Air temperature out	°C
	Outout	kW
	Air velocity	m/s
	Air pressure drop, wet and dry	Pa
	Outgoing moisture option	%
	Condensate	g/s
Water side:	Return temperature	°C
	Fluid flow	l/s
	Fluid velocity	m/s
	Fluid pressure drop	kPa

INSTALLATION

The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchanger must be ordered in either a right or left-hand design. The system must be fully bled to give optimal performance. If, after draining, the heat exchanger is exposed to a risk of freezing it should be blown through with air to ensure that all water has been removed.



Counter flow coupling.

ACCESSORIES

Additional accessories are available, see pages 94-96.

MAINTENANCE

Operating and maintenance instructions are available via the production selection program Coils or from our website.

CODE KEY

QLC_ – aaa – bbb – cc – dd – ee – fff

- QLCN = Casing with inward folded edges on the top and bottom plates. Cover plate for the header. Available with or without drip tray.
- QLCT = Basic casing without cover plate. Without drip tray.
- QLCO = Casing with outward folded edges on the top and bottom plates.
- QLCQ = Casing with outward folded edges on the top and bottom plates. Cover plate for the header.

aaa = Width (cm)

QLCN, QLCO, QLCQ: 020-350,
QLCT: 020-120 (Fin width excl. header and elbows)

bbb = Height (cm)

QLCN, QLCO, QLCQ: 020-240,
QLCT: 020-100 (Fin height excl. plates)

cc = No. of tube rows

QLCN, QLCO, QLCQ: 01, 02, 03, 04, 06, 08, 10, 12
QLCT: 01, 02, 03, 04, 06

dd = Fin spacing (mm x 10) 20, 25, 30, 40, 50, 60

ee = Number of fluid paths 02, 04, 06, 08, 10, etc.

f-- = Connection side

QLCN: 1=right without drip tray,
2=left without drip tray,
3=right with drip tray,
4=left with drip tray,
5=right with drip tray and space for droplet eliminator,
6=left with drip tray and space for droplet eliminator.
QLCT, QLCO, QLCQ: 1=right, 2=left.

-ff = Edge height on top and bottom plate (mm)

QLCO, QLCQ: 17-99



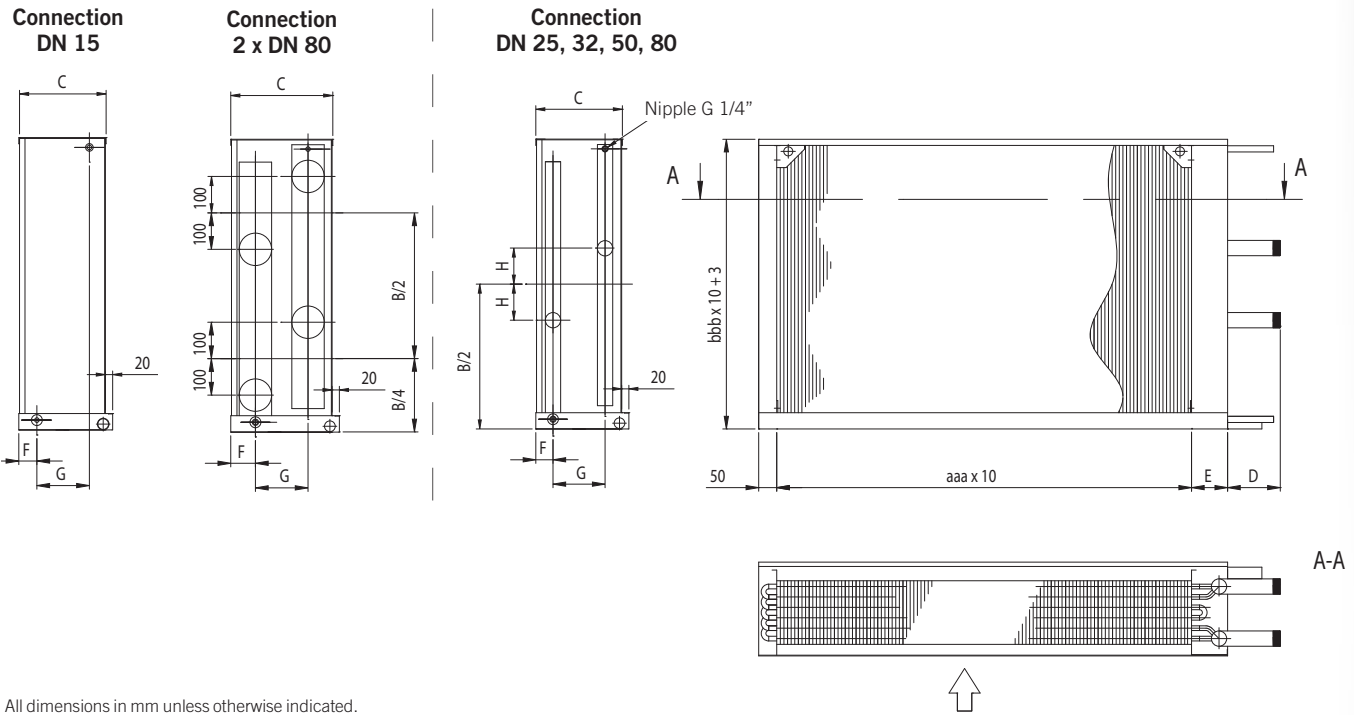
Our products can be ordered with a number of different accessories and with other dimensions and materials than standard. Contact us for more information.



QLCN, QLCT, QLCO, QLCQ

DIMENSION DRAWING QLCN WITH DRIP TRAY: Casing with inward folded edges on the top and bottom plates.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



All dimensions in mm unless otherwise indicated.

f=3,4	C				
	DN 15	DN 25	DN 32	DN 50	DN 80
No. of rows (cc)					
01	96	102	112	136	-
02	125	125	127	146	206
03	154	154	154	154	206
04	183	183	183	183	213
06	240	240	240	240	260
08	298	298	298	298	318
10	356	356	356	356	376
12	414	414	414	414	434

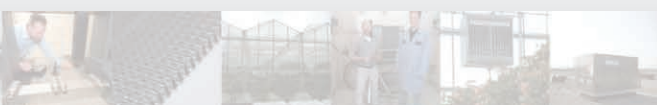
f=5,6	C				
	DN 15	DN 25	DN 32	DN 50	DN 80
No. of rows (cc)					
01	206	212	222	246	-
02	235	235	237	256	316
03	264	264	264	264	316
04	293	293	293	293	323
06	350	350	350	350	370
08	408	408	408	408	428
10	466	466	466	466	486
12	524	524	524	524	544

Header Size	D	E	F	G	No. of rows (cc)							
					1	2	3	4	6	8	10	12
DN 15 (Cu)	195	50	48	0	29	-	-	-	-	-	-	-
DN 25 (Cu)	139	100	48	36	58	58	87	144	205	263	321	
DN 32 (Fe)	146	100	48	43	58	58	87	144	205	263	321	
DN 50 (Fe)	125	150	48*	68	68	68	87	144	205	263	321	
DN 80 (Fe)	145	150	68	-	94	94	101	144	205	263	321	

B=bbb x 10

bbb (cm)	H (mm)
<040	60
≥040	100

*) 38 by 1 tubewrow.

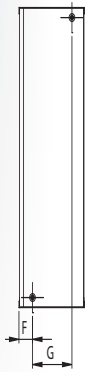


QLCN, QLCT, QLCO, QLCQ

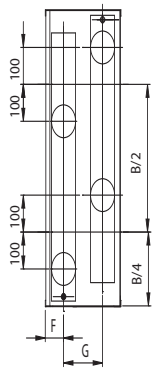
DIMENSION DRAWINGS QLCN WITHOUT DRIP TRAY: Casing with inward folded edges on the top and bottom plates.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.

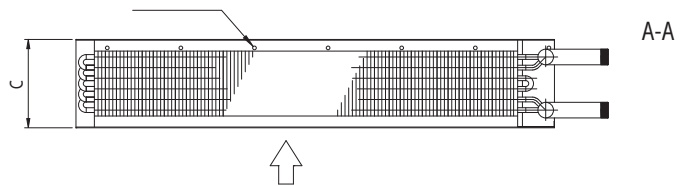
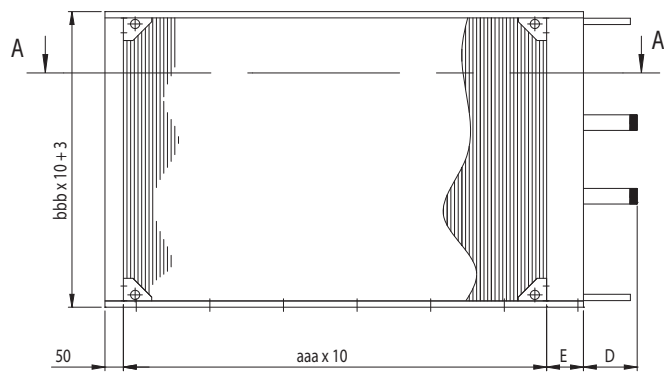
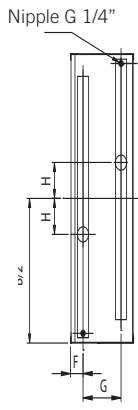
Connection
DN 15



Connection
2 x DN 80



Connection
DN 25, 32, 50, 80



All dimensions in mm unless otherwise indicated.

f=1,2	C				
No. of rows (cc)	DN 15	DN 25	DN 32	DN 50	DN 80
01	96	102	112	136	-
02	125	125	127	146	206
03	154	154	154	154	206
04	183	183	183	183	213
06	240	240	240	240	260
08	298	298	298	298	318
10	356	356	356	356	376
12	414	414	414	414	434

Header Size	D	E	F	G	No. of rows (cc)						
					1	2	3	4	6	8	10
DN 15 (Cu)	195	50	48	0	29	-	-	-	-	-	-
DN 25 (Cu)	139	100	48	36	58	58	87	144	205	263	321
DN 32 (Fe)	146	100	48	43	58	58	87	144	205	263	321
DN 50 (Fe)	125	150	48*	68	68	68	87	144	205	263	321
DN 80 (Fe)	145	150	68	-	94	94	101	144	205	263	321

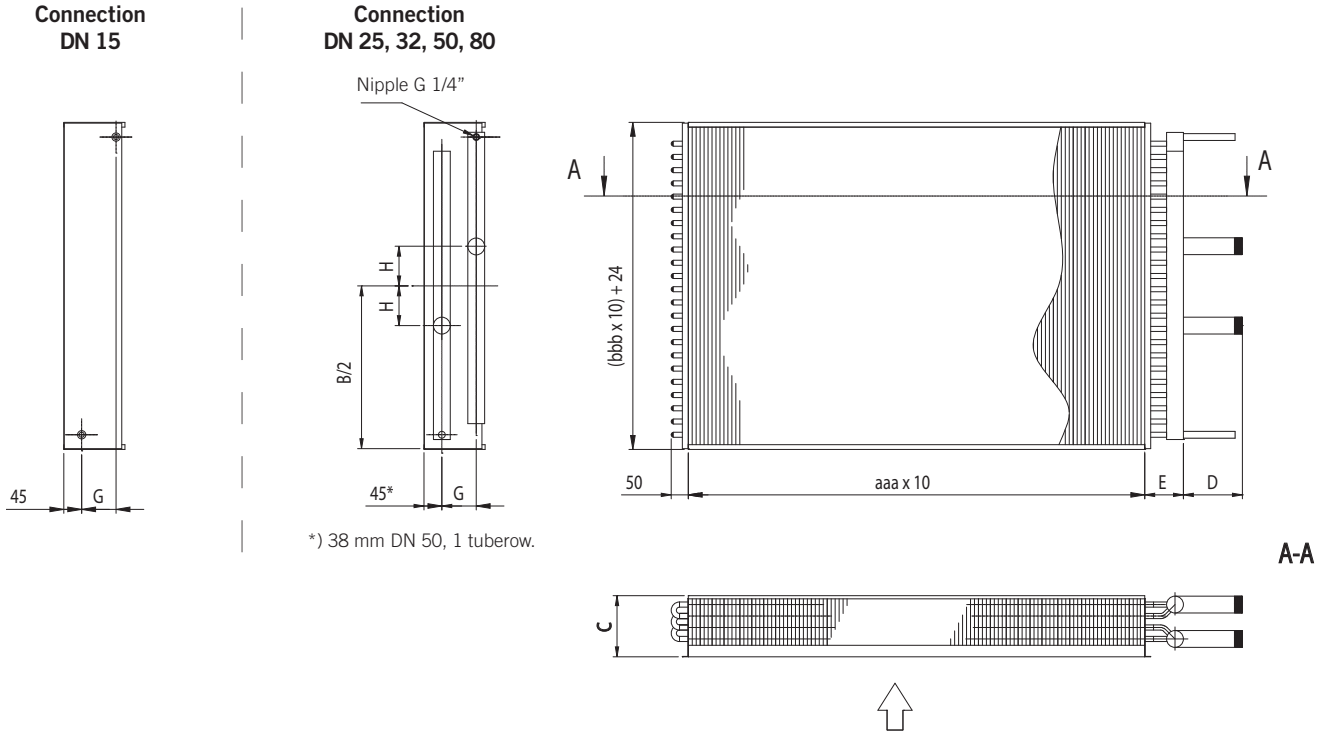
B=bbb x 10

bbb (cm)	H (mm)
<040	60
≥040	100

*) 38 by 1 tuberow.

DIMENSION DRAWINGS QLCT: Basic casing without cover plate.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



*) 38 mm DN 50, 1 tuberow.

All dimensions in mm unless otherwise indicated.

B=bbb x 10	
bbb (cm)	H (mm)
<040	60
≥040	100

No. of rows (cc)	C
01	125
02	125
03	125
04	154
06	221

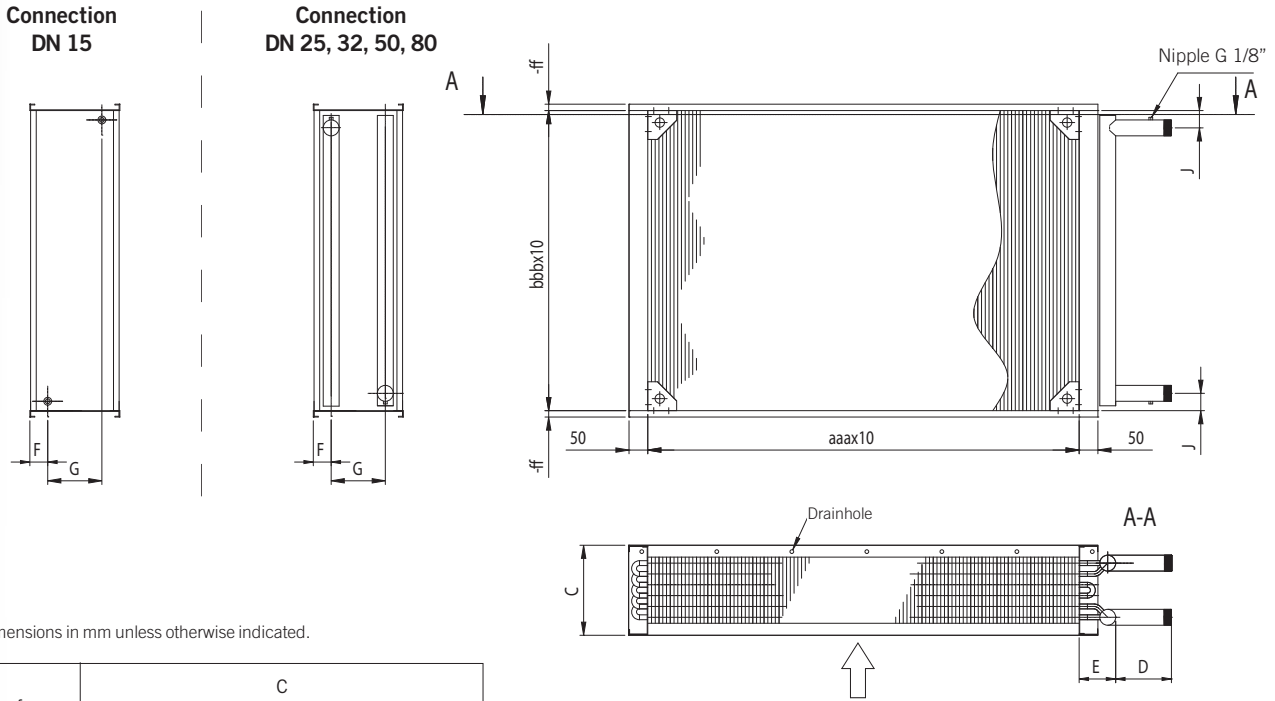
Header Size	D	E	G	No. of rows (cc)				
				1	2	3	4	6
DN 15 (Cu)	-	-	0	29	-	-	-	-
DN 25 (Cu)	150	90	36	58	58	87	144	
DN 32 (Fe)	149	97	43	58	58	87	144	
DN 50 (Fe)	160	115	68	68	68	87	144	
DN 80 (Fe)	151	144	-	94	94	101	144	



QLCN, QLCT, QLCO, QLCQ

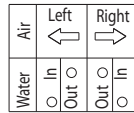
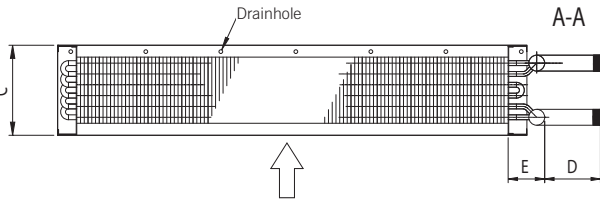
DIMENSION DRAWING QLCO: Casing with outward folded edges on the top and bottom plates.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



All dimensions in mm unless otherwise indicated.

No. of rows (cc)	C					
	DN 15	DN 25	DN 32	DN 50	DN 80	DN 100
01	96	102	112	136	-	-
02	125	125	127	146	206	-
03	154	154	154	154	206	-
04	183	183	183	183	213	-
06	240	240	240	240	260	269
08	298	298	298	298	318	327
10	356	356	356	356	376	385
12	414	414	414	414	434	443



Header Size	D	E	J	F	G	No. of rows (cc)						
						1	2	3	4	6	8	10
DN 15 (Cu)	-	-	-	48	0	29	-	-	-	-	-	-
DN 25 (Cu)	150	90	27	48	36	58	58	87	144	205	263	321
DN 32 (Fe)	149	97	46	48	43	58	58	87	144	205	263	321
DN 50 (Fe)	160	115	55	48*	68	68	68	87	144	205	263	321
DN 80 (Fe)	151	144	69	68	-	94	94	101	144	205	263	321
DN 100 (Fe)	150	169	84	68	-	-	-	-	144	205	263	321

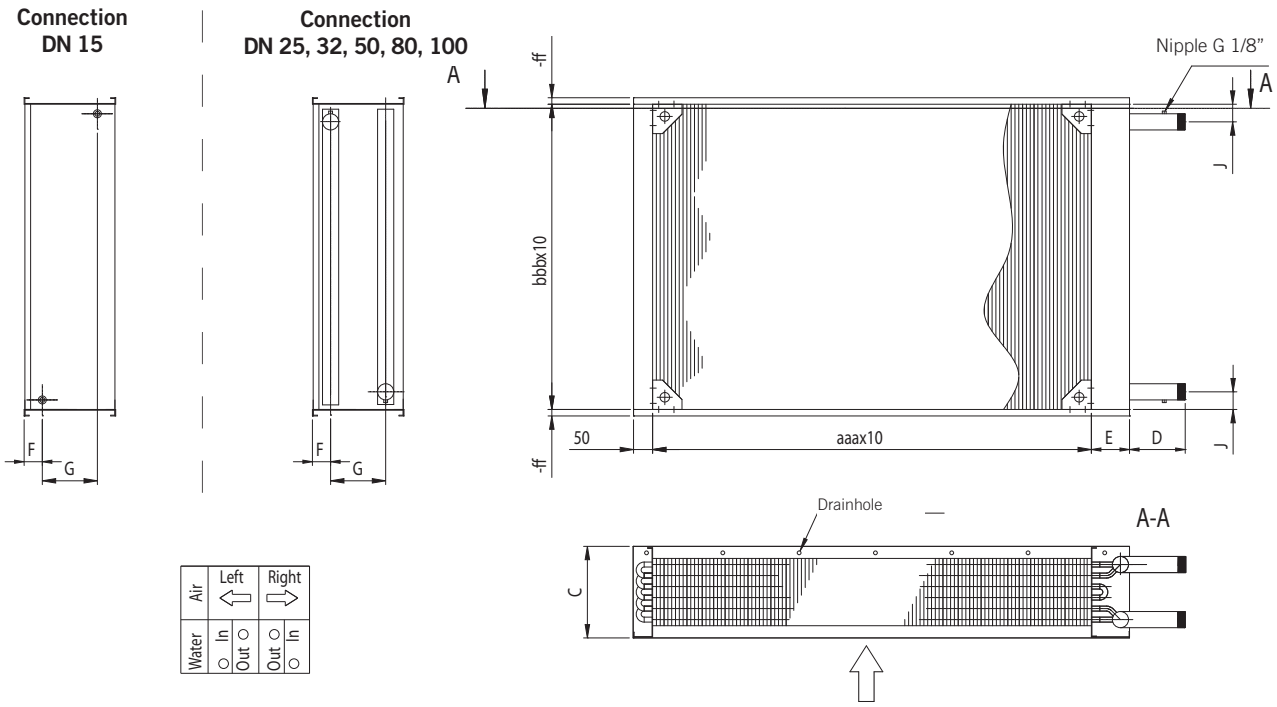
*) 38 by 1 tubewow.

