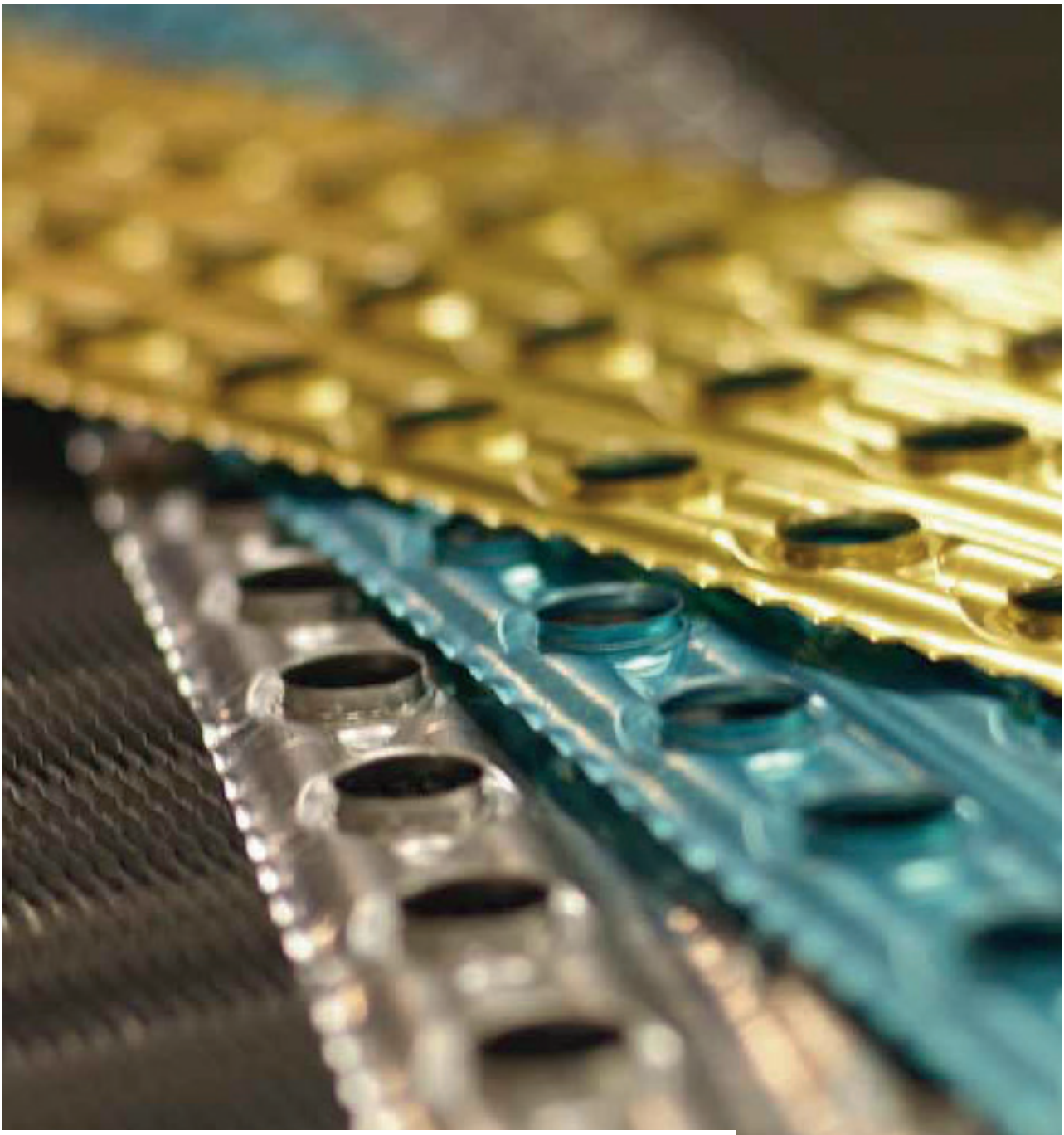

Product Catalogue - Ventilation

MODINE®
Engineering a Cleaner, Healthier World

ENG

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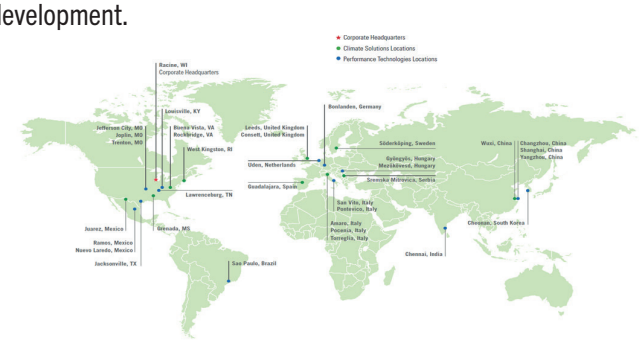
The Best in Heat Exchangers

EFFICIENT HEAT EXCHANGE FOR A SUSTAINABLE FUTURE

At Modine, we are proud to offer innovative heat exchangers that not only deliver high performance, but also contribute to a sustainable society. We know that every degree of energy efficiency makes a difference - for the environment, for people and for future generations. With our products, we strive to help companies achieve their sustainability goals, while reducing their environmental impact and costs.

Modine was founded in 1916 by Arthur B. Modine, and has for over a century built up a reputation as a reliable partner in heating and cooling technology. The companys journey started with a ground-breaking innovation in heat transfer and has grown over the years to become a global player with solutions in both industrial and commercial sectors. With strong roots in the United States and a worldwide network, Modine continues to develop future technology for efficient energy management and sustainable solutions. We are today represented in all corners of the world through 38 factories in 14+ countries.

Modine strives to be a driving force in the global transition towards a sustainable future and sees it as its mission to develop innovative solutions that combine economic growth with environmental and social responsibility. Through our efficient products and manufacturing, and a way of working that is driven by continous improvement, we contribute to a positive climate development.



QUALITY AND ENVIRONMENT - PRIORITY AREAS

We deliver heat exchangers that are components of large projects and therefore we know how important delivery precision is. The products must always be delivered on time, to the right place and with the right quality. Our constant development and testing capabilities guarantee that the products are at the forefront of the market and that they meet the specified data. Through their function, several of our products play an active role in recycling energy and working for a better indoor environment. We work consciously and structured to protect the environment during the products entire life cycle, including development, manufacturing, use, disposal and recycling. By streamlining the use of materials and energy, we make our contribution to long-term stewardship of natural resources.

Modine uses the sustainability platform EcoVadis to evaluate and ensure our sustainability initiatives. Through EcoVadis we can get an objective assessment of our sustainability performance in environmental responsibility, working conditions, ethics and sustainable purchasing. This internationally recognized certification serves as a receipt for our endeavor to constantly improve and transparently report our impact on people and the environment. With EcoVadis as a benchmark, we strengthen our commitments and ensure that our sustainability goals are met and developed in line with global standards. Modine is certified according to quality management system ISO 9001, environmental management system ISO 14001 and fusion welding ISO 3834-2.

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. Altough 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 program that makes choosing the right heat exchanger easy:

- Heat exchangers for:

-heating of air with hot water
-cooling of air with cold water
-heating of air with steam

- 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 airs 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 sea 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 products 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 program 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.

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 thred). 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 or T casing.

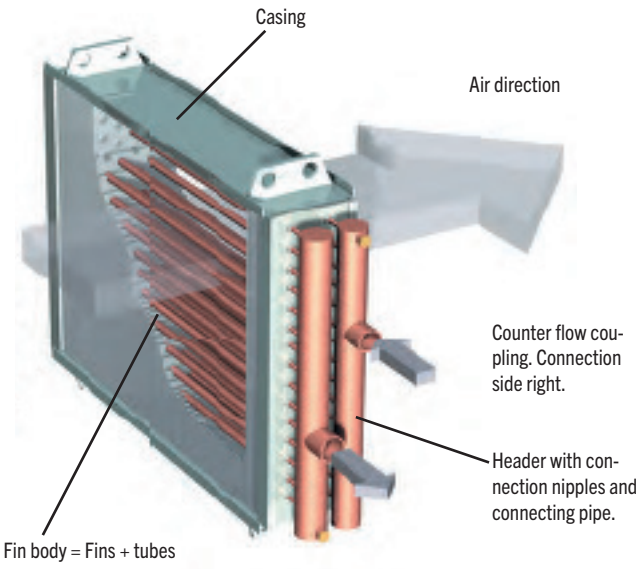
SIZES

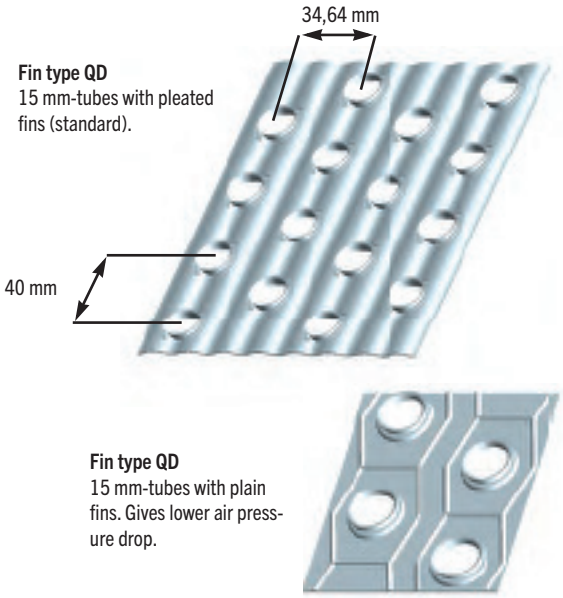
Our heat exchangers are manufactured as standard in sizes up to 3,8x2,4m. Our products can be ordered with a number of different accessories (see pages 92-94) and with other dimensions than standard. Contact us for more information.

DIMENSIONING

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

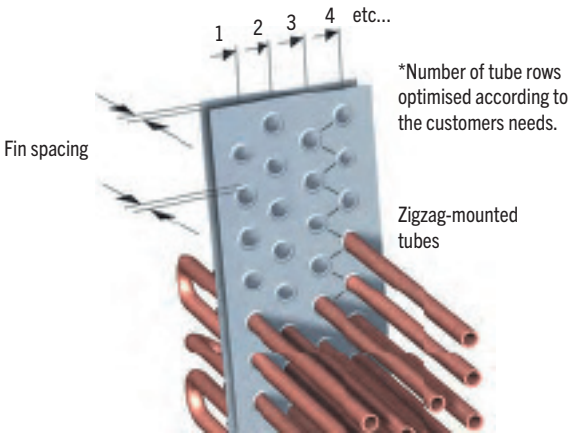
Construction Heat Exchanger

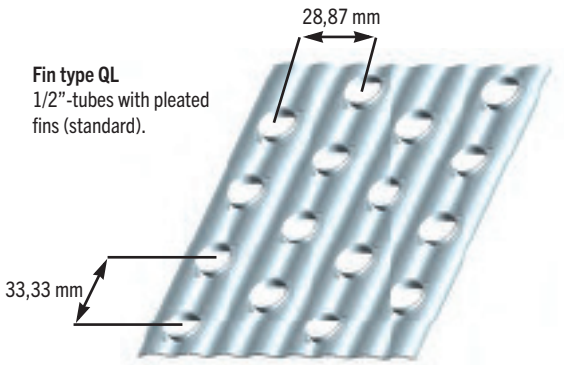




Fin type QD
15 mm-tubes with pleated fins (standard).

Fin type QD
15 mm-tubes with plain fins. Gives lower air pressure drop.





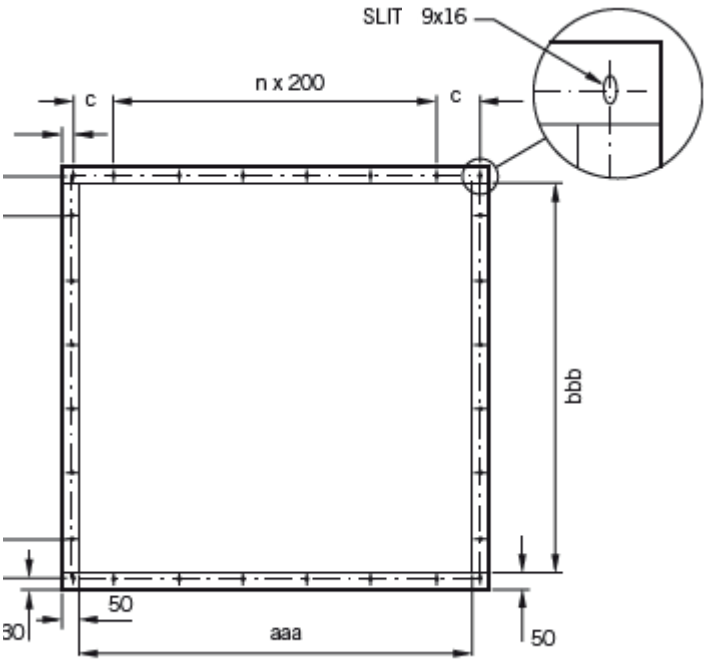
Fin type QL
1/2”-tubes with pleated fins (standard).

Fin type QL
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			



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
Acid-resistant				X
Magnolia				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) and magnolia (EN10346).

Tubes

Heat exchangers for ducts and unit rooms are as standard QL in 0,32 mm copper, but also with thick wall in 0,65 mm or 0,85 mm copper and copper/nickel in 0,65 mm. In QD 0,36 mm copper and 0,70 mm copper.

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 AlMg, Corropaint, electrically tinned copper, Heresite, Hydropaint and copper. 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.

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.

E-coating

E-coating is a C5 Marine rated corrosion protection used in many corrosive environments. The painting is done on a fully assembled heat exchanger where the entire fin surface, header and casing are protected. The color is black. Heat transfer is reduced by a maximum of 1% compared to aluminium.

Electrically tinned copper

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.

Heresite

Protection used in corrosive environments, e.g. wastewater treatment plants, swimming halls with high chloride content (<100 ppm) and other acidic environments. The heresite painting is done on the finished heat exchanger, whereby the entire fin surface, including the header is protected. The color is brown and is hardened at 180 °C. The paint thickness is 70 µm. The heat transfer deteriorates by approx. 2-3% in relation to aluminium. On cooling and extract air heat exchangers, drip separators are required from a speed of 1,6 m/s.

Hydropaint

Protection (aluminium with 2 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 or 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 and Velocities

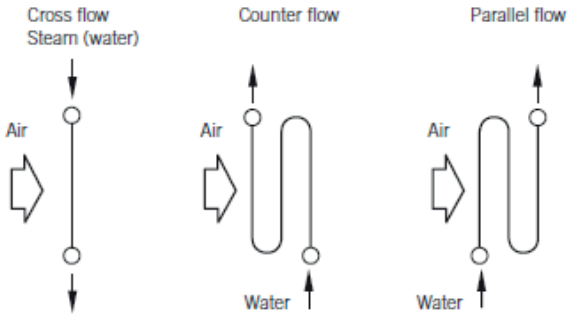
COUPLINGS

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 is common and is used on heat exchangers for cooling and heating with high output and with heat recovery. This coupling gives 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 istalled 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

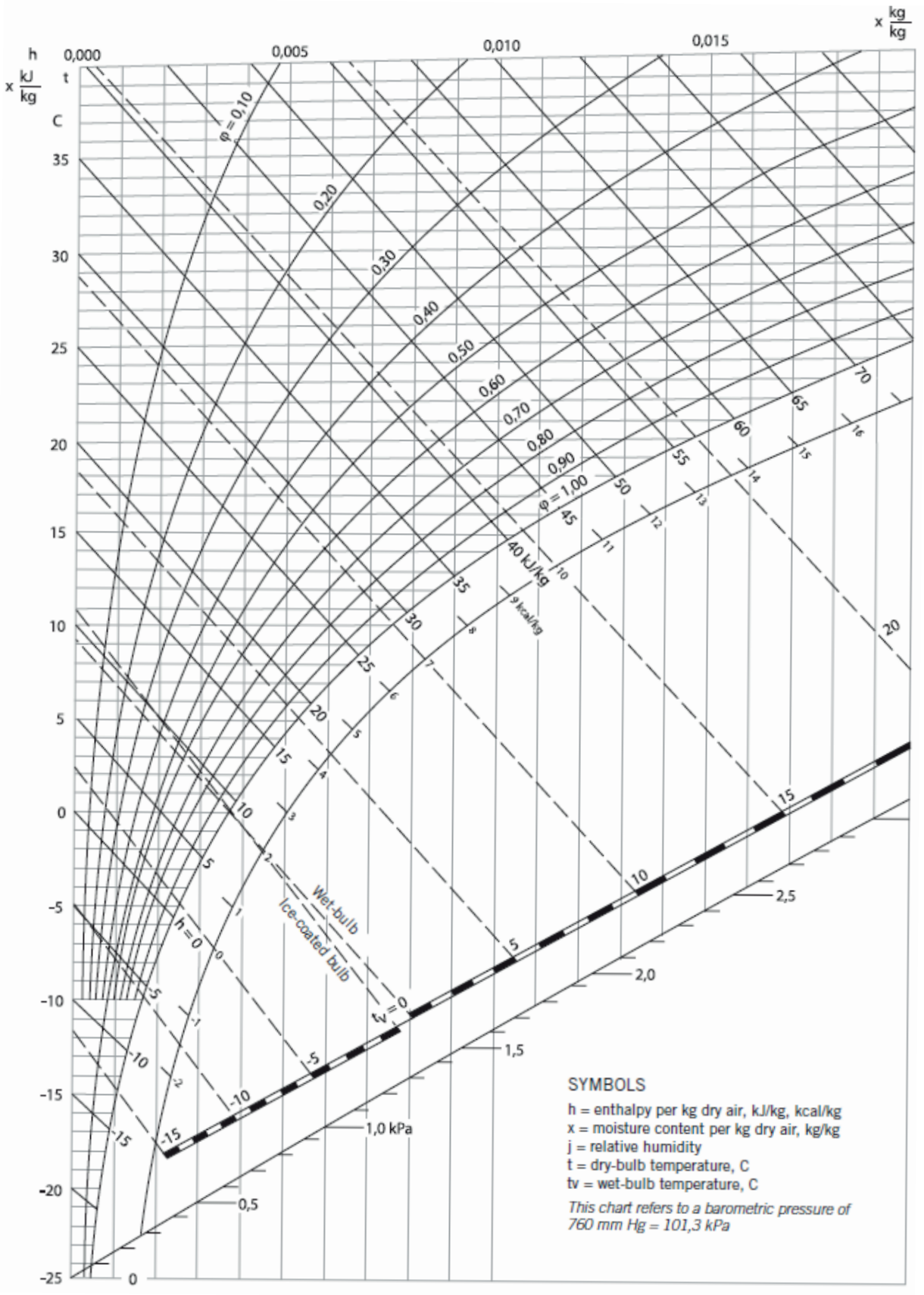
Standard velocities for heat exchangers suggested:

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.

Mollier Diagram for Humid Air

AIR -25 TO +40 °C:



Formulas

AIR

FOR HEATING AND HOT WATER

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

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

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

Efficiency: $n = \dfrac{t_u - t_i}{t_{ri} - t_i}$

FOR COOLING

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

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

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

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

MIXTURE OF AIR

Mixing temperature:

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

WATER

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

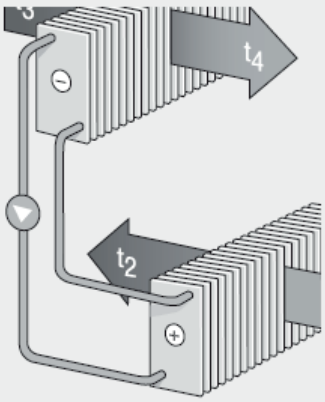
Water flow: $q_r\ (l/s) = \dfrac{P\ (kW)}{\Delta t_r\ (°C) \cdot 4{,}2}$

Temperature difference: $\Delta t_r\ (°C) = \dfrac{P\ (kW)}{q_r\ (l/s) \cdot 4{,}2}$

Power requirement, pump: $P\ (kW) = \dfrac{q_r\ (l/s) \cdot \Delta p_r\ (kPa)}{\sim 0.75\ (n) \cdot 1000}$

HEAT RECOVERY

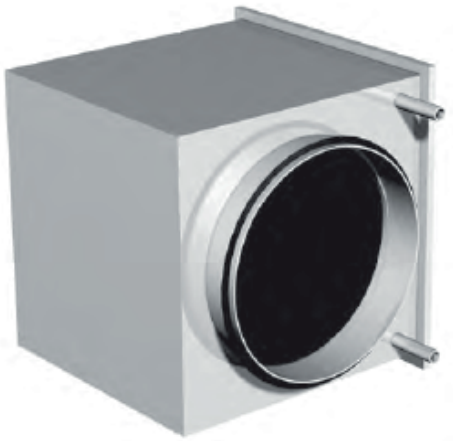
Temperature efficiency: $n_t = \dfrac{t_2 - t_1}{t_3 - t_1}$



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

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 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

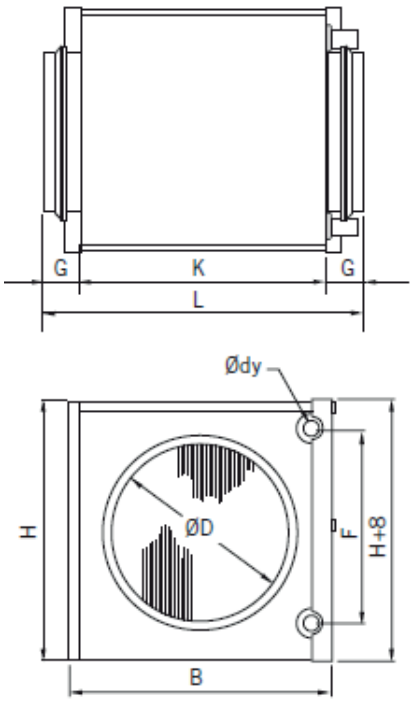
- Max operating pressure 1,0 MPa at max operating temperature 110 °C.
- All heat exchangers are leakage tested using dry air under water.

MATERIAL

The heat exchanger is designed using copper tubes and aluminium fins. The casing is manufactured of zincmagnesium treated steel sheet, ZM310. The connection pipes on the fluid side are of copper.

SIZES AND CAPACITY

Available in 8 different sizes: 100, 125, 160, 200, 250, 315, 400, 500 (circular duct, mm). See the size table below. Also see capacity tables on pages 12-14.



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.

QJHD

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	35,2	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
m³/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

QJHD

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
m³/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

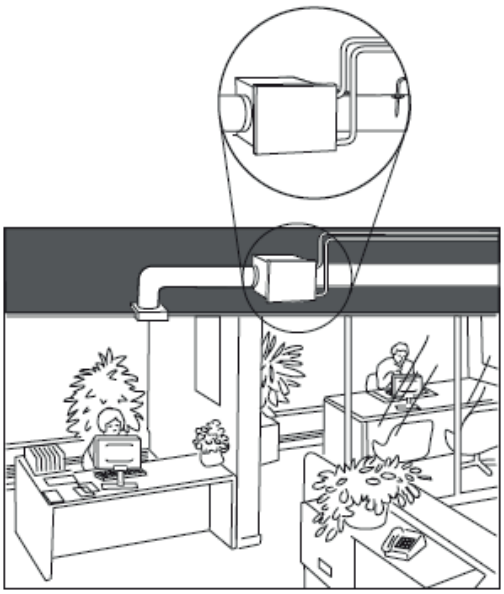
1400	11	-15	30,2	24,2	0,30	7	18,2	17,8	0,22	4	20,0	18,7	0,46	17
1400	11	-7,5	33,9	21,5	0,26	6	21,8	15,2	0,19	3	23,6	16,2	0,39	13
1400	11	0	37,5	19,0	0,23	5	25,2	12,7	0,16	2	27,1	13,7	0,33	9
1400	11	7,5	40,9	16,5	0,20	4	28,4	10,3	0,13	2	30,5	11,3	0,28	7
1400	11	15	44,3	14,1	0,17	3	31,9	8,1	0,10	1	33,8	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.



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

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 92-94.

MAINTENANCE

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

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

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 (R 1/2).
- The casing conforms to tightness class C according to EN 1751.

OPERATING DATA

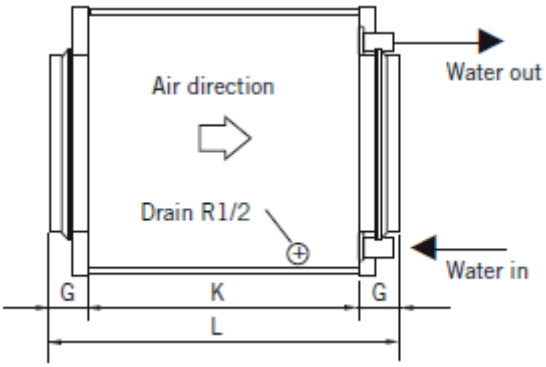
- Operating pressure 1,0 MPa at max operating temperature 110 °C.
- All heat exchangers are leakage tested using dry air under water.

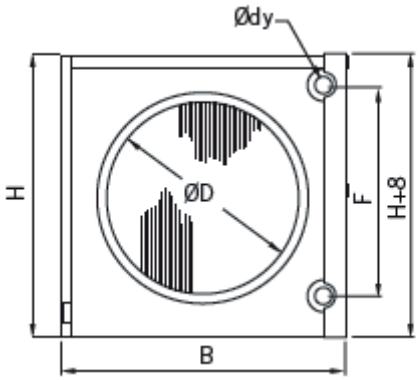
MATERIAL

The heat exchanger is designed using copper tubes and aluminium fins. The casing is manufactured of zincmagnesium treated steel sheet, ZM310, with a stainless steel tray. The connection pipes on the fluid side are of copper.

SIZES AND CAPACITY

Available in 7 different standard sizes; 100, 125, 160, 200, 250, 315, 400 (cirkulär kanal, mm). See the size table below. Also see capacity tables on page 17.





QJCD (mm)	D	dy	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
m³/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 125. Water temperature 6/12 °C

Air flow	Pressure drop	Air in	Air in	Air out	Output	Water flow	Pressure water
m³/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 160. Water temperature 6/12 °C

Air flow	Pressure drop	Air in	Air in	Air out	Output	Water flow	Pressure water
m³/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 200. Water temperature 6/12 °C

Air flow	Pressure drop	Air in	Air in	Air out	Output	Water flow	Pressure water
m³/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

Capacity QJCD 250. Water temperature 6/12 °C

Air flow	Pressure drop	Air in	Air in	Air out	Output	Water flow	Pressure water
m³/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 315. Water temperature 6/12 °C

Air flow	Pressure drop	Air in	Air in	Air out	Output	Water flow	Pressure water
m³/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 400. Water temperature 6/12 °C

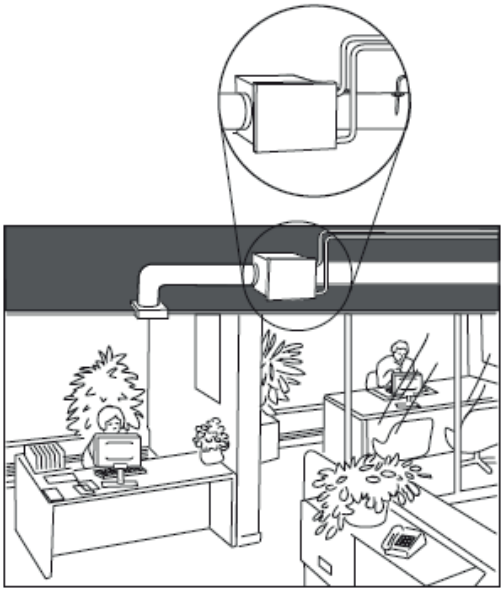
Air flow	Pressure drop	Air in	Air in	Air out	Output	Water flow	Pressure water
m³/h	Pa	°C	%RH	°C	kW	l/s	kPa
900	11	25	50	14,9	4,4	0,17	4
900	11	30	45	16,6	6,3	0,25	7
1590	26	25	50	16,1	6,8	0,27	8
1590	26	30	45	18,3	9,7	0,38	16
2280	50	25	50	16,9	8,8	0,35	13
2280	50	30	45	19,4	12,6	0,50	26

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

QJCD

INSTALLATION

On the fluid side pipes are connected using compresion 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 92-94.

MAINTENANCE

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

Heat Exchangers for Heating - Q(L,F)HG, Q(L,F)HF, Q(L,F)HB, Q(L,F)HH

The heat exchangers Q(L,F)HG, Q(L,F)HF, Q(L,F)HB and Q(L,F)HH 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.
- Material 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

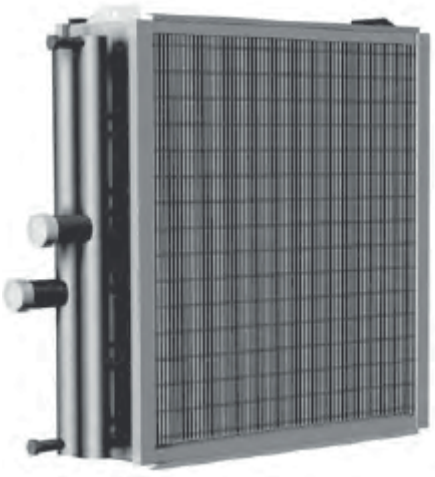
- Max fluid velocity: 1.5 m/s in tubes.
- Normal air velocity should be 3-4 m/s.
- Max air velocity: 5.0 m/s.
- For air flows up to 40 m^3/s.
- Operating pressure:

Header	Max/Min temp	Max. operating pressure
Fe	110/-20 °C	1.6 Mpa
Cu (DN 15-80)	110/-20 °C	1.6 Mpa

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

QLHG/QLHF/QLHB/QLHH can in a special version with steel header be permitted for a maximum temperature of 150 °C.