QLCN, QLCT, QLCO, QLCQ

DIMENSION DRAWING QLCQ: Casing with outward folded edges on the top and bottom plates.

Cover plates for the header and elbows.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



All dimensions in mm unless otherwise indicated.

No. of rows (cc)	C					
	DN 15	DN 25	DN 32	DN 50	DN 80	DN 100
01	96	102	112	136	-	-
02	125	125	127	146	206	-
03	154	154	154	154	206	-
04	183	183	183	183	213	-
06	240	240	240	240	260	269
08	298	298	298	298	318	327
10	356	356	356	356	376	385
12	414	414	414	414	434	443

Header Size	D	E	J	F	G	No. of rows (cc)						
						1	2	3	4	6	8	10
DN 15 (Cu)	195	50	-	48	0	29	-	-	-	-	-	-
DN 25 (Cu)	140	100	27	48	36	58	58	87	144	205	263	321
DN 32 (Fe)	146	100	46	48	43	58	58	87	144	205	263	321
DN 50 (Fe)	125	150	55	48*	68	68	68	87	144	205	263	321
DN 80 (Fe)	145	150	69	68	-	94	94	101	144	205	263	321
DN 100 (Fe)	139	180	84	68	-	-	-	-	144	205	263	321

*) 38 by 1 tuberow.



HEAT EXCHANGER FOR HEAT RECOVERY - SUPPLY AIR

The heat exchangers Q(L,F)TN, Q(L,F)TO and Q(L,F)TQ are designed for heating the supply air, via a circulating anti-freeze fluid, which recovers energy from the exhaust air. The heat exchangers are fitted in units. The design conforms with the Pressure Equipment Directive 2014/68/EU.

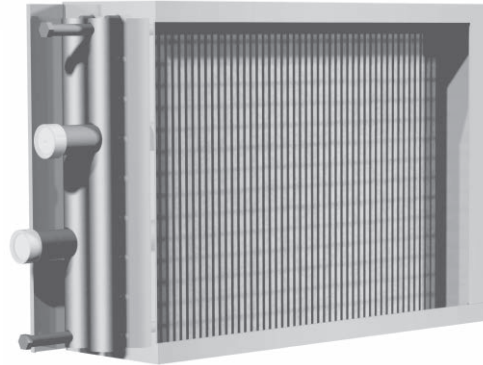
GENERAL

- The design consists of a fin body, headers and casing.
- QL= 1/2" tubes with pleated fins
QF= 1/2" tubes with plain fins
- QLTN-casing with inward folded edges on the top and bottom plates and cover plate for the header and elbows.
- The header is equipped with nipples for bleeding and draining. The plug is designed as a manual bleeding valve.
- The tubes are zigzag mounted in the fin body to give, together with the pleated fins, maximum efficiency.
- All connections are fitted with male pipe threads (SS-EN ISO 228-1).
- AMA-code QFC.
- Materials for aggressive environments are available.
- If a specific connection size is required, the following fluid flow restrictions apply:

Connection	Flow (max)
DN 15	0,7 l/s
DN 25	1,6 l/s
DN 32	2,8 l/s
DN 50	7,0 l/s
DN 80	14,0 l/s
2 x DN 80	28,0 l/s

OPERATING DATA

- Max fluid velocity: 1,5 m/s in tubes.
- Normal air velocity should be 2-3 m/s.
- Max air velocity: 5 m/s.
- For air flows up to 40 m³/s.
- Max operating pressure: 1,6 MPa at max operating temperature 100 °C.
- Max operating pressure: 1,0 MPa at max operating temperature 150 °C.
- All heat exchangers are leakage tested using dry air under water.



The QLTN casing with inward folded edges on the top and bottom plates as well as cover plates for the header and elbows.

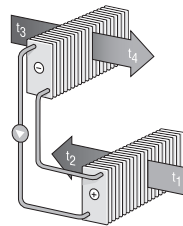
MATERIAL & SIZE

The heat exchanger is designed using copper tubes and aluminium fins. The casing is made of hot-dip galvanized steel sheet. As standard the header is designed of steel, a part from DN 15 and DN 25 which are of copper with brass connections. QLTN, QLTO, QLTQ: Standard sizes are from 200 x 200 mm to 3500 x 2400 mm. Materials for aggressive environments are available, see page 6.

DIMENSIONING VIA COILS

Dimensioning is performed using the product selection program Coils, which presents dimensional sketches and the following data:

Temperature efficiency in %:



$$n_t = \frac{t_2 - t_1}{t_3 - t_1}$$

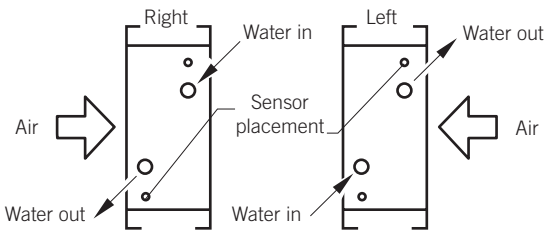
Air side:	Air temperature out	°C
	Output	kW
	Air velocity	m/s
	Air pressure drop	Pa
	Outgoing moisture option	%
Water side:	Return temperature	°C
	Fluid flow/heat exchanger	l/s
	Total fluid flow	l/s
	Fluid velocity	m/s



Q(L,F)TN, Q(L,F)TO, Q(L,F)TQ - ECOTERM®

INSTALLATION

The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchanger must be ordered in either a right or left-hand design. The system must be fully bled to give optimal performance.



Counter flow coupling.

ANTI-FREEZE (BRINES)

Glycols, ethanols, salt solutions, oils, etc. In order to gain good performance it is extremely important that the system is filled with the same brine solution and concentration that it is designed for. Different types of brine are included in the calculation program Coils, which gives the correct pressure drop depending on the brine and concentration. Examples of normal mixtures of ethylene glycol are 20-35% and propylene glycol 25-35%. Depending which temperature the system works at a concentration of 20% could eliminate frost tension in the heat exchanger.

ACCESSORIES

Additional accessories are available, *see pages 94-96.*

MAINTENANCE

Operating and maintenance instructions are available via the production selection program Coils or from our website.

CODE KEY**Q(L,F)T_ – aaa – bbb – cc – dd – ee – fff**

Q(L,F)TN = Casing with inward folded edges on the top and bottom plates. Cover plate for the header.

Q(L,F)TO = Casing with outward folded edges on the top and bottom plates.

Q(L,F)TQ = Casing with outward folded edges on the top and bottom plates. Cover plate for the header.

QL = 1/2" tubes with pleated fins

QF = 1/2" tubes with plain fins

aaa = Width (cm) 020-350

(Fin width excl. header and elbows)

bbb = Height (cm) 020-240 (Fin height excl. plates)

cc = No. of tube rows 01, 02, 03, 04, 06, 08, 10, 12.

dd = Fin spacing 18, 20, 25, 30, 40, 50, 60

ee = Number of fluid paths 02, 04, 06, 08, 10, etc.

f-- = Connection side

QLTO, QLTQ: 1=right, 2=left

-ff = Edge height on top and bottom plate (mm)

QLOO, QLOQ: 17-99



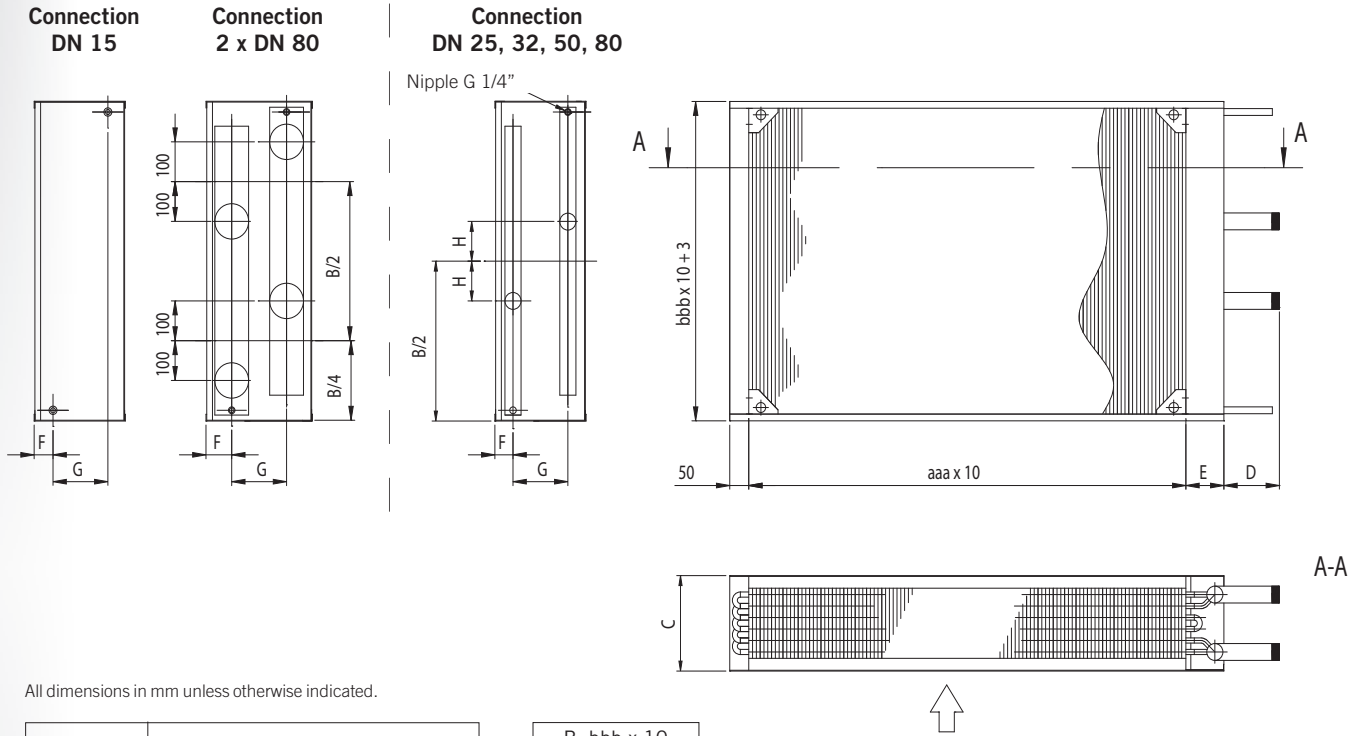
Our products can be ordered with a number of different accessories and with other dimensions and materials than standard. Contact us for more information.

Q(L,F)TN, Q(L,F)TO, Q(L,F)TQ - ECOTERM®

DIMENSION DRAWING Q(L,F)TN: Casing with inward folded edges on the top and bottom plates.

Cover plate for the header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



All dimensions in mm unless otherwise indicated.

No. of rows (cc)	C				
	DN 15	DN 25	DN 32	DN 50	DN 80
01	96	102	112	136	-
02	125	125	127	146	206
03	154	154	154	154	206
04	183	183	183	183	213
06	240	240	240	240	260
08	298	298	298	298	318
10	356	356	356	356	376
12	414	414	414	414	434

$B = bbb \times 10$

bbb (cm)	H (mm)
<040	60
≥040	100

Header Size	D	E	F	G	No. of rows (cc)							
					1	2	3	4	6	8	10	12
DN 15 (Cu)	195	50	48	0	29	-	-	-	-	-	-	-
DN 25 (Cu)	139	100	48	36	58	58	87	144	205	263	321	
DN 32 (Fe)	146	100	48	43	58	58	87	144	205	263	321	
DN 50 (Fe)	125	150	48*	68	68	68	87	144	205	263	321	
DN 80 (Fe)	145	150	68	-	94	94	101	144	205	263	321	

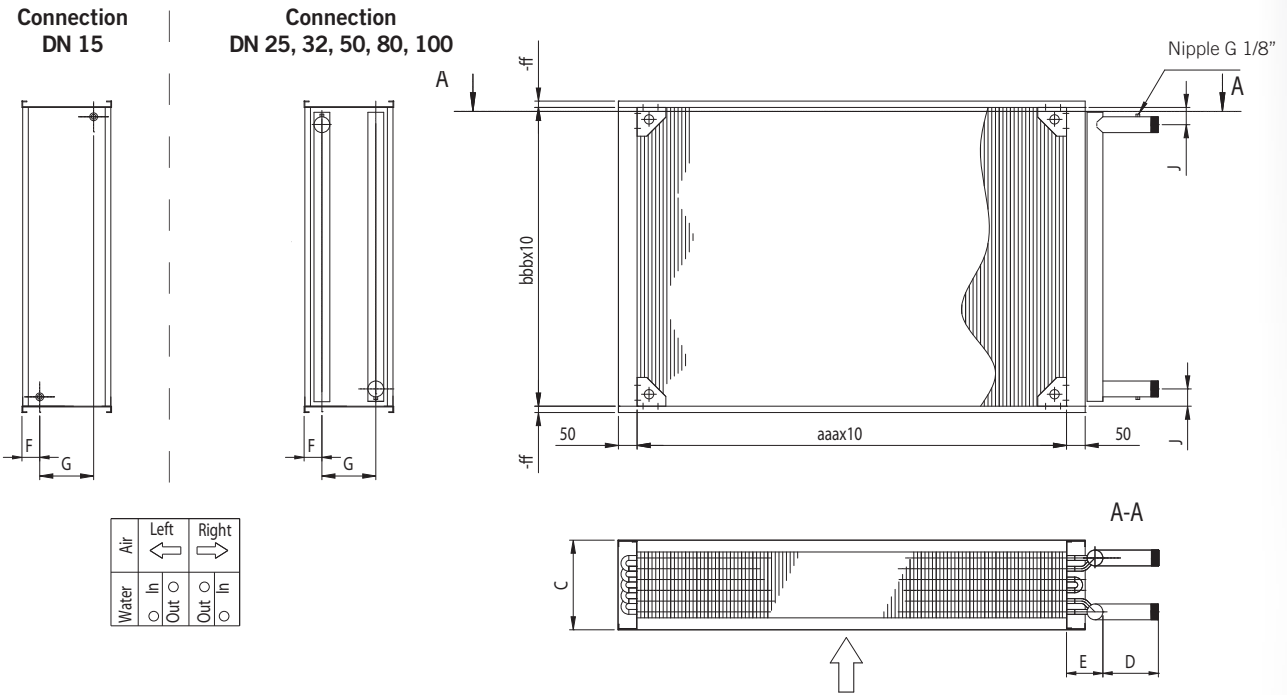
*) 38 by 1 tuberow.



Q(L,F)TN, Q(L,F)TO, Q(L,F)TQ - ECOTERM®

DIMENSION DRAWING Q(L,F)TO: Casing with outward folded edges on the top and bottom plates.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



Air	Left	Right
Water	In	Out
	Out	In

All dimensions in mm unless otherwise indicated.

Header Size	D	E	J	F	G	No. of rows (cc)						
						1	2	3	4	6	8	10
DN 15 (Cu)	-	-	-	48	0	29	-	-	-	-	-	-
DN 25 (Cu)	150	90	27	48	36	58	58	87	144	205	263	321
DN 32 (Fe)	149	97	46	48	43	58	58	87	144	205	263	321
DN 50 (Fe)	160	115	55	48*	68	68	68	87	144	205	263	321
DN 80 (Fe)	151	144	69	68	-	94	94	101	144	205	263	321
DN 100 (Fe)	150	169	84	68	-	-	-	-	144	205	263	321

*) 38 by 1 tuberow.

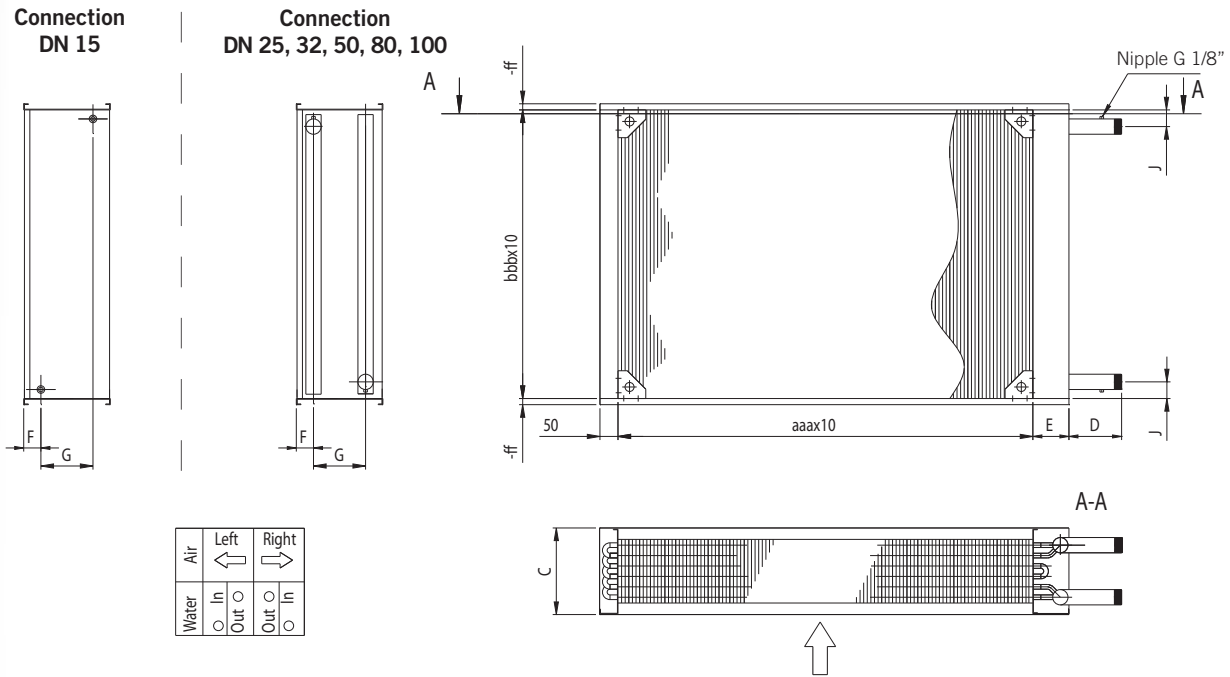
No. of rows (cc)	C					
	DN 15	DN 25	DN 32	DN 50	DN 80	DN 100
01	96	102	112	136	-	-
02	125	125	127	146	206	-
03	154	154	154	154	206	-
04	183	183	183	183	213	-
06	240	240	240	240	260	269
08	298	298	298	298	318	327
10	356	356	356	356	376	385
12	414	414	414	414	434	443

Q(L,F)TN, Q(L,F)TO, Q(L,F)TQ - ECOTERM®

DIMENSION DRAWING Q(L,F)TQ: Casing with outward folded edges on the top and bottom plates.

Cover plate for the header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



Air	Left	Right
Water	In	Out
	Out	In

All dimensions in mm unless otherwise indicated.

No. of rows (cc)	C					
	DN 15	DN 25	DN 32	DN 50	DN 80	DN 100
01	96	102	112	136	-	-
02	125	125	127	146	206	-
03	154	154	154	154	206	-
04	183	183	183	183	213	-
06	240	240	240	240	260	269
08	298	298	298	298	318	327
10	356	356	356	356	376	385
12	414	414	414	414	434	443

Header Size	D	E	J	F	G	No. of rows (cc)						
						1	2	3	4	6	8	10
DN 15 (Cu)	195	50	-	48	0	29	-	-	-	-	-	-
DN 25 (Cu)	140	100	27	48	36	58	58	87	144	205	263	321
DN 32 (Fe)	146	100	46	48	43	58	58	87	144	205	263	321
DN 50 (Fe)	125	150	55	48*	68	68	68	87	144	205	263	321
DN 80 (Fe)	145	150	69	68	-	94	94	101	144	205	263	321
DN 100 (Fe)	139	180	84	68	-	-	-	-	144	205	263	321

*) 38 by 1 tuberow.



HEAT EXCHANGER FOR HEAT RECOVERY - EXHAUST AIR

The heat exchangers Q(L,F)FN, Q(L,F)FO and Q(L,F)FQ are designed for heating the exhaust air, via a circulating antifreeze fluid, which recovers energy from the supply air. The heat exchangers are fitted in units. The design conforms with the Pressure Equipment Directive PED 2014/68/EU.

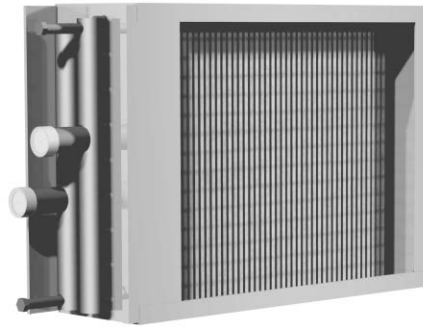
GENERAL

- The design consists of a fin body, headers and casing.
- QL= 1/2" tubes with pleated fins
QF= 1/2" tubes with plain fins
- The QLFN casing with inward folded edges on the top and bottom plates as well as cover plates for the header and elbows. QLFN is available with or without drip tray (horizontal drain 32 mm).
- The header is equipped with nipples for bleeding and draining. The plug is designed as a manual bleeding valve.
- The tubes are zigzag mounted in the fin body to give, together with the pleated fins, maximum efficiency.
- All connections are fitted with male pipe threads (SS-EN ISO 228-1).
- AMA-code QFC.
- If a specific connection size is required, the following fluid flow restrictions apply:

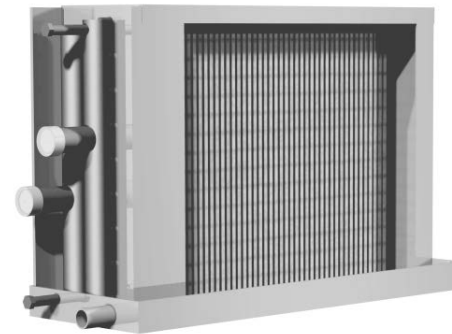
Connection	Flow (max)
DN 15	0,7 l/s
DN 25	1,6 l/s
DN 32	2,8 l/s
DN 50	7,0 l/s
DN 80	14,0 l/s
2 x DN 80	28,0 l/s

OPERATING DATA

- Max fluid velocity should be 1,5 m/s in tubes.
- Normal air velocity should be 2-3 m/s.
- Max air velocity without droplet eliminator: 2,9 m/s.
Max air velocity with droplet eliminator: 5,0 m/s.
- For air flows up to 40 m³/s.
- Max operating pressure: 1,6 MPa at max operating temperature 100 °C.
- Max operating pressure: 1,0 MPa at max operating temperature 185 °C.
- All heat exchangers are leakage tested using dry air under water.



QLFN casing with inward folded edges on the top and bottom plates as well as cover plates for the header and elbows.



The QLFN with inward folded edges on the top and bottom plates and cover plate for the header and elbows. With drip tray.

MATERIAL & SIZE

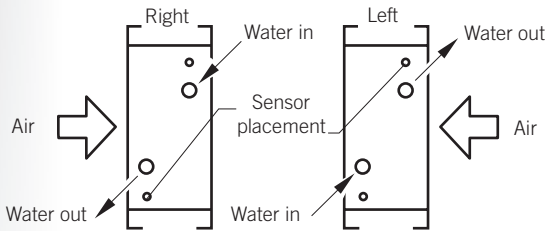
The heat exchanger is designed using copper tubes and aluminium fins. The casing is made of hot-dip galvanized steel sheet. Exhaust air coil's possible drip tray is made of stainless steel. As standard the header is designed of steel, a part from DN 15 and DN 25 which are of copper with brass connections. QLFN, QLFO, QLFQ: Standard sizes are from 200 x 200 mm till 3500 x 2400 mm.

Materials for aggressive environments are available, *see page 6*.

Q(L,F)FN, Q(L,F)FO, Q(L,F)FQ - ECOTERM®

INSTALLATION

The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchanger must be ordered in either a right or left-hand design. The system must be fully bled to give optimal performance.

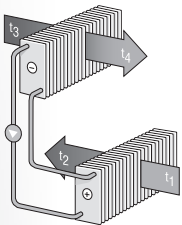


Counter flow coupling.

DIMENSIONING VIA COILS

Dimensioning is performed using the product selection program Coils, which can be downloaded from our website. Coils shows, among others, dimension drawings and the following data:

Temperature efficiency in %:



$$\eta_t = \frac{t_2 - t_1}{t_3 - t_1}$$

Air side:	Air temperature out	°C
	Output	kW
	Air velocity	m/s
	Air pressure drop	Pa
	Outgoing moisture option	%
Water side:	Return temperature	°C
	Fluid flow per coil	l/s
	Total fluid flow	l/s
	Fluid velocity	m/s

CODE KEY

Q(L,F)F – aaa – bbb – cc – dd – ee – fff

Q(L,F)FN = Casing with inward folded edges on the top and bottom plates. Cover plate for the header.

Q(L,F)FO = Casing with outward folded edges on the top and bottom plates.

Q(L,F)FQ = Casing with outward folded edges on the top and bottom plates. Cover plate for the header.

QL= 1/2" tubes with pleated fins

QF= 1/2" tubes with plain fins

aaa = Width (cm) 020-350
(Fin width excl. Header and elbows)

bbb = Height (cm) 020-240 (Fin height excl. plates)

cc = No. of tube rows 01, 02, 03, 04, 06, 08, 10, 12.

dd = Fin spacing (mm x 10) 18, 20, 25, 30, 40, 50, 60

ee = Number of fluid paths 02, 04, 06, 08, 10, etc.

f-- = Connection side

QLFN: 1= right without drip tray, 2=left without drip tray,

3= right with drip tray, 4=left with drip tray,

5= right with drip tray and space for droplet eliminator,

6= left with drip tray and space for droplet eliminator.

QLFO, QLFQ: 1=right, 2=left

-ff= Edge height on top and bottom plate (mm)

QLFO, QLFQ: 17-99

FREEZE PROTECTION

Glycols, ethanols, salt solutions, oils, etc. In order to gain good performance it is extremely important that the system is filled with the same brine solution and concentration that it is designed for. Different types of brine are included in the calculation program Coils, which gives the correct pressure drop depending on the brine and concentration. Examples of normal mixtures of ethylene glycol are 20-35% and propylene glycol 25-35%. Depending which temperature the system works at a concentration of 20% could eliminate frost tension in the heat exchanger.

ACCESSORIES

Additional accessories are available, *see pages 94-96.*

MAINTENANCE

Operating and maintenance instructions are available via the production selection program Coils or from our website.



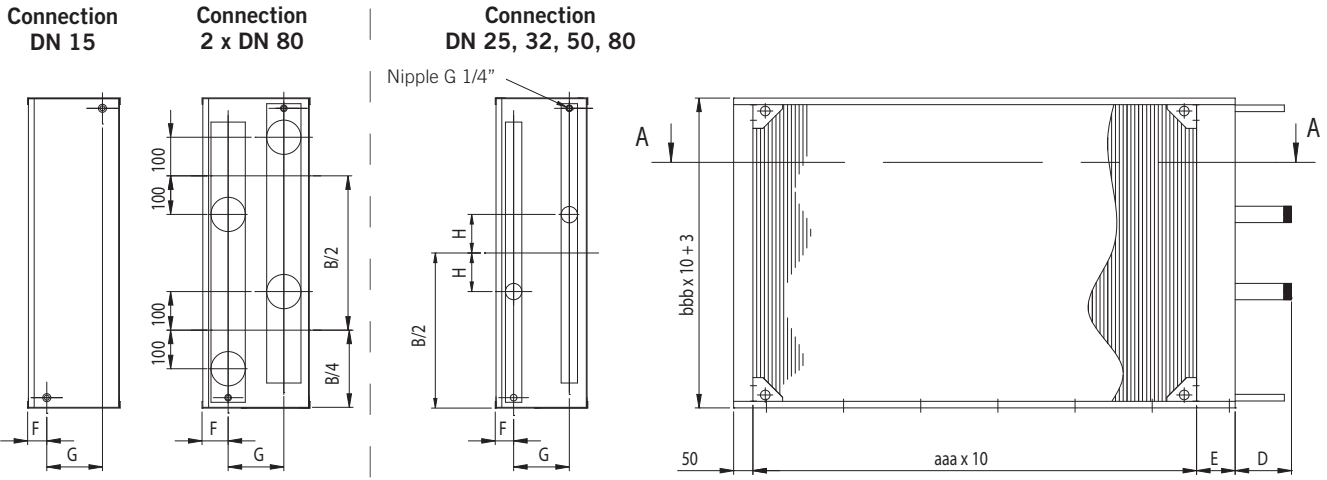
Our products can be ordered with a number of different accessories and with other dimensions and materials than standard. Contact us for more information.



Q(L,F)FN, Q(L,F)FO, Q(L,F)FQ - ECOTERM®

DIMENSION DRAWING Q(L,F)FN: Casing with inward folded edges on the top and bottom plates. Cover plate for the header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.

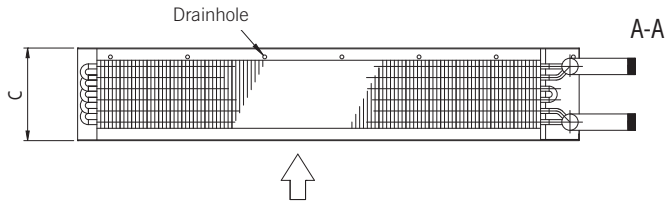


All dimensions in mm unless otherwise indicated.

f=1,2	C				
No. of rows (cc)	DN 15	DN 25	DN 32	DN 50	DN 80
01	96	102	112	136	-
02	125	125	127	146	206
03	154	154	154	154	206
04	183	183	183	183	213
06	240	240	240	240	260
08	298	298	298	298	318
10	356	356	356	356	376
12	414	414	414	414	434

$B = bbb \times 10$

bbb (cm)	H (mm)
<040	60
≥040	100



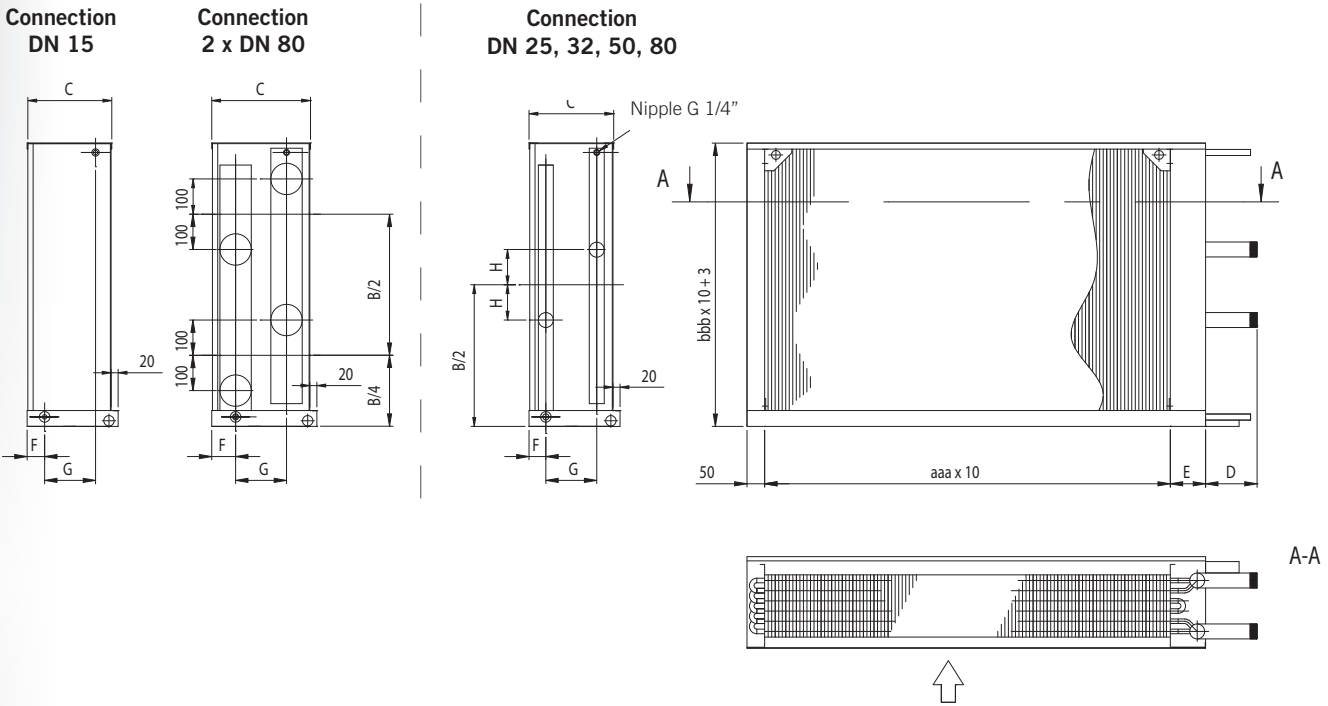
Header Size	D	E	F	G	No. of rows (cc)							
					1	2	3	4	6	8	10	12
DN 15 (Cu)	195	50	48	0	29	-	-	-	-	-	-	-
DN 25 (Cu)	139	100	48	36	58	58	87	144	205	263	321	
DN 32 (Fe)	146	100	48	43	58	58	87	144	205	263	321	
DN 50 (Fe)	125	150	48*	68	68	68	87	144	205	263	321	
DN 80 (Fe)	145	150	68	-	94	94	101	144	205	263	321	

*) 38 by 1 tuberow.

Q(L,F)FN, Q(L,F)FO, Q(L,F)FQ - ECOTERM®

DIMENSION DRAWING Q(L,F)FN WITH DRIP TRAY: Casing with inward folded edges on the top and bottom plates. Cover plate for the header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



All dimensions in mm unless otherwise indicated.

f=3,4	C				
No. of rows (cc)	DN 15	DN 25	DN 32	DN 50	DN 80
01	96	102	112	136	-
02	125	125	127	146	206
03	154	154	154	154	206
04	183	183	183	183	213
06	240	240	240	240	260
08	298	298	298	298	318
10	356	356	356	356	376
12	414	414	414	414	434

f=5,6	C				
No. of rows (cc)	DN 15	DN 25	DN 32	DN 50	DN 80
01	206	212	222	246	-
02	235	235	237	256	316
03	264	264	264	264	316
04	293	293	293	293	323
06	350	350	350	350	370
08	408	408	408	408	428
10	466	466	466	466	486
12	524	524	524	524	544

Header Size	D	E	F	G	No. of rows (cc)							
					1	2	3	4	6	8	10	12
DN 15 (Cu)	195	50	48	0	29	-	-	-	-	-	-	-
DN 25 (Cu)	139	100	48	36	58	58	87	144	205	263	321	
DN 32 (Fe)	146	100	48	43	58	58	87	144	205	263	321	
DN 50 (Fe)	125	150	48*	68	68	68	87	144	205	263	321	
DN 80 (Fe)	145	150	68	-	94	94	101	144	205	263	321	

B=bbb x 10

bbb (cm)	H (mm)
<040	60
≥040	100

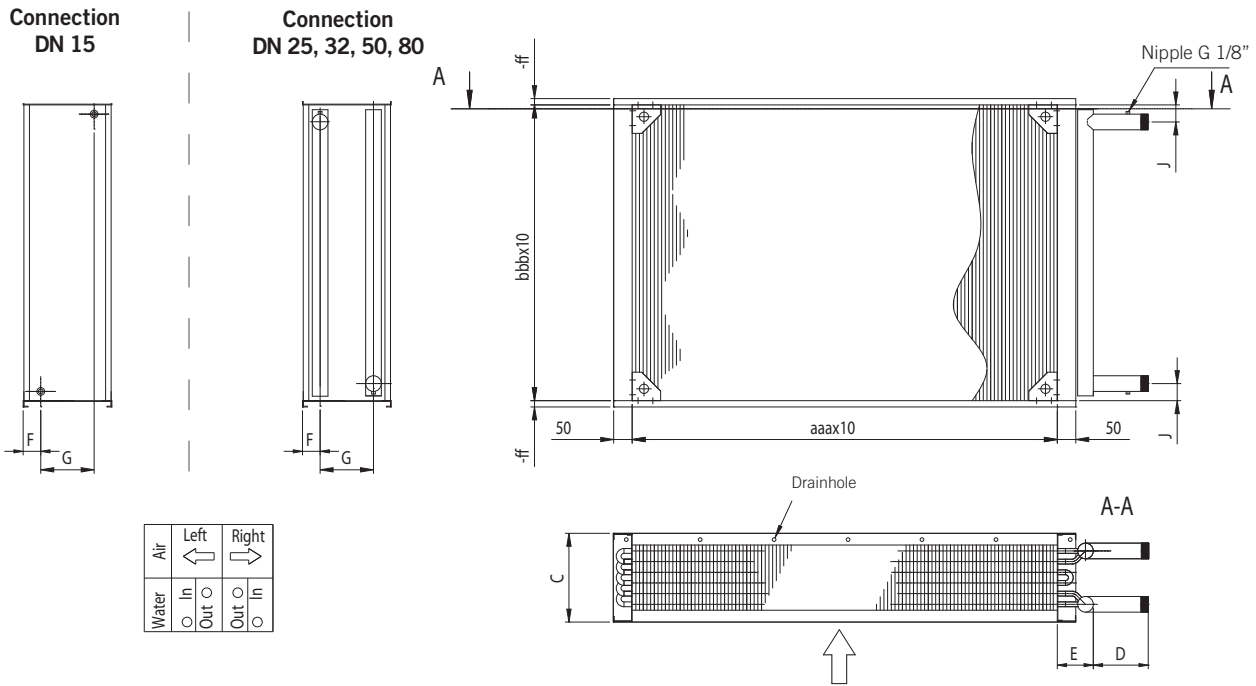
*) 38 by 1 tuberow.



Q(L,F)FN, Q(L,F)FO, Q(L,F)FQ - ECOTERM®

DIMENSION DRAWING Q(L,F)FO: Casing with outward folded edges on the top and bottom plates.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



Air	Left	Right
Water	In	Out
	○	○

All dimensions in mm unless otherwise indicated.