QLHH with flanged casing and integrated header.



QLHG with slip-clamp casing and exposed header.

MATERIAL AND 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, apart from DN 15 and DN 25 which are of copper with brass connections. Standard sizes are from 200x200 mm to 3500x2400 mm.

DIMENSIONING VIA COILS

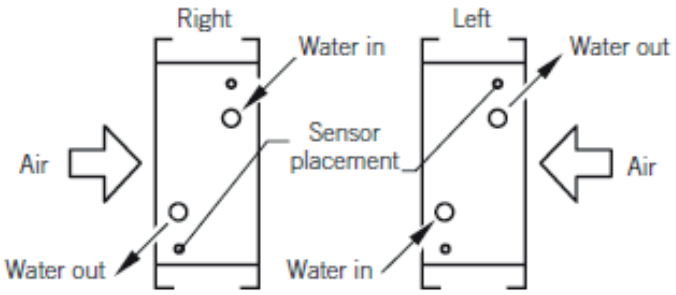
Dimensioning is performed using the product selection program Coils, which can be downloaded from our website. Coils shows among others, dimension drawings and the following data:

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

Q(L,F)HG, Q(L,F)HF, Q(L,F)HB, Q(L,F)HH

INSTALLATION

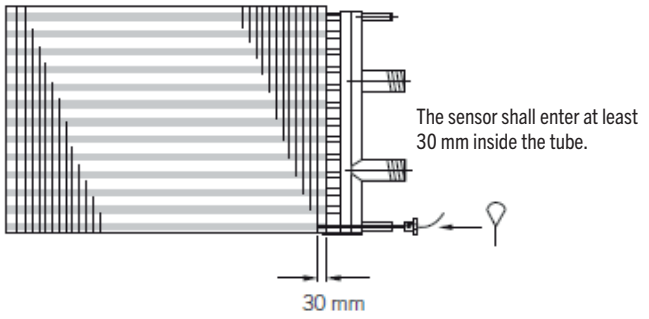
The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. If the heat exchanger is ordered without specifying right/left-hand design, a right-hand design is delivered. Heat exchangers 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 exchangers 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 92-94.

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.

QL = 1/2" tubes with pleated fins
QF = 1/2" tubes with plain fins.

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
R	SS	Cu	Corropaint
C	Mgn	Steel (conn 15+25=Cu)	Al
G	Mgn	Cu	Cu
H	Mgn	Cu	Al
I	Mgn	Steel (conn 15+25=Cu)	Corropaint
J	Mgn	Cu	Cu tinned
S	Mgn	Cu	Corropaint
T	AR	Steel (conn 15+25=Cu)	Al
U	AR	Cu	Cu
V	AR	Cu	Al
X	AR	Steel (conn 15+25=Cu)	Corropaint
Y	AR	Cu	Cu tinned
Z	AR	Cu	Corropaint

Galv = galvanized steel sheet, SS = stainless steel sheet, Cu = copper, Al = aluminium, AR = acid resistant steel sheet, Mgn = magnolia steel sheet.

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

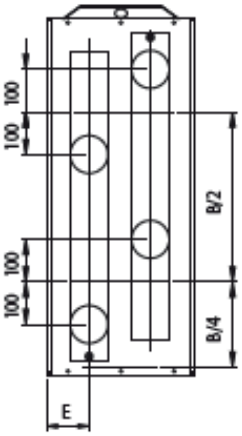
Q(L,F)HG, Q(L,F)HF, Q(L,F)HB, Q(L,F)HH

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

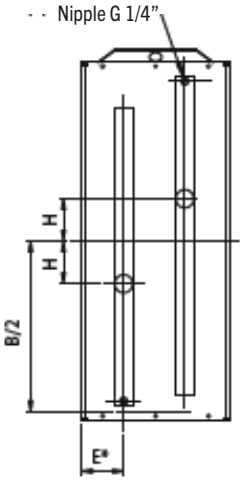
Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.

Connection DN 15

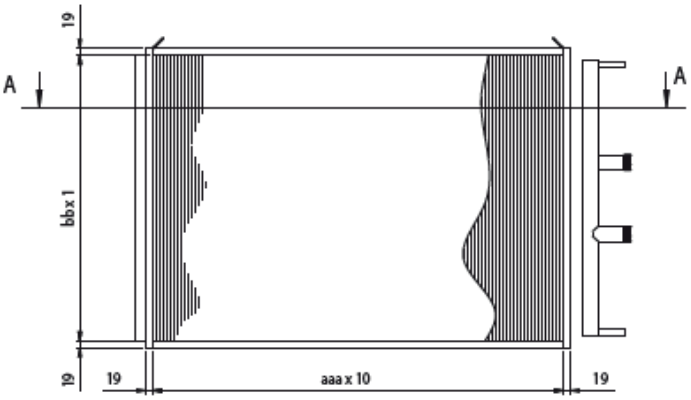
Connection 2 x DN 80

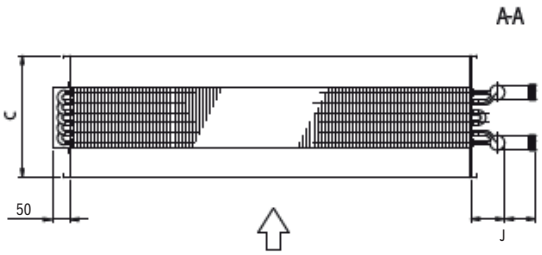


Connection DN 25, 32, 50, 80



*) 33 mm 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)
DN 15 (Cu)	115
DN 25 (Cu)	173
DN 32 (Fe)	188
DN 50 (Fe)	215
DN 80 (Fe)	254
2 x DN 80(Fe)	254

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

Q(L,F)HG, Q(L,F)HF, Q(L,F)HB, Q(L,F)HH

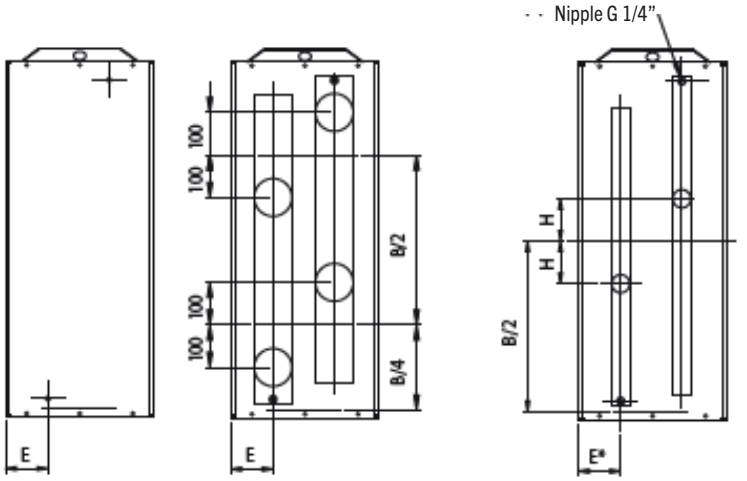
DIMENSION DRAWING QLHF: Flanged casing with exposed header.

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

Connection DN 15

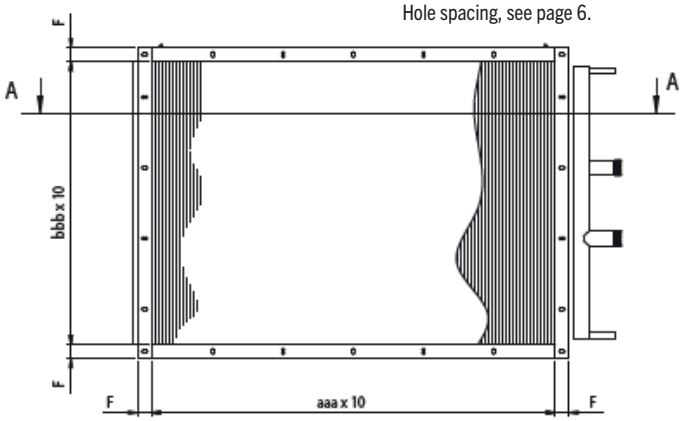
Connection 2 x DN 80

Connection DN 25, 32, 50, 80

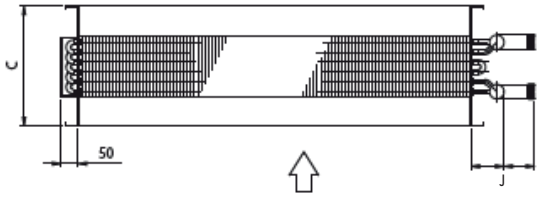


*) 34 mm DN 50, 1 tuberow.

Hole spacing, see page 6.



A-A



All dimensions in mm unless otherwise indicated.

B=bbb x 10

bbb (cm)	H (mm)
<040	60
≥040	100

aaa (cm)	F (mm)
≤240	40
>240	50

Connection	J (mm)
DN 15 (Cu)	115
DN 25 (Cu)	173
DN 32 (Fe)	188
DN 50 (Fe)	215
DN 80 (Fe)	254
2 x DN 80(Fe)	254

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

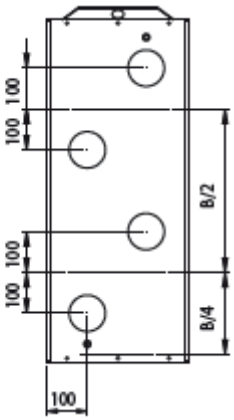
Q(L,F)HG, Q(L,F)HF, Q(L,F)HB, Q(L,F)HH

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

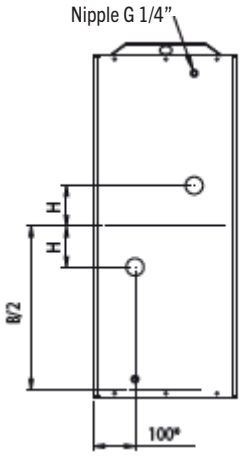
Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.

Connection DN 15

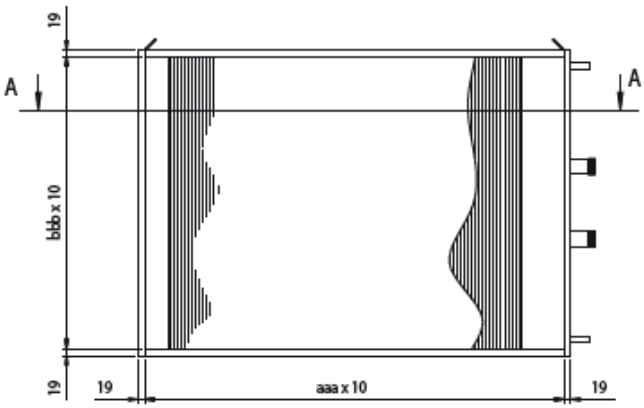
Connection 2 x DN 80

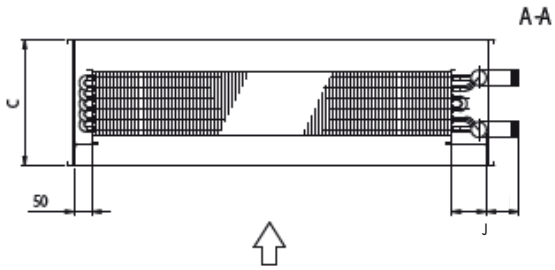


Connection DN 25, 32, 50, 80



*) 90 mm 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)
DN 15 (Cu)	115
DN 25 (Cu)	173
DN 32 (Fe)	188
DN 50 (Fe)	215
DN 80 (Fe)	254
2 x DN 80(Fe)	254

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

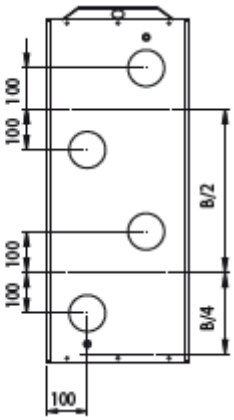
Q(L,F)HG, Q(L,F)HF, Q(L,F)HB, Q(L,F)HH

DIMENSION DRAWING QLHH: Flanged casing with integrated header.

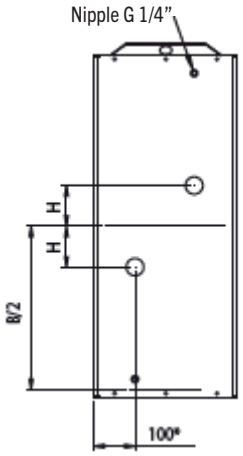
Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.

Connection DN 15

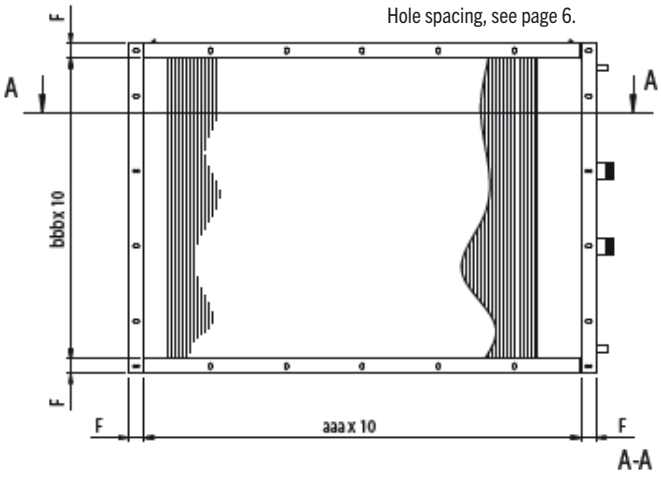
Connection 2 x DN 80

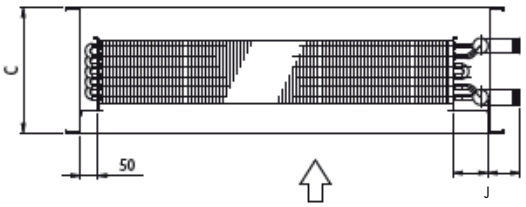


Connection DN 25, 32, 50, 80



*) 90 mm DN 50, 1 tuberow.





All dimensions in mm unless otherwise indicated.

B=bbb x 10

bbb (cm)	H (mm)
<040	60
≥040	100

aaa (cm)	F (mm)
≤240	40
>240	50

Connection	J (mm)
DN 15 (Cu)	115
DN 25 (Cu)	173
DN 32 (Fe)	188
DN 50 (Fe)	215
DN 80 (Fe)	254
2 x DN 80(Fe)	254

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 - Q(L,F)CG, Q(L,F)CF, Q(L,F)CB, Q(L,F)CH

The heat exchangers Q(L,F)CG, Q(L,F)CF, Q(L,F)CB and Q(L,F)CH 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 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.
- As standard the drip tray is made of stainless steel with vertical drainage, but can be ordered with horizontal drainage (QLAZ-30 or QLAZ-39).
- 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

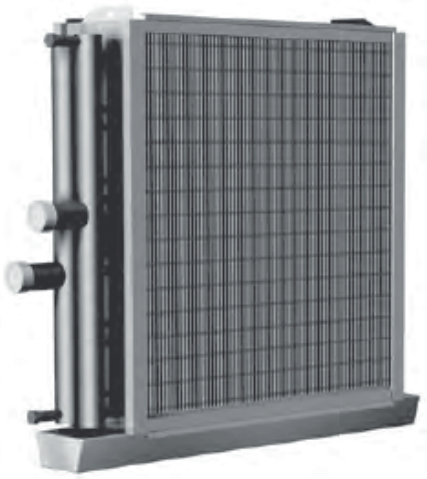
DRIFTDATA

- 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 m^3/s.
- Operating pressure:

Header	Max/Min temp	Max. operating pressure
Fe	110/-20 °C	1.6 Mpa
Cu (DN 15-80)	110/-20 °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 AND SIZE (see the code key for more info)

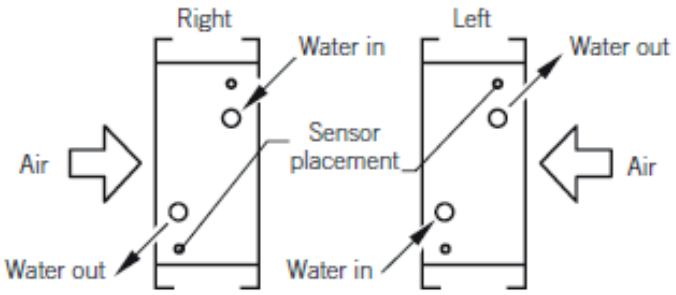
The heat exchangers are normally designed using copper tubes and aluminium fins. Casing of hot-dip galvanized steel sheet with drip tray of stainless steel sheet. As standard the header is designed of steel, a part from DN 15 and DN 25 which are of copper with brass connections. Standard sizes are from 200x200 mm to 3500x2400 mm. Materials for aggressive environments are available, see page 7.

Q(L,F)CG, Q(L,F)CF, Q(L,F)CB, Q(L,F)CH

INSTALLATION

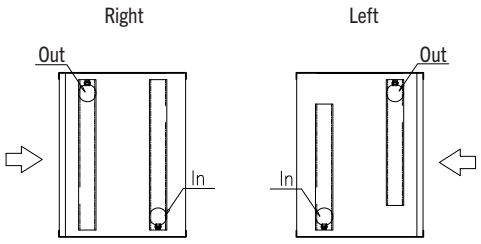
The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchanger must be ordered in either a right or left-hand design. The system must be fully bled to give optimal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

T-connection:



Counter-flow coupling

L-connection:



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 92-94.

MAINTENANCE

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

modinecoolers.com
modinecoils.com

CODE KEY

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

Q(L,F)CG = Slip-clamp casing with exposed header.
Q(L,F)CF = Flanged casing with exposed header.
Q(L,F)CB = Slip-clamp casing with integrated header.
Q(L,F)CH = 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 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	Drip tray
A	Galv	Steel (conn 15+25=Cu)	Al	SS
B	Galv	Cu	Cu	SS
D	Galv	Cu	Al	SS
E	Galv	Steel (conn 15+25=Cu)	Corropaint	SS
F	Galv	Cu	Cu tinned	SS
K	Galv	Cu	Corropaint	SS
L	SS	Steel (conn 15+25=Cu)	Al	SS
M	SS	Cu	Cu	SS
N	SS	Cu	Al	SS
O	SS	Steel (conn 15+25=Cu)	Corropaint	SS
P	SS	Cu	Cu tinned	SS
R	SS	Cu	Corropaint	SS
C	Mgn	Steel (conn 15+25=Cu)	Al	Al
G	Mgn	Cu	Cu	Al
H	Mgn	Cu	Al	Al
I	Mgn	Steel (conn 15+25=Cu)	Corropaint	Al
J	Mgn	Cu	Cu tinned	Al
S	Mgn	Cu	Corropaint	Al
T	AR	Steel (conn 15+25=Cu)	Al	AR
U	AR	Cu	Cu	AR
V	AR	Cu	Al	AR
X	AR	Steel (conn 15+25=Cu)	Corropaint	AR
Y	AR	Cu	Cu tinned	AR
Z	AR	Cu	Corropaint	AR

Galv = galvanized steel sheet, SS = stainless steel sheet, Cu = copper, Al = aluminium, AR = acid resistant steel sheet, Mgn = magnolia steel sheet.

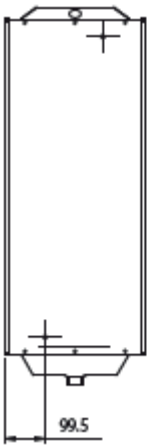
Our products can be ordered with a number of different accessories and with other dimensions and materials than standard. Contact us for more information.

Q(L,F)CG, Q(L,F)CF, Q(L,F)CB, Q(L,F)CH

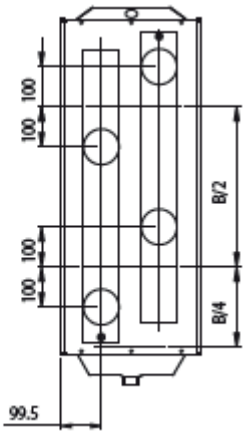
DIMENSION DRAWING QLCG: Slip-clamp casing with exposed header.

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

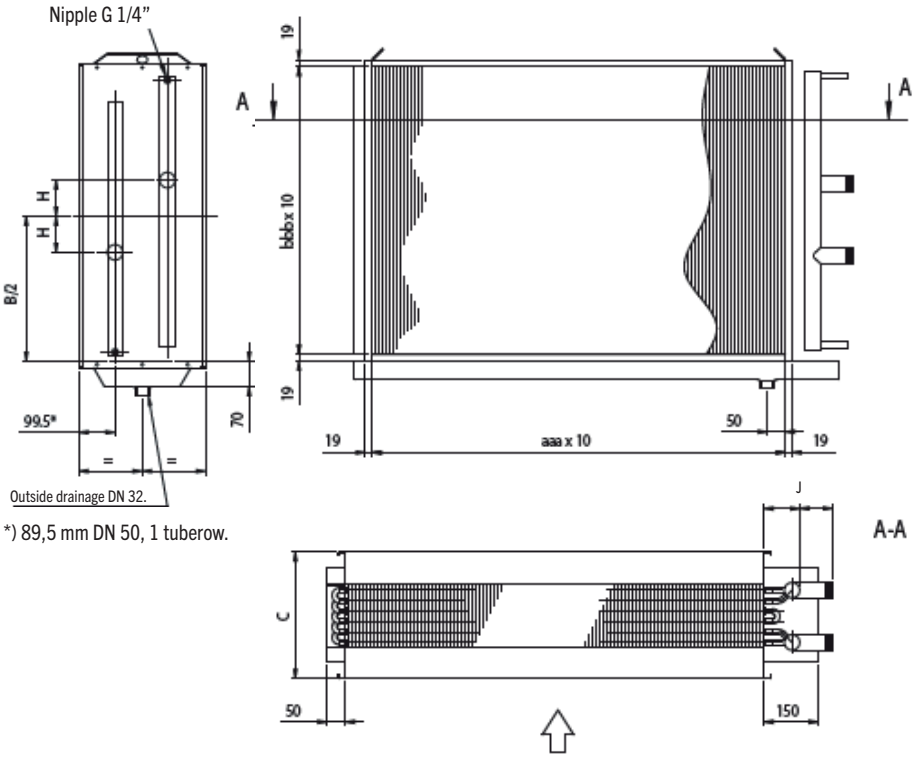
Connection DN 15



Connection 2 x DN 80



Connection DN 25, 32, 50, 80



*) 89,5 mm 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)
DN 15 (Cu)	115
DN 25 (Cu)	173
DN 32 (Fe)	188
DN 50 (Fe)	215
DN 80 (Fe)	254
2 x DN 80(Fe)	254

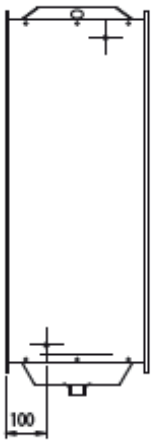
No. of rows (cc)	C (mm) Without-Droplet eliminator	With
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580

Q(L,F)CG, Q(L,F)CF, Q(L,F)CB, Q(L,F)CH

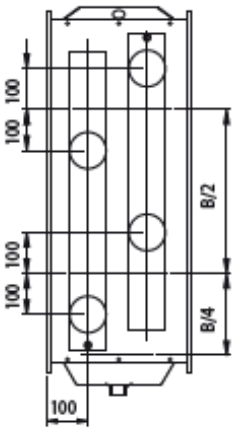
DIMENSION DRAWING QLCF: Flanged casing with exposed header.

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

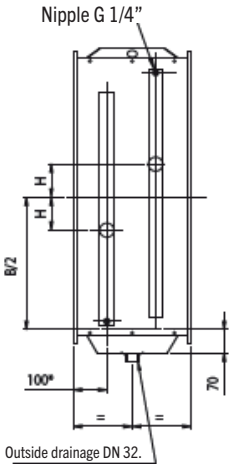
Connection DN 15



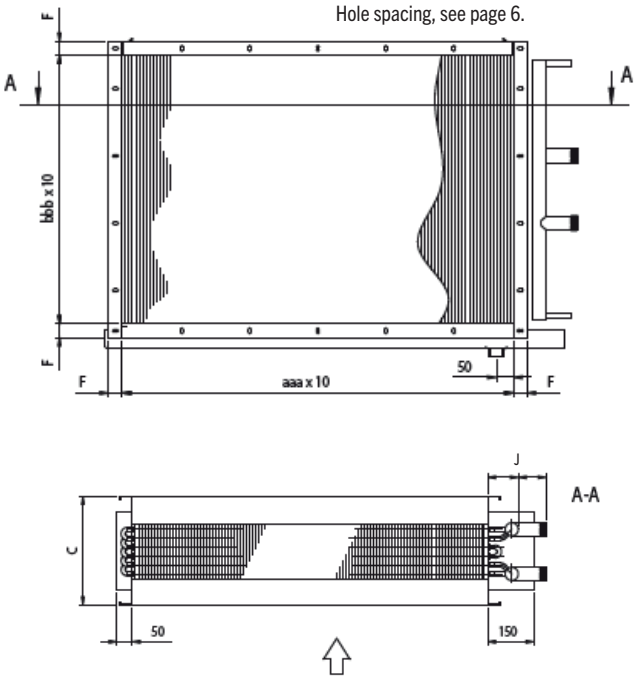
Connection 2 x DN 80



Connection DN 25, 32, 50, 80



*) 90 mm DN 50, 1 tuberow.



All dimensions in mm unless otherwise indicated.

B=bbb x 10

bbb (cm)	H (mm)
<040	60
≥040	100

aaa (cm)	F (mm)
≤240	40
>240	50

Connection	J (mm)
DN 15 (Cu)	115
DN 25 (Cu)	173
DN 32 (Fe)	188
DN 50 (Fe)	215
DN 80 (Fe)	254
2 x DN 80(Fe)	254

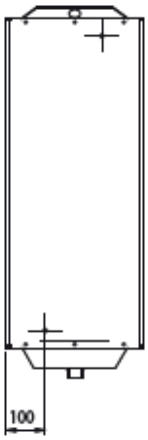
No. of rows (cc)	C (mm) Without-Droplet eliminator	With
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580

Q(L,F)CG, Q(L,F)CF, Q(L,F)CB, Q(L,F)CH

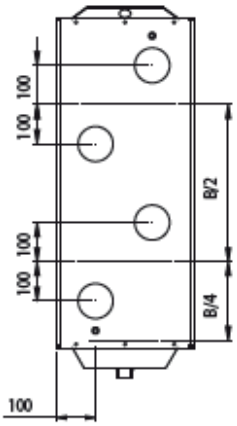
DIMENSION DRAWING QLCB: Slip-clamp casing with integrated header.

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

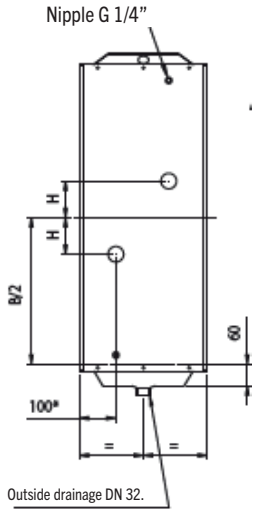
Connection DN 15



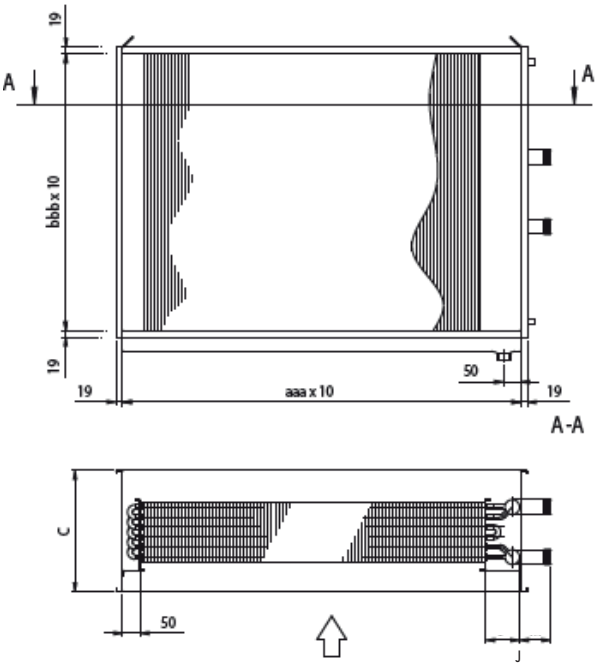
Connection 2 x DN 80



Connection DN 25, 32, 50, 80



*) 90 mm 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)
DN 15 (Cu)	115
DN 25 (Cu)	173
DN 32 (Fe)	188
DN 50 (Fe)	215
DN 80 (Fe)	254
2 x DN 80(Fe)	254

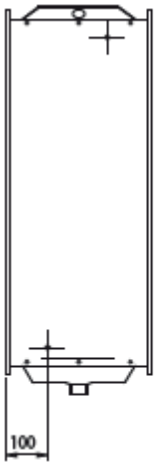
No. of rows (cc)	C (mm) Without-Droplet eliminator	-With
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580

Q(L,F)CG, Q(L,F)CF, Q(L,F)CB, Q(L,F)CH

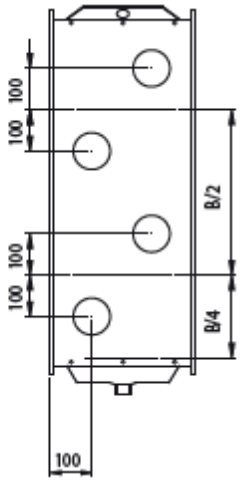
DIMENSION DRAWING QLCH: Flanged casing with integrated header.

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

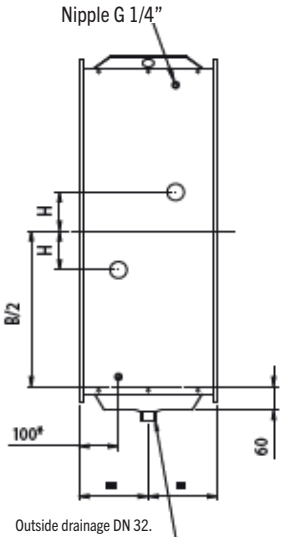
Connection DN 15



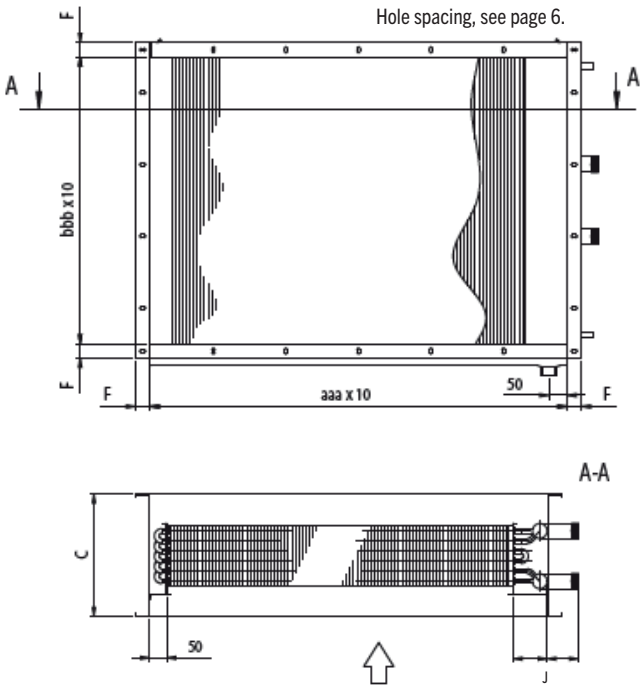
Connection 2 x DN 80



Connection DN 25, 32, 50, 80



*) 90 mm DN 50, 1 tuberow.



All dimensions in mm unless otherwise indicated.

B=bbb x 10

bbb (cm)	H (mm)
<040	60
≥040	100

aaa (cm)	F (mm)
≤240	40
>240	50

Connection	J (mm)
DN 15 (Cu)	115
DN 25 (Cu)	173
DN 32 (Fe)	188
DN 50 (Fe)	215
DN 80 (Fe)	254
2 x DN 80(Fe)	254

No. of rows (cc)	C (mm) Without-Droplet eliminator	-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, 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/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 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 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

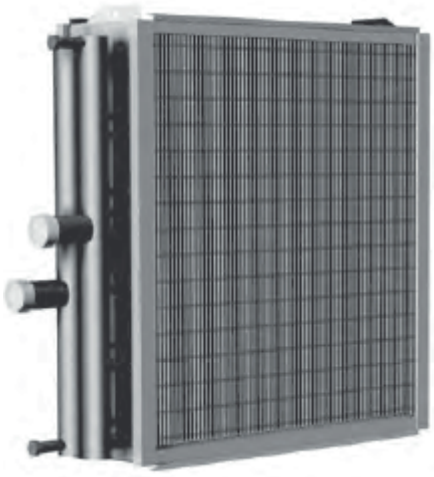
- Max fluid velocity: 2.0 m/s in tubes.
- Normal air velocity should be 2-3 m/s.
- Max air velocity 5.0 m/s.
- At duct pressures above 300 Pa an integrated header is recommended.
- For air flows up to 40 m^3/s.
- Operating pressure:

Header	Max/Min temp	Max. operating pressure
Fe	110/-20 °C	1.6 Mpa
Cu (DN 15-80)	110/-20 °C	1.6 Mpa

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

Q(L,F)TG, Q(L,F)TF, Q(L,F)TB and Q(L,F)TH) can in a special version with steel manifolds be permitted for a maximum temperature of 150 °C.

QLTH with flanged casing and integrated header.



QLTG with slip-clamp casing and exposed header.

MATERIAL AND 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 200x200 mm to 3500x2400 mm. Materials for aggressive environments are available, see page 7.

ANTI-FREEZE (brines)

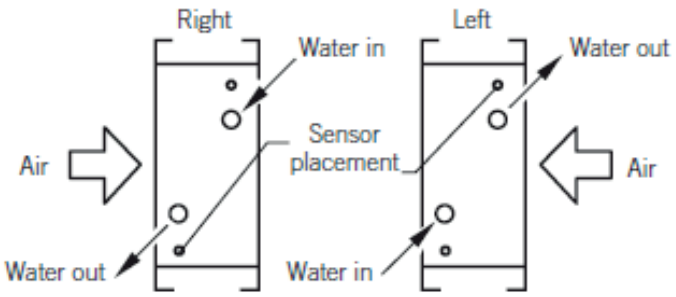
Glycols, ethanols, salt solutions, oils etc. In order to gain good performance it is extremely important that the system is filled with the same brine solution and concentration that it is designed for. Different types of brine are included in the calculation program Coils, which gives the correct pressure 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.

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

INSTALLATION

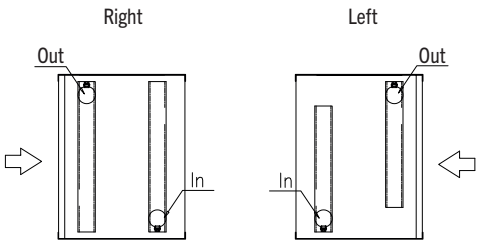
The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchanger must be ordered in either a right or left-hand design. The system must be fully bled to give optimal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

T-connection:



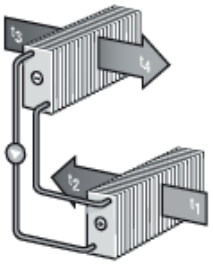
Counter-flow coupling

L-connection:



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 %:



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

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

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 height (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**

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
R	SS	Cu	Corropaint
C	Mgn	Steel (conn 15+25=Cu)	Al
G	Mgn	Cu	Cu
H	Mgn	Cu	Al
I	Mgn	Steel (conn 15+25=Cu)	Corropaint
J	Mgn	Cu	Cu tinned
S	Mgn	Cu	Corropaint
T	AR	Steel (conn 15+25=Cu)	Al
U	AR	Cu	Cu
V	AR	Cu	Al
X	AR	Steel (conn 15+25=Cu)	Corropaint
Y	AR	Cu	Cu tinned
Z	AR	Cu	Corropaint

Galv = galvanized steel sheet, SS = stainless steel sheet, Cu = copper, Al = aluminium, AR = acid resistant steel sheet, Mgn = magnolia steel sheet.

ACCESSORIES

Additional accessories, see pages 92-94.

MAINTENANCE

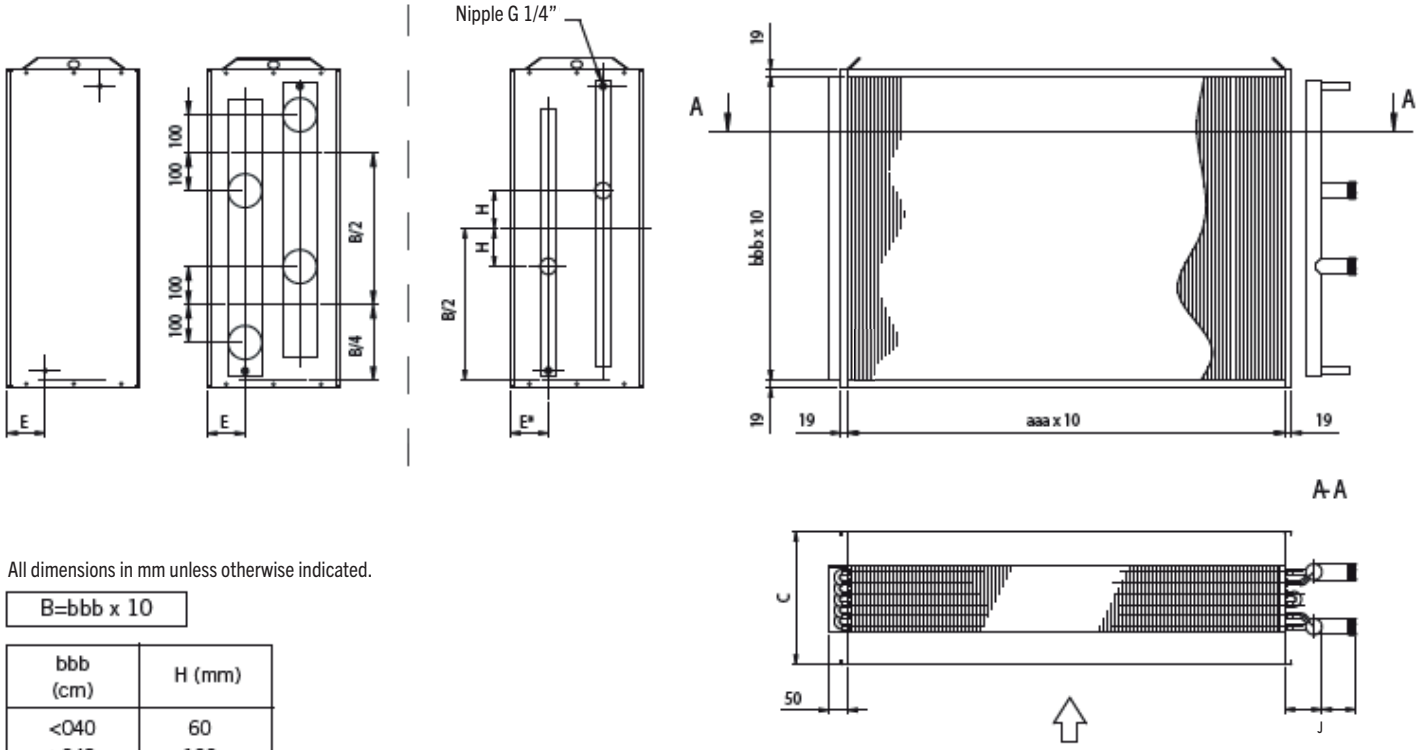
Operating and maintenance instructions are available via the product selection program Coils or from our website.

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.

Connection DN 15 | **Connection 2 x DN 80** | **Connection DN 25, 32, 50, 80**



All dimensions in mm unless otherwise indicated.

B=bbb x 10

bbb (cm)	H (mm)
<040	60
≥040	100

Connection	J (mm)
DN 15 (Cu)	115
DN 25 (Cu)	173
DN 32 (Fe)	188
DN 50 (Fe)	215
DN 80 (Fe)	254
2 x DN 80(Fe)	254

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

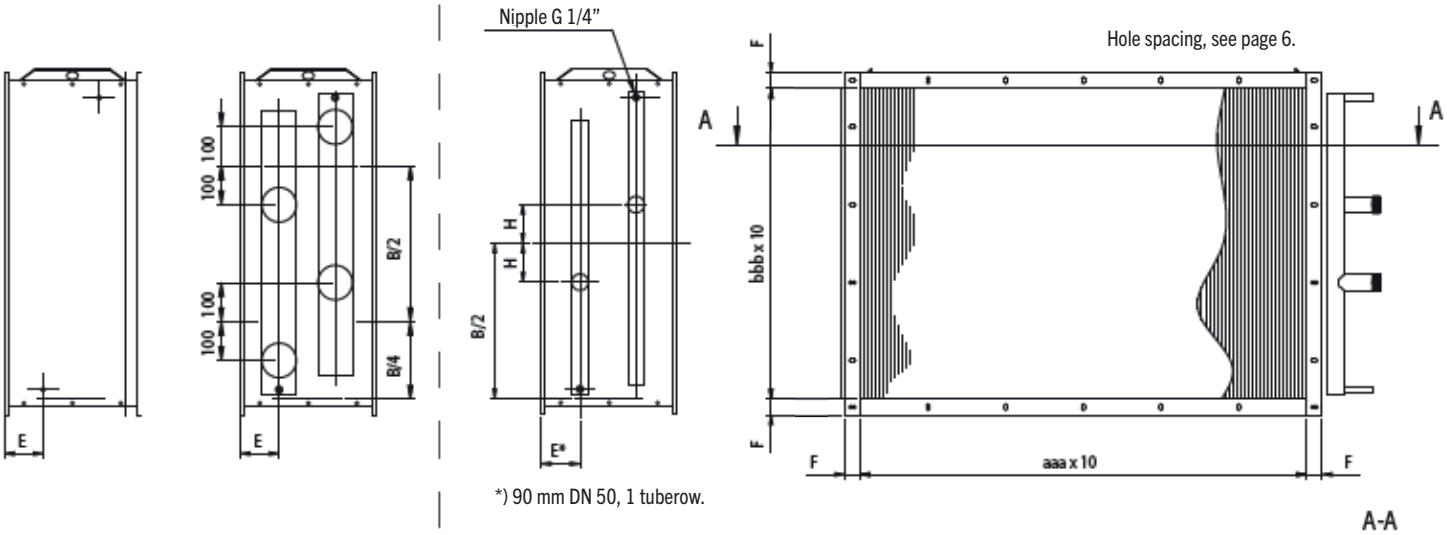
No. of rows (cc)	E (mm)
01	100
02	100
03	100
04	100
06	100
08	97
10	97
12	100

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.

Connection DN 15 | **Connection 2 x DN 80** | **Connection DN 25, 32, 50, 80**



*) 90 mm DN 50, 1 tuberow.

All dimensions in mm unless otherwise indicated.

B=bbb x 10

bbb (cm)	H (mm)
<040	60
≥040	100

aaa (cm)	F (mm)
≤240	40
>240	50

Connection	J (mm)
DN 15 (Cu)	115
DN 25 (Cu)	173
DN 32 (Fe)	188
DN 50 (Fe)	215
DN 80 (Fe)	254
2 x DN 80(Fe)	254

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

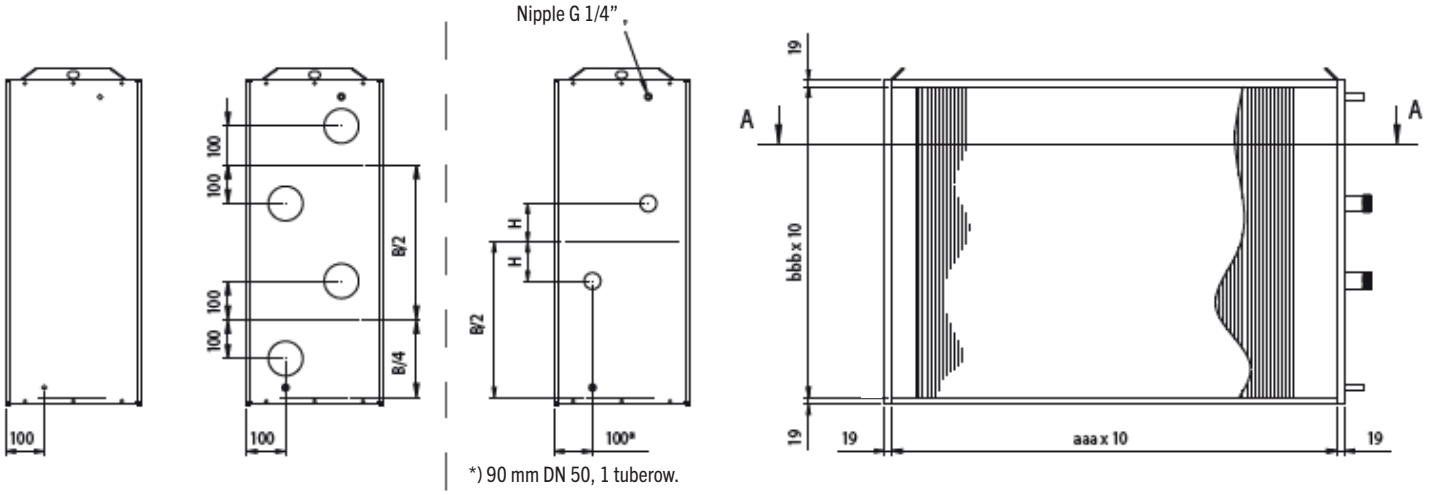
No. of rows (cc)	E (mm)
01	100
02	100
03	100
04	100
06	100
08	98
10	98
12	100

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

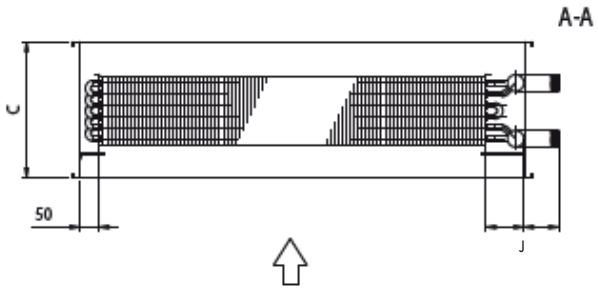
DIMENSION DRAWING Q(L,F)TB: Slip-clamp casing with integrated header.

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

Connection DN 15 | **Connection 2 x DN 80** | **Connection DN 25, 32, 50, 80**



All dimensions in mm unless otherwise indicated.



B=bbb x 10

bbb (cm)	H (mm)
<040	60
≥040	100

Connection	J (mm)
DN 15 (Cu)	115
DN 25 (Cu)	173
DN 32 (Fe)	188
DN 50 (Fe)	215
DN 80 (Fe)	254
2 x DN 80(Fe)	254

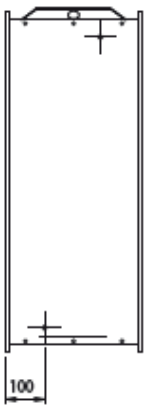
No. of rows (cc)	C (mm)
01	300
02	300
03	300
04	300
06	350
08	400
10	460
12	520

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

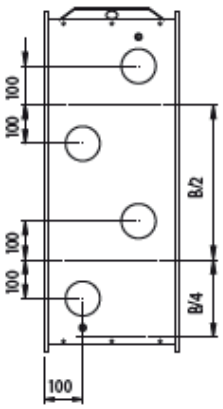
DIMENSION DRAWING Q(L,F)TH: Flanged casing with integrated header.

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

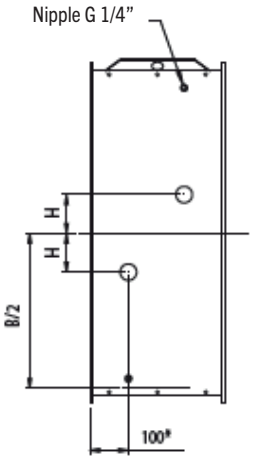
Connection DN 15



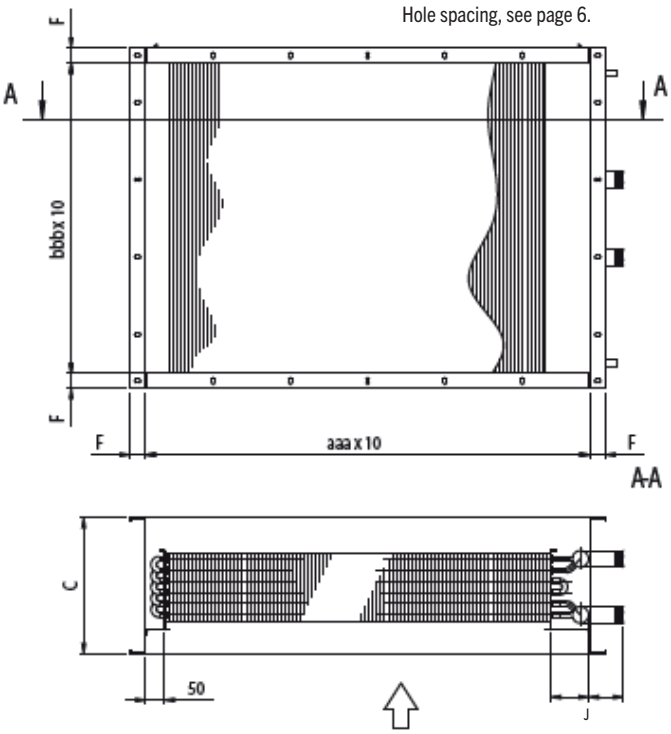
Connection 2 x DN 80



Connection DN 25, 32, 50, 80



*) 90 mm DN 50, 1 tuberow.



All dimensions in mm unless otherwise indicated.

B=bbb x 10

bbb (cm)	H (mm)
<040	60
≥040	100

aaa (cm)	F (mm)
≤240	40
>240	50

Connection	J (mm)
DN 15 (Cu)	115
DN 25 (Cu)	173
DN 32 (Fe)	188
DN 50 (Fe)	215
DN 80 (Fe)	254
2 x DN 80(Fe)	254

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 th Pressure Equipment Directive PED 2014/68/EU.

GENERAL

- The design consists of a fin body, headers and casing.
- QL = 1/2" 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 eller QLAZ-39).
- 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

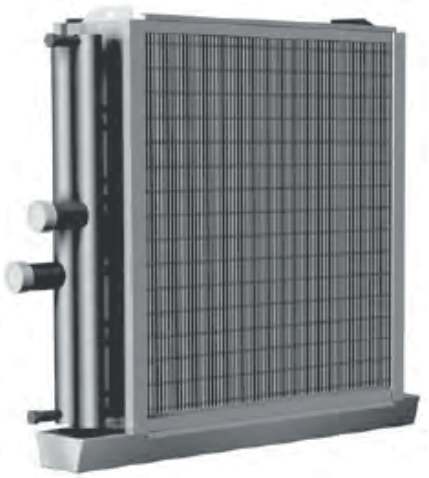
- Max air velocity: 1.5 m/s i tubes.
- Normal air velocity should be 2-3 m/s.
- Max air velocity without droplet eliminator: 2.9 m/s.
- Max air velocity with droplet eliminator: 5.0 m/s.
- At duct pressures above 300 Pa an integrated header is recommended.
- For air flows up to 40 m^3/s.
- Operating pressure:

Header	Max/Min temp	Max. operating pressure
Fe	110/-20 °C	1.6 Mpa
Cu (DN 15-80)	110/-20 °C	1.6 Mpa

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

Q(L,F)FG, Q(L,F)FF, Q(L,F)FB och Q(L,F)FH) can in a special version with steel manifolds be permitted for a maximum temperature of 150 °C.

QLFH with flanged casing and integrated header.



QLFG with slip-clamp casing and exposed header.

MATERIAL AND 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. The drip tray is made in stainless steel or aluminium. 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 7.

ANTI-FREEZE (brines)

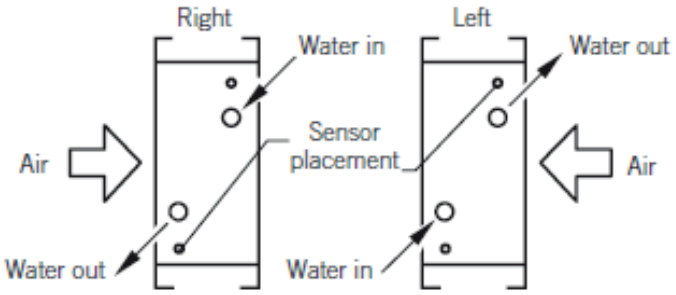
Glycols, ethanols, salt solutions, oils etc. can be used as anti-freeze. In order to gain good performance it is extremely important that the system is filled with the same brine solution and concentration that it is designed for. Different types of brine are included in the calculation program Coils, 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.

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

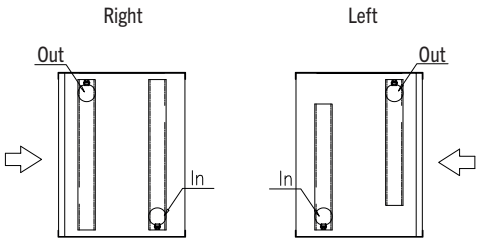
INSTALLATION

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 fully bled to give optimal performance.

T-connection:

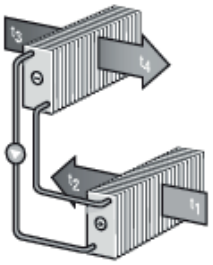


L-connection:



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 %:



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

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

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 height (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**

g = Material	Casing	Header	Fin	Drip tray
A	Galv	Steel (conn 15+25=Cu)	Al	SS
B	Galv	Cu	Cu	SS
D	Galv	Cu	Al	SS
E	Galv	Steel (conn 15+25=Cu)	Corropaint	SS
F	Galv	Cu	Cu tinned	SS
K	Galv	Cu	Corropaint	SS
L	SS	Steel (conn 15+25=Cu)	Al	SS
M	SS	Cu	Cu	SS
N	SS	Cu	Al	SS
O	SS	Steel (conn 15+25=Cu)	Corropaint	SS
P	SS	Cu	Cu tinned	SS
R	SS	Cu	Corropaint	SS
C	Mgn	Steel (conn 15+25=Cu)	Al	Al
G	Mgn	Cu	Cu	Al
H	Mgn	Cu	Al	Al
I	Mgn	Steel (conn 15+25=Cu)	Corropaint	Al
J	Mgn	Cu	Cu tinned	Al
S	Mgn	Cu	Corropaint	Al
T	AR	Steel (conn 15+25=Cu)	Al	AR
U	AR	Cu	Cu	AR
V	AR	Cu	Al	AR
X	AR	Steel (conn 15+25=Cu)	Corropaint	AR
Y	AR	Cu	Cu tinned	AR
Z	AR	Cu	Corropaint	AR

Galv = galvanized steel sheet, SS = stainless steel sheet, Cu = copper, Al = aluminium, AR = acid resistant steel sheet, Mgn = magnolia steel sheet

ACCESSORIES

Additional accessories are available, see pages 92-94.

MAINTENANCE

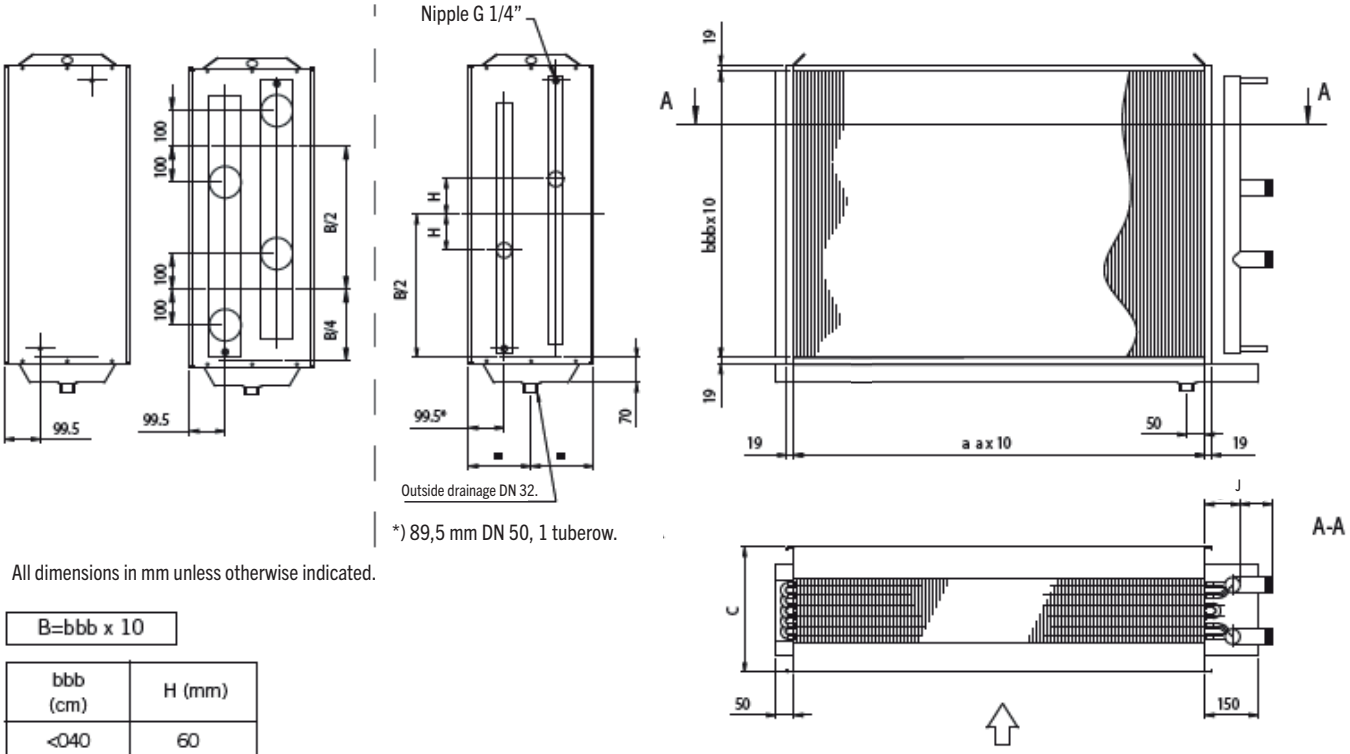
Operating and maintenance instructions are available via the production selection program or from our website.

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.