No. of rows (cc)	C					
	DN 15	DN 25	DN 32	DN 50	DN 80	DN 100
01	96	102	112	136	-	-
02	125	125	127	146	206	-
03	154	154	154	154	206	-
04	183	183	183	183	213	-
06	240	240	240	240	260	269
08	298	298	298	298	318	327
10	356	356	356	356	376	385
12	414	414	414	414	434	443

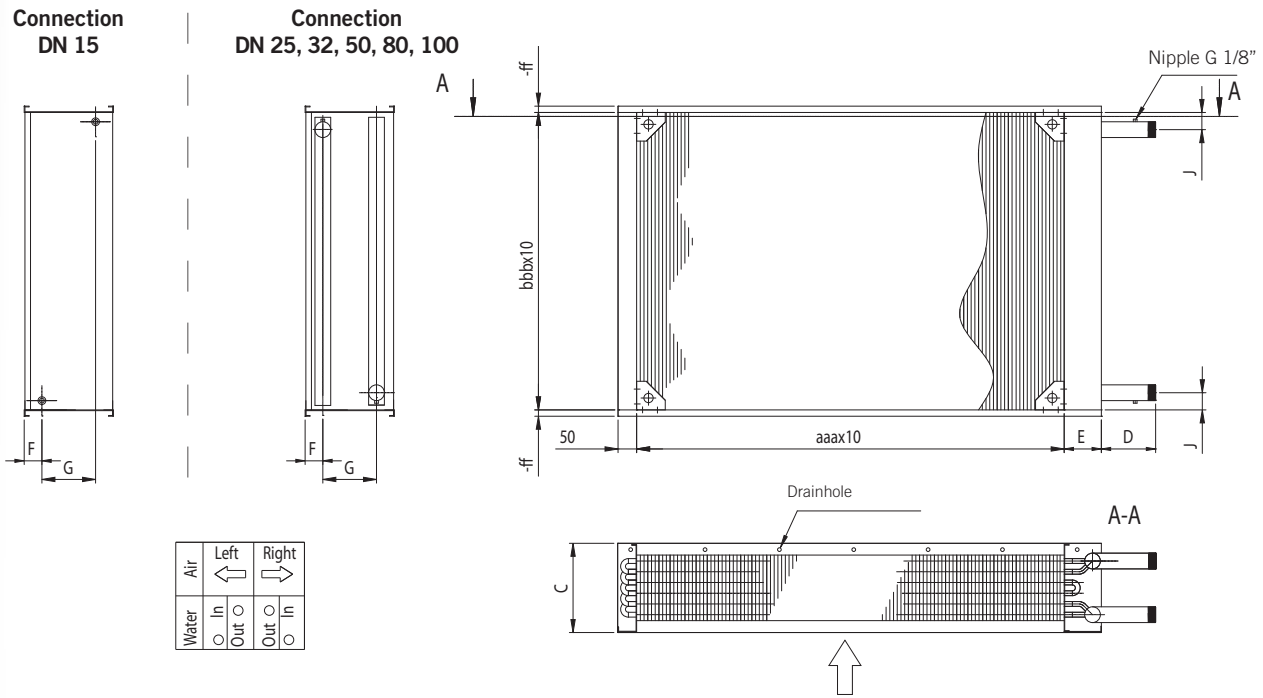
Header Size	D	E	J	F	G	No. of rows (cc)						
						1	2	3	4	6	8	10
DN 15 (Cu)	-	-	-	48	0	29	-	-	-	-	-	-
DN 25 (Cu)	150	90	27	48	36	58	58	87	144	205	263	321
DN 32 (Fe)	149	97	46	48	43	58	58	87	144	205	263	321
DN 50 (Fe)	160	115	55	48*	68	68	68	87	144	205	263	321
DN 80 (Fe)	151	144	69	68	-	94	94	101	144	205	263	321
DN 100 (Fe)	150	169	84	68	-	-	-	-	144	205	263	321

*) 38 by 1 tuberow.

Q(L,F)FN, Q(L,F)FO, Q(L,F)FQ - ECOTERM®

DIMENSION DRAWING Q(L,F)FQ: Casing with outward folded edges on the top and bottom plates.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



All dimensions in mm unless otherwise indicated.

No. of rows (cc)	C					
	DN 15	DN 25	DN 32	DN 50	DN 80	DN 100
01	96	102	112	136	-	-
02	125	125	127	146	206	-
03	154	154	154	154	206	-
04	183	183	183	183	213	-
06	240	240	240	240	260	269
08	298	298	298	298	318	327
10	356	356	356	356	376	385
12	414	414	414	414	434	443

Header Size	D	E	J	F	G	No. of rows (cc)						
						1	2	3	4	6	8	10
DN 15 (Cu)	195	50	-	48	0	29	-	-	-	-	-	-
DN 25 (Cu)	140	100	27	48	36	58	58	87	144	205	263	321
DN 32 (Fe)	146	100	46	48	43	58	58	87	144	205	263	321
DN 50 (Fe)	125	150	55	48*	68	68	68	87	144	205	263	321
DN 80 (Fe)	145	150	69	68	-	94	94	101	144	205	263	321
DN 100 (Fe)	139	180	84	68	-	-	-	-	144	205	263	321

*) 38 by 1 tuberow.



HEAT EXCHANGER FOR EVAPORATING REFRIGERANT (DX)

The heat exchangers QLEN, QLET, QLEO and QLEQ are designed for cooling of air with an evaporating medium and are mounted in the unit room. The design conforms with the Pressure Equipment Directive PED 2014/68/EU.

GENERAL

- The design consists of a fin body, headers/distributor and casing.
- For horizontal air flow.
- The QLEN casing has inward folded edges on the top and bottom plates and cover plates for the header and elbows. Available with or without drip tray (the drain is 32 mm and mounted horizontal).
- QLET has a basic casing without a cover plate for the header. The advantage is a smaller built-in depth.
- The tubes are zigzag mounted in the fin body to give, together with the pleated fins, maximum efficiency.
- The heat exchangers are designed with a distributor for incoming refrigerant and a header for outgoing.
- Several different output stages.
- AMA-code QFC.22.
- For the greatest cleanliness the heat exchangers are shield gas soldered and are filled with nitrogen gas before delivery.

OPERATING DATA

- Normal air velocity should be 2-3 m/s.
- Max air velocity without droplet eliminator 2,9 m/s.
- Max air velocity with droplet eliminator: 5,0 m/s.
- For air flows up to 40 m³/s.
- Max operating pressure: 2,2 MPa at max operating temperature 100 °C.
- All heat exchangers are leakage tested using dry air under water.
- If reversible operation or hot-gas defrosting are used, the max. operating pressure should be observed.

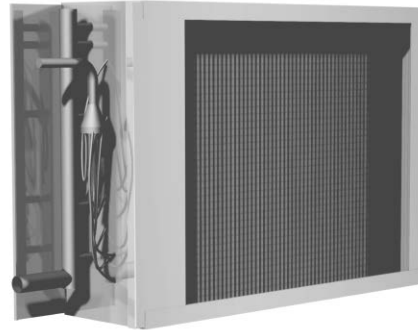
MATERIAL & SIZE

The heat exchanger is designed using copper tubes and aluminium fins. The casing is made of hot-dip galvanized steel sheet and possible drip tray of stainless steel. As standard the header is designed of steel which are of copper.

QLEN, QLEO, QLEQ: Standard sizes are from 200 x 200 mm to 3500 x 2400 mm. QLET: Standard sizes are from 200 x 200 mm to 1200 x 1000 mm. Materials for aggressive environments are available, see page 6.

ACCESSORIES

Additional accessories are available, see pages 94-96.



QLEN casing with inward folded edges on the top and bottom plates as well as cover plates for the header and elbows.



QLET with basic casing without cover plate.

DIMENSIONING VIA COILS

Dimensioning is performed using the product selection program Coils, which can be downloaded from our website. Coils shows, among others, dimension drawings and the following data:

Air side:	Air temperature out	°C
	Output	kW
	Air velocity	m/s
	Air pressure drop wet and dry	Pa
	Outgoing air humidity	%
	Condensate	g/s
Refrigerant side:	Refrigerant pressure drop	°C

INSTALLATION

The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger must be ordered in either a right or left-hand design. The system must be fully bled to give optimal performance.

Maintenance

Operating and maintenance instructions are available via the production selection program Coils or from our website.

QLEN, QLET, QLEO, QLEQ

OUTPUT STAGES

Heat exchangers for evaporating refrigerant can be delivered divided into one, two or several output stages depending on the height of the heat exchanger. Heat exchangers are normally coupled so that every other coil is coupled to output stage one and every other to output stage two ("interlaced coupling"), see figure 1. Connections and fluid pipes are equipped with copper washers that indicate the stage association. Three or more output stages are normally divided vertically, see figure 2.

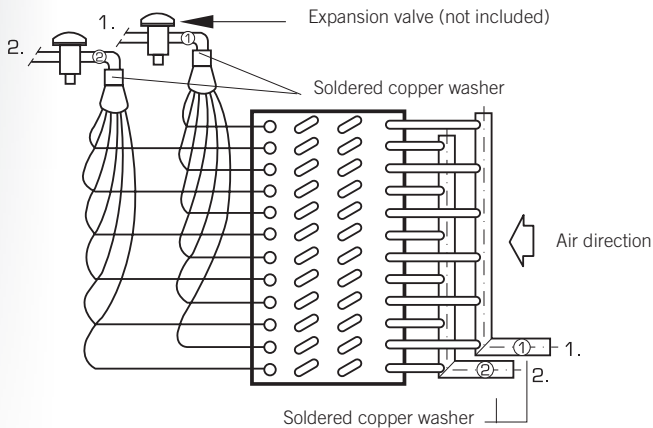


Figure 1. Two output stages with "interlace coupling".

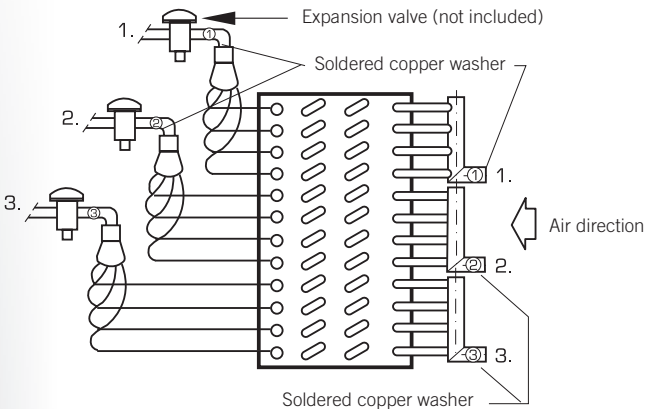


Figure 2. Three or more output stages are normally divided vertically.



Our products can be ordered with a number of different accessories and with other dimensions and materials than standard. Contact us for more information.

CODE KEY

QLE_ – aaa – bbb – cc – dd – ee – f – h

QLEN = Casing with inward folded edges on the top and bottom plates. Cover plate for the header.
QLET = Basic casing without cover plate.

aaa = Width (cm)

QLEN: 020-350,
QLET: 020-120 (Fin width excl. header and elbows)

bbb = Height (cm)

QLEN: 020-240,
QLET: 020-100 (Fin height excl. plates)

cc = No. of tube rows

QLEN: 01, 02, 03, 04, 06, 08, 10, 12
QLET: 01, 02, 03, 04, 06

dd = Fin spacing (mm x 10)

18, 20, 25, 30, 40, 50, 60

ee = Number of fluid paths 02, 04, 06, 08, 10, etc.

f = Connection side

QLEN: 1=right, 2=left, 3=right with drip tray,
4=left with drip tray,
5=right with drip tray and space for droplet eliminator,
6=left with drip tray and space for droplet eliminator.

QLET: 1=right, 2=left.

h = Number of stages

1=one circuit
2=shared circuit 1/2+1/2
3=shared circuit 1/3+2/3

QLEO – aaa – bbb – cc – dd – ee – fff

QLEO = Casing with outward folded edges on the top and bottom plates.

QLEQ = Casing with outward folded edges on the top and bottom plates. Cover plate for the header.

aaa = Width (cm) 020-350

bbb = Height (cm) 020-240

cc = No. of tube rows 01, 02, 03, 04, 06, 08, 10, 12

dd = Fin spacing (mm x 10)

18, 20, 25, 30, 40, 50, 60

ee = Number of fluid paths 02, 04, 06, 08, 10, etc.

f-- = Connection side

1=right
2=left
3=right shared circuit 1/2+1/2
4=left shared circuit 1/2+1/2
5=right shared circuit 1/3+2/3
6=left shared circuit 1/3+2/3

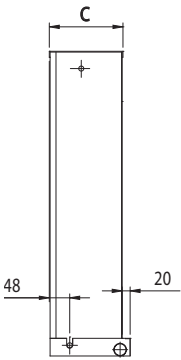
-ff = Edge height on top and bottom plate (mm) 17-99

QLEN, QLET, QLEO, QLEQ

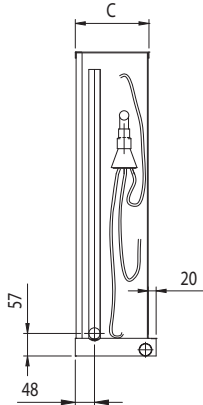
DIMENSION DRAWINGS QLEN WITH DRIP TRAY, 1 STAGE: Casing with inward folded edges on the top and bottom plates. Cover plate for the header. (Also available without drip tray).

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.

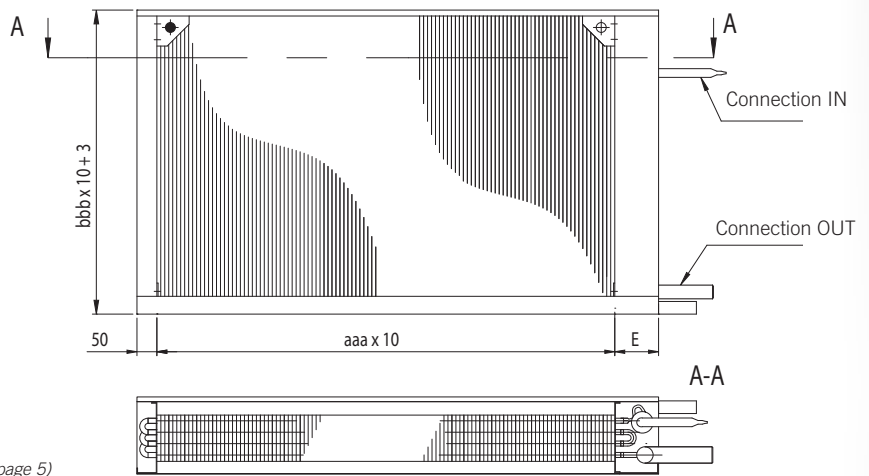
Connection for brazing
OUT 1/2"



Connection for brazing
OUT 1 1/8" - 2 1/8"



Connection for brazing
OUT 1 1/8" - 2 1/8"



All dimensions in mm unless otherwise indicated. (Inch table, see page 5)



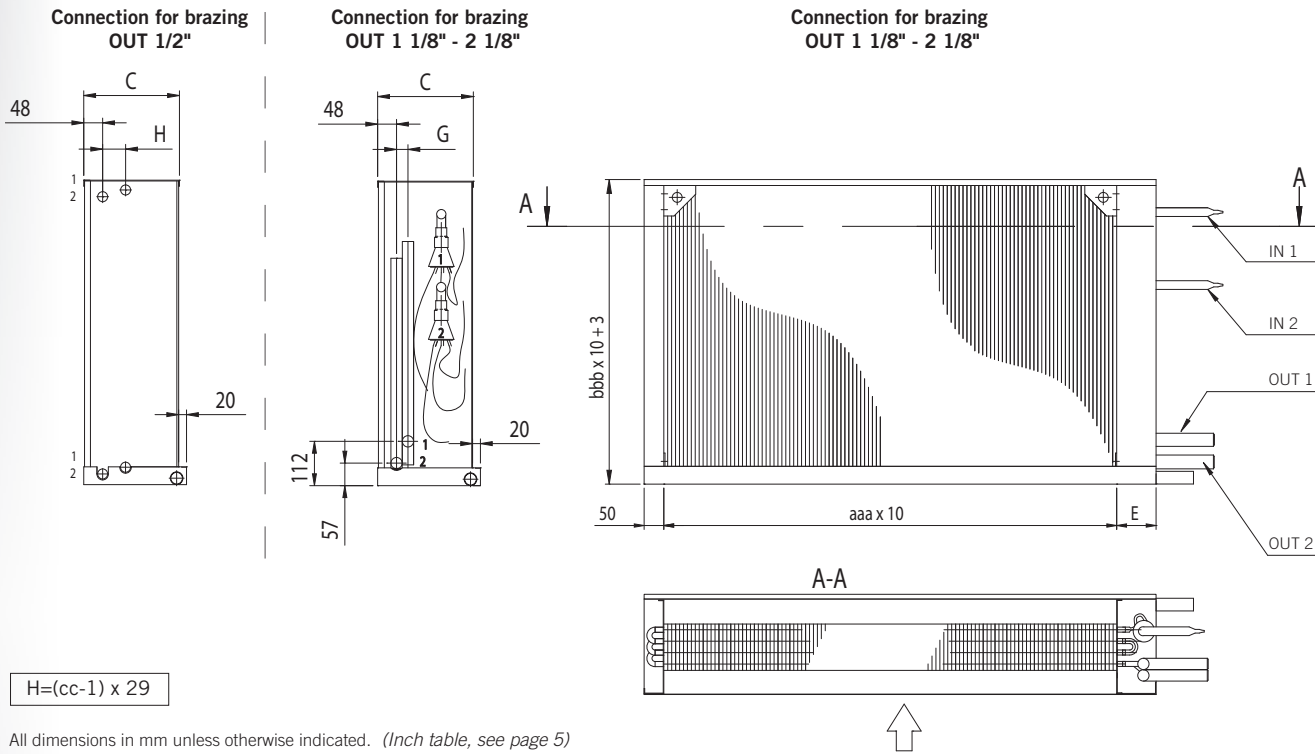
f=3,4	C				
	Connection OUT				
No. of rows (cc)	1/2"	1 1/8"	1 3/8"	1 5/8"	2 1/8"
01	96	130	160	192	255
02	125	144	160	192	255
03	154	154	160	192	255
04	183	183	183	192	255
06	240	240	240	240	255
08	298	298	298	298	298
10	356	356	356	356	356
12	414	414	414	414	414

f=5,6	C				
	Connection OUT				
No. of rows (cc)	1/2"	1 1/8"	1 3/8"	1 5/8"	2 1/8"
01	206	206	206	206	255
02	235	235	235	235	255
03	264	264	264	264	264
04	293	293	293	293	293
06	350	350	350	350	350
08	408	408	408	408	408
10	466	466	466	466	466
12	524	524	524	524	524

Connection OUT	E	Connection IN
1/2"	50	1/2"
1 1/8"	100	5/8" eller 7/8"
1 3/8"	100	7/8"
1 5/8"	150	7/8"
2 1/8"	180	7/8"

QLEN, QLET, QLEO, QLEQ

DIMENSION DRAWING QLEN WITH DRIP TRAY, 2 STAGES: Casing with inward folded edges on the top and bottom plates. (Also available without drip tray).