Connection DN 15 | **Connection 2 x DN 80** | **Connection DN 25, 32, 50, 80**



*) 89,5 mm 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)
DN 15 (Cu)	115
DN 25 (Cu)	173
DN 32 (Fe)	188
DN 50 (Fe)	215
DN 80 (Fe)	254
2 x DN 80(Fe)	254

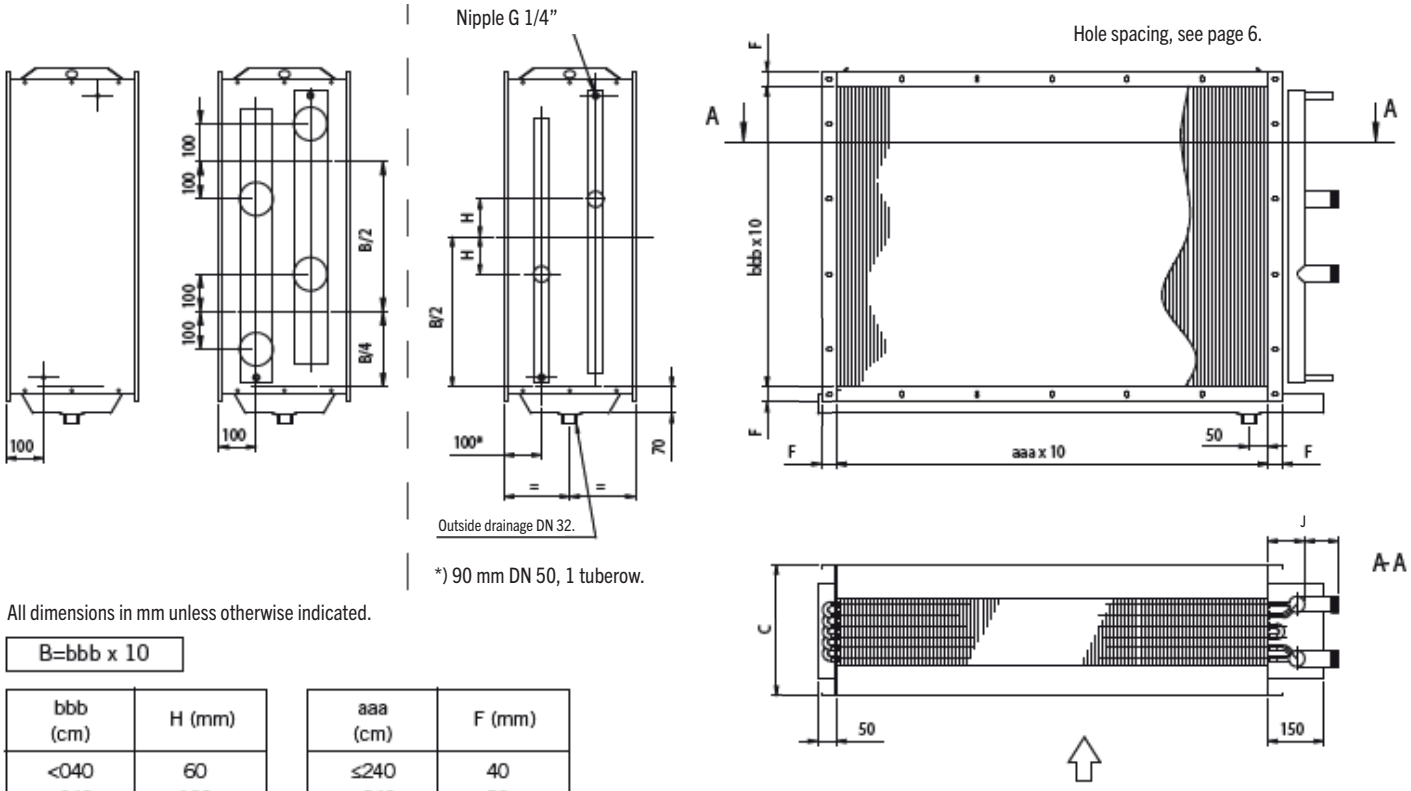
No. of rows (cc)	C (mm)	C with droplet eliminator
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580

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.

Connection DN 15 | **Connection 2 x DN 80** | **Connection DN 25, 32, 50, 80**



*) 90 mm DN 50, 1 tuberow.

All dimensions in mm unless otherwise indicated.

B=bbb x 10

bbb (cm)	H (mm)
<040	60
≥040	100

aaa (cm)	F (mm)
≤240	40
>240	50

Connection	J (mm)
DN 15 (Cu)	115
DN 25 (Cu)	173
DN 32 (Fe)	188
DN 50 (Fe)	215
DN 80 (Fe)	254
2 x DN 80(Fe)	254

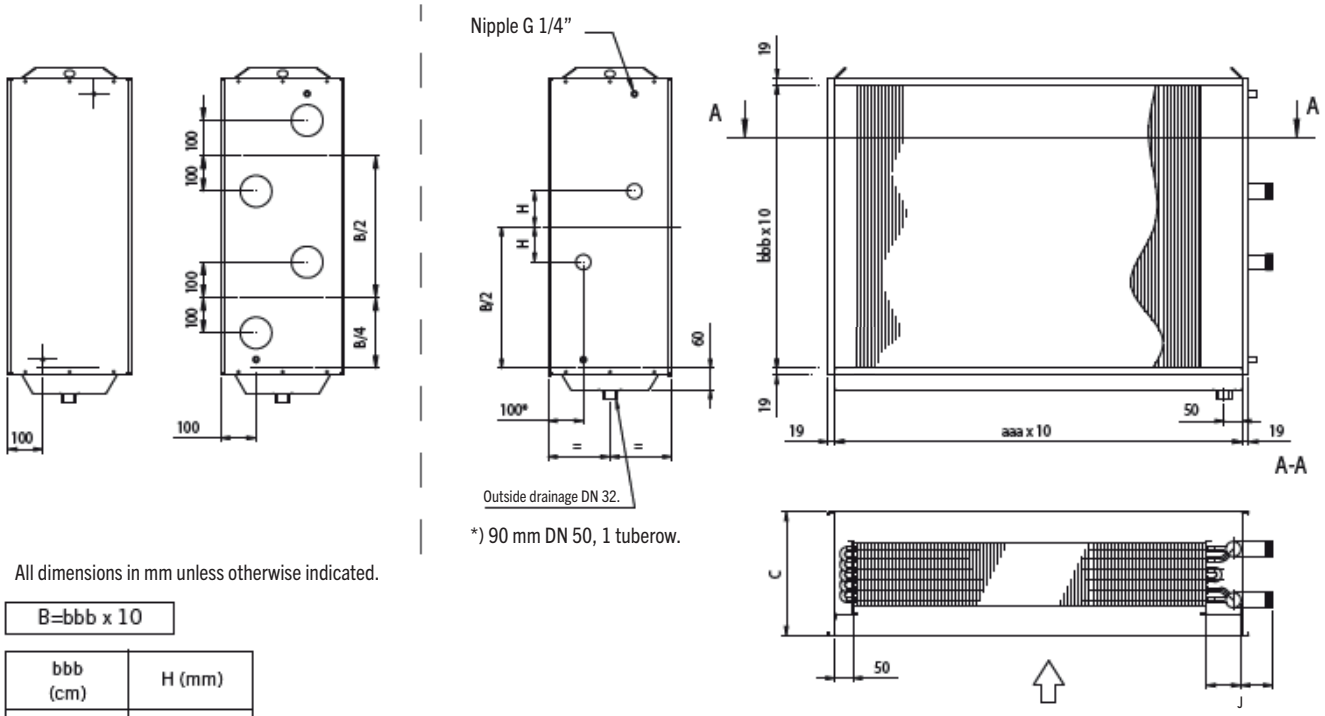
No. of rows (cc)	C (mm) Without-Droplet eliminator	C (mm) With
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580

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.

Connection DN 15 | **Connection 2 x DN 80** | **Connection DN 25, 32, 50, 80**



All dimensions in mm unless otherwise indicated.

B=bbb x 10

bbb (cm)	H (mm)
<040	60
≥040	100

Connection	J (mm)
DN 15 (Cu)	115
DN 25 (Cu)	173
DN 32 (Fe)	188
DN 50 (Fe)	215
DN 80 (Fe)	254
2 x DN 80(Fe)	254

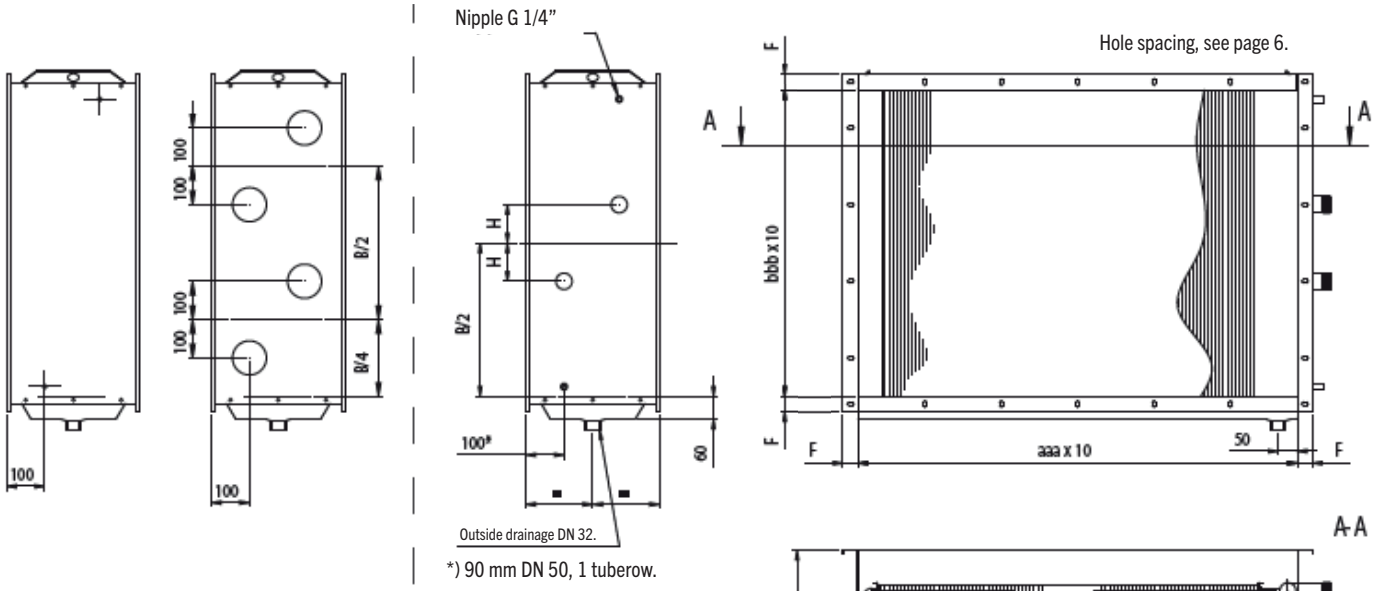
No. of rows (cc)	C (mm) Without-Droplet eliminator	With
01	300	350
02	300	350
03	300	350
04	300	350
06	350	400
08	400	460
10	460	520
12	520	580

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.

Connection DN 15 | **Connection 2 x DN 80** | **Connection DN 25, 32, 50, 80**



All dimensions in mm unless otherwise indicated.

B=bbb x 10

bbb (cm)	H (mm)
<040	60
≥040	100

aaa (cm)	F (mm)
≤240	40
>240	50

Connection	J (mm)
DN 15 (Cu)	115
DN 25 (Cu)	173
DN 32 (Fe)	188
DN 50 (Fe)	215
DN 80 (Fe)	254
2 x DN 80(Fe)	254

No. of rows (cc)	C (mm) Without-Droplet eliminator	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 Heating - Q(D,G)HG, Q(D,G)HF

The heat exchangers Q(D,G)HG and Q(D,G)HF 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.

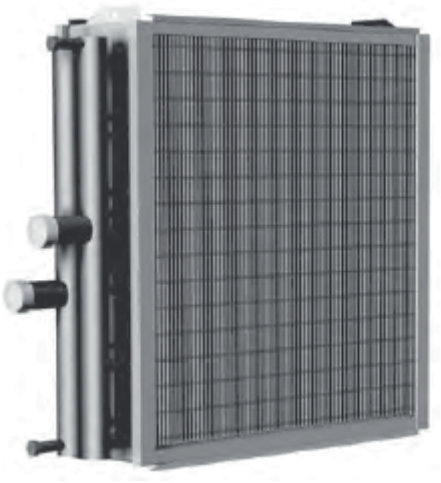
GENERAL

- The heat exchanger consists of 15mm copper tubes with low water pressure drop.
- QDHG and QDHF are provided with a profiled fin for optimal efficiency. QGHG and QGHF are provided with a flat fin for lower air pressure drop.
- The casing has a perforated frame according to RFHF (RVGL).
- Q(D,G)HG and Q(D,G)HF have threaded connections.
- Plugged connections are provided for venting and drainage (not DN15).
- The design conforms with the Pressure Equipment Directive PED 2014/68/EU

OPERATING DATA

- Max. operating pressure 1.6 Mpa at max. operating temperature 110 °C.
- All heat exchangers are leakage tested using dry air under water at pressure 2.3 Mpa.

Q(D,G)HG and Q(D,G)HF can in a special version with steel manifolds be permitted for a maximum temperature of 150 °C.



Q(D,G)HG with slip-clamp casing and exposed header.

MATERIAL AND SURFACE TREATMENT

In basic version, material code ”A”, Q(D,G)HG and Q(D,G)HF are made of copper tubes and fins are made of aluminium. Round headers and connections are made of steel and painted with corrosion-protecting paint. DN15 has brass connection and DN25 has copper collection pipes as standard. The casing is made of galvanized steel sheet. In the product in detail, corrosion category C2 is met according to ISO 12944. Other fin materials, copper round headers and stainless steel housing are available as standard.

SIZES

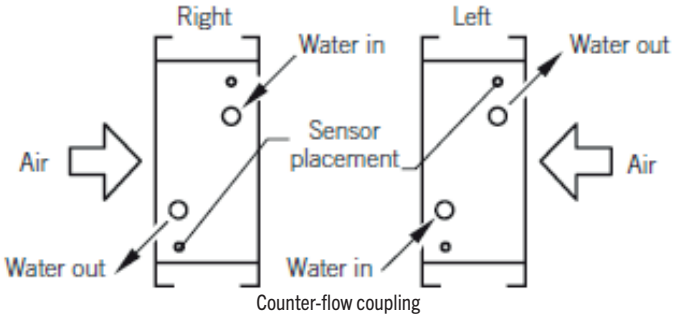
The coils are available with various fin pitches in sizes up to 3,8x2,4 m for horizontal air flow, in the standard version.

Q(D,G)HG, Q(D,G)HF

INSTALLATION

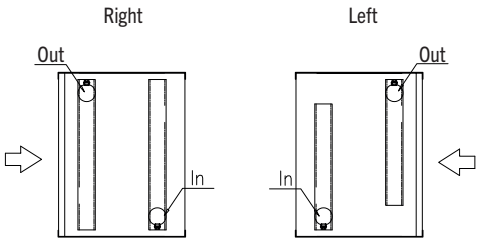
The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. If the heat exchanger is ordered without specifying right/left-hand design, a right-hand design is delivered. Heat exchangers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

T-connection:



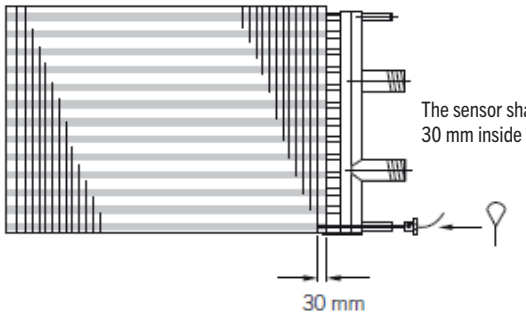
Counter-flow coupling

L-connection:



FREEZE PROTECTION

At least one of the heat exchangers 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 92-94.

MAINTENANCE

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

modinecoolers.com
modinecoils.com

CODE KEY

Q(D,G)H_- aaa - bbb - cc - dd - ee - f - g

Q(D,G)HG = Slip-clamp casing with exposed header.
Q(D,G)HF = Flanged casing with exposed header.

aaa = **Duct width (cm)** 020-380
bbb = **Duct height (cm)** 024-240
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
R	SS	Cu	Corropaint
C	Mgn	Steel (conn 15+25=Cu)	Al
G	Mgn	Cu	Cu
H	Mgn	Cu	Al
I	Mgn	Steel (conn 15+25=Cu)	Corropaint
J	Mgn	Cu	Cu tinned
S	Mgn	Cu	Corropaint
T	AR	Steel (conn 15+25=Cu)	Al
U	AR	Cu	Cu
V	AR	Cu	Al
X	AR	Steel (conn 15+25=Cu)	Corropaint
Y	AR	Cu	Cu tinned
Z	AR	Cu	Corropaint

Galv = galvanized steel sheet, SS = stainless steel sheet, Cu = copper, Al = aluminium, AR = acid resistant steel sheet, Mgn = magnolia steel sheet.

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(D,G)HG

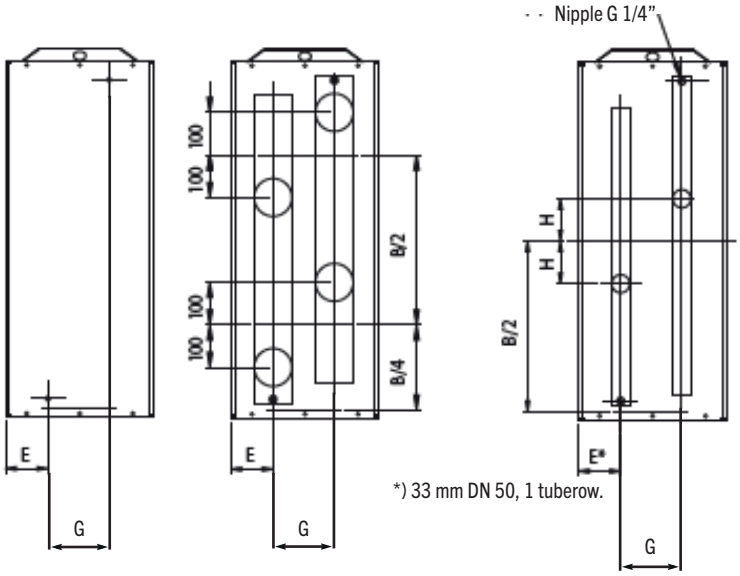
DIMENSION DRAWING Q(D,G)HG: Slip-clamp casing with exposed header.

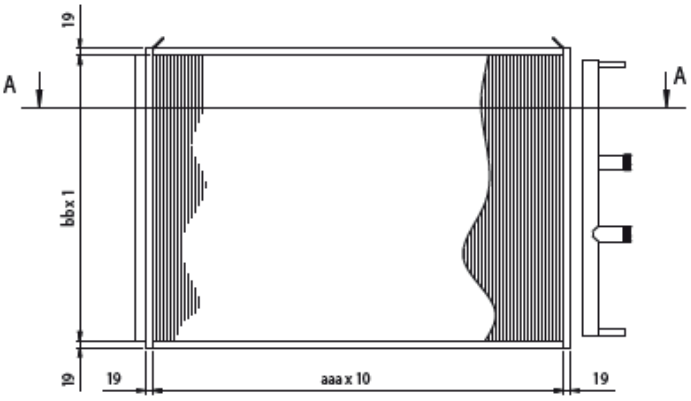
Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.

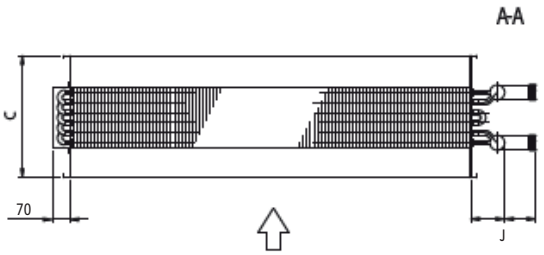
Connection DN 15

Connection 2 x DN 80

Connection DN 25, 32, 50, 80







All dimensions in mm unless otherwise indicated.

B=bbb x 10

bbb (cm)	H (mm)
<040	60
≥040	100

No. of rows (cc)	C	EE
01	200	100
02	200	83
03	200	65
04	300	98
06	350	88
08	460	107
10	520	102
12	580	98

Header size	J(Cu)	H(Cu)	J(Fe)	H(Fe)
DN15	110	-	-	-
DN25	190	159	-	-
DN32	198	172	197	181
DN50	225	185	225	199
DN80	264	220	264	228

G	No. of rows (cc)						
1	2	3	4	6	8	10	12
0	35	-	-	-	-	-	-
35	35	69	104	173	246	315	384
43	69	69	104	173	246	315	384
69	69	69	104	173	246	315	384
-	104	104	104	173	246	315	384

Q(D,G)HF

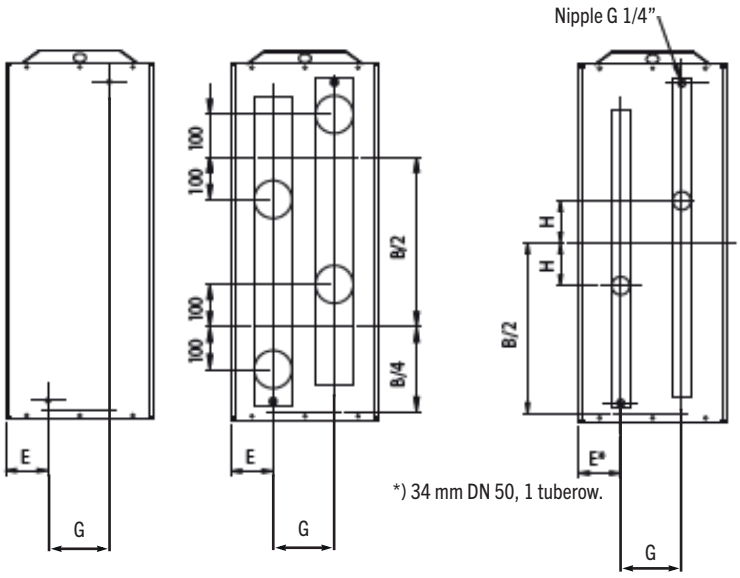
DIMENSION DRAWING Q(D,G)HF: Flanged casing with exposed header.

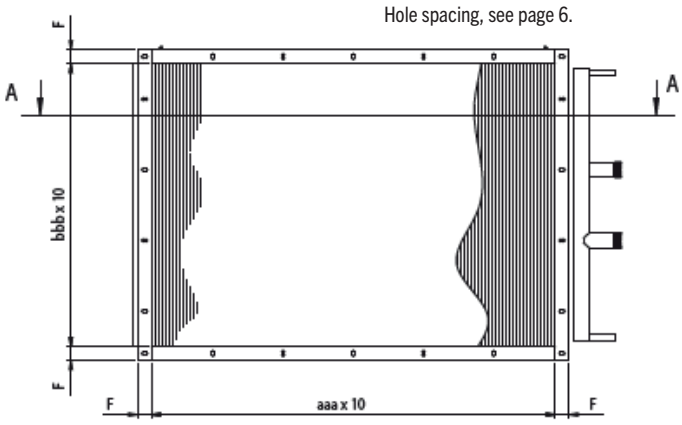
Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.

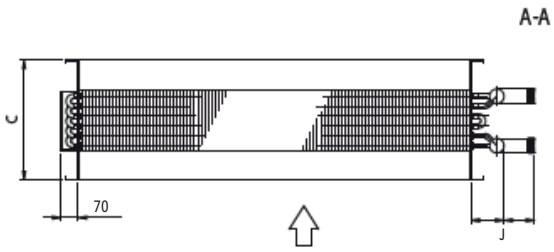
Connection DN 15

Connection 2 x DN 80

Connection DN 25, 32, 50, 80







All dimensions in mm unless otherwise indicated.

B=bbb x 10

bbb (cm)	H (mm)
<040	60
≥040	100

aaa (cm)	F (mm)
≤240	40
>240	50

No. of rows (cc)	C	EE
01	200	100
02	200	83
03	200	65
04	300	98
06	350	88
08	460	107
10	520	102
12	580	98

Header size	J(Cu)	H(Cu)	J(Fe)	H(Fe)
DN15	110	-	-	-
DN25	190	159	-	-
DN32	198	172	197	181
DN50	225	185	225	199
DN80	264	220	264	228

G	No. of rows (cc)						
1	2	3	4	6	8	10	12
0	35	-	-	-	-	-	-
35	35	69	104	173	246	315	384
43	69	69	104	173	246	315	384
69	69	69	104	173	246	315	384
-	104	104	104	173	246	315	384

Heat Exchangers for Cooling - Q(D,G)CG

The heat exchangers Q(D,G)CG are designed for cooling 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 2014/68/EU.

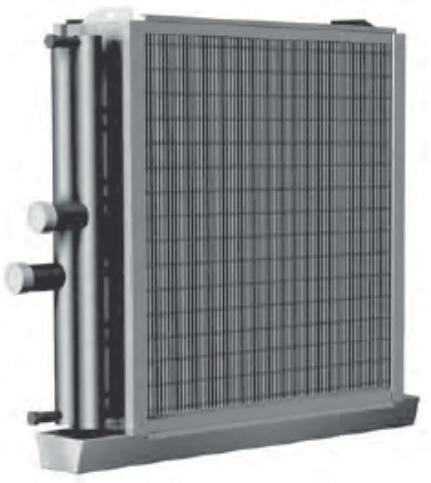
GENERAL

- The heat exchanger consists of 15mm copper tubes with low water pressure drop.
- QDCG are provided with a profiled fin for optimal efficiency. QGCG are provided with a flat fin for lower air pressure drop.
- The casing has a perforated frame according to RFHF (RVGL).
- Q(D,G)CG have threaded connections.
- Plugged connections are provided for venting and drainage (not DN15).
- The design conforms with the Pressure Equipment Directive PED 2014/68/EU.

OPERATING DATA

- Max. operating pressure 1.6 Mpa at max. operating temperature 110 °C.
- All heat exchangers are leakage tested using dry air under water at pressure 2.3 Mpa.

Q(D,G)CG can in a special version with steel manifolds be permitted for a maximum temperature of 150 °C.



Q(D,G)CG with slip-clamp casing and exposed header.

MATERIAL AND SURFACE TREATMENT

In basic version, material code "A", Q(D,G)CG are made of copper tubes and fins are made of aluminium. Round headers and connections are made of steel and painted with corrosion-protecting paint. DN15 has brass connection and DN25 has copper collection pipes as standard. The casing is made of galvanized steel sheet. In the product in detail, corrosion gategory C2 is met according to ISO 12944. Other fin materials, copper round headers and stainless steel housing are available as standard.

SIZES

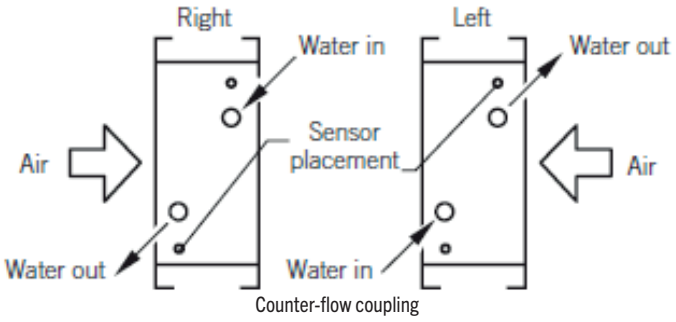
The coils are available with various fin pitches in sizes up to 3,8x2,4m for horizontal air flow, in the standard version.

Q(D,G)CG

INSTALLATION

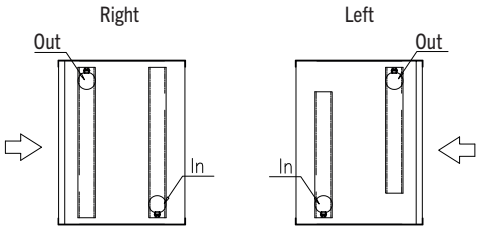
The heat exchanger is equipped with signs (label) that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchanger must be ordered in either a right or left-hand design. The system must be fully bled to give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

T-connection:



Counter-flow coupling

L-connection:



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 92-94.

MAINTENANCE

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

CODE KEY

Q(D,G)C_- aaa - bbb - cc - dd - ee - f - g

Q(D,G)CG = Slip-clamp casing with exposed header.

aaa = **Duct width (cm)** 020-380
bbb = **Duct height (cm)** 024-240
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	Drip tray
A	Galv	Steel (conn 15+25=Cu)	Al	SS
B	Galv	Cu	Cu	SS
D	Galv	Cu	Al	SS
E	Galv	Steel (conn 15+25=Cu)	Corropaint	SS
F	Galv	Cu	Cu tinned	SS
K	Galv	Cu	Corropaint	SS
L	SS	Steel (conn 15+25=Cu)	Al	SS
M	SS	Cu	Cu	SS
N	SS	Cu	Al	SS
O	SS	Steel (conn 15+25=Cu)	Corropaint	SS
P	SS	Cu	Cu tinned	SS
R	SS	Cu	Corropaint	SS
C	Mgn	Steel (conn 15+25=Cu)	Al	Al
G	Mgn	Cu	Cu	Al
H	Mgn	Cu	Al	Al
I	Mgn	Steel (conn 15+25=Cu)	Corropaint	Al
J	Mgn	Cu	Cu tinned	Al
S	Mgn	Cu	Corropaint	Al
T	AR	Steel (conn 15+25=Cu)	Al	AR
U	AR	Cu	Cu	AR
V	AR	Cu	Al	AR
X	AR	Steel (conn 15+25=Cu)	Corropaint	AR
Y	AR	Cu	Cu tinned	AR
Z	AR	Cu	Corropaint	AR

Galv = galvanized steel sheet, SS = stainless steel sheet, Cu = copper, Al = aluminium, AR = acid resistant steel sheet, Mgn = magnolia steel sheet.

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(D,G)CG

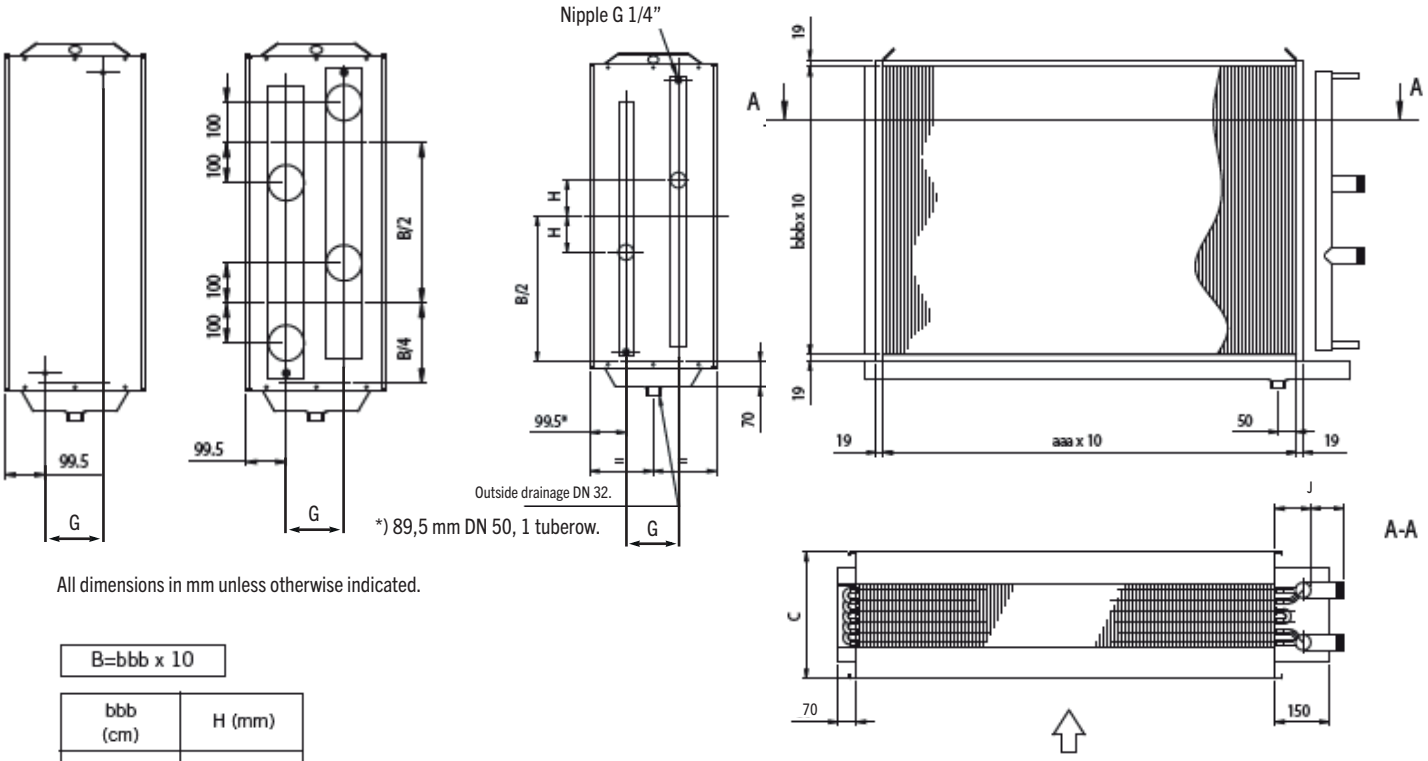
DIMENSION DRAWING Q(D,G)CG: Slip-clamp casing with exposed header.

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



All dimensions in mm unless otherwise indicated.

B=bbb x 10

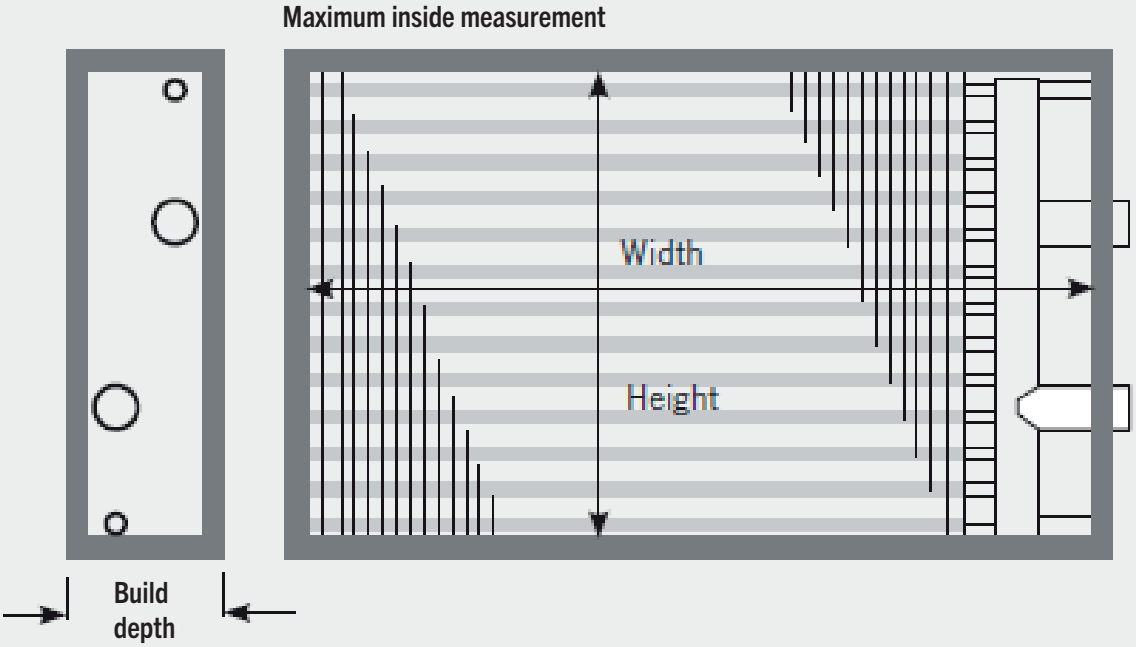
bbb (cm)	H (mm)
<040	60
≥040	100

No. of rows (cc)	C	C* dropstop	EE
01	300	350	98
02	300	350	98
03	300	350	98
04	300	350	98
06	350	400	88
08	460	520	107
10	520	580	102
12	580	640	98

Header size	J(Cu)	H(Cu)	J(Fe)	H(Fe)
DN15	110	-	-	-
DN25	190	159	-	-
DN32	198	172	197	181
DN50	225	185	225	199
DN80	264	220	264	228

G	No. of rows (cc)						
1	2	3	4	6	8	10	12
0	35	-	-	-	-	-	-
35	35	69	104	173	246	315	384
43	69	69	104	173	246	315	384
69	69	69	104	173	246	315	384
-	104	104	104	173	246	315	384

Heat Exchangers for Installation in Units



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 belongs 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.

QL
Width measurement: Available in cm increments from 20 cm to 380 cm.
Height measurement: Available in 3,33 cm increments from 20 cm to 240 cm.

QD
Width measurement: Available in cm increments from 20 cm to 380 cm.
Height measurement: Available in 4 cm increments from 20 cm to 240 cm.

Heat Exchanger for Air Handling Units - QLHN, QFHN

The heat exchanger QLHN 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 DN15).
- 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

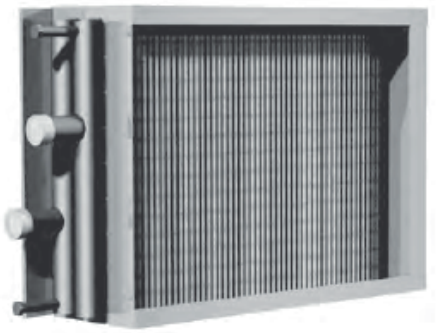
OPERATING DATA

- 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 110 °C.
- For air flows up to 40 m^3/s.
- All heat exchangers are leakage tested using dry air under water.

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

The heat exchanger is designed using copper tubes and aluminium fins. The casing is as standard made in hot-dip galvanized steel sheet but can also be delivered in stainless steel sheet, acid resistant steel sheet or magnolia 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.
QLHN: Standard sizes from 200x200 mm - 3800x2400 mm.
Materials for aggressive environments are available, see page 7.

QLHN can in a special version with steel manifolds be permitted for a maximum temperature of 150 °C.

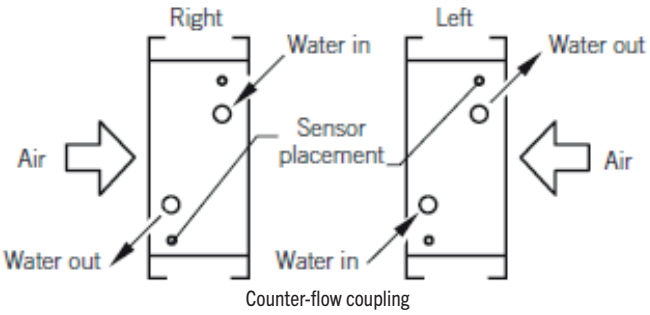


QLHN casing with inward folded edges on the top and bottom plates as well as cover plates for the header and elbows.

INSTALLATION

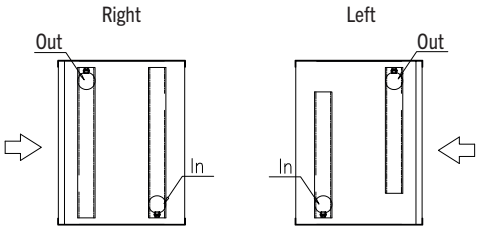
The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchangers are not in right/left designs but are reversible. The system must be fully bled to give optimal performance.

T-connection:



Counter-flow coupling

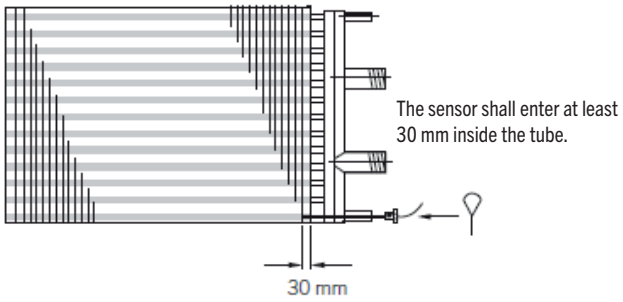
L-connection:



QLHN, QFHN

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.



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 92-94.

MAINTENANCE

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

QLHN, QFHN

CODE KEY

Q_H_- aaa - bbb - cc - dd - eee - fff - gg - h - i

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

aaa = Width (cm)
QLHN: 020-380

bbb = Height (cm)
QLHN: 020-240

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

dd = Fin spacing (mm x 10)
18, 20, 22, 23, 25, 27, 30, 40, 50, 60

ee = Number of fluid paths
002, 004, 006, 008 etc.

f-- = Connection side
1=right, 2=left

-ff = Edge height on top and bottom plate:
-00 inwardly folded top and bottom plate (cover edge 2hh)
-11-50 outward-folded top and bottom plate (cover edge 3hh)

gg = Connection dimension
15, 25, 32, 50, 80, 82 = 2x80, 90 = 1x100, 92 = 2x100

h = Connection type
1 = T-conn
2 = L-conn

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

i =

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
R	SS	Cu	Corropaint
C	Mgn	Steel (conn 15+25=Cu)	Al
G	Mgn	Cu	Cu
H	Mgn	Cu	Al
I	Mgn	Steel (conn 15+25=Cu)	Corropaint
J	Mgn	Cu	Cu tinned
S	Mgn	Cu	Corropaint
T	AR	Steel (conn 15+25=Cu)	Al
U	AR	Cu	Cu
V	AR	Cu	Al
X	AR	Steel (conn 15+25=Cu)	Corropaint
Y	AR	Cu	Cu tinned
Z	AR	Cu	Corropaint

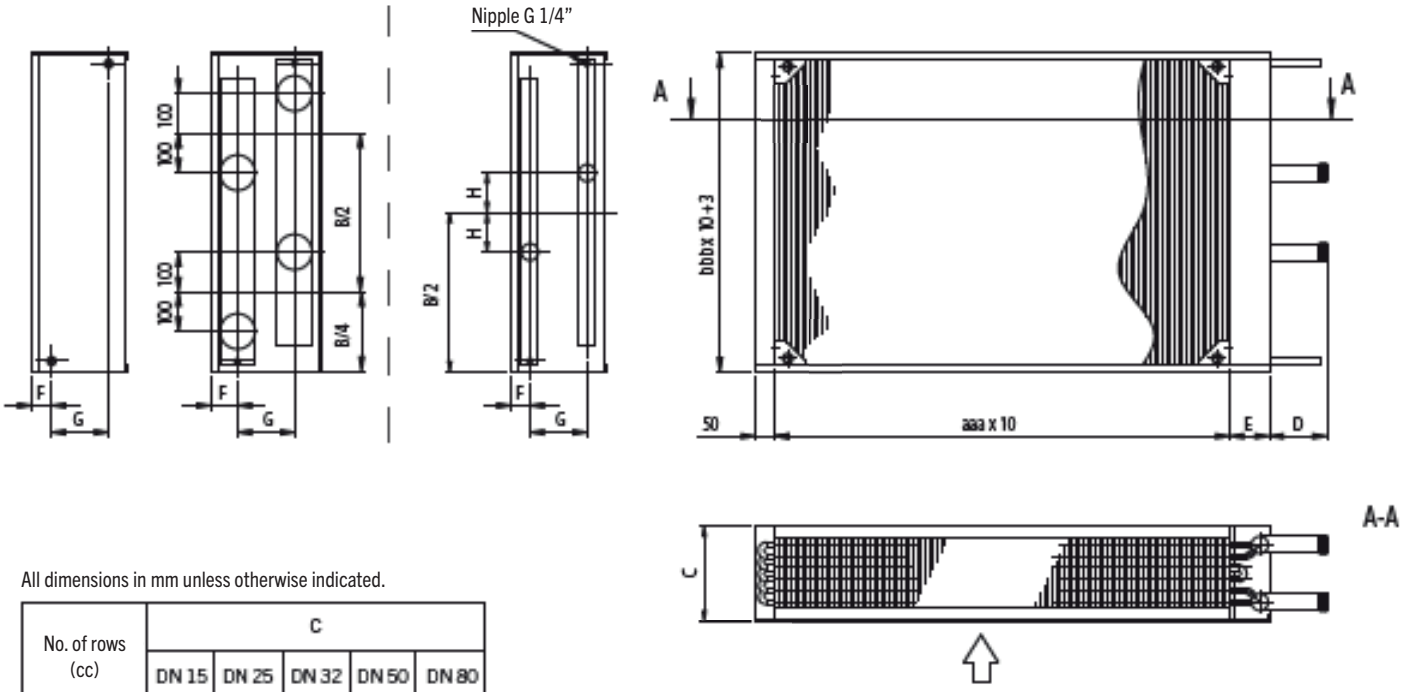
Galv = galvanized steel sheet, SS = stainless steel sheet, Cu = copper, Al = aluminium, AR = acid resistant steel sheet, Mgn = magnolia steel sheet.

QLHN, QFHN

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. The picture shows a battery with an inwardly folded top and bottom plate with a T-connection.

Connection DN 15 **Connection 2 x DN 80** **Connection DN 25, 32, 50, 80**



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 x 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

Heat Exchanger for Cooling - Q(L,F)CN

The heat exchangers Q(L,F)CN 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.

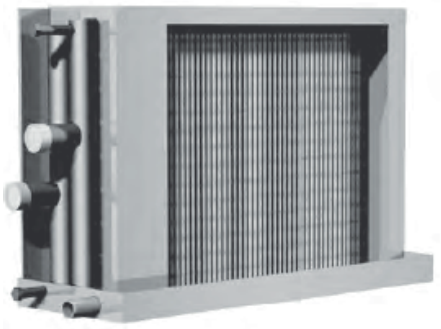
GENERAL

- 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).
- 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 i 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 110 °C.
- For air flows up to 40 m^3/s.
- All heat exchangers are leakage tested using dry air.



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

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

The heat exchanger is designed using copper tubes and aluminium fins. The casing is as standard made in hot-dip galvanized steel sheet but can also be delivered in stainless steel sheet, acid resistant steel sheet or magnolia 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.
QLCN: Standard sizes are from 200x200 mm to 3800x2400 mm.
Materials for aggressive environments are available, see page 7.

Q(L,F)CN

DIMENSIONING VIA COILS

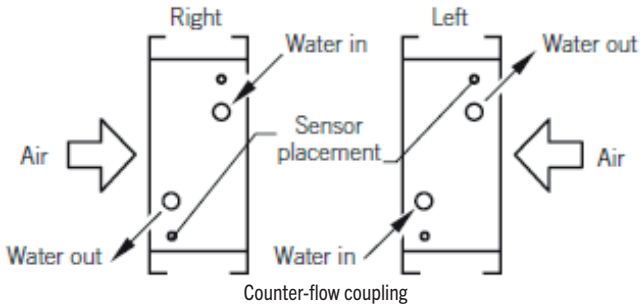
Dimensioning is performed using the product selection program Coils, which can be downloaded from our website. Coils shows, amongs others, dimension drawings and the following data:

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

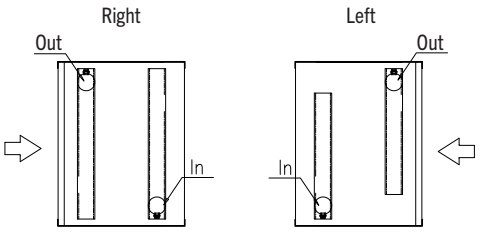
The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchanger must be ordered in either a right or left-hand design. The system must be fully bled to give optimal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

T-connection:



Counter-flow coupling

L-connection:



ACCESSORIES

Additional accessories are available, see pages 92-94

MAINTENANCE

Operating and maintenance instructions are available via the product selection program Coils.

Q(L,F)CN

CODE KEY

QLC_- aaa - bbb - cc - dd - eee - fff - gg - h - i

Q(L,F)CN = Casing with inward folded edges on the top and bottom plates. Cover plate for the header. Available with or without drip tray.

QL = 1/2" tubes with pleated fins
QF = 1/2" tubes with plain fins

aaa = Width (cm)
QLCN: 020-380

bbb = Height (cm)
QLCN: 020-240

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

dd = Fin spacing (mm x 10)
18, 20, 22, 23, 25, 27, 30, 40, 50, 60

ee = Number of fluid paths
002, 004, 006, 008 etc.

f-- = Connection side
1=right, 2=left, 3=right with drip tray (does not apply to type H and T), 4=left with drip tray (does not apply to type H and T), 5=right with drip tray and space for droplet eliminator (does not apply to type H and T), 6=left with drip tray and space for droplet eliminator (does not apply to type H and T), 7=right with drip tray and droplet eliminator (does not apply to type H and T), 8=left with drip tray and droplet eliminator (does not apply to type H and T).

-ff = Edge height on top and bottom plate:
-00 inwardly folded top and bottom plate (cover edge 2hh)
-11-50 outward-folded top and bottom plate (cover edge 2hh)

gg = Connection dimension
15, 25, 32, 50, 80, 82 = 2x80, 90 = 1x100, 92 = 2x100

h = Connection type
1 = T-conn
2 = L-conn

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

i =

g = Material	Casing	Header	Fin	Drip tray
A	Galv	Steel (conn 15+25=Cu)	Al	SS
B	Galv	Cu	Cu	SS
D	Galv	Cu	Al	SS
E	Galv	Steel (conn 15+25=Cu)	Corropaint	SS
F	Galv	Cu	Cu tinned	SS
K	Galv	Cu	Corropaint	SS
L	SS	Steel (conn 15+25=Cu)	Al	SS
M	SS	Cu	Cu	SS
N	SS	Cu	Al	SS
O	SS	Steel (conn 15+25=Cu)	Corropaint	SS
P	SS	Cu	Cu tinned	SS
R	SS	Cu	Corropaint	SS
C	Mgn	Steel (conn 15+25=Cu)	Al	Al
G	Mgn	Cu	Cu	Al
H	Mgn	Cu	Al	Al
I	Mgn	Steel (conn 15+25=Cu)	Corropaint	Al
J	Mgn	Cu	Cu tinned	Al
S	Mgn	Cu	Corropaint	Al
T	AR	Steel (conn 15+25=Cu)	Al	AR
U	AR	Cu	Cu	AR
V	AR	Cu	Al	AR
X	AR	Steel (conn 15+25=Cu)	Corropaint	AR
Y	AR	Cu	Cu tinned	AR
Z	AR	Cu	Corropaint	AR

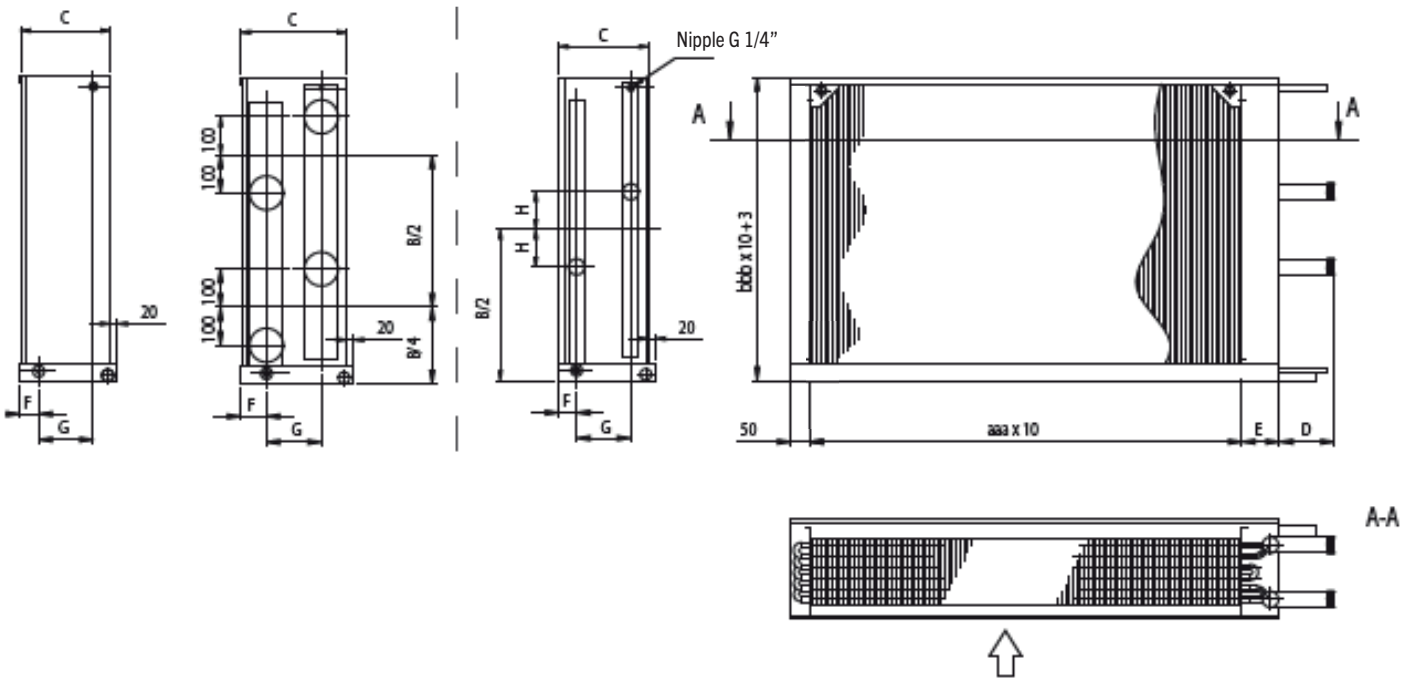
Galv = galvanized steel sheet, SS = stainless steel sheet, Cu = copper, Al = aluminium, AR = acid resistant steel sheet, Mgn = magnolia steel sheet.

Q(L,F)CN

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. The picture shows a battery with an inwardly folded top and bottom plate and with a T-connection.

Connection DN 15 | **Connection 2 x DN 80** | **Connection DN 25, 32, 50, 80**



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

*) by 1 tuberow.

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

Q(L,F)CN

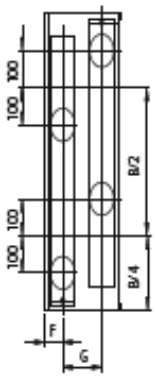
DIMENSION DRAWING QLCN WITHOUT DRIP TRAY: Casing with inward folded edges on the top and bottom plates.

Cover plate for headers.

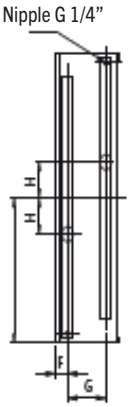
Detailed dimension drawing, weight and volume are gathered via the product selection program Coils. The picture shows a battery with an inwardly folded top and bottom plate and with a T-connection.

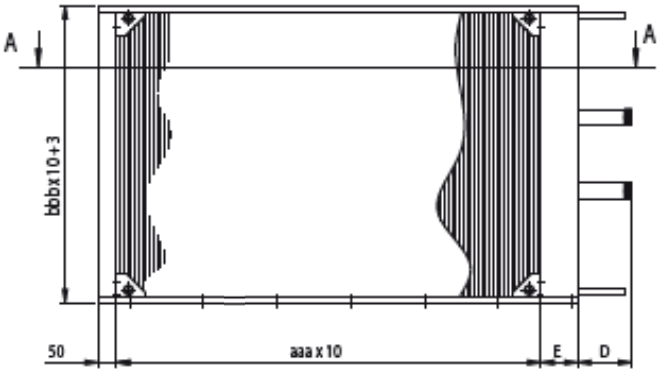
Connection DN 15

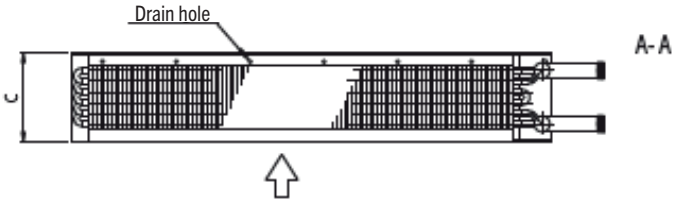
Connection 2 x DN 80



Connection DN 25, 32, 50, 80, 100







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	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

*) by 1 tuberow.

B=bbb x 10

bbb (cm)	H (mm)
<040	60
≥040	100

Heat Exchanger for Heat Recovery - Supply Air

The heat exchangers Q(L,F)TN 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 PED 2014/68/EU.

GENERAL

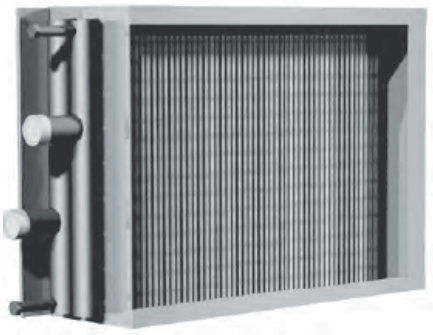
- The design consists of a fin body, headers and casing.
- QL = 1/2" tubes with pleated fins. QF = 1/2" tubes with plain fins.
- QLTN-casing with inward folded edges on the top and bottom plates and cover plate for the header and elbows.
- The header is equipped with nipples for bleeding and draining. 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
- Max operating pressure: 1.6 MPa at max operating temperature 110 °C.
- For air flows up to 40 m^3/s.
- All heat exchangers are leakage tested using dry air under water.

Q(L,F)TN can in a special version with steel manifolds be permitted for a maximum temperature of 150 °C.



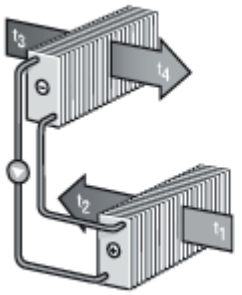
The QLTN casing with inward folded edges on the top and bottom plates as well as cover plates for the header and elbows.

MATERIAL AND SIZE

The heat exchanger is designed using copper tubes and aluminium fins. The casing is as standard made in hot-dip galvanized steel sheet but can also be delivered in stainless steel sheet, acid resistant steel sheet or magnolia 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.
Q(L,F)TN: Standard sizes are from 200x200 mm to 3800x2400 mm.
Materials for aggressive environments are available, see page 7.