$H=(cc-1) \times 29$

All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

f=3,4	C				
	Connection OUT 2				
No. of rows (cc)	1/2"	1 1/8"	1 3/8"	1 5/8"	2 1/8"
01	96	200	251	307	414
02	125	200	251	307	414
03	154	200	251	307	414
04	183	200	251	307	414
06	240	240	251	307	414
08	298	298	298	307	414
10	356	356	356	356	414
12	414	414	414	414	414

f=5,6	C				
	Connection OUT 2				
No. of rows (cc)	1/2"	1 1/8"	1 3/8"	1 5/8"	2 1/8"
01	206	206	251	307	414
02	235	235	251	307	414
03	264	264	264	307	414
04	293	293	293	307	414
06	350	350	350	350	414
08	408	408	408	408	414
10	466	466	466	466	466
12	524	524	524	524	524

Connection OUT 2	E
1/2"	50
1 1/8"	100
1 3/8"	100
1 5/8"	150
2 1/8"	180

Connection OUT 2	Connection OUT 1	G
1 1/8"	1 1/8"	29
1 3/8"	1 1/8"	34
1 3/8"	1 3/8"	36
1 5/8"	1 1/8"	38
1 5/8"	1 3/8"	40
1 5/8"	1 5/8"	43
2 1/8"	1 3/8"	50
2 1/8"	1 5/8"	53
2 1/8"	2 1/8"	58

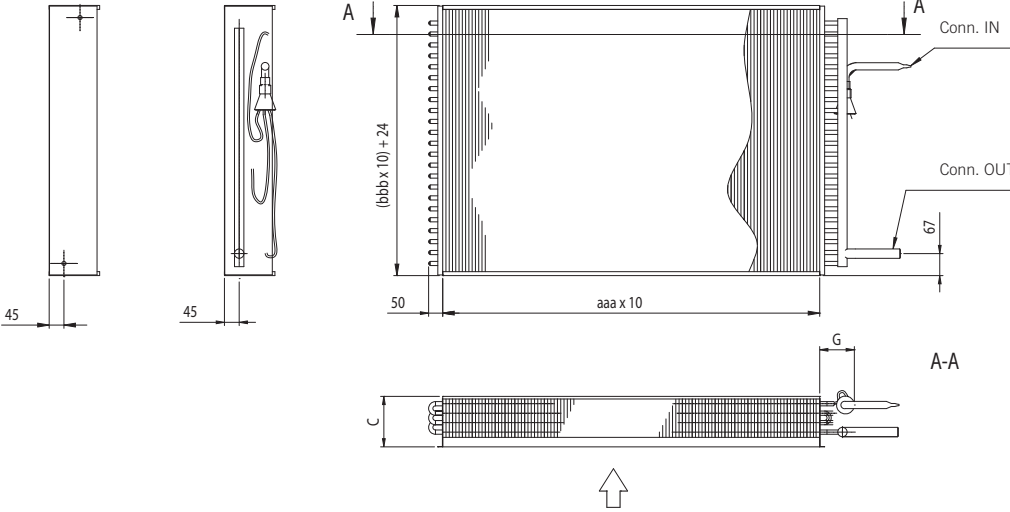
QLEN, QLET, QLEO, QLEQ

DIMENSION DRAWINGS QLET, 1 STAGE: Basic casing without cover plate.

Connection for brazing OUT 1/2"

Connection for brazing OUT 1 1/8" - 2 1/8"

All dimensions in mm unless otherwise indicated. (Inch table, see page 5)



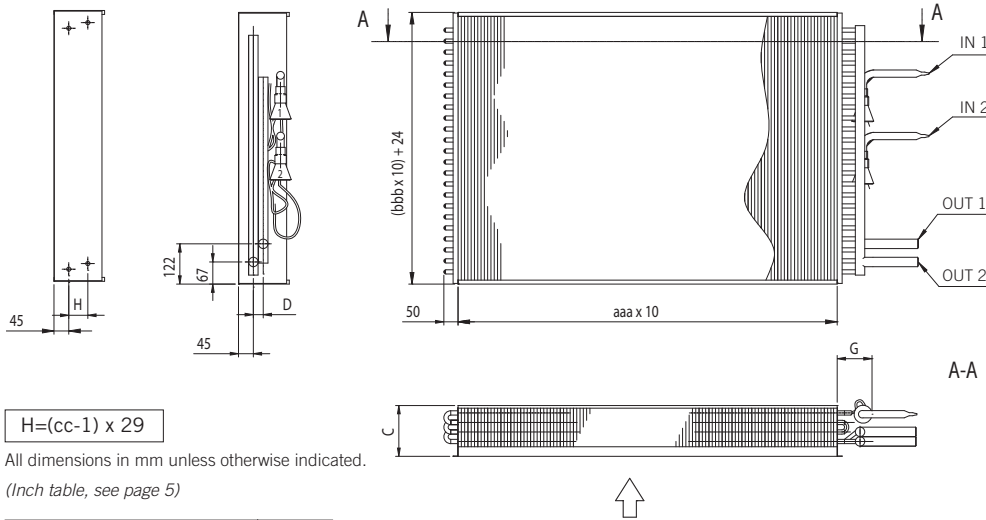
No. of rows (cc)	C (mm)
01	125
02	125
03	125
04	154
06	221

Connection OUT	G max	Connection IN
1/2"	-	1/2"
1 1/8"	100	5/8" or 7/8"
1 3/8"	100	7/8"
1 5/8"	150	7/8"
2 1/8"	180	7/8"

DIMENSION DRAWING QLET, 2 STAGES: Basic casing without cover plate.

Connection for brazing OUT 1/2"

Connection for brazing OUT 1 1/8" - 2 1/8"



$H = (cc-1) \times 29$

All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

Connection OUT 2	Connection OUT 1	D
1 1/8"	1 1/8"	29
1 3/8"	1 1/8"	34
1 3/8"	1 3/8"	36
1 5/8"	1 1/8"	38
1 5/8"	1 3/8"	40
1 5/8"	1 5/8"	43
2 1/8"	1 3/8"	50
2 1/8"	1 5/8"	53
2 1/8"	2 1/8"	58

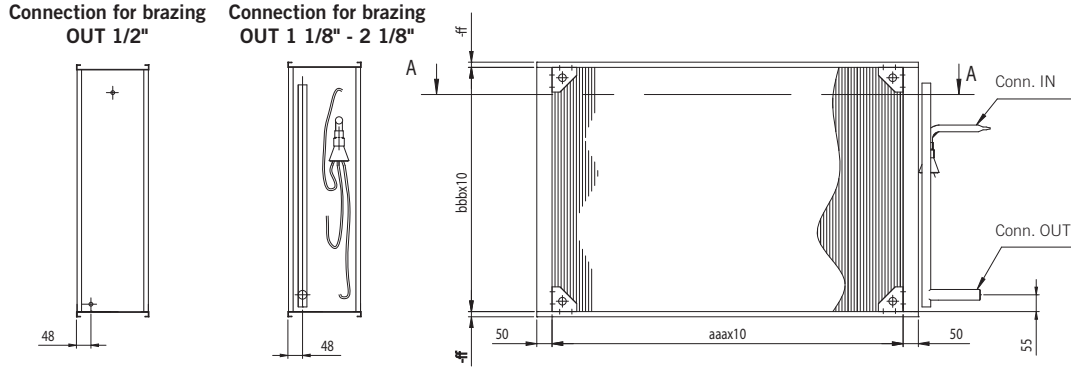
No. of rows (cc)	C (mm)
01	125
02	125
03	125
04	154
06	221

Connection OUT 2	G max
1/2"	-
1 1/8"	100
1 3/8"	100
1 5/8"	150
2 1/8"	180

QLEN, QLET, QLEO, QLEQ

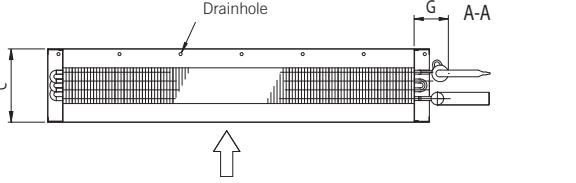
DIMENSION DRAWING QLEO, 1 STAGE: Casing with outward folded edges on the top and bottom plates.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



No. of rows (cc)	C				
	Connection OUT				
	1/2"	1 1/8"	1 3/8"	1 5/8"	2 1/8"
01	96	130	160	192	255
02	125	144	160	192	255
03	154	154	160	192	255
04	183	183	183	192	255
06	240	240	240	240	255
08	298	298	298	298	298
10	356	356	356	356	356
12	414	414	414	414	414

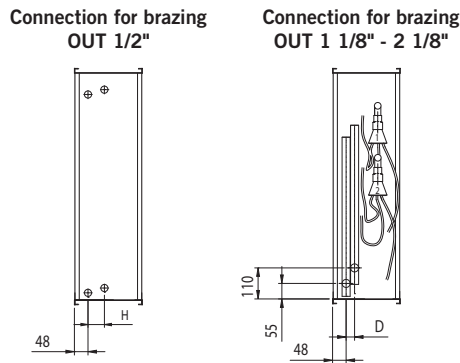
Connection OUT	G max	Connection IN
1/2"		1/2"
1 1/8"	100	5/8" eller 7/8"
1 3/8"	100	7/8"
1 5/8"	150	7/8"
2 1/8"	180	7/8"



All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

DIMENSION DRAWING QLEO, 2 STAGES: Casing with outward folded edges on the top and bottom plates.

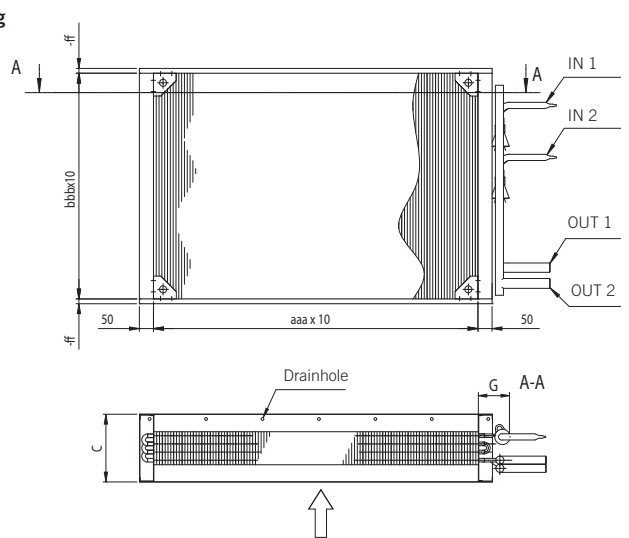
Connection OUT 2	Connection OUT 1	D
1 1/8"	1 1/8"	29
1 3/8"	1 1/8"	34
1 3/8"	1 3/8"	36
1 5/8"	1 1/8"	38
1 5/8"	1 3/8"	40
1 5/8"	1 5/8"	43
2 1/8"	1 3/8"	50
2 1/8"	1 5/8"	53
2 1/8"	2 1/8"	58



No. of rows (cc)	C				
	Connection OUT 2				
	1/2"	1 1/8"	1 3/8"	1 5/8"	2 1/8"
01	96	200	251	307	414
02	125	200	251	307	414
03	154	200	251	307	414
04	183	200	251	307	414
06	240	240	251	307	414
08	298	298	298	307	414
10	356	356	356	356	414
12	414	414	414	414	414

$H = (cc - 1) \times 29$

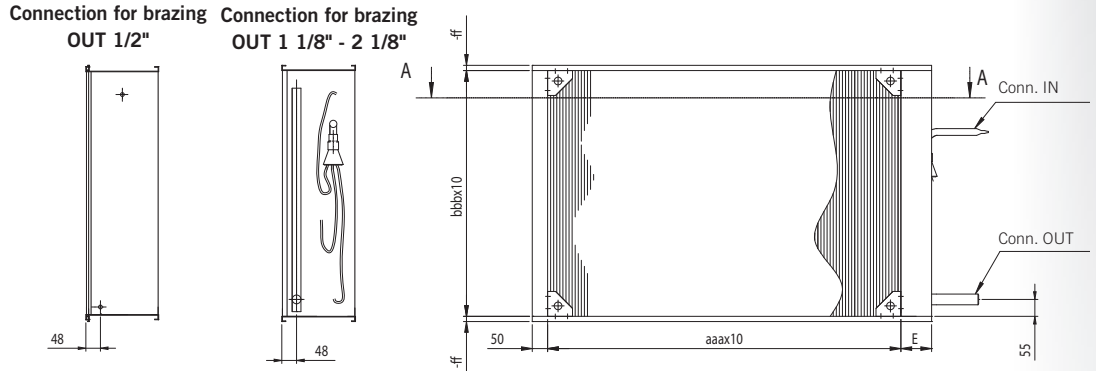
Connection OUT 2	G max
1/2"	
1 1/8"	100
1 3/8"	100
1 5/8"	150
2 1/8"	180



All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

QLEN, QLET, QLEO, QLEQ

QLEQ, 1 STAGE: Casing with outward folded edges on the top and bottom plates. Cover plate for the header.



All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

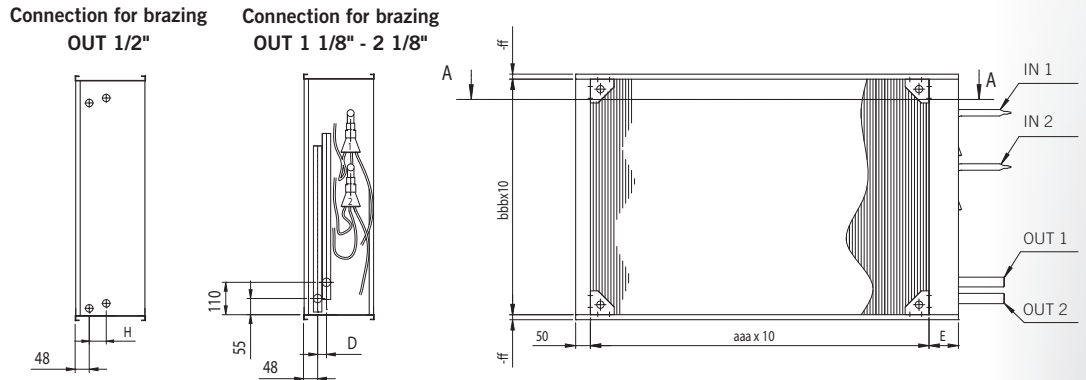
No. of rows (cc)	C				
	Connection OUT				
	1/2"	1 1/8"	1 3/8"	1 5/8"	2 1/8"
01	96	130	160	192	255
02	125	144	160	192	255
03	154	154	160	192	255
04	183	183	183	192	255
06	240	240	240	240	255
08	298	298	298	298	298
10	356	356	356	356	356
12	414	414	414	414	414

Connection OUT	E	Connection IN
1/2"	50	1/2"
1 1/8"	100	5/8" eller 7/8"
1 3/8"	100	7/8"
1 5/8"	150	7/8"
2 1/8"	180	7/8"

QLEQ, 2 STAGES: Casing with outward folded edges on the top and bottom plates. Cover plate for the header.

Connection OUT 2	Connection OUT 1	D
1 1/8"	1 1/8"	29
1 3/8"	1 1/8"	34
1 3/8"	1 3/8"	36
1 5/8"	1 1/8"	38
1 5/8"	1 3/8"	40
1 5/8"	1 5/8"	43
2 1/8"	1 3/8"	50
2 1/8"	1 5/8"	53
2 1/8"	2 1/8"	58

$H = (cc - 1) \times 29$



No. of rows (cc)	C				
	Connection OUT 2				
	1/2"	1 1/8"	1 3/8"	1 5/8"	2 1/8"
01	96	200	251	307	414
02	125	200	251	307	414
03	154	200	251	307	414
04	183	200	251	307	414
06	240	240	251	307	414
08	298	298	298	307	414
10	356	356	356	356	414
12	414	414	414	414	414

Connection OUT 2	E
1/2"	50
1 1/8"	100
1 3/8"	100
1 5/8"	150
2 1/8"	180

All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

HEAT EXCHANGERS FOR CONDENSATION REFRIGERANT

The heat exchangers QLON, QLOT, QLOO and QLOQ are designed for heating air with condensing medium and are mounted in the unit. The design conforms with the Pressure Equipment Directive PED 2014/68/EU.

GENERAL

- The design consists of a fin body, headers and casing.
- QLON casing has inward folded edges on the top and bottom plates and cover plates for the header and elbows.
- QLOT has a basic casing without a cover plate for the header. The advantage of QLOT is a smaller built-in depth.
- The tubes are zigzag mounted in the fin body to give, together with the pleated fins, maximum output.
- Available in several output stages.
- AMA-code QFC.

OPERATING DATA

- Normal air velocity should be 3-4 m/s.
- Max air velocity: 5,0 m/s.
- Max operating pressure: 2,2 MPa at max operating temperature 100 °C.
- For air flows up to 40 m³/s.
- All heat exchangers are leakage tested using dry air under water.

MATERIAL & SIZE (see the code key for more info)

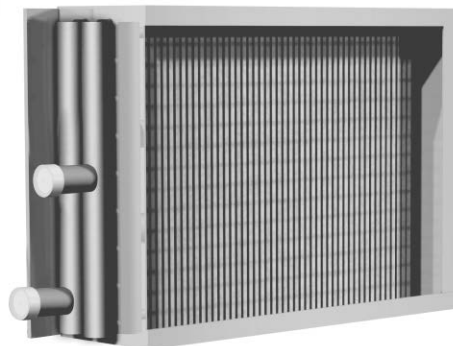
The heat exchanger is designed using copper tubes and aluminium fins. The casing is made of hot-dip galvanized steel sheet. The headers are made of copper. Standard sizes are from 200 x 200 mm to 3500 x 2400 mm. Materials for aggressive environments are available, see page 6.

OUTPUT STAGES

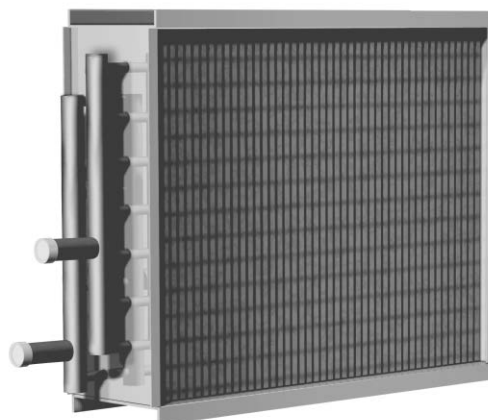
The heat exchangers can be delivered divided into one, two or several output stages depending on the height of the heat exchanger. Heat exchangers with two output stages are normally coupled so that every other coil is coupled to output stage 1 and every other to output stage 2 ("interlaced coupling"). Three or more output stages are normally divided vertically.

INSTALLATION

The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchanger must be ordered in either a right or left-hand design. The system must be fully bled to give optimal performance.



QLON casing has inward folded edges on the top and bottom plates and cover plates for the header and elbows.



QLOT has a basic casing without cover plate.

DIMENSIONING VIA COILS

Dimensioning is performed using the product selection program Coils, which can be downloaded from our website. Coils shows, among others, dimension drawings and the following data:

Air side:	Air temperature out	°C
	Outout	kW
	Air velocity	m/s
	Air pressure drop	Pa
Water side:	Return temperature	°C
	Media flow	l/s
	Media pressure drop	kPa

ACCESSORIES

Additional accessories are available, see pages 94-96.

MAINTENANCE

Operating and maintenance instructions are available via the production selection program Coils or from our website.



QLON, QLOT, QLOO, QLOQ

CODE KEY

QLO_ – aaa – bbb – cc – dd – ee – f – h

QLON = Casing with inward folded edges on the top and bottom plates. Cover plate for the header.

QLOT = Basic casing without cover plate.

aaa = Width (cm)

QLON: 020-350

QLOT: 020-120 (Fin width excl. header and elbows)

bbb = Height (cm)

QLON: 020-240

QLOT: 020-100 (Fin height excl. plates)

cc = No. of tube rows

QLON: 01, 02, 03, 04, 06, 08, 10, 12

QLOT: 01, 02, 03, 04, 06

dd = Fin spacing (mm x 10)

18, 20, 25, 30, 40, 50, 60

ee = Number of fluid paths

02, 04, 06, 08, 10, etc.

f = Connection side

QLON: 1=right, 2=left,

3=right with dip tray,

4=left with dip tray,

5=right with drip tray and space for droplet eliminator,

6=left with drip tray and space for droplet eliminator.

QLOT: 1=right, 2=left

h = Number of stages

1=one circuit

2=shared circuit 1/2+1/2

3=shared circuit 1/3+2/3

QLO_ – aaa – bbb – cc – dd – ee – fff

QLOO = Casing with outward folded edges on the top and bottom plates.