DIMENSIONING VIA COILS

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



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

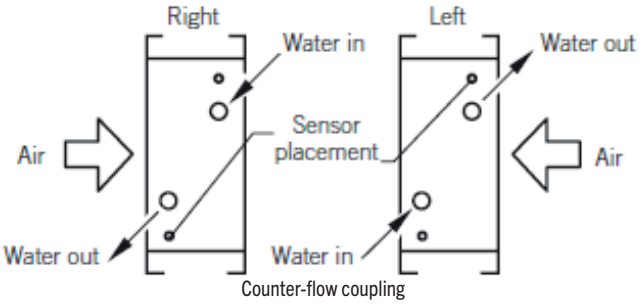
Air side:	Air temperature out	°C
	Output	kW
	Air velocity	m/s
	Air pressure drop	Pa
	Outgoing moisture option	%
Water side:	Return temperature	°C
	Fluid flow/heat exchanger	l/s
	Total fluid flow	l/s
	Fluid velocity	m/s

Q(L,F)TN - ECOTERM®

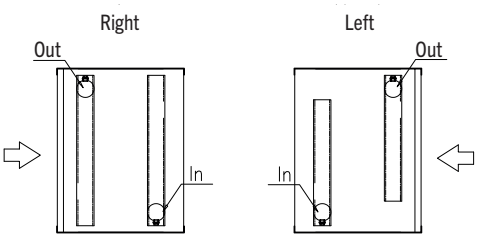
INSTALLATION

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

T-connection:



L-connection:



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 92-94.

MAINTENANCE

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

Q(L,F)TN - ECOTERM®

CODE KEY

Q(L,F)TN- aaa - bbb - cc - dd - eee - fff - gg - h - i

Q(L,F)TN = Casing with inward 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)**
Q(L,F)TN: 020-380

bbb = **Height (cm)**
Q(L,F)TN: 020-240

cc = **No. of tube rows**
Q(L,F)TN: 04, 06, 08, 10, 12, 14, 16, 18

dd = **Fin spacing (mm x 10)**
18, 20, 22, 23, 25, 27, 30, 40, 50, 60

ee = **No. of fluid paths**
002, 004, 006, 008 etc.

f-- = **Connection side**
1=right, 2=left

-ff = **Edge height on top and bottom plate:**
-00 inwardly folded top and bottom plate (cover edge 2hh)
-11-50 outward-folded top and bottom plate (cover edge 3hh)

gg = **Connection dimension**
15, 25, 32, 50, 80, 82 = 2x80, 90 = 1x100, 92 = 2x100

h = **Connection type**
1 = T-conn
2 = L-conn

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

i =

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
R	SS	Cu	Corropaint
C	Mgn	Steel (conn 15+25=Cu)	Al
G	Mgn	Cu	Cu
H	Mgn	Cu	Al
I	Mgn	Steel (conn 15+25=Cu)	Corropaint
J	Mgn	Cu	Cu tinned
S	Mgn	Cu	Corropaint
T	AR	Steel (conn 15+25=Cu)	Al
U	AR	Cu	Cu
V	AR	Cu	Al
X	AR	Steel (conn 15+25=Cu)	Corropaint
Y	AR	Cu	Cu tinned
Z	AR	Cu	Corropaint

Galv = galvanized steel sheet, SS = stainless steel sheet, Cu = copper, Al = aluminium, AR = acid resistant steel sheet, Mgn = magnolia steel sheet.

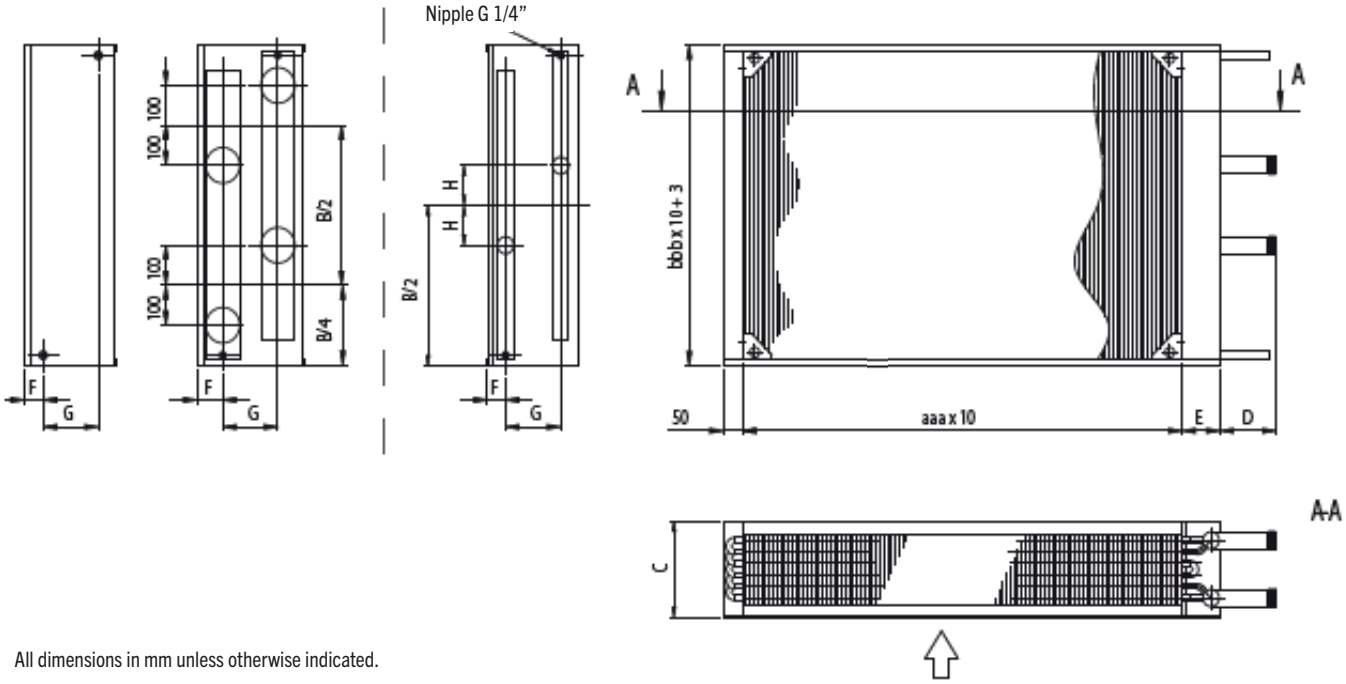
Q(L,F)TN - ECOTERM®

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. The picture shows a battery with an inwardly folded top and bottom plate and with a T-connection.

Connection DN 15 | **Connection 2 x DN 80** | **Connection DN 25, 32, 50, 80**



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 x 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

*) by 1 tuberow.

Heat Exchanger for Heat Recovery - Exhaust Air

The heat exchangers Q(L,F)FN 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

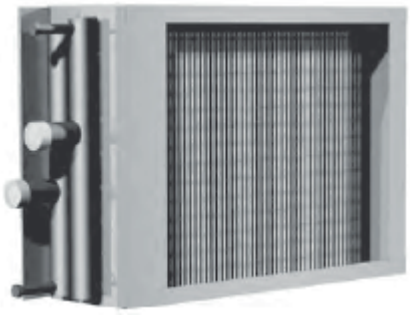
- The design consists of a fin body, headers and casing.
- QL = 1/2" tubes with pleated fins. QF = 1/2" tubes with plain fins.
- The QLFN casing with inward folded edges on the top and
- bottom plates as well as cover plates for the header and
- elbows. QLFN is available with or without drip tray (horizontal 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

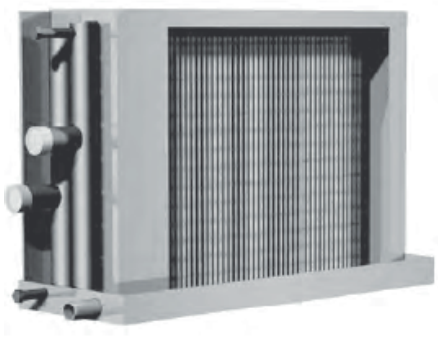
OPERATING DATA

- 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 40m^3/s.
- Max operating pressure: 1.6 MPa at max operating temperature 110 °C.
- All heat exchangers are leakage tested using dry air under water.

Q(L,F)FN can in a special version with steel manifolds be permitted for a maximum temperature of 150 °C.



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



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

MATERIAL AND SIZE

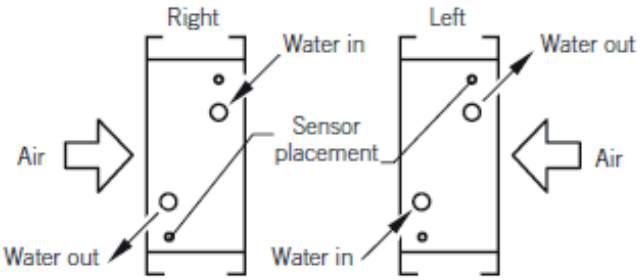
The heat exchanger is designed using copper tubes and aluminium fins. The casing is as standard made in hot-dip galvanized steel sheet but can also be delivered in stainless steel sheet, acid resistant steel sheet or magnolia steel sheet. As standard the header is designed of steel, a part from DN 15 and DN 25 which are of copper with brass connections.
QLFN: Standard sizes are from 200x200 mm to 3800x2400 mm.
Materials for aggressive environments are available, see page 7.

Q(L,F)FN - ECOTERM®

INSTALLATION

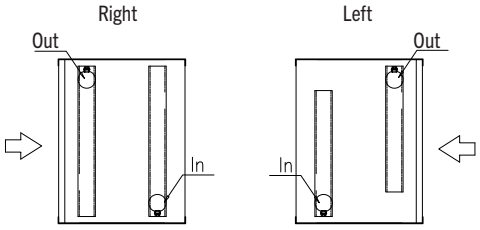
The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchanger must be ordered in either a right or left-hand design. The system must be fully bled to give optimal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

T-connection:



Counter-flow coupling

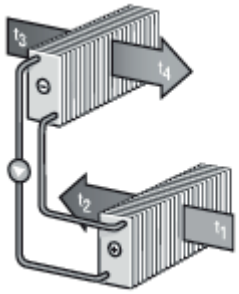
L-connection:



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 %



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

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

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 92-94.

MAINTENANCE

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

Q(L,F)FN - ECOTERM®

CODE KEY

Q(L,F)FN- aaa - bbb - cc - dd - eee - fff - gg - h - i

Q(L,F)FN = Casing with inward 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)**
Q(L,F)FN: 020-380

bbb = **Height (cm)**
Q(L,F)FN: 020-240

cc = **Number of tube rows**
Q(L,F)FN: 04, 06, 08, 10, 12, 14, 16, 18

dd = **Fin spacing (mm x 10)**
18, 20, 22, 23, 25, 27, 30, 40, 50, 60

ee = **Number of fluid paths**
002, 004, 006, 008 etc.

f-- = **Connection side**
1=right, 2=left, 3=right with drip tray (does not apply to type H and T), 4=left with drip tray (does not apply to type H and T), 5=right with drip tray and space for droplet eliminator (does not apply to type H and T), 6=left with drip tray and space for droplet eliminator (does not apply to type H and T), 7=right with drip tray and droplet eliminator (does not apply to type H and T), 8=left with drip tray and droplet eliminator (does not apply to type H and T).

-ff = **Edge height on top and bottom plate:**
-00 inwardly folded top and bottom plate (cover edge 2hh)
-11-50 outward-folded top and bottom plate (cover edge 3hh)

gg = **Connection dimension**
15, 25, 32, 50, 80, 82 = 2x80, 90 = 1x100, 92 = 2x100

h = **Connection type**
1 = T-conn
2 = L-conn

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

i =

g = Material	Casing	Header	Fin	Drip tray
A	Galv	Steel (conn 15+25=Cu)	Al	SS
B	Galv	Cu	Cu	SS
D	Galv	Cu	Al	SS
E	Galv	Steel (conn 15+25=Cu)	Corropaint	SS
F	Galv	Cu	Cu tinned	SS
K	Galv	Cu	Corropaint	SS
L	SS	Steel (conn 15+25=Cu)	Al	SS
M	SS	Cu	Cu	SS
N	SS	Cu	Al	SS
O	SS	Steel (conn 15+25=Cu)	Corropaint	SS
P	SS	Cu	Cu tinned	SS
R	SS	Cu	Corropaint	SS
C	Mgn	Steel (conn 15+25=Cu)	Al	Al
G	Mgn	Cu	Cu	Al
H	Mgn	Cu	Al	Al
I	Mgn	Steel (conn 15+25=Cu)	Corropaint	Al
J	Mgn	Cu	Cu tinned	Al
S	Mgn	Cu	Corropaint	Al
T	AR	Steel (conn 15+25=Cu)	Al	AR
U	AR	Cu	Cu	AR
V	AR	Cu	Al	AR
X	AR	Steel (conn 15+25=Cu)	Corropaint	AR
Y	AR	Cu	Cu tinned	AR
Z	AR	Cu	Corropaint	AR

Galv = galvanized steel sheet, SS = stainless steel sheet, Cu = copper, Al = aluminium, AR = acid resistant steel sheet, Mgn = magnolia steel sheet.

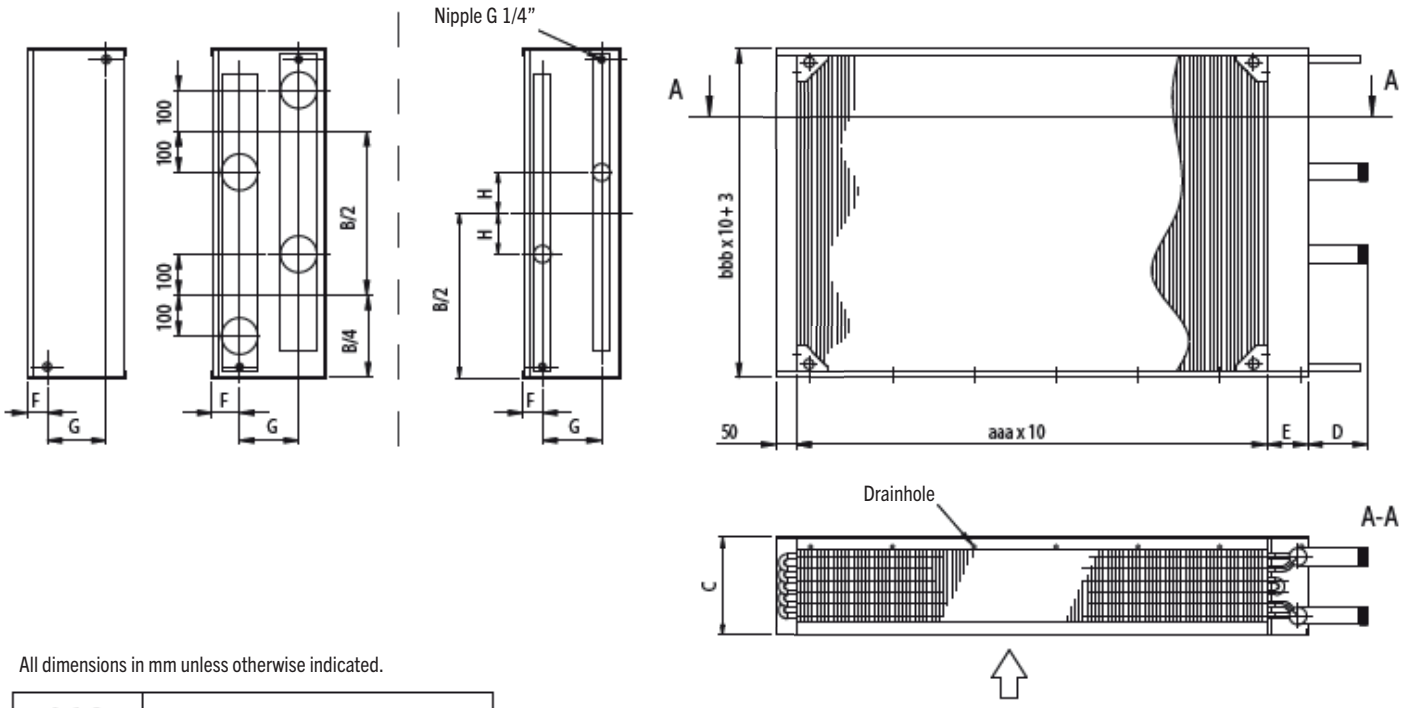
Q(L,F)FN - ECOTERM®

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. The picture shows a battery with an inwardly folded top and bottom plate and with a T-connection.

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

B=bbbx10

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

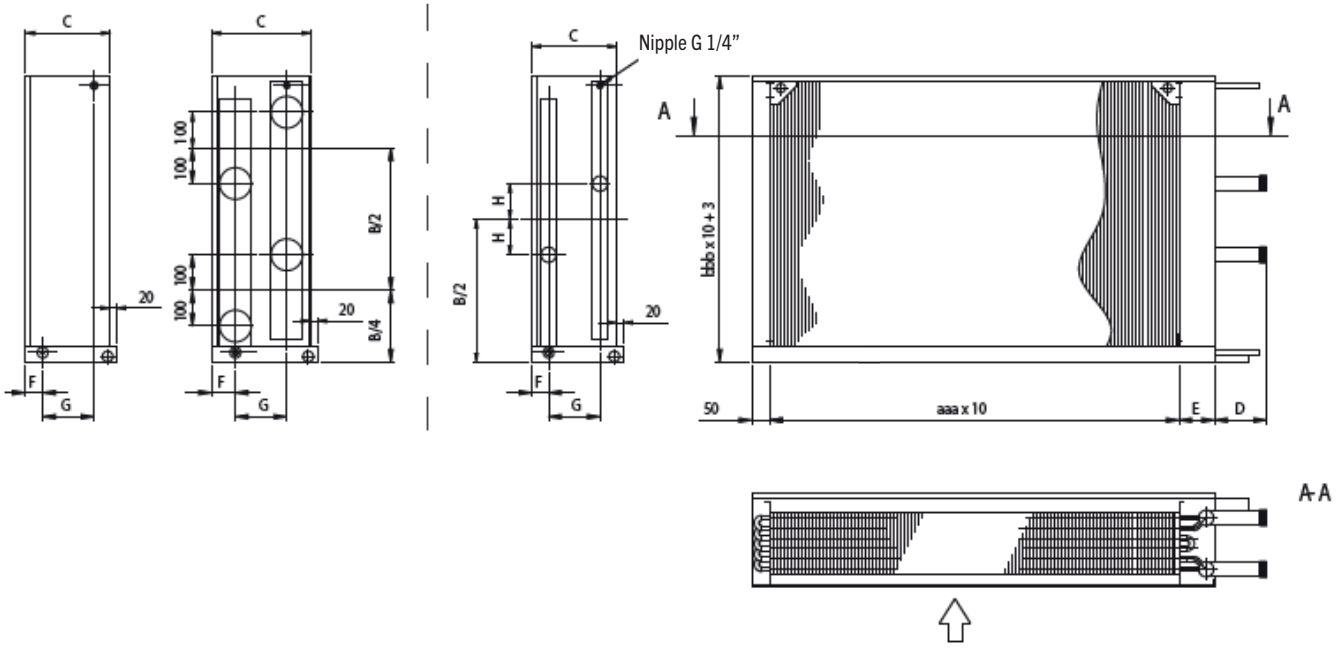
Q(L,F)FN - ECOTERM®

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. The picture shows a battery with an inwardly folded top and bottom plate and with a T-connection.

Connection DN 15 | **Connection 2 x DN 80** | **Connection DN 25, 32, 50, 80, 100**



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

*) 38 by 1 tuberow

B=bbbx10

bbb (cm)	H (mm)
<040	60
≥040	100

Heat Exchanger for Air Handling Units - QLHT

The heat exchangers QLHT are intended for heating air with liquid as a heat carrier and are installed 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 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

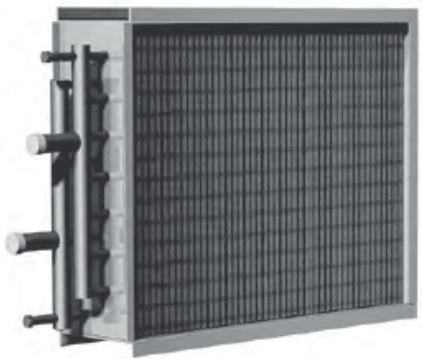
OPERATING DATA

- 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 110 °C.
- For air flows up to 40 m^3/s.
- All heat exchangers are leakage tested using dry air under water.

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

The heat exchanger is designed using copper tubes and aluminium fins. The casing is as standard made in hot-dip galvanized steel sheet but can also be delivered in stainless steel sheet, acid resistant steel sheet or magnolia 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.
QLHT: Standard sizes from 200x200 mm - 1200x1000 mm.
Materials for aggressive environments are available, see page 7.

QLHT can in a special version with steel manifolds be permitted for a maximum temperature of 150 °C.

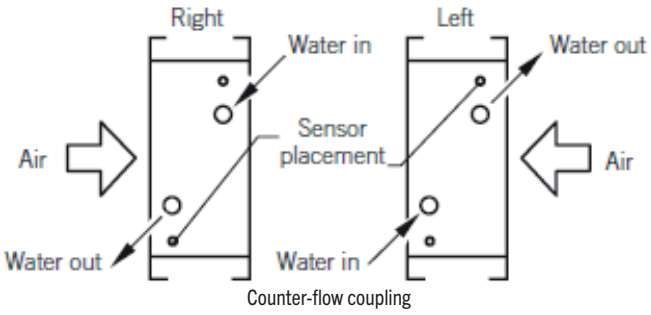


QLHT with basic casing without cover plate.

INSTALLATION

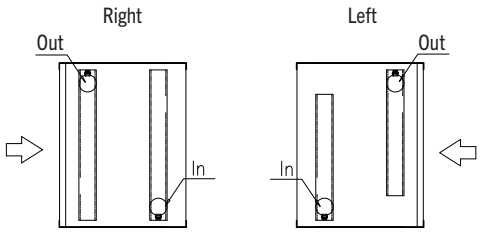
The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchangers are not in right/left designs but are reversible. The system must be fully bled to give optimal performance.

T-connection:



Counter-flow coupling

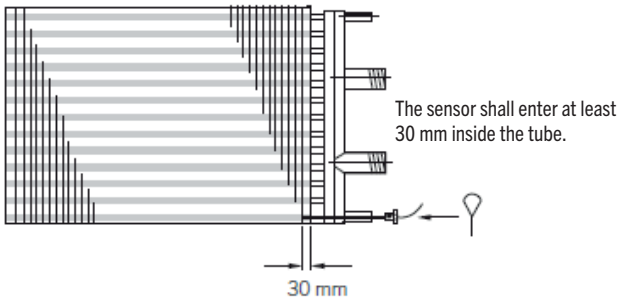
L-connection:



QLHT

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.



CODE KEY

Q_H_- aaa - bbb - cc - dd - ee - f
QLHT = Basic casing without cover plate.

aaa = **Width (cm)**
QLHT: 020-120 (Fin width excl. header and elbows)

bbb = **Height (cm)**
QLHT: 020-100 (Fin height excl. plates)

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

dd = **Fin spacing (mm x 10)**
18, 20, 22, 23, 25, 27, 30, 40, 50, 60

ee = **Number of fluid paths**
002, 004, 006, 008 etc.

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

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 92-94.

MAINTENANCE

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

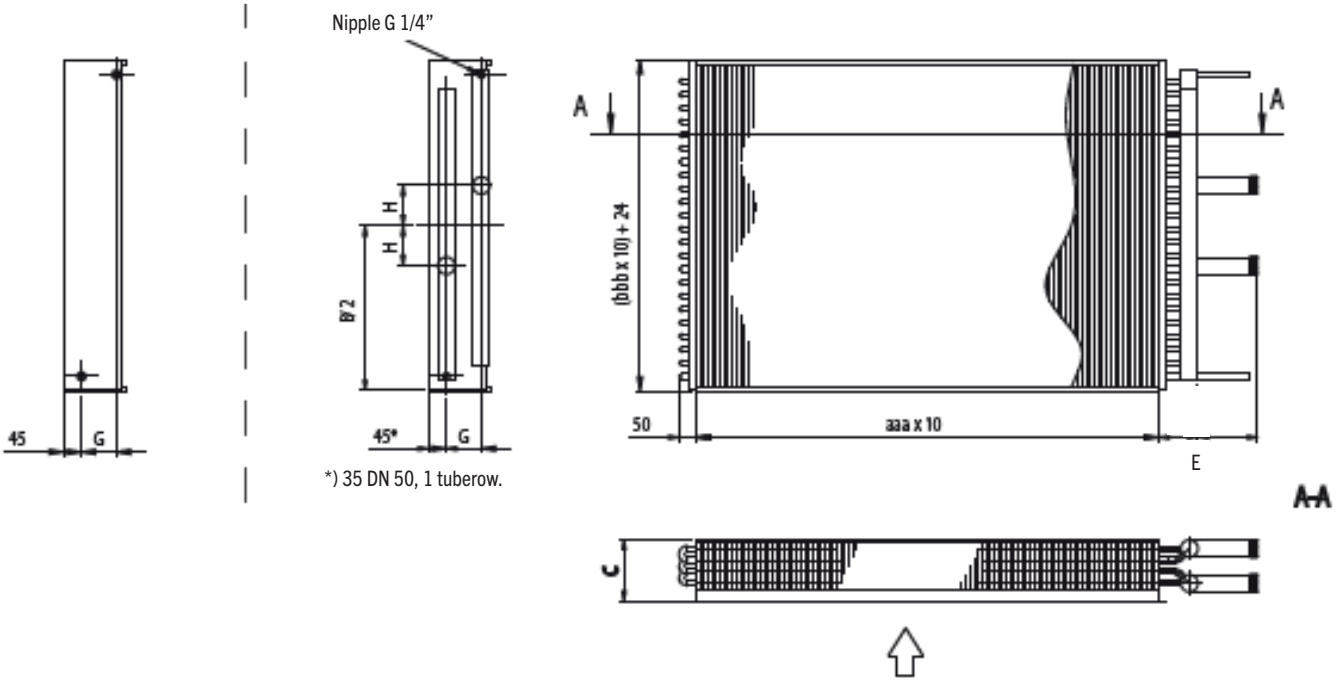
QLHT

DIMENSION DRAWING QLHT: Basic casing without cover plate.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils. The picture shows a battery with an inwardly folded top and bottom plate and with a T-connection.

Connection DN 15

Connection DN 25, 32, 50, 80



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	E	G No. of rows (cc)				
		1	2	3	4	6
DN 15 (Cu)	-	0	29	-	-	-
DN 25 (Cu)	240	36	58	58	87	144
DN 32 (Fe)	246	43	58	58	87	144
DN 50 (Fe)	275	68	68	68	87	144
DN 80 (Fe)	295	-	94	94	101	144

Heat Exchangers for Cooling - QLCT

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

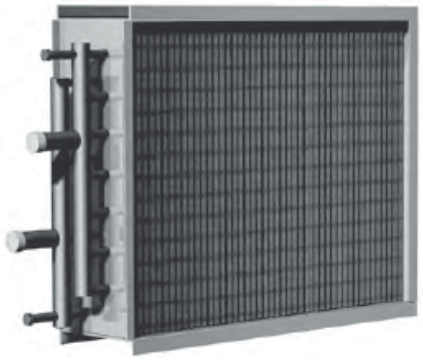
GENERAL

- The design consists of a fin body, headers and casing.
- 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 110 °C.
- For air flows up to 40 m^3/s.
- All heat exchangers are leakage tested using dry air.



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

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

The heat exchanger is designed using copper tubes and aluminium fins. The casing is as standard made in hot-dip galvanized steel sheet but can also be delivered in stainless steel sheet, acid resistant steel sheet or magnolia 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.
QLCT: Standard sizes are from 200x200 mm to 1200x1000 mm.
Materials for aggressive environments are available, see page 7.

QLCT

DIMENSIONING VIA COILS

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

QLC_- aaa - bbb - cc - dd - ee - f
QLCT = Basic casing without cover plate.

aaa = Width (cm)
QLCT: 020-120 (Fin width excl. header and elbows)

bbb = Height (cm)
QLCT: 020-100 (Fin height excl. header and elbows)

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

dd = Fin spacing (mm x 10)
18, 20, 22, 23, 25, 27, 30, 40, 50, 60

ee = Number of fluid paths
002, 004, 006, 008 etc.

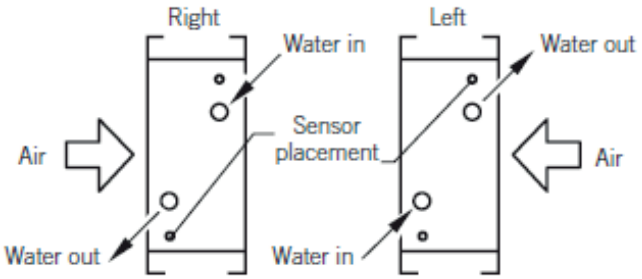
f = Connection side
1=right, 2=left

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

INSTALLATION

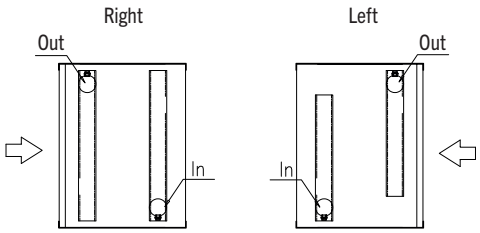
The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchanger must be ordered in either a right or left-hand design. The system must be fully bled to give optimal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

T-connection:



Counter-flow coupling

L-connection:



ACCESSORIES

Additional accessories are available, see pages 92-94.

MAINTENANCE

Operating and maintenance instructions are available via the product selection program Coils.

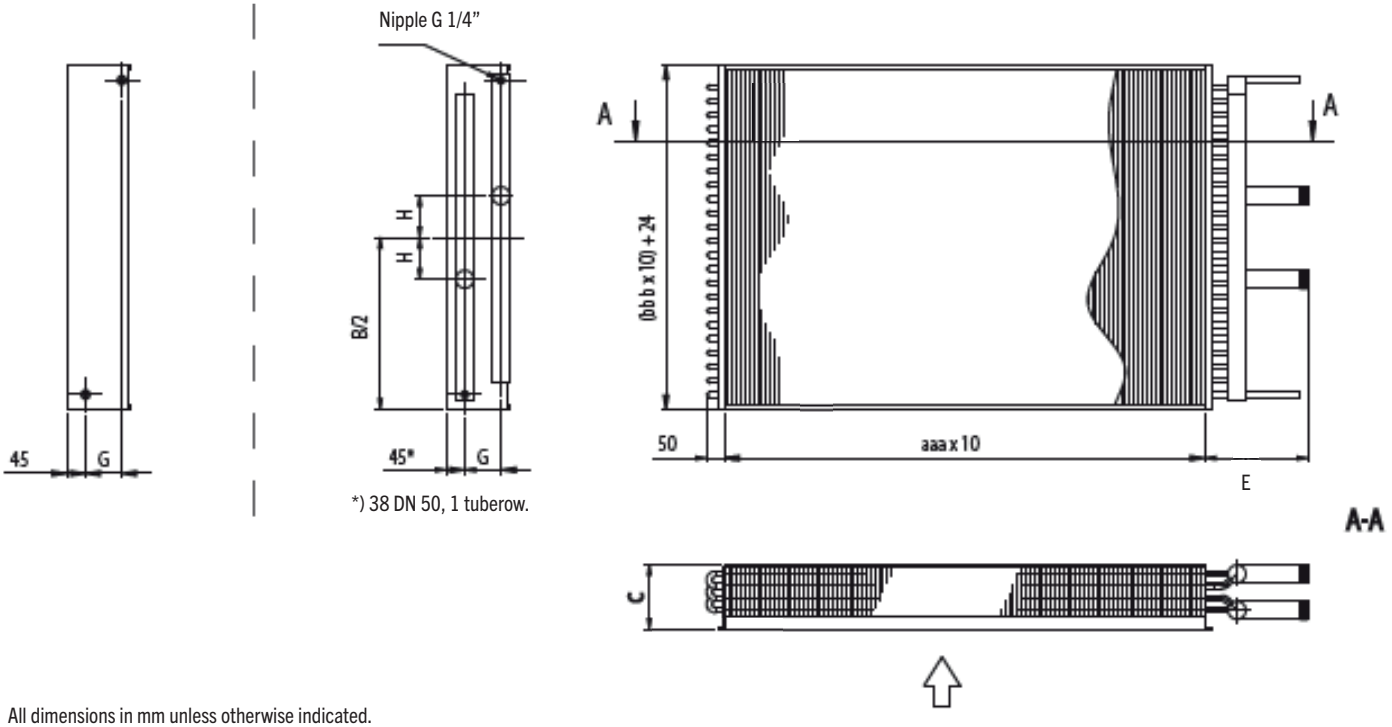
QLCT

DIMENSION DRAWING QLCT: Basic casing without cover plate.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils. The picture shows a battery with an inwardly folded top and bottom plate and with a T-connection

Connection DN 15

Connection DN 25, 32, 50, 80



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	E	G	No. of rows (cc)			
		1	2	3	4	6
DN 15 (Cu)	-	0	29	-	-	-
DN 25 (Cu)	240	36	58	58	87	144
DN 32 (Fe)	246	43	58	58	87	144
DN 50 (Fe)	275	68	68	68	87	144
DN 80 (Fe)	295	-	94	94	101	144

Q(D,G)TN

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

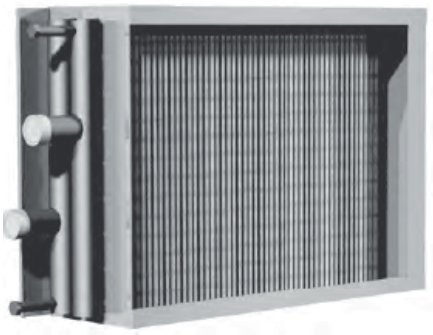
GENERAL

- The heat exchanger consists of 15 mm copper tubes with low water pressure drop.
- QDTN has a profiled fin for optimal efficiency. QGTN has a flat fin for lower air pressure drop.
- QDTN/QGTN are provided with plugged connections for venting and drainage (not DN15).
- The designs conforms with the Pressure Equipment Directive PED 2014/68/EU.

OPERATING DATA

- Max. operating pressure: 1.6 Mpa at max. operating temperature 110 °C.
- All heat exchangers are leakage tested using dry air under water at pressure 2.3 Mpa. The pressure specifications refer to overpressure.

QDTN/QGTN can in a special version with steel manifolds be permitted for a maximum temperature of 150 °C.



The Q(D,G)TN casing with inward folded edges on the top and bottom plates as well as cover plates for the header and elbows.

MATERIAL AND SURFACE TREATMENT

In basic version, material code ”A”, QDTN/QGTN are made of copper tubes and fins are made of aluminium. Round headers and connections are made of steel and painted with corrosion-protecting paint. DN15 has brass connection and DN25 has copper collection pipes as standard. The casing is made of galvanized steel sheet. In the product in detail, corrosion category C2 is met according to ISO 12944. Other fin materials, copper round headers and stainless steel housing are available as standard.

SIZES

The coils are available with various fin pitches in sizes up to 3,8 x 2,4m for horizontal air flow, in the standard version.

FREEZE PROTECTION (BRINES)

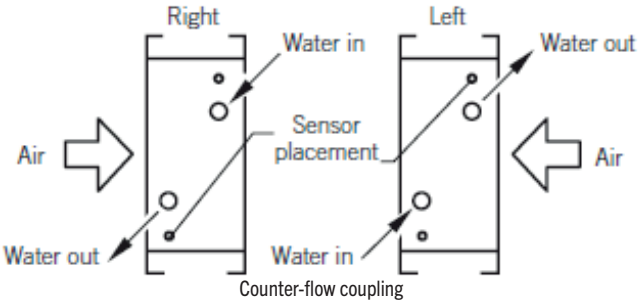
Glycols, ethanols, salt solutions, oils etc. In order to gain good performance it is extremely important that the system is filled with the same brine solution and concentration that it is designed for. Different types of brine are included in the calculation program Coils, which gives the correct pressure 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.

Q(D,G)TN

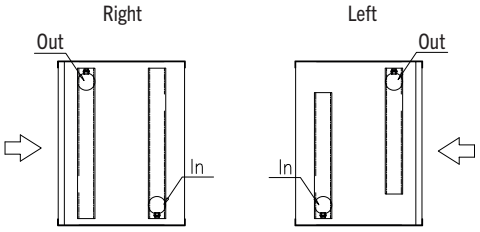
INSTALLATION

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.

T-connection:



L-connection:



ACCESSORIES

Additional accessories are available, see pages 92-94.

MAINTENANCE

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

CODE KEY

Q(D,G)TN_- aaa - bbb - cc - dd - eee - fff - gg - h -i

Q(D,G)TN = Casing with inward folded edges on the bottom plate and top plate with inward alternatively outward folded edges. Cover plate for the header.

QD = 15mm tubes with pleated fins.
QG = 15mm tubes with plain fins.

aaa = Width (cm) 020-380
(Fin width excl. header and elbows)

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

cc = Number of tube rows 04,06, 08, 10, 12, 14, 16, 18

dd = Fin spacing (mm x 10) 18, 20, 22, 23, 25, 27, 30, 40, 50 ,60

eee = Number of fluid paths 002, 004, 006, 008 etc.

f-- = Connection side
1=right, 2=left

-ff = Edge height on top and bottom plate
-00 inward folded top and bottom plates
-11-50 outward folded top plate and inward folded bottom plate

gg = Connection dimension
15, 25, 32, 50, 80, 82= 2x80, 90= 1x100, 92= 2x100

h = Connection type
1 = T-conn
2 = L-conn
3 = T-conn angled with the air, only cu header
4 = L-conn angled with the air, only cu header
5 = T-conn angled against the air, only cu header
6 = L-conn angled against the air, only cu header

i = Material (g)

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
R	SS	Cu	Corropaint
C	Mgn	Steel (conn 15+25=Cu)	Al
G	Mgn	Cu	Cu
H	Mgn	Cu	Al
I	Mgn	Steel (conn 15+25=Cu)	Corropaint
J	Mgn	Cu	Cu tinned
S	Mgn	Cu	Corropaint
T	AR	Steel (conn 15+25=Cu)	Al
U	AR	Cu	Cu
V	AR	Cu	Al
X	AR	Steel (conn 15+25=Cu)	Corropaint
Y	AR	Cu	Cu tinned
Z	AR	Cu	Corropaint

Galv = galvanized steel sheet, SS = stainless steel sheet, Cu = copper, Al = aluminium, AR = acid resistant steel sheet, Mgn = magnolia steel sheet.

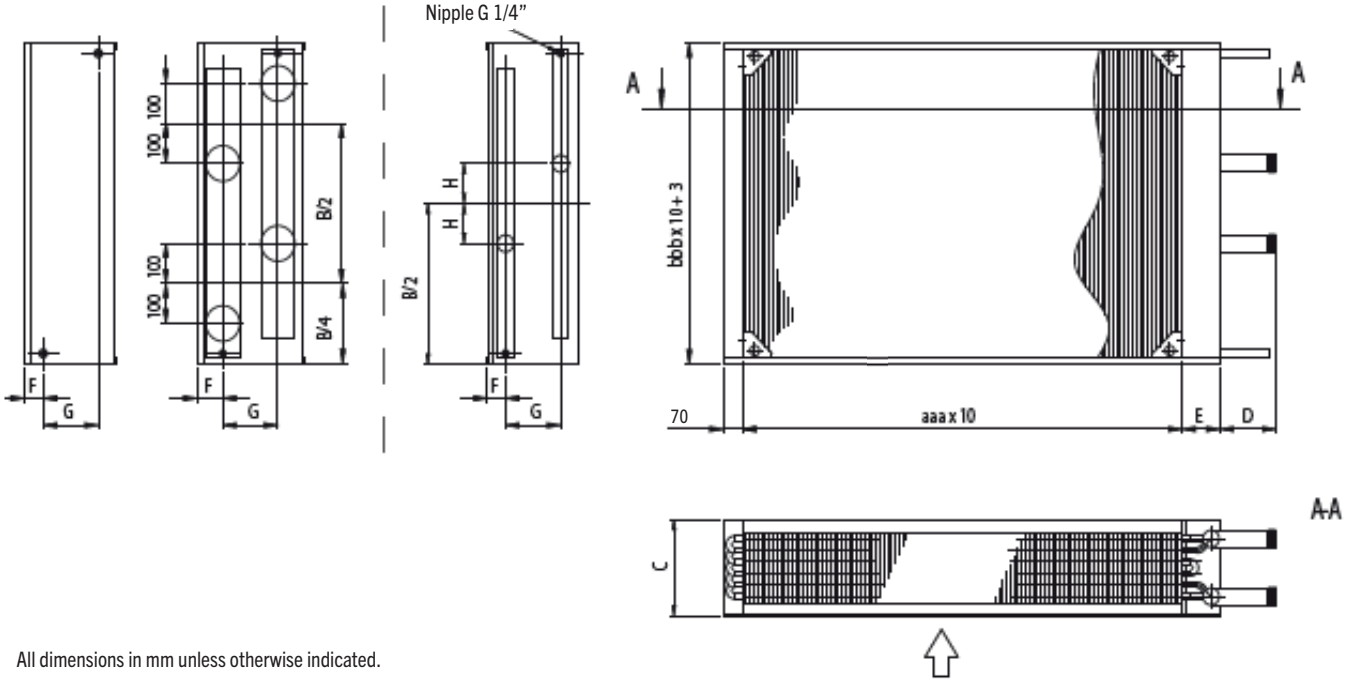
Our products can be ordered with a number of different accessories and with other dimensions and materials than standard. Contact us for more information.

Q(D,G)TN

DIMENSION DRAWING Q(D,G)TN: Casing with inward folded edges on the bottom plate and top plate with inward alternatively outward folded edges. Cover plate for the header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils. The picture shows a battery with an inwardly folded top and bottom plate and with a T-connection.

Connection DN 15 | **Connection 2 x DN 80** | **Connection DN 25, 32, 50, 80**



All dimensions in mm unless otherwise indicated.

No. of rows (cc)	C			
	DN15-32	DN50	DN80	DN100
4	242	242	242	270
6	312	312	312	312
8	384	384	384	384
10	454	454	454	454
12	523	523	523	523
14	596	596	596	596
16	665	665	665	665
18	734	734	734	734

B = bbb x 10

bbb (cm)	H (mm)
<040	60
>040	100

Header size	E	D	G No. of rows (cc) 4	6	8	10	12	14	16	18
DN15 (Cu)	70	170	-	-	-	-	-	-	-	-
DN25 (Cu)	100	150	104	173	246	315	384	457	525	595
DN32 (Fe)	120	136	104	173	246	315	384	457	525	595
DN50 (Fe)	130	155	104	173	246	315	384	457	525	595
DN80 (Fe)	160	145	104	173	246	315	384	457	525	595
DN100 (Fe)	190	139	-	173	246	315	384	457	525	595

Q(D,G)FN

The heat exchangers Q(D,G)FN 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

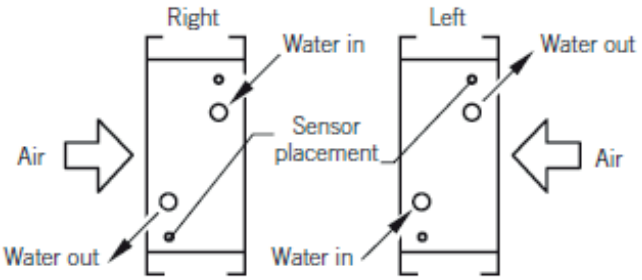
- The heat exchanger consists of 15 mm copper tubes with low water pressure drop.
- QDFN has a pleated fin for optimal efficiency. QGFN has a plain fin for lower air pressure drop.
- QDFN/QGFN have threaded connections.
- Plugged connections are provided for venting and drainage (not DN15).
- The designs conforms with the Pressure Equipment Directive PED 2014/68/EU.

OPERATING DATA

- Max. operating pressure: 1.6 Mpa vid max. operating temperature 110 °C.
- All heat exchangers are leakage tested using dry air under water at pressure 2.3 Mpa. The pressure indications refer to excess pressure.

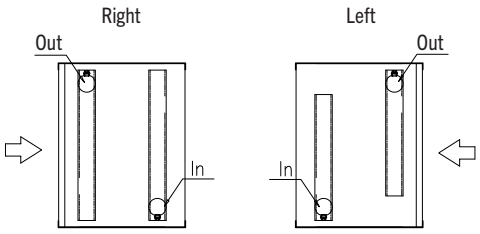
Q(D,G)FN can in a special version with steel manifolds be permitted for a maximum temperature of 150 °C.

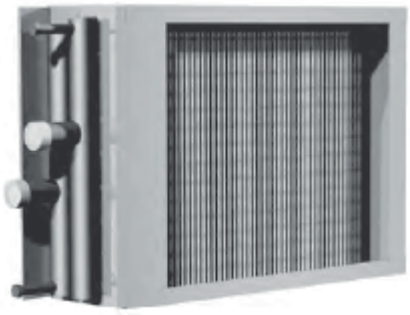
T-connection:



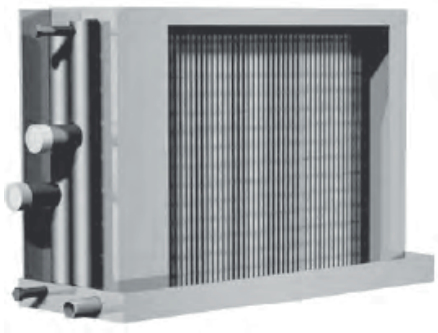
Counter-flow coupling

L-connection:





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



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

MATERIAL AND SURFACE TREATMENT

In basic version, material code "A", QDFN/QGFN are made of copper tubes and fins are made of aluminium. Round headers and connections are made of steel and painted with corrosion-protecting paint. DN15 has brass connection and DN25 has copper collection pipes as standard. The casing is made of galvanized steel sheet. In the product in detail, corrosion category C2 is met according to ISO 12944. Other fin materials, copper round headers and stainless steel housing are available as standard.

SIZES

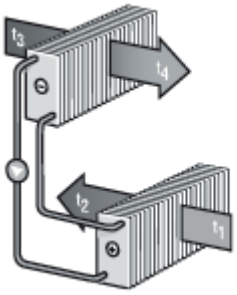
The coils are available with various fin pitches in sizes up to 3,8x2,4m for horizontal air flow, in the standard version.

Q(D,G)FN

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

FREEZE PROTECTION

Glycols, ethanols, salt solutions, oils etc. can be used as anti-freeze. 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 92-94.

MAINTENANCE

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

CODE KEY

Q(D,G)FN_- aaa - bbb - cc - dd - eee - fff - gg - h -i

Q(D,G)FN = Casing with inward folded edges on the bottom plate and top plate with inward alternatively outward folded edges. Cover plate for the header.

QD = 15mm tubes with pleated fins.
QG = 15mm tubes with plain fins.

aaa = **Width (cm)** 020-380
(Fin width excl. header and elbows)

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

cc = **Number of tube rows** 04,06, 08, 10, 12, 14, 16, 18

dd = **Fin spacing (mm x 10)** 18, 20, 22, 23, 25, 27, 30, 40, 50 ,60

eee = **Number of fluid paths** 002, 004, 006, 008 etc.

f-- = **Connection side**
1=right, 2=left

-ff = **Edge height on top and bottom plate**
-00 inward folded top and bottom plates
-11-50 outward folded top plate and inward folded bottom plate

gg = **Connection dimension**
15, 25, 32, 50, 80, 82= 2x80, 90= 1x100, 92= 2x100

h = **Connection type**
1 = T-conn
2 = L-conn
3 = T-conn angled with the air, only cu header
4 = L-conn angled with the air, only cu header
5 = T-conn angled against the air, only cu header
6 = L-conn angled against the air, only cu header

Q(D,G)FN

i = Material (g)

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
R	SS	Cu	Corropaint
C	Mgn	Steel (conn 15+25=Cu)	Al
G	Mgn	Cu	Cu
H	Mgn	Cu	Al
I	Mgn	Steel (conn 15+25=Cu)	Corropaint
J	Mgn	Cu	Cu tinned
S	Mgn	Cu	Corropaint
T	AR	Steel (conn 15+25=Cu)	Al
U	AR	Cu	Cu
V	AR	Cu	Al
X	AR	Steel (conn 15+25=Cu)	Corropaint
Y	AR	Cu	Cu tinned
Z	AR	Cu	Corropaint

Galv = galvanized steel sheet, SS = stainless steel sheet, Cu = copper, Al = aluminium, AR = acid resistant steel sheet, Mgn = magnolia steel sheet.

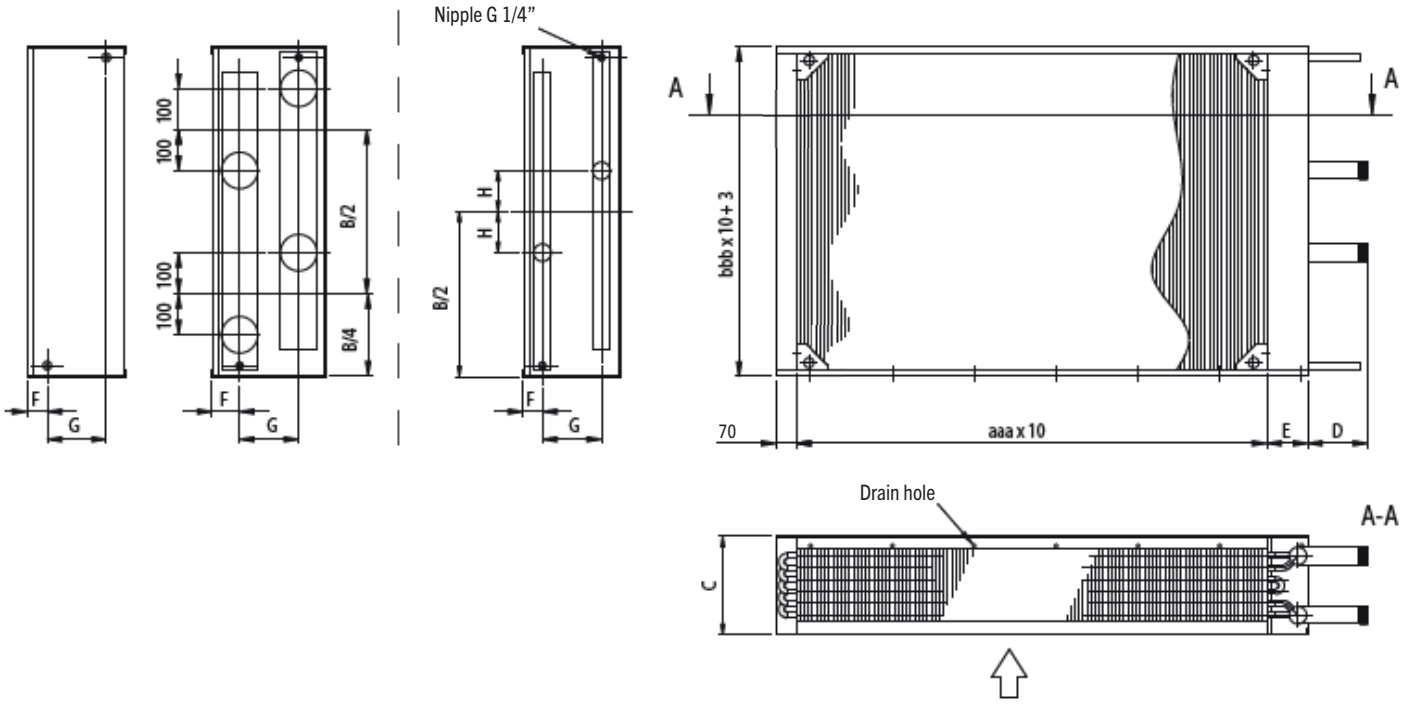
Our products can be ordered with a number of different accessories and with other dimensions and materials than standard. Contact us for more information.

Q(D,G)FN

DIMENSIONAL DRAWING Q(D,G)FN: Casing with inward folded edges on the bottom plate and top plate with inward alternatively outward folded edges. Cover plate for the header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils. The picture shows a battery with an inwardly folded top and bottom plate and with a T-connection.

Connection DN 15 | **Connection 2 x DN 80** | **Connection DN 25, 32, 50, 80**



All dimensions in mm unless otherwise indicated.

C		
No. of rows (cc)	DN15-80	DN100
04	242	270
06	312	312
08	384	384
10	454	454
12	523	523
14	596	596
16	665	665
18	734	734

B = bbb x 10

bbb (cm)	H (mm)
<040	60
>040	100

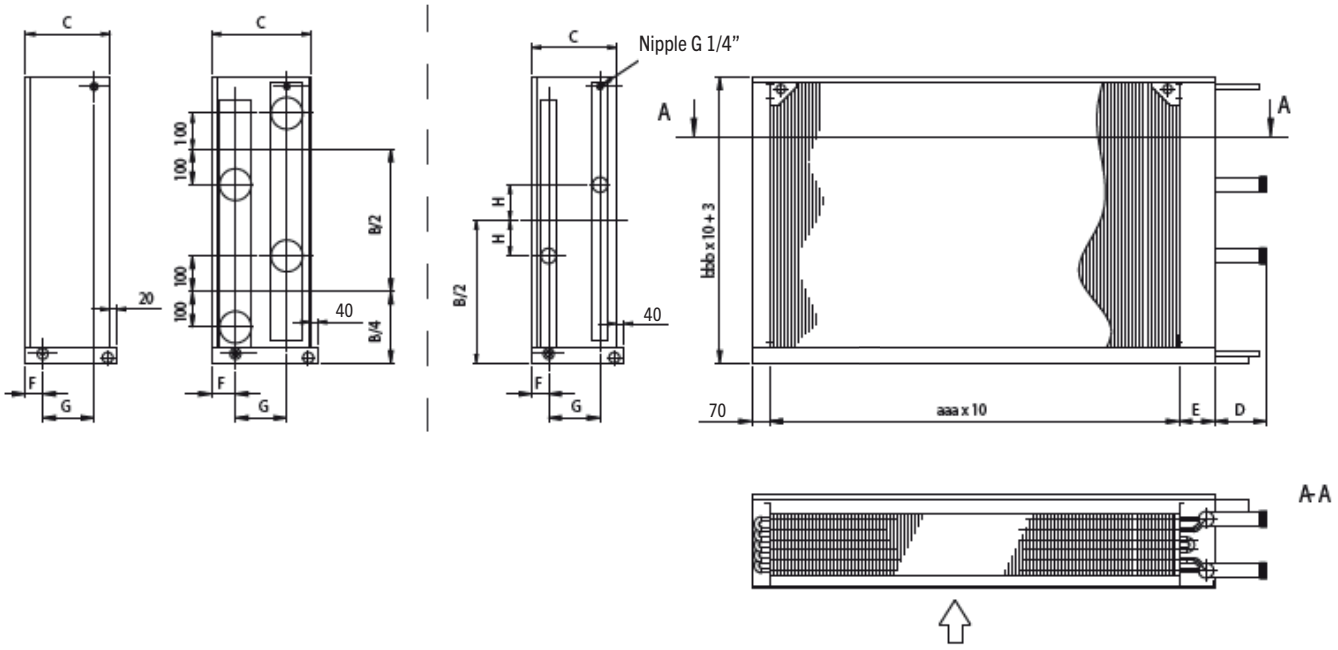
Header size	E	D	G No. of rows (cc) 4	6	8	10	12	14	16	18
DN15 (Cu)	70	170	-	-	-	-	-	-	-	-
DN25 (Cu)	100	150	104	173	246	315	384	457	525	595
DN32 (Fe)	120	136	104	173	246	315	384	457	525	595
DN50 (Fe)	130	155	104	173	246	315	384	457	525	595
DN80 (Fe)	160	145	104	173	246	315	384	457	525	595
DN100 (Fe)	190	139	-	173	246	315	384	457	525	595

Q(D,G)FN

DIMENSION DRAWING Q(D,G)FN WITH DRIP TRAY: Casing with inward folded edges on the bottom plate and top plate with inward alternatively outward folded edges. Cover plate for the header.

Detailed dimension drawing, weight and volume are gathered via the product selection program Coils. The picture shows a battery with an inwardly folded top and bottom plate and with a T-connection.

Connection DN 15 | **Connection 2 x DN 80** | **Connection DN 25, 32, 50, 80, 100**



All dimensions in mm unless otherwise indicated.

C		
No. of rows (cc)	DN15-80	DN100
04	242	270
06	312	312
08	384	384
10	454	454
12	523	523
14	596	596
16	665	665
18	734	734

B = bbb x 10

bbb (cm)	H (mm)
<040	60
>040	100

Header size	E	D	G	No. of rows (cc)					
			4	6	8	10	12	14	16	18
DN15 (Cu)	70	170	-	-	-	-	-	-	-	-
DN25 (Cu)	100	150	104	173	246	315	384	457	525	595
DN32 (Fe)	120	136	104	173	246	315	384	457	525	595
DN50 (Fe)	130	155	104	173	246	315	384	457	525	595
DN80 (Fe)	160	145	104	173	246	315	384	457	525	595
DN100 (Fe)	190	139	-	173	246	315	384	457	525	595

Q(D,G)HN

The heat exchangers Q(D,G)HN 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 heat exchanger consists of 15 mm copper tubes with low water pressure drop.
- QDHN are provided with a profiled fin for optimal efficiency. QGHN are provided with a plain fin for lower air pressure drop.
- QDHN have threaded connections.
- Plugged connections are provided for venting and drainage (not DN15).
- The design conforms with the Pressure Equipment Directive PED 2014/68/EU.

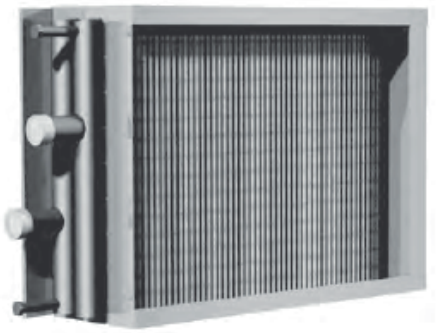
OPERATING DATA

- Max. operating pressure: 1.6 Mpa at max. operating temperature 110 °C.
- All heat exchangers are leakage tested using dry air under water at pressure 2.3 Mpa. The pressure indications refer to excess pressure.

MATERIAL AND SURFACE TREATMENT

In basic version, material code "A", Q(D,G)HN are made of copper tubes and fins are made of aluminium. Round headers and connections are made of steel and painted with corrosion-protecting paint. DN15 has brass connection and DN25 has copper collection pipes as standard. The casing is made of galvanized steel sheet. In the product in detail, corrosion category C2 meets according to ISO 12944. Other fin materials, copper round headers and stainless steel housing are available as standard.

Q(D,G)HN can in a special version with steel manifolds be permitted for a maximum temperature of 150 °C.