QLOQ = Casing with outward folded edges on the top and bottom plates. Cover plate for the header.

aaa = Width (cm) 020-350

bbb = Height (cm) 020-240

cc = No. of tube rows 01, 02, 03, 04, 06, 08, 10, 12

dd = Fin spacing (mm x 10)

18, 20, 25, 30, 40, 50, 60

ee = Number of fluid paths 02, 04, 06, 08, 10, etc.

fff = Connection side

1=right

2=left

3=right shared circuit 1/2+1/2

4=left shared circuit 1/2+1/2

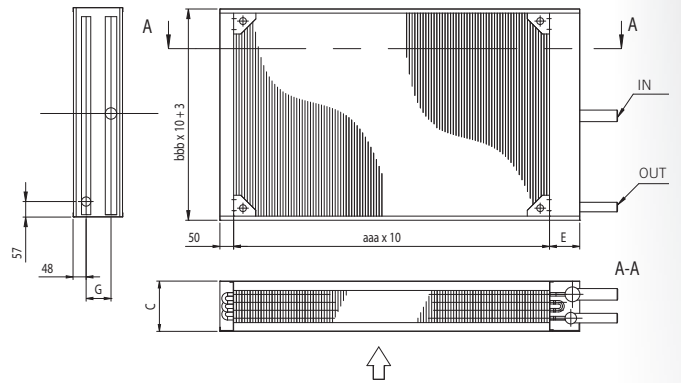
5=right shared circuit 1/3+2/3

6=left shared circuit 1/3+2/3

-ff = Edge height on top and bottom plate (mm) 17-99

Dimension drawing QLON, 1 stage:

Casing with inward folded edges on the top and bottom plates. Cover plate for the header.



No. of rows (cc)	C			
	Connection IN			
	1 1/8"	1 3/8"	1 5/8"	2 1/8"
01	102	102	112	136
02	125	125	127	146
03	154	154	154	154
04	183	183	183	183
06	240	240	240	240
08	298	298	298	298
10	356	356	356	356
12	414	414	414	414

All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

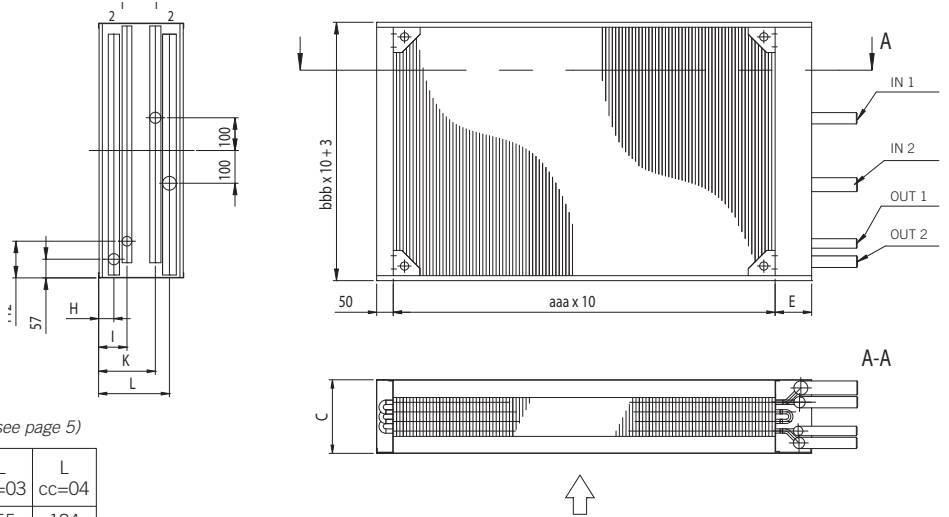
Connc. IN	E	Connc. OUT	G		No. of rows (cc)					
			1	2	3	4	6	8	10	12
1 1/8"	100	7/8"	29	29	58	87	144	205	263	321
1 3/8"	100	1 1/8"	36	58	58	87	144	205	263	321
1 5/8"	100	1 3/8"	43	58	58	87	144	205	263	321
2 1/8"	150	1 5/8"	58	58	58	87	144	205	263	321



QLON, QLOT, QLOO, QLOQ

QLON, 2 STAGES, 3-4 TUBE ROWS: Casing with inward folded edges on the top and bottom plates.

Cover plate for the header.



All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

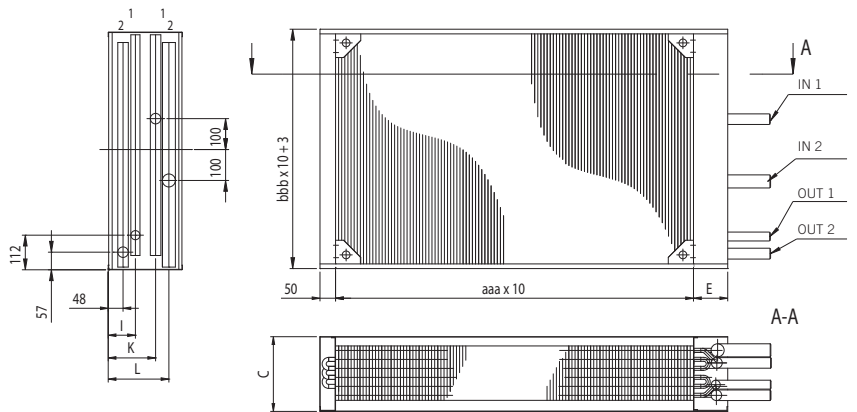
Conn.IN step 2	Conn.IN step 1	Conn.OUT step 2	Conn.OUT step 1	E	H	L cc=03	L cc=04
1 1/8"	1 1/8"	7/8"	7/8"	100	39	155	184
1 3/8"	1 1/8"	1 1/8"	7/8"	100	39	162	194
1 3/8"	1 3/8"	1 1/8"	1 1/8"	100	39	162	194
1 5/8"	1 1/8"	1 3/8"	1 1/8"	100	32	169	198
1 5/8"	1 3/8"	1 3/8"	1 1/8"	100	32	169	198
1 5/8"	1 5/8"	1 3/8"	1 3/8"	100	32	169	198
2 1/8"	1 3/8"	1 5/8"	1 1/8"	150	25	184	213
2 1/8"	1 5/8"	1 5/8"	1 3/8"	150	25	184	213
2 1/8"	2 1/8"	1 5/8"	1 5/8"	150	25	184	213

No. of rows (cc)	C				I	K
	Connection IN, 2 step					
	1 1/8"	1 3/8"	1 5/8"	2 1/8"		
03	194	194	194	211	68	126
04	223	223	223	240	68	155

QLON, 2 STAGES, 6-12 TUBE ROWS: Casing with inward folded edges on the top and bottom plates.

Cover plate for the header.

All dimensions in mm unless otherwise indicated. (Inch table, see page 5)



No. of rows (cc)	C			
	Connection IN, 2 step			
	1 1/8"	1 3/8"	1 5/8"	2 1/8"
06	240	240	240	252
08	298	298	298	310
10	356	356	356	368
12	414	414	414	426

Conn.IN step 2	Conn.IN step 1	Conn.OUT step 2	Conn.UT step 1	E	I	K				L			
						cc=06	cc=08	cc=10	cc=12	cc=06	cc=08	cc=10	cc=12
						1 1/8"	1 1/8"	7/8"	7/8"	100	77	163	224
1 3/8"	1 1/8"	1 1/8"	7/8"	100	77	158	219	277	335	192	253	311	369
1 3/8"	1 3/8"	1 1/8"	1 1/8"	100	77	156	217	275	333	192	253	311	369
1 5/8"	1 1/8"	1 3/8"	1 1/8"	100	82	154	215	273	331	192	253	311	369
1 5/8"	1 3/8"	1 3/8"	1 1/8"	100	82	152	213	271	329	192	253	311	369
1 5/8"	1 5/8"	1 3/8"	1 3/8"	100	84	149	210	268	326	192	253	311	369
2 1/8"	1 3/8"	1 5/8"	1 1/8"	150	86	142	203	261	319	192	253	311	369
2 1/8"	1 5/8"	1 5/8"	1 3/8"	150	88	139	200	258	316	192	253	311	369
2 1/8"	2 1/8"	1 5/8"	1 5/8"	150	91	163	224	282	340	221	282	340	398

QLON, QLOT, QLOO, QLOQ

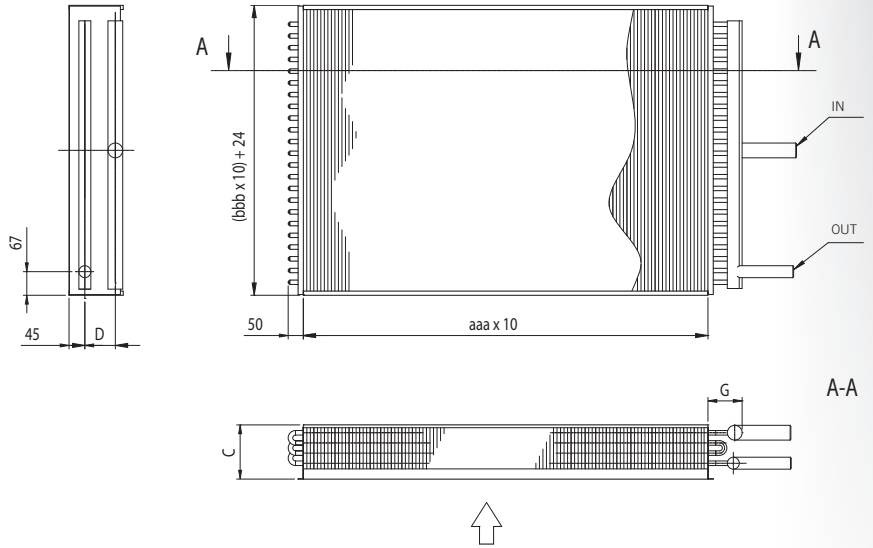
DIMENSION DRAWINGS QLOT, 1 STAGE: Basic casing without cover plate.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.

All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

Connection IN	G max	No. of rows (cc)	C (mm)
1 1/8"	100	01	125
1 3/8"	100	02	125
1 5/8"	100	03	125
2 1/8"	150	04	154
		06	221

Connection IN	Connectio OUT	D				
		No. of rows (cc)				
		01	02	03	04	06
1 1/8"	7/8"	29	29	58	87	144
1 3/8"	1 1/8"	36	58	58	87	144
1 5/8"	1 3/8"	43	58	58	87	144
2 1/8"	1 5/8"	58	58	58	87	144

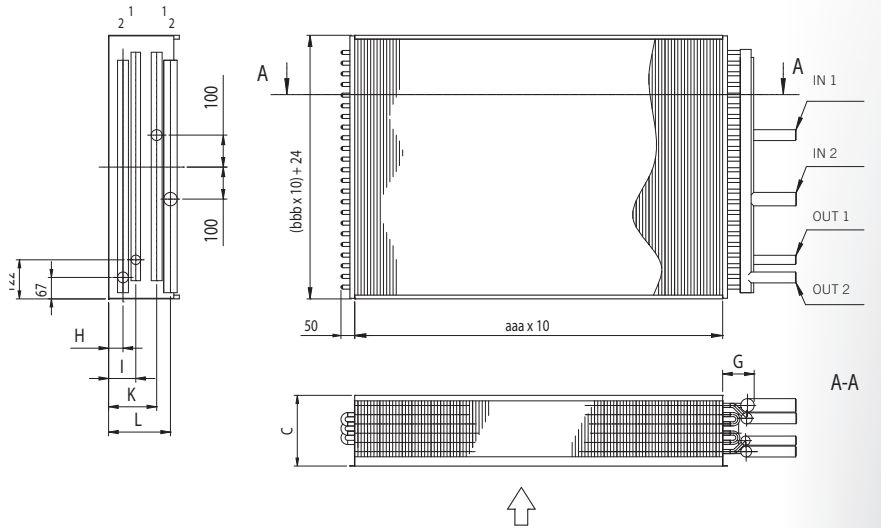


DIMENSION DRAWING QLOT, 2 STAGES:

Basic casing without cover plate.

All dimensions in mm unless otherwise indicated (Inch table, see page 5)

No. of rows (cc)	C (mm)	Connection IN 2	G max
01	125	1 1/8"	100
02	125	1 3/8"	100
03	125	1 3/8"	100
04	154	1 5/8"	100
06	221	1 5/8"	100
		1 5/8"	100
		2 1/8"	150
		2 1/8"	150



Conn. IN 2	Conn. IN 1	Conn. OUT 2	Conn. OUT 1	H		I		K			L		
				cc= 03-04	cc= 06	cc= 03-04	cc= 06	cc= 03	cc= 04	cc= 06	cc= 03	cc= 04	cc= 06
1 1/8"	1 1/8"	7/8"	7/8"	16	45	45	74	103	132	160	132	161	189
1 3/8"	1 1/8"	1 1/8"	7/8"	16	45	45	74	103	132	155	139	168	189
1 3/8"	1 3/8"	1 1/8"	1 1/8"	16	45	45	74	103	132	153	139	168	189
1 5/8"	1 1/8"	1 3/8"	1 1/8"	9	45	45	79	103	132	151	146	221	189
1 5/8"	1 3/8"	1 3/8"	1 1/8"	9	45	45	79	103	132	149	146	221	189
1 5/8"	1 5/8"	1 3/8"	1 3/8"	9	45	45	81	103	132	146	146	221	189
2 1/8"	1 3/8"	1 5/8"	1 1/8"	2	45	45	83	103	132	139	161	221	189
2 1/8"	1 5/8"	1 5/8"	1 3/8"	2	45	45	85	103	132	136	161	221	189

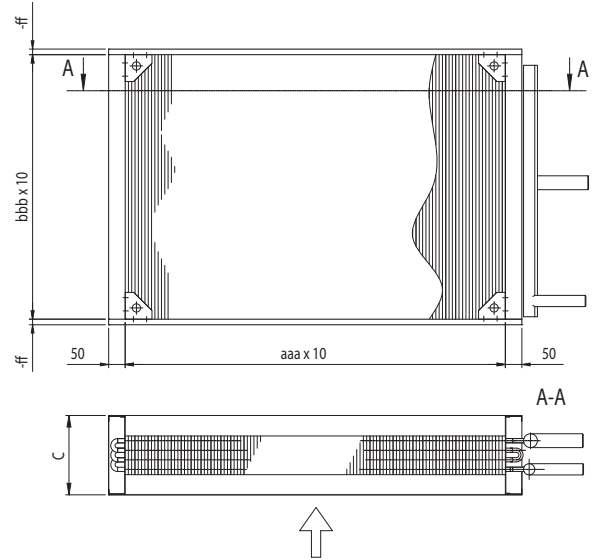
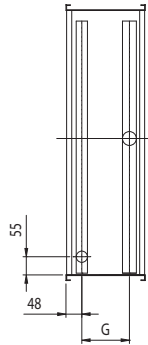


QLON, QLOT, QLOO, QLOQ

DIMENSION DRAWINGS QLOO, 1 STAGE: Casing with outward folded edges on the top and bottom plates.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.

No. of rows (cc)	C			
	Connection IN			
	1 1/8"	1 3/8"	1 5/8"	2 1/8"
01	102	102	112	136
02	125	125	127	146
03	154	154	154	154
04	183	183	183	183
06	240	240	240	240
08	298	298	298	298
10	356	356	356	356
12	414	414	414	414

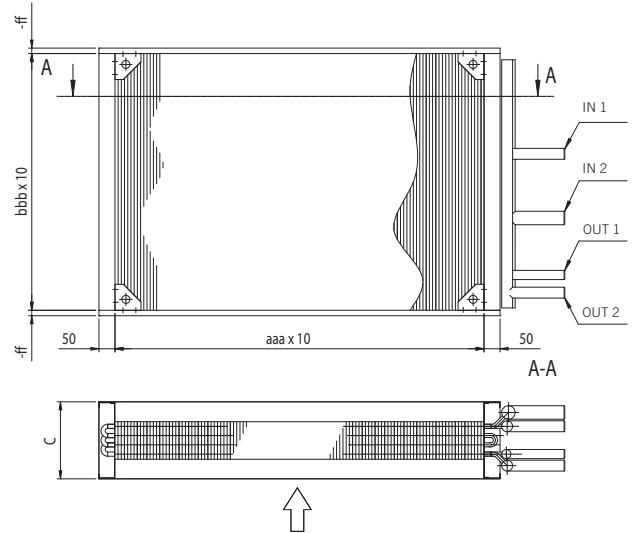
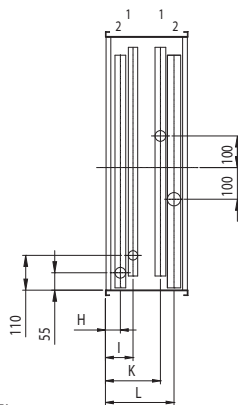


All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

Connection IN	Connection OUT	G							
		No. of rows (delkod cc)							
		1	2	3	4	6	8	10	12
1 1/8"	7/8"	29	29	58	87	144	205	263	321
1 3/8"	1 1/8"	36	58	58	87	144	205	263	321
1 5/8"	1 3/8"	43	58	58	87	144	205	263	321
2 1/8"	1 5/8"	58	58	58	87	144	205	263	321

DIMENSION DRAWING QLOO, 2 STAGES, 3-4 TUBE ROWS:

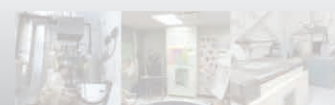
Casing with outward folded edges on the top and bottom plates.



All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

Conn. IN 2	Conn. IN 1	Conn. OUT 2	Conn. OUT 1	H	L cc=03	L cc=04
1 1/8"	1 1/8"	7/8"	7/8"	39	155	184
1 3/8"	1 1/8"	1 1/8"	7/8"	39	162	194
1 3/8"	1 3/8"	1 1/8"	1 1/8"	39	162	194
1 5/8"	1 1/8"	1 3/8"	1 1/8"	32	169	198
1 5/8"	1 3/8"	1 3/8"	1 1/8"	32	169	198
1 5/8"	1 5/8"	1 3/8"	1 3/8"	32	169	198
2 1/8"	1 3/8"	1 5/8"	1 1/8"	25	184	213
2 1/8"	1 5/8"	1 5/8"	1 3/8"	25	184	213
2 1/8"	2 1/8"	1 5/8"	1 5/8"	25	184	213

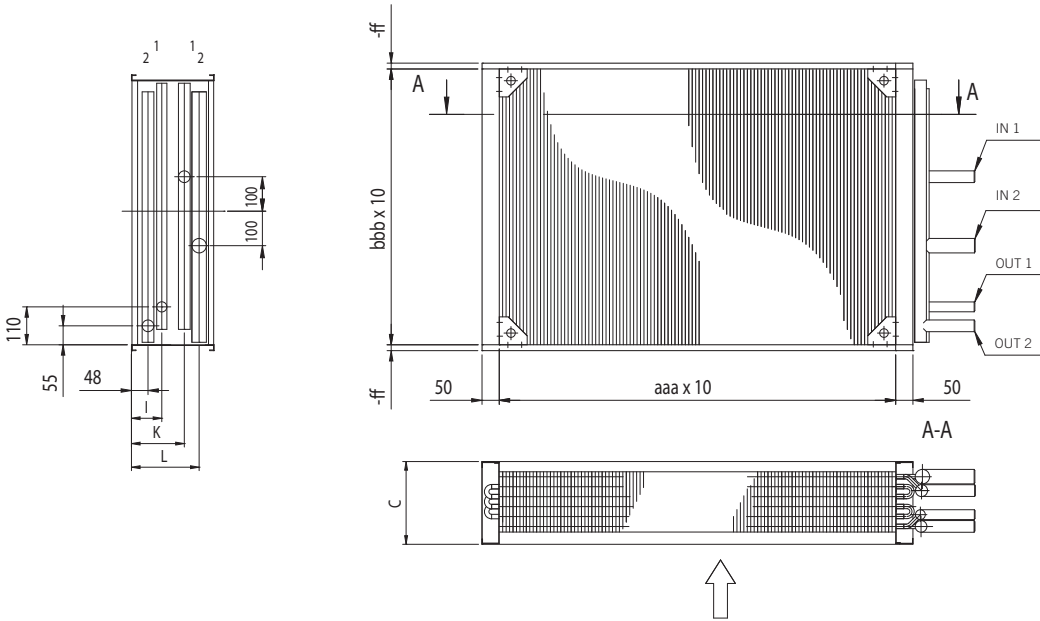
No. of rows (cc)	C				I	K
	Connection IN 2					
	1 1/8"	1 3/8"	1 5/8"	2 1/8"		
03	194	194	194	211	68	126
04	223	223	223	240	68	155



QLON, QLOT, QLOO, QLOQ

DIMENSION DRAWING QLOO, 2 STAGES, 6-12 TUBE ROWS:

Casing with outward folded edges on the top and bottom plates.



All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

Conn. IN 2	Conn. IN 1	Conn. OUT 2	Conn. OUT 1	I	K				L			
					cc=06	cc=08	cc=10	cc=12	cc=06	cc=08	cc=10	cc=12
1 1/8"	1 1/8"	7/8"	7/8"	77	163	224	282	340	192	253	311	369
1 3/8"	1 1/8"	1 1/8"	7/8"	77	158	219	277	335	192	253	311	369
1 3/8"	1 3/8"	1 1/8"	1 1/8"	77	156	217	275	333	192	253	311	369
1 5/8"	1 1/8"	1 3/8"	1 1/8"	82	154	215	273	331	192	253	311	369
1 5/8"	1 3/8"	1 3/8"	1 1/8"	82	152	213	271	329	192	253	311	369
1 5/8"	1 5/8"	1 3/8"	1 3/8"	84	149	210	268	326	192	253	311	369
2 1/8"	1 3/8"	1 5/8"	1 1/8"	86	142	203	261	319	192	253	311	369
2 1/8"	1 5/8"	1 5/8"	1 3/8"	88	139	200	258	316	192	253	311	369
2 1/8"	2 1/8"	1 5/8"	1 5/8"	91	163	224	282	340	221	282	340	398

No. of rows (cc)	C				H
	Connection IN 2				
	1 1/8"	1 3/8"	1 5/8"	2 1/8"	
06	240	240	240	252	48
08	298	298	298	310	48
10	356	356	356	368	48
12	414	414	414	426	48



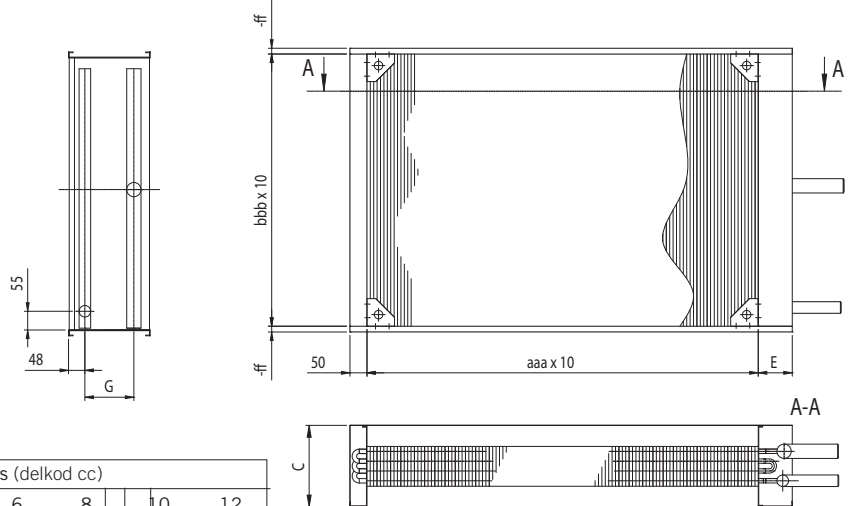
QLON, QLOT, QLOO, QLOQ

DIMENSION DRAWING QLOQ, 1 STAGE: Casing with outward folded edges on the top and bottom plates.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.

All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

Number of rows (delkod cc)	C			
	Connection IN			
	1 1/8"	1 3/8"	1 5/8"	2 1/8"
01	102	102	112	136
02	125	125	127	146
03	154	154	154	154
04	183	183	183	183
06	240	240	240	240
08	298	298	298	298
10	356	356	356	356
12	414	414	414	414

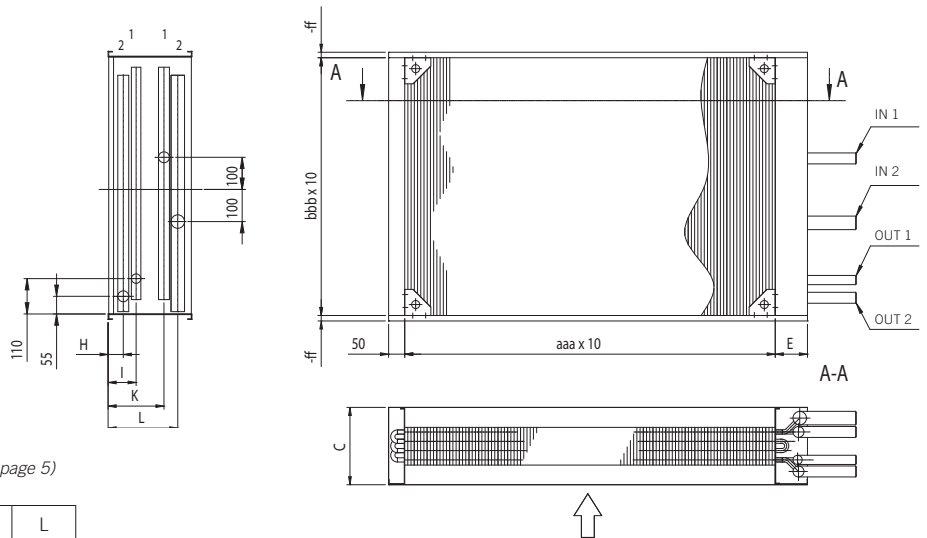


Connection IN	E	Connection OUT	G	Number of rows (delkod cc)							
				1	2	3	4	6	8	10	12
1 1/8"	100	7/8"	29	29	58	87	144	205	263	321	
1 3/8"	100	1 1/8"	36	58	58	87	144	205	263	321	
1 5/8"	100	1 3/8"	43	58	58	87	144	205	263	321	
2 1/8"	150	1 5/8"	58	58	58	87	144	205	263	321	

DIMENSION DRAWING QLOQ, 2 STAGES, 3-4 TUBE ROWS:

Casing with outward folded edges on the top and bottom plates.

All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

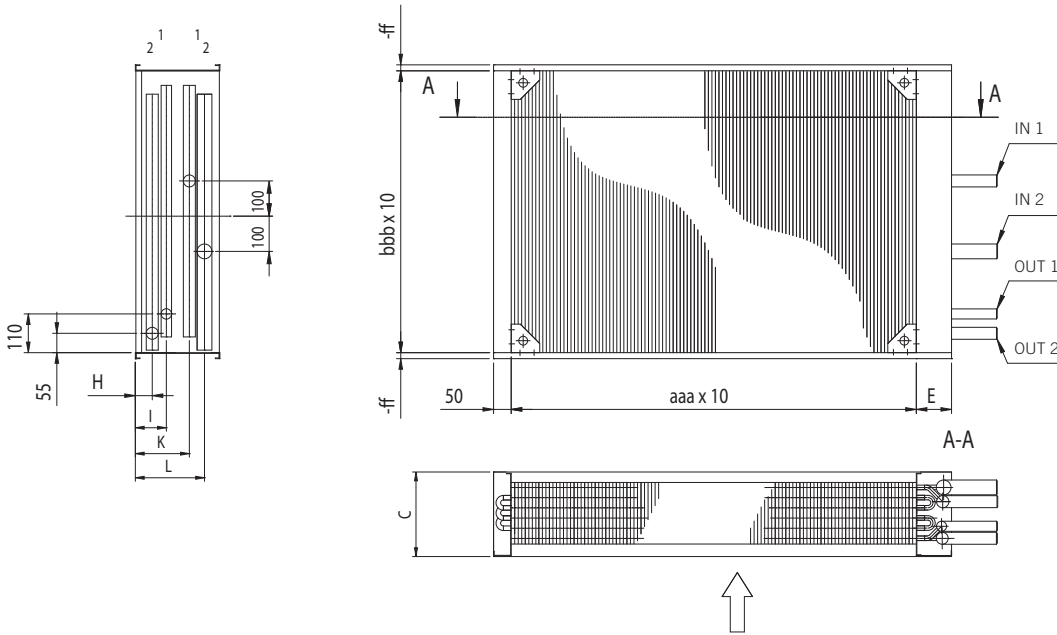


Conn. IN 2	Conn. IN 1	Conn. OUT 2	Conn. OUT 1	E	H	L cc=03	L cc=04
1 1/8"	1 1/8"	7/8"	7/8"	100	39	155	184
1 3/8"	1 1/8"	1 1/8"	7/8"	100	39	162	194
1 3/8"	1 3/8"	1 1/8"	1 1/8"	100	39	162	194
1 5/8"	1 1/8"	1 3/8"	1 1/8"	100	32	169	198
1 5/8"	1 3/8"	1 3/8"	1 1/8"	100	32	169	198
1 5/8"	1 5/8"	1 3/8"	1 3/8"	100	32	169	198
2 1/8"	1 3/8"	1 5/8"	1 1/8"	150	25	184	213
2 1/8"	1 5/8"	1 5/8"	1 3/8"	150	25	184	213
2 1/8"	2 1/8"	1 5/8"	1 5/8"	150	25	184	213

No. of rows (cc)	C				I	K
	Connection IN 2					
	1 1/8"	1 3/8"	1 5/8"	2 1/8"		
03	194	194	194	211	68	126
04	223	223	223	240	68	155

DIMENSION DRAWING QLOQ, 2 STAGES, 6-12 TUBE ROWS:

Casing with outward folded edges on the top and bottom plates.



All dimensions in mm unless otherwise indicated. (Inch table, see page 5)

No. of rows (cc)	C				H
	Connection IN 2				
	1 1/8"	1 3/8"	1 5/8"	2 1/8"	
06	240	240	240	252	48
08	298	298	298	310	48
10	356	356	356	368	48
12	414	414	414	426	48

Conn. IN 2	Conn. IN 1	Conn. OUT 2	Conn. OUT 1	E	I	K				L			
						cc=06	cc=08	cc=10	cc=12	cc=06	cc=08	cc=10	cc=12
1 1/8"	1 1/8"	7/8"	7/8"	100	77	163	224	282	340	192	253	311	369
1 3/8"	1 1/8"	1 1/8"	7/8"	100	77	158	219	277	335	192	253	311	369
1 3/8"	1 3/8"	1 1/8"	1 1/8"	100	77	156	217	275	333	192	253	311	369
1 5/8"	1 1/8"	1 3/8"	1 1/8"	100	82	154	215	273	331	192	253	311	369
1 5/8"	1 3/8"	1 3/8"	1 1/8"	100	82	152	213	271	329	192	253	311	369
1 5/8"	1 5/8"	1 3/8"	1 3/8"	100	84	149	210	268	326	192	253	311	369
2 1/8"	1 3/8"	1 5/8"	1 1/8"	150	86	142	203	261	319	192	253	311	369
2 1/8"	1 5/8"	1 5/8"	1 3/8"	150	88	139	200	258	316	192	253	311	369
2 1/8"	2 1/8"	1 5/8"	1 5/8"	150	91	163	224	282	340	221	282	340	398



HEAT EXCHANGERS FOR STEAM

QLSK

The heat exchanger QLSK is designed to heat air with steam. Fitted in the unit and intended for vertical steam transfer. The design conforms with the Pressure Equipment Directive PED 2014/68/EU.

GENERAL

- The design consists of a fin body, headers and casing.
- The tubes are zigzag mounted in the fin body to give, together with the pleated fins, the highest output.
- The heat exchanger is designed for vertical steam transfer.
- All connections are fitted with male pipe threads (SS-EN ISO 228-1).
- Smooth cover plates over the header.
- AMA-code QFC.
- Low pressure drop on the air side.

OPERATING DATA

- Normal air velocity should be 3-4 m/s.
- Max air velocity: 5 m/s.
- For air flows up to 40 m³/s.
- Max operating pressure: 1,0 MPa at max operating temperature 185 °C.
- All heat exchangers are leakage tested using dry air under water.

STEAM CLEANLINESS

The steam's pH-value should be between 8,8 and 9,2. The oxygen (O₂) content must not exceed 0,01 mg/kg. Ammonia content (NH₃) must not exceed 0,3 mg/kg.

MATERIAL & SIZE

The heat exchanger is designed using copper tubes and aluminium fins. The casing is made of hot-dip galvanized steel sheet. The header on the steam side is made of steel (DN 25 is made of copper) and on the condensate side of copper. Standard sizes are from 200 x 200 mm to 3500 x 1800 mm. Materials for aggressive environments are available, see page 6.

INSTALLATION

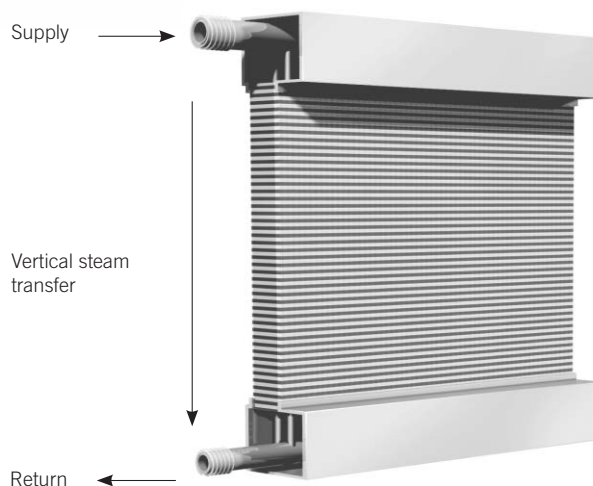
The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected with steam to the upper pipe and the return to the lower pipe, see the figure above.

FREEZE PROTECTION

If there is a risk of freezing it is appropriate to fit a freeze protection sensor in the air stream, alternatively an electric heater can preheat the air.

ACCESSORIES

Additional accessories are available, see pages 94-96.



QLSK with inward folded edges on the cover plate. The heat exchanger is connected with steam to the upper pipe and the return to the lower pipe.

DIMENSIONING VIA COILS

Dimensioning is performed using the product selection program Coils, which can be downloaded from our website. Coils shows, among others, dimension drawings and the following data:

Air side:	Air temperature out	°C
	Outout	kW
	Air velocity	m/s
	Air pressure drop	Pa
Steam side:	Return temperature	°C
	Steam flow	l/s
	Condensation pressure	Bar

MAINTENANCE

Operating and maintenance instructions are available via the production selection program Coils or from our website.

CODE KEY

QLS_ – aaa – bbb – cc – dd – ee – ff

QLSK = Casing with cover plate for header

aaa = Width = unit height (cm) 020-350
(Fin width excl. header and elbows)

bbb = Height = unit width (cm) 020-180 (Fin width)

cc = No. of tube rows 01, 02

dd = Fin spacing 18, 20, 25, 30, 40, 50, 60

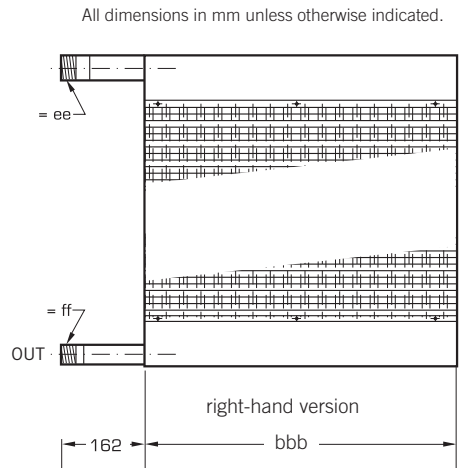
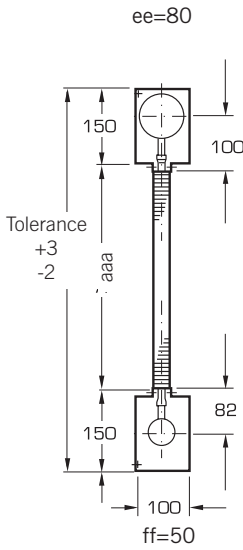
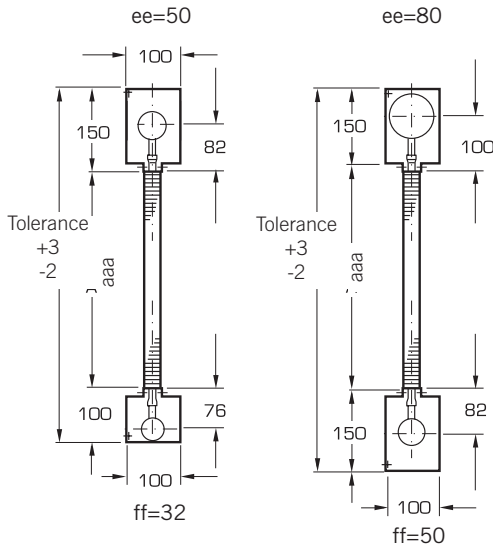
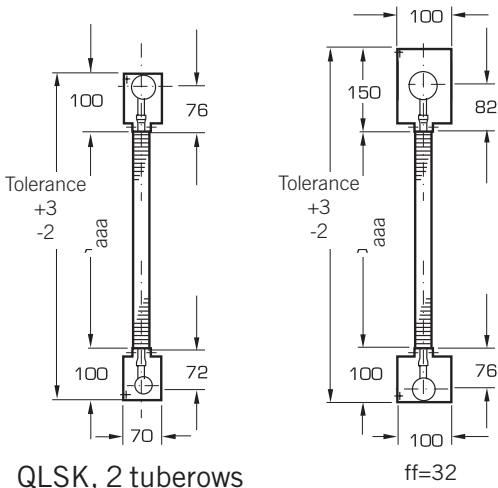
ee = Connection size, steam side

ff = Connection size, condensate side

DIMENSION DRAWINGS QLSK: Casing with cover plate for header.

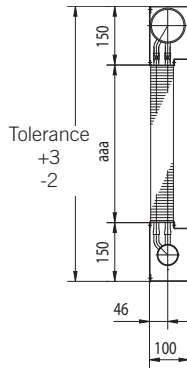
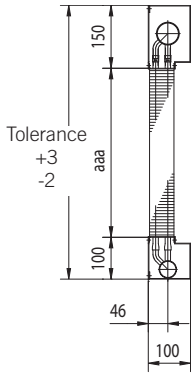
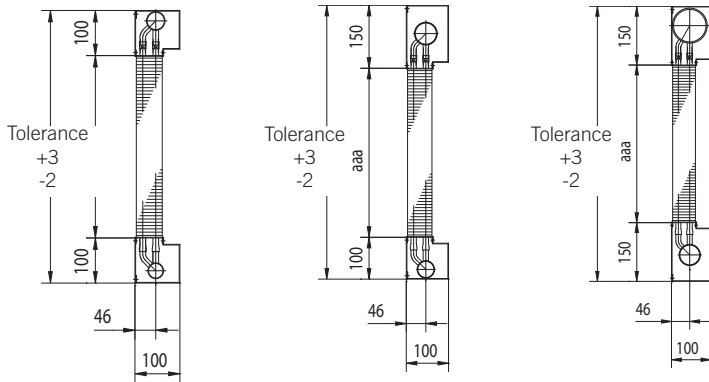
QLSK, 1 tuberow

Thread connection ee=32



QLSK, 2 tuberows

Thread connection ff=25



Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.



ACCESSORIES

Accessories	Type	Page
QLAZ-02	Manual bleed valve	94
QLAZ-03	Automatic bleed valve with non-return valve	94
QLAZ-04	Nipple	94
QLAZ-20	Fin comb.....	95
QLAZ-30	Drain on side	95
QLAZ-32	Expansion valves.....	95
QLAZ-11	Weld flange, steel	95
QLAZ-15	Threaded flange steel.....	95
QLAZ-41	Soldered flange, bronze/ steel	95
QLAZ-42	Threaded flange bronze.....	95
QLAZ-43	Threaded flange bronze/steel	95
QLAZ-44	Flange gasket	95
QLAZ-25	Droplet eliminator	96

QLAZ 02, 03, 04

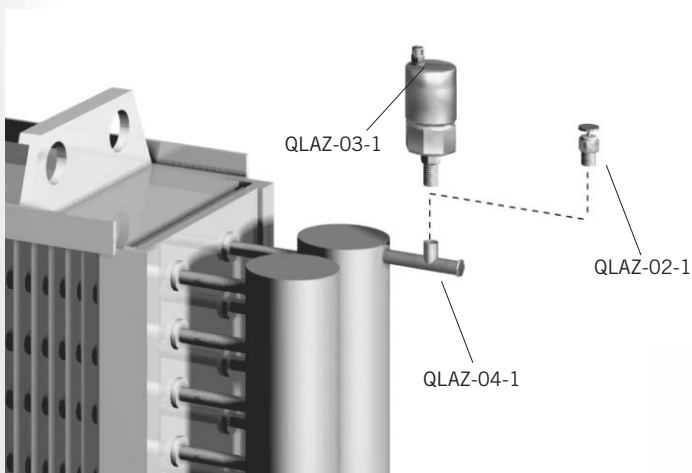
The valve must always be fitted vertically with the air valve above. Note the top clearance when building in and extending (see dimensional sketches). Install the supplied non-return valve, which is self-sealing against the valve first.

The valve cap protects the air valve from external dirt and must always be fitted, opened two turns to work. As the water flows into the valve housing, the float rises and closes the valve. When air collects in the valve housing the float drops and the valve opens, so that the air can escape.

If the valve starts to leak due to dirt, the valve housing is dismantled from the non-return valve (non-return valve shall remain on the nipple QLAZ-04-1). The over and lower sections of the valve housing are then separated and the parts cleaned. The valve seat is not damaged by high water temperatures or by water that contains antifreeze.

INSTALLATION VALVE AND NIPPLE

The valve is connected to the bleed nipple on the heat exchanger with the help of nipple QLAZ-04-1, which can also be combined with freeze protection.



MANUAL BLEED VALVE QLAZ-02-1

For water coils. Fitted together with nipple QLAZ-04-1.

AUTOMATIC BLEED VALVE WITH NON-RETURN VALVE QLAZ-03-1

For max. 115°C and 1.1 MPa (11 atmos. ex. press.).

For water coils together with QLAZ-04-1.



NIPPLE QLAZ-04-1

For connection of freeze protection and bleed valve QLAZ-03-1 or drain valve on the coil.

The nipple is used in combination with bleed valve QLAZ-02-1, QLAZ-03-1 or freeze protection or drain valve on the coil.



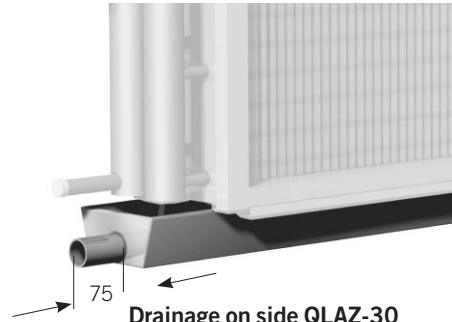
QLAZ 20, 30, 32



Fin comb QLAZ-20
Supplied in packs of 10.

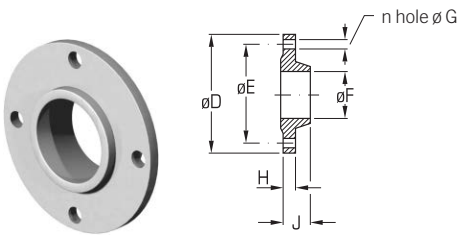


Expansion valve QLAZ-32

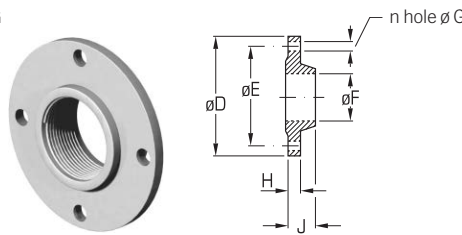


Drainage on side QLAZ-30

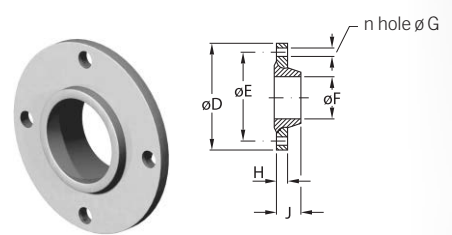
QLAZ 11, 15, 41, 42, 43, 44



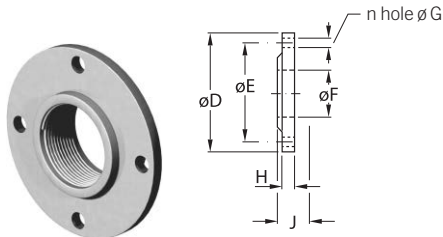
Weld flange, steel QLAZ-11-bb
For connection on the water or steam side. Size (bb): See the table below.



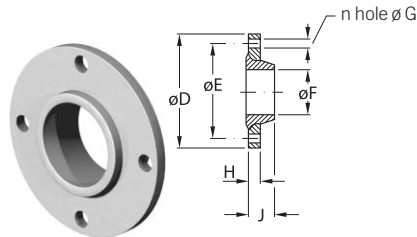
Threaded flange, steel QLAZ-15-bb
For connection on the water or steam side. Size (bb): See the table below.



Soldered flange, bronze/steel QLAZ-41-bb
For connection on the water, steam and condensate side. Size (bb): See the table below.



Threaded flange bronze QLAZ-42-bb
For connection on the water or steam side. Size (bb): See the table below.



Threaded flange bronze/steel QLAZ-43-bb
For connection on the water or steam side. Size (bb): See the table below.

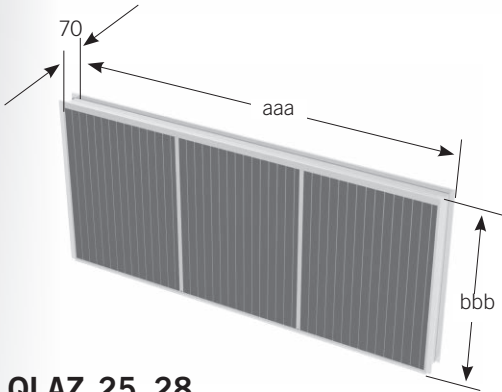


Flange gasket QLAZ-44-bb
For connection between flanges. Size (bb): 25, 32, 50, 80.

Size (bb)	D	E	G	n	QLAZ-11				QLAZ-15				QLAZ-41				QLAZ-42				QLAZ-43	
					F	H	J	Weight (kg)	F	H	J	Weight (kg)	F	H	J	Weight (kg)	F	H	J	Weight (kg)	F	Weight (kg)
DN 25	115	85	14	4	28,5	16	38	1,1	1"	16	24	1,1	28,3	17	-	1,0	1"	16	21	1,3	1"	1,0
DN 32	140	100	18	4	37,2	16	40	1,7	1 1/4"	16	26	1,6	41,6	17	-	1,4	1 1/4"	16	21	2,0	1 1/4"	1,4
DN 50	165	125	18	4	54,5	18	45	2,5	2"	18	28	2,5	54,3	17	-	2,0	2"	18	23	3,0	2"	2,0
DN 80	200	160	18	8	82,5	20	50	3,7	3"	20	34	4,1	89,3	19	-	2,9	3"	20	26	4,3	3"	2,9

QLAZ-11 is designed according to SMS 2035 (DIN 2635) and QLAZ-15 according to SMS 348 (DIN 2566).
QLAZ-41 and QLAZ-42's designed according to SMS 2033 (DIN 2633) and SMS 2035 (DIN 2635).

QLAZ



QLAZ 25, 28

DROPLET ELIMINATOR QLAZ-25-AAA-BBB-C

aaa= Width, cm

bbb= Height, cm

c= Material in coil casing where

1= galvanized steel sheet, 2= stainless steel, 2333

3= austenitic stainless steel, 2343

Supplied assembled on coils ordered at the same time unless otherwise stated. Note the increased build-in depth. See the dimension drawing. Gives approx. 15 Pa higher air pressure drop at 3 m/s. The droplet eliminator frame is made of stainless steel.

Order example:

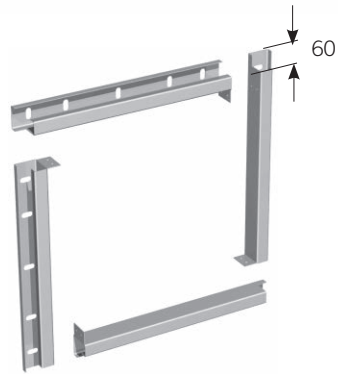
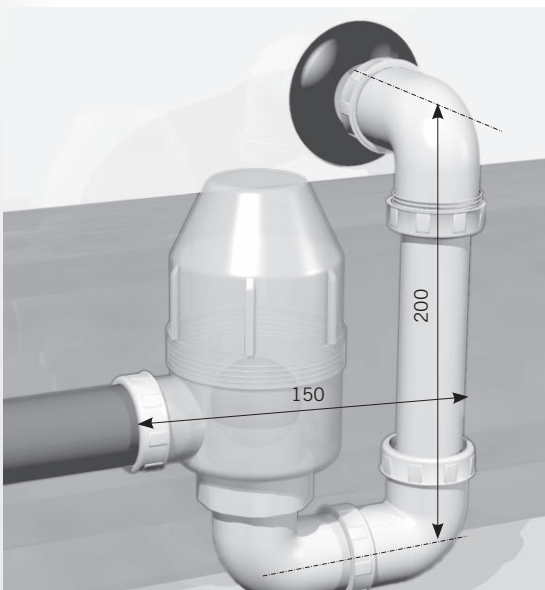
Heat exchanger: QLCB-100-080-03-20-04-1-A

Droplet eliminator: QLAZ-25-100-080-1

QLAZ 26, 27

WATER SEAL, FOR UNDERPRESSURE INSTALLATION QLAZ-26

Fits the duct coils drainage tray, thread connection DN 32.



ADAPTER SLEEVE QLAZ-28-bbb-ccc-d

bbb= Width, cm

ccc= Height, cm

d= Material in coil casing where

1= galvanized steel sheet, 2= stainless steel, 2333

3= austenitic stainless steel, 2343

For the transition from flange to PG-slip clamp or vice versa, flange holes according to RFHF, RVGL. Supplied unassembled in four parts, but assembled easily with the supplied screws.

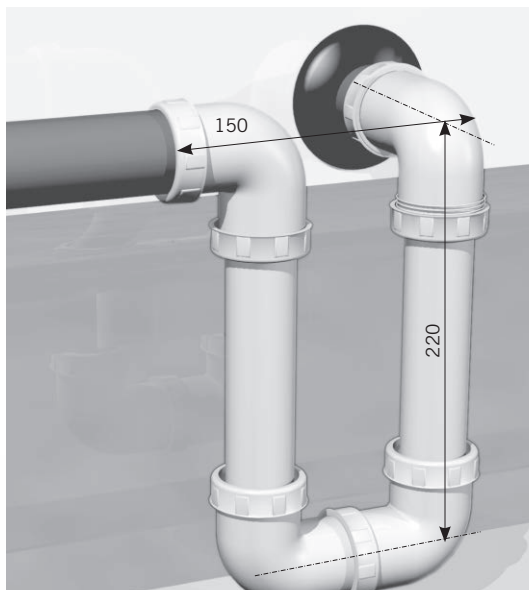
Order example:

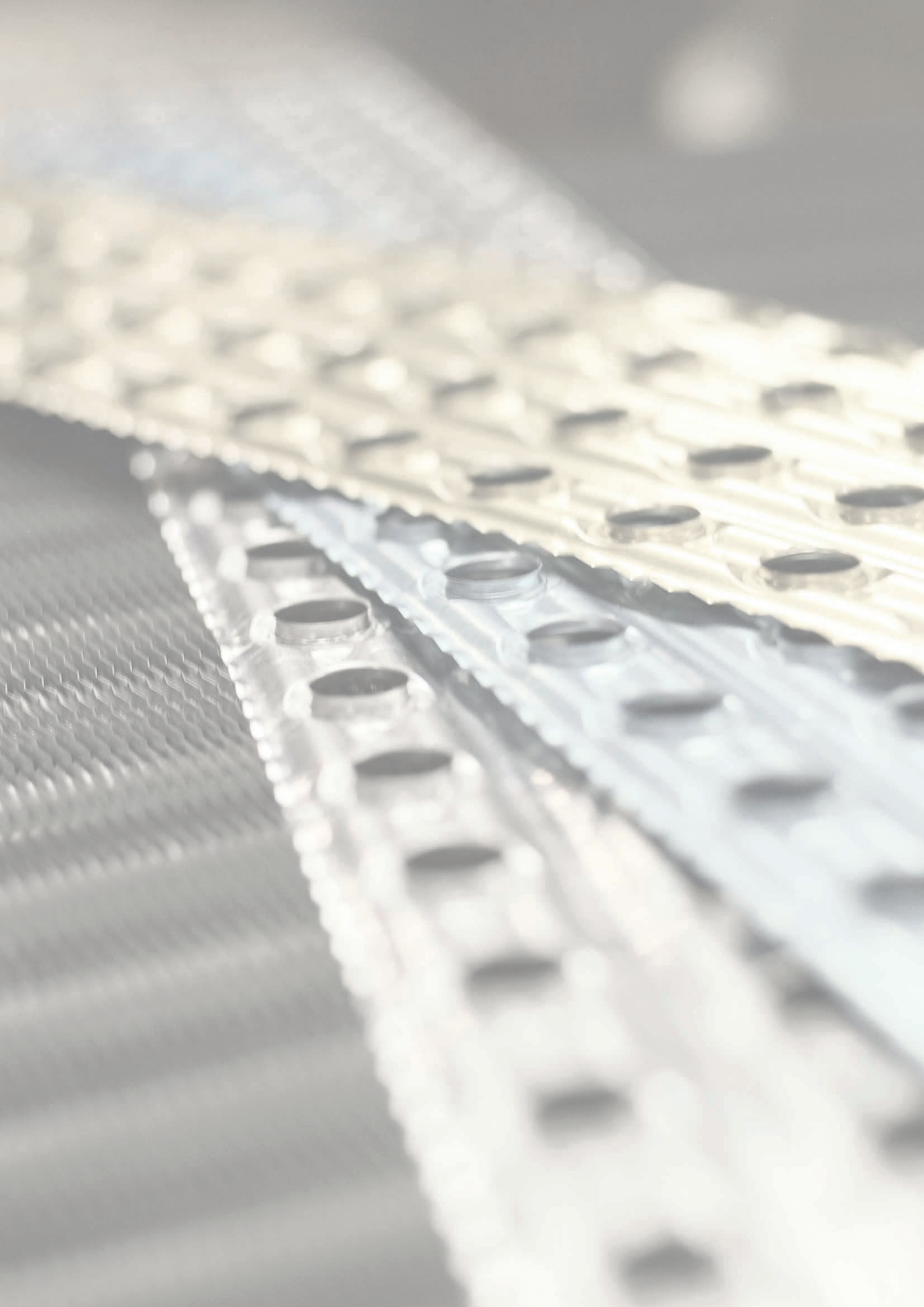
Heat exchanger: QLHF-100-080-03-20-04-1-A

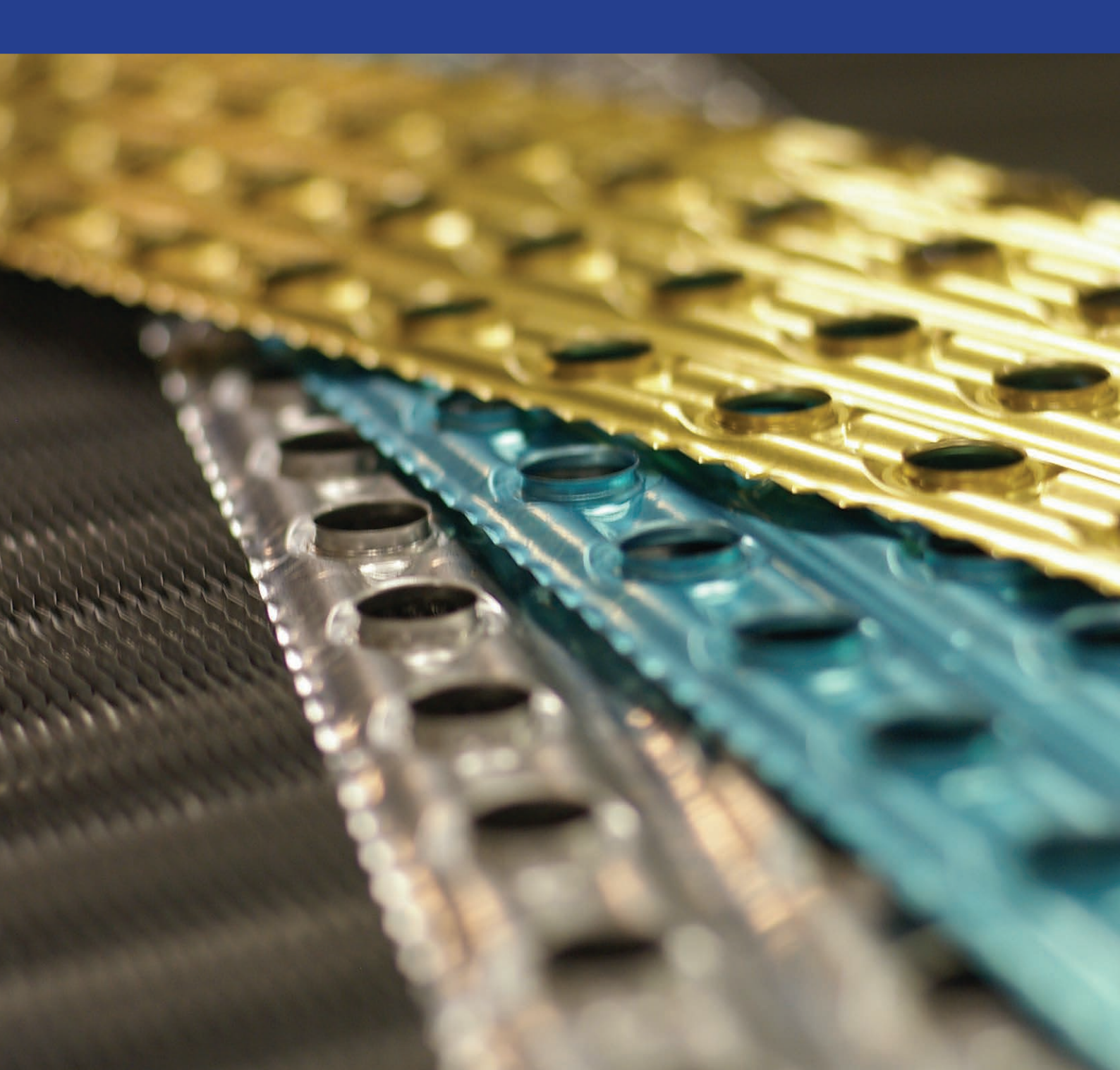
Adapter sleeve: QLAZ-28-100-080-1

WATER SEAL, FOR OVERPRESSURE INSTALLATION QLAZ-27

Fits the duct coils drainage tray, thread connection DN 32. Withstands pressure to approx. 1500 Pa.







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About Modine

Modine specializes in thermal management systems and components, bringing highly engineered heating and cooling components, original equipment products, and systems to diversified global markets through its three complementary business units: Vehicular Thermal Solutions (VTS); Commercial & Industrial Solutions (CIS); and Building HVAC Systems (BHVAC).

Modine is a global company headquartered in Racine, Wisconsin (USA), with operations in North America, South America, Europe and Asia.

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