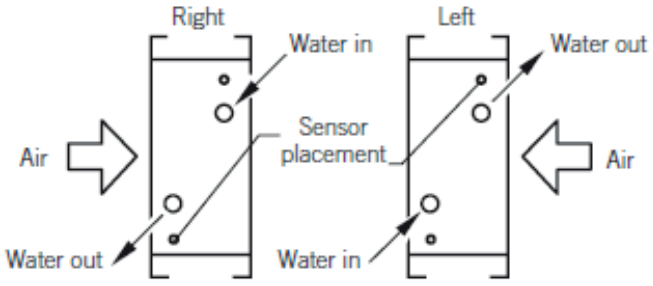


QDHN casing with inward folded edges on the top and bottom plates as well as cover plates for the header and elbows.

SIZES

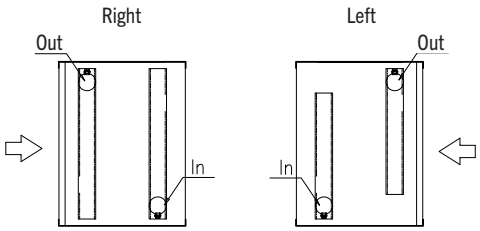
The coils are available with various fin pitches in sizes up to 3,8 x 2,4m for horizontal air flow, in the standard version.

T-connection:



Counter-flow coupling

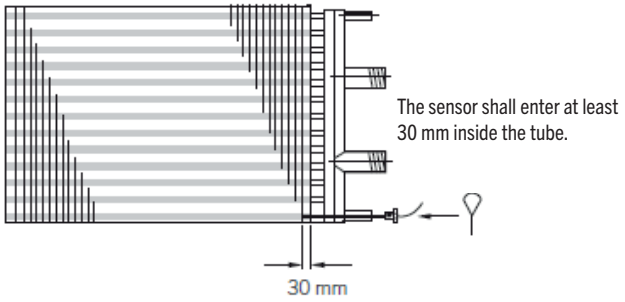
L-connection:



Q(D,G)HN

FREEZE PROTECTION

At least one of the heat exchangers nipples can be fitted with a sensor for the freeze protection thermostat, see figure below. If, after draining, the heat exchanger will be at risk of freezing, it should be blown with air to ensure that all water is gone.



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 92-94.

MAINTENANCE

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

CODE KEY

Q(D,G)HN_- aaa - bbb - cc - dd - eee - fff - gg - h -i

Q(D,G)HN = Casing with inward folded edges on the bottom plate and top plate with inward alternatively outward folded edges. Cover plate for the header.

QD = 15mm tubes with pleated fins.
QG = 15mm tubes with plain fins.

aaa = **Width (cm)** 020-380

bbb = **Height (cm)** 020-240

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

dd = **Fin spacing (mm x 10)** 18, 20, 22, 23, 25, 27, 30, 40, 50 ,60

eee = **Number of fluid paths** 002, 004, 006, 008 etc.

f-- = **Connection side**
1=right, 2=left

-ff = **Edge height on top and bottom plate**
-00 inward folded top and bottom plate
-11-50 outward folded top plate and inward folded bottom plate

gg = **Connection dimension**
15, 25, 32, 50, 80, 82= 2x80, 90= 1x100, 92= 2x100

h = **Connection type**
1 = T-conn
2 = L-conn
3 = T-conn angled with the air, only cu header
4 = L-conn angled with the air, only cu header
5 = T-conn angled against the air, only cu header
6 = L-conn angled against the air, only cu header

i = **Material (g)**

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
R	SS	Cu	Corropaint
C	Mgn	Steel (conn 15+25=Cu)	Al
G	Mgn	Cu	Cu
H	Mgn	Cu	Al
I	Mgn	Steel (conn 15+25=Cu)	Corropaint
J	Mgn	Cu	Cu tinned
S	Mgn	Cu	Corropaint
T	AR	Steel (conn 15+25=Cu)	Al
U	AR	Cu	Cu
V	AR	Cu	Al
X	AR	Steel (conn 15+25=Cu)	Corropaint
Y	AR	Cu	Cu tinned
Z	AR	Cu	Corropaint

Galv = galvanized steel sheet, SS = stainless steel sheet, Cu = copper, Al = aluminium, AR = acid resistant steel sheet, Mgn = magnolia steel sheet.

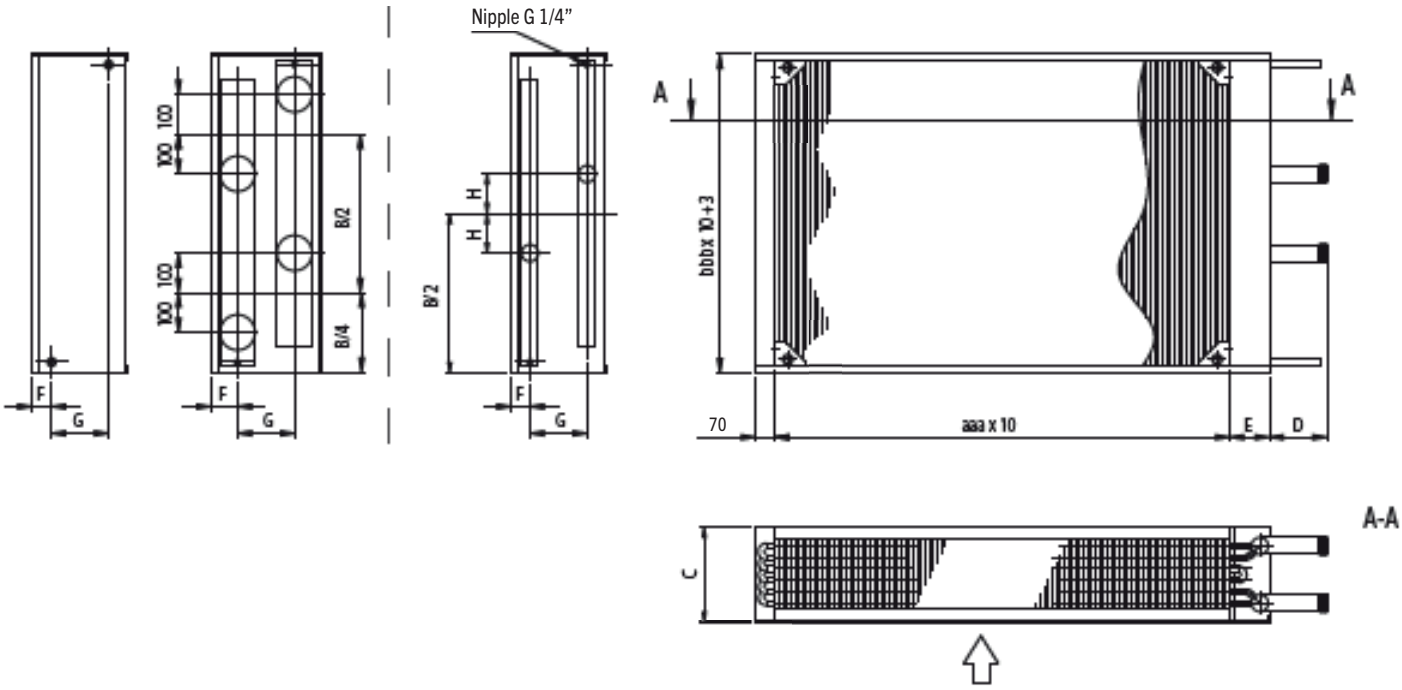
Our products can be ordered with a number of different accessories and with other dimensions and materials than standard. Contact us for more information

Q(D,G)HN

DIMENSION DRAWING Q(D,G)HN: Casing with inward folded edges on the bottom plate and top plate with inward alternatively outward folded edges. Cover plate for the 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**



All dimensions in mm unless otherwise indicated.

C				
No. of rows (cc)	DN15-32	DN50	DN80	DN100
01	138	-	-	-
02	173	180	225	-
03	207	207	225	-
04	242	242	242	270
06	312	312	312	312
08	384	384	384	384
10	454	454	454	454
12	523	523	523	523

B = bbb x 10

bbb (cm)	H (mm)
<040	60
>040	100

Header size	E	D	G No. of rows (cc)										
			1	2	3	4	6	8	10	12	14	16	18
DN15 (Cu)	70	170	0	35	-	-	-	-	-	-	-	-	-
DN25 (Cu)	100	150	35	35	69	104	173	246	315	384	457	525	595
DN32 (Fe)	120	136	43	69	69	104	173	246	315	384	457	525	595
DN50 (Fe)	130	155	69	69	69	104	173	246	315	384	457	525	595
DN80 (Fe)	160	145	-	104	104	104	173	246	315	384	457	525	595
DN100 (Fe)	190	139	-	-	-	-	173	246	315	384	457	525	595

Q(D,G)CN

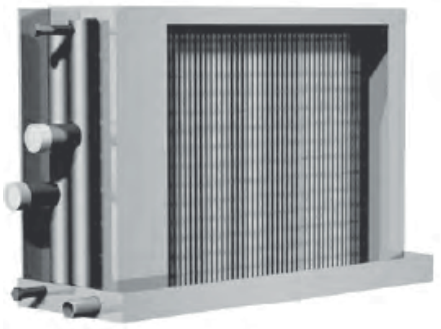
The heat exchangers Q(D,G)CN are designed for cooling of air with cooling water and are intended for installation in units. The design conforms with the Pressure Equipment Directive PED 2014/68/EU.

GENERAL

- The heat exchanger consists of 15 mm copper tubes with low water pressure drop.
- QDCN are provided with a pleated fin for optimal efficiency. QGCN are provided with a plain fin for lower air pressure drop.
- QDCN have threaded connections.
- Plugged connections are provided for venting and drainage (not DN15).
- The designs conforms with the Pressure Equipment Directive PED 2014/68/EU.

OPERATING DATA

- Max. operating pressure: 1.6 Mpa at max operating temperature 110 °C.
- All heat exchangers are leakage tested using dry air under water at pressure 2.3 Mpa. The pressure indications refer to excess pressure.



Q(D,G)CN casing with inward folded edges on the top and bottom plates as well as cover plates for the header and elbows. Available with drip tray.

MATERIAL AND SURFACE TREATMENT

In basic version, material code "A", Q(D,G)CN are made of copper tubes and fins are made of aluminium. Round headers and connections are made of steel and painted with corrosion-protecting paint. DN15 has brass connection and DN25 has copper collection pipes as standard. The casing is made of galvanized steel sheet. In the product in detail, corrosion category C2 is met according to ISO 12944. Other fin materials, copper round headers and stainless steel housing are available as standard.

SIZES

The coils are available with various fin pitches in sizes up to 3,8x2,4m for horizontal air flow, in the standard version.

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:

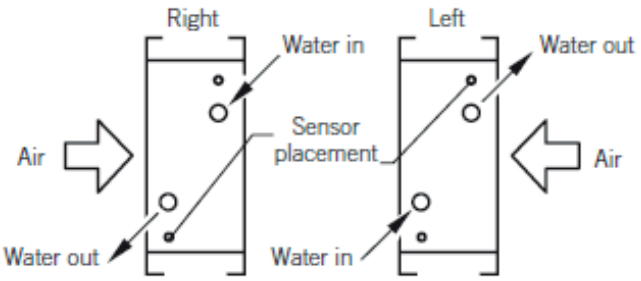
Air side:	Air temperature out	°C
	Output	kW
	Air velocity	m/s
	Air pressure drop	Pa
Water side:	Return temperature	°C
	Fluid flow	l/s
	Fluid velocity	m/s
	Fluid pressure drop	kPa

Q(D,G)CN

INSTALLATION

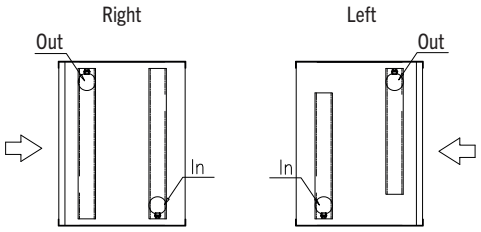
The heat exchanger is equipped with signs that show how the supply and return lines are to be connected. The heat exchanger is connected so that a counter flow coupling is obtained. The heat exchanger must be ordered in either a right or left-hand design. The system must be fully bled to give optimal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

T-connection:



Counter-flow coupling

L-connection:



ACCESSORIES

Additional accessories are available, see pages 92-94.

MAINTENANCE

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

CODE KEY

Q(D,G)CN_- aaa - bbb - cc - dd - eee - fff-gg-h-i

QDCN = Casing with inward folded edges on top and bottom plates. Cover plate for the header. With or without drip tray.

QD = 15mm tubes with pleated fins
QG = 15mm tubes with plain fins

aaa = **Width (cm)**
QDCN: 020-380

bbb = **Height (cm)**
QDCN: 020-240

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

dd = **Fin spacing (mm x 10)**
18, 20, 22, 23, 25, 27, 30, 40, 50, 60

eee = **Number of fluid paths**
002, 004, 006, 008 etc.

f-- = **Connection side**
QDCN: 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.

-ff = **Edge height on top and bottom plate (mm):**
-00 inward folded edges on top and bottom plates
-11-50 outward folded top plate and inward folded bottom plate

gg = **Connection dimension**
15, 25, 32, 50, 80, 82= 2x80, 90=1X100, 92= 2X100

h = **Connection type**
1 = T-conn
2 = L-conn
3 = T-conn angled with the air, only cu header
4 = L-conn angled with the air, only cu header
5 = T-conn angled against the air, only cu header
6 = L-conn angled against the air, only cu header

i = **Material (g)**

g = Material	Casing	Header	Fins
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
R	SS	Cu	Corropaint
C	Mgn	Steel (conn 15+25=Cu)	Al
G	Mgn	Cu	Cu
H	Mgn	Cu	Al
I	Mgn	Steel (conn 15+25=Cu)	Corropaint
J	Mgn	Cu	Cu tinned
S	Mgn	Cu	Corropaint
T	AR	Steel (conn 15+25=Cu)	Al
U	AR	Cu	Cu
V	AR	Cu	Al
X	AR	Steel (conn 15+25=Cu)	Corropaint
Y	AR	Cu	Cu tinned
Z	AR	Cu	Corropaint

Galv = galvanized steel sheet, SS = stainless steel sheet, Cu = copper, Al = aluminium, AR = acid resistant steel sheet, Mgn = magnolia steel sheet.

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(D,G)CN

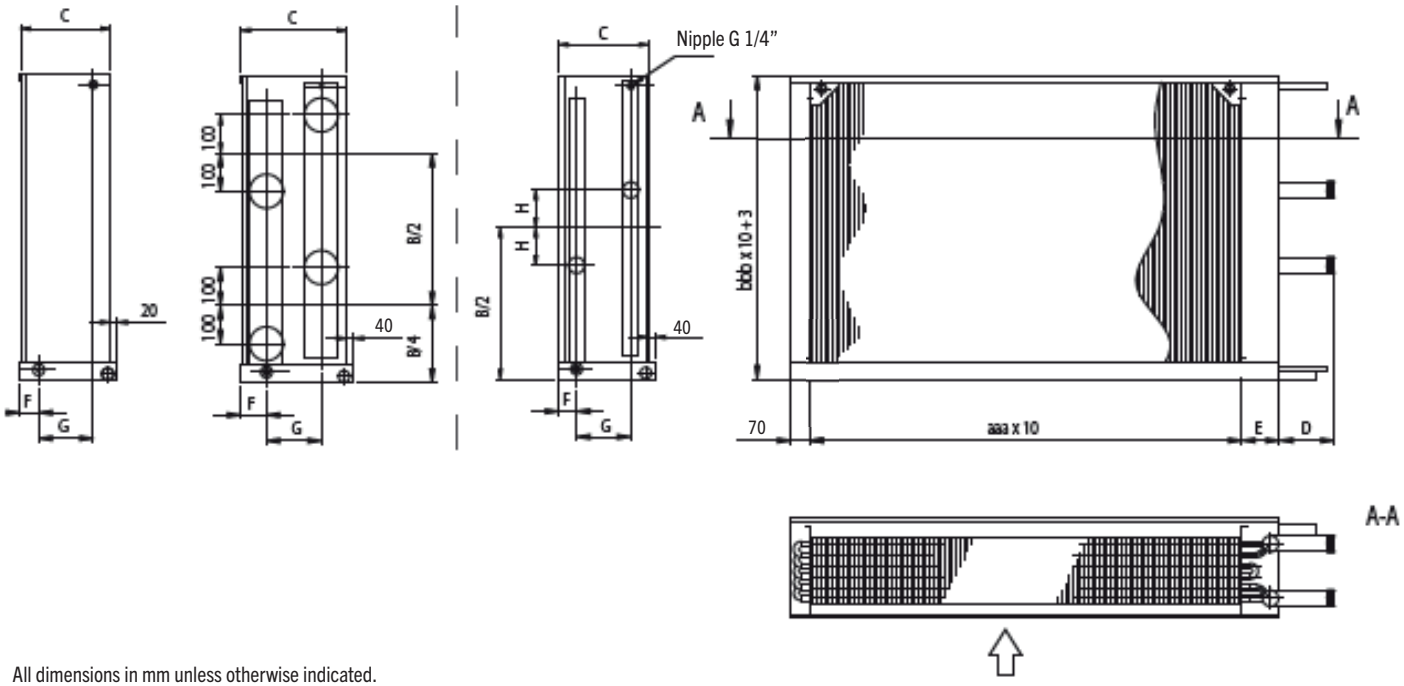
DIMENSION DRAWING Q(D,G)CN WITH DRIP TRAY: Casing with inward folded edges on the bottom plate and top plate with inward alternatively outward folded edges. Cover plate for the header.

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



All dimensions in mm unless otherwise indicated.

C				
No. of rows (cc) f = 3-4	DN15-32	DN50	DN80	DN100
01	138	-	-	-
02	173	180	225	-
03	207	207	225	-
04	242	242	242	270
06	312	312	312	312
08	384	384	384	384
10	454	454	454	454
12	523	523	523	523

C				
No. of rows (cc) f = 5-6	DN15-32	DN50	DN80	DN100
01	228	-	-	-
02	263	270	315	-
03	297	297	315	-
04	332	332	332	360
06	402	402	402	402
08	474	474	474	474
10	544	544	544	544
12	613	613	613	613

B = bbb x 10

bbb (cm)	H (mm)
<040	60
>040	100

Header size	E	D	G No. of rows (cc) 1	2	3	4	6	8	10	12
DN15 (Cu)	70	170	0	35	-	-	-	-	-	-
DN25 (Cu)	100	150	35	35	69	104	173	246	315	384
DN32 (Fe)	120	136	43	69	69	104	173	246	315	384
DN50 (Fe)	130	155	69	69	69	104	173	246	315	384
DN80 (Fe)	160	145	-	104	104	104	173	246	315	384
DN100 (Fe)	190	139	-	-	-	-	173	246	315	384

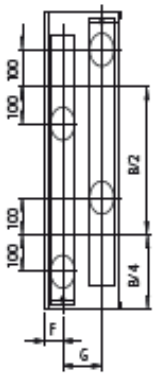
Q(D,G)CN

DIMENSION DRAWING Q(D,G)CN WITHOUT DRIP TRAY: Casing with inward folded edges on the bottom plate and top plate with inward alternatively outward folded edges. Cover plate for the header.

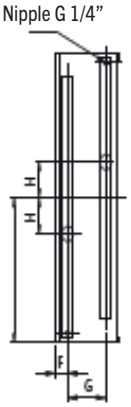
Detailed dimension drawing, weight and volume are gathered via the product selection program Coils.

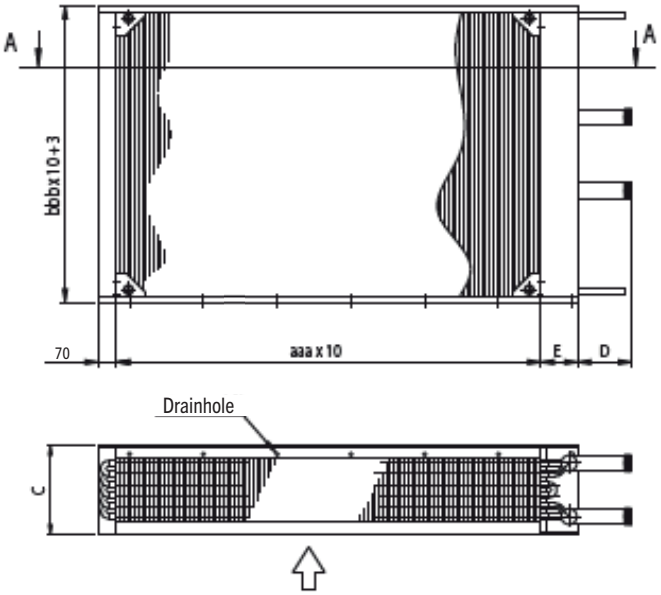
Connection DN 15

Connection 2 x DN 80



Connection DN 25, 32, 50, 80, 100





All dimensions in mm unless otherwise indicated.

No. of rows (cc) f = 1-2	DN15-32	DN50	DN80	DN100
01	138	-	-	-
02	173	180	225	-
03	207	207	225	-
04	242	242	242	270
06	312	312	312	312
08	384	384	384	384
10	454	454	454	454
12	523	523	523	523

B = bbb x 10

bbb (cm)	H (mm)
<040	60
>040	100

Header size	E	D	G No. of rows (cc) 1	2	3	4	6	8	10	12
DN15 (Cu)	70	170	0	35	-	-	-	-	-	-
DN25 (Cu)	100	150	35	35	69	104	173	246	315	384
DN32 (Fe)	120	136	43	69	69	104	173	246	315	384
DN50 (Fe)	130	155	69	69	69	104	173	246	315	384
DN80 (Fe)	160	145	-	104	104	104	173	246	315	384
DN100 (Fe)	190	139	-	-	-	-	173	246	315	384

Heat Exchanger for Steam - QLSK

The heat exchangers QLSK are 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 40m^3/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 steams pH-value should be between 8,8 and 9,2. The oxygen (O_2) content must not exceed 0,01 mg/kg. Ammonia content (NH3) must not exceed 0,3 mg/kg.

MATERIAL AND SIZE

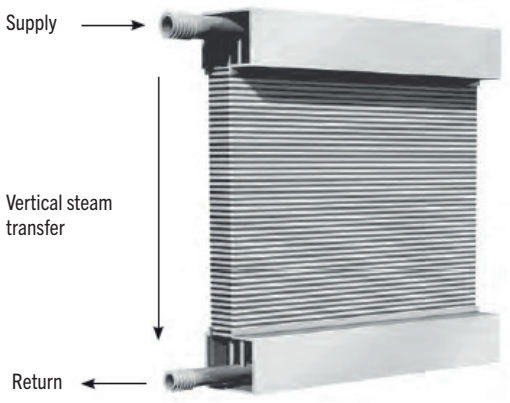
The heat exchanger is designed using copper tubes and aluminium fins. The casing is made of hot-dip galvanized steel sheet. The header on the steam side is made of steel (DN 25 is made of copper) and on the condensate side of copper. Standard sizes are from 200x200 mm to 3500x1800 mm. Materials for aggressive 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.

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.



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
	Output	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 = **Number 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**

ACCESSORIES

Additional accessories are available, see pages 92-94.

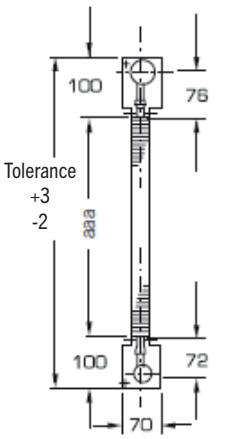
QLSK

DIMENSION DRAWING QLSK: Casing with cover plate for header.

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

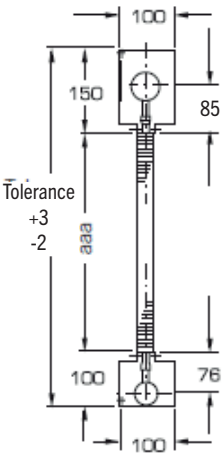
QLSK, 1 tuberow

Thread connection ee=32



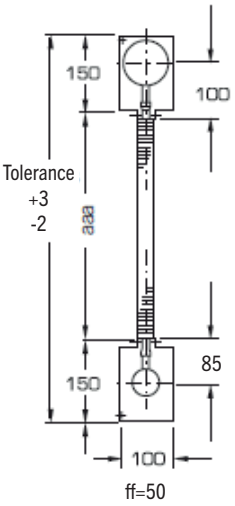
Thread connection ff= 25

ee=50



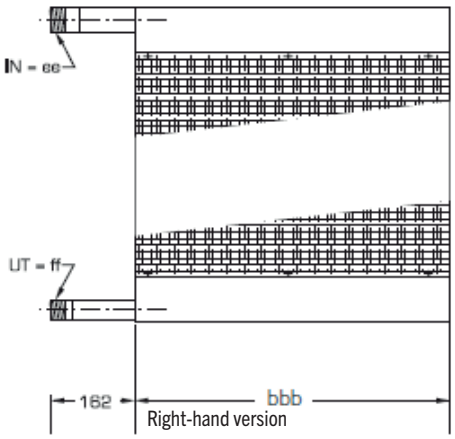
ff=32

ee=80

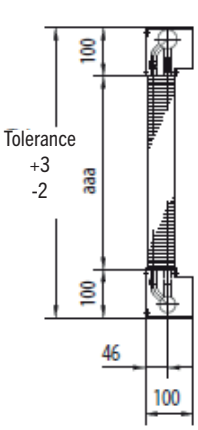


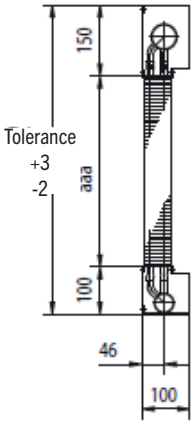
ff=50

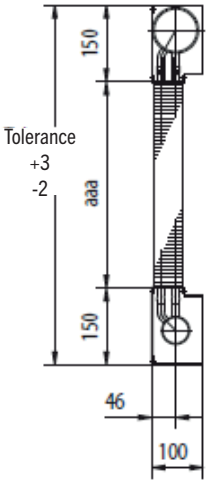
All dimensions in mm unless otherwise indicated.



QLSK, 2 tuberows







Accessories

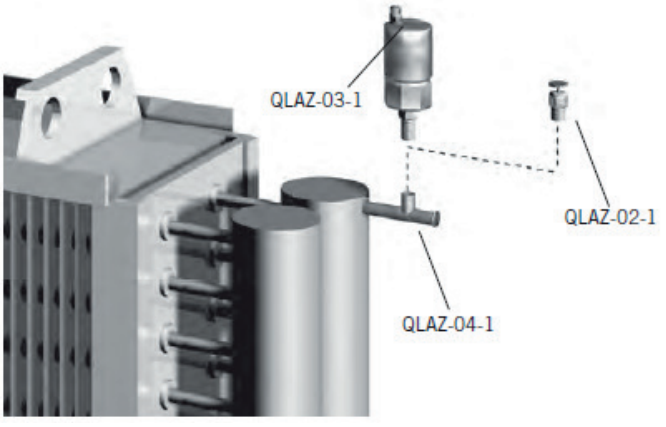
QLAZ-02	Manual bleed valve	92
QLAZ-03	Automatic bleed valve with non-return valve	92
QLAZ-04	Nipple	92
QLAZ-20	Fin comb	93
QLAZ-30	Drain on side	93
QLAZ-39	Drain on the side	93
QLAZ-32	Expansion valves	93
QLAZ-11	Weld flange, steel	93
QLAZ-15	Threaded flange, steel	93
QLAZ-41	Soldered flange, bronze/steel	93
QLAZ-42	Threaded flange, bronze	93
QLAZ-43	Threaded flange, bronze/steel	93
QLAZ-44	Flange gasket	93
QLAZ-25	Droplet eliminator	94
QLAZ-28	Adapter sleeve	94

QLAZ 02, 03, 04

The valve must always be fitted vertically with the air valve above. Note the top clearence 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

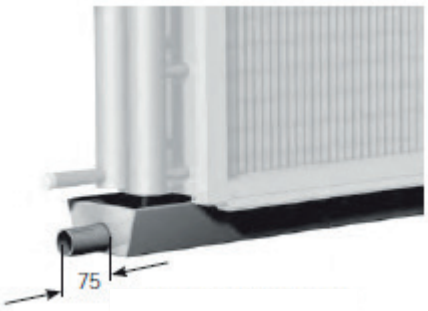
For connection of freeze protection and bleed valve QLAZ-03-1 or drain valve on the coil. The nipple is used in combination with bleed valve QLAZ-02-1, QLAZ-03-1 or freeze protection or drain valve on the coil.

QLAZ

QLAZ 20, 30, 32

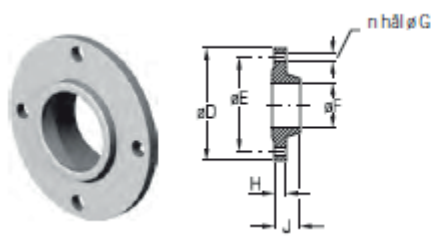
Fin comb QLAZ-20
Supplies in packs of 10.

Expansion valve QLAZ-32

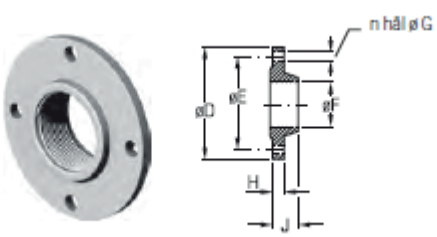


Simple drainage on side QLAZ-30. QLAZ-39 double drains where the front and rear tray parts are led to the front.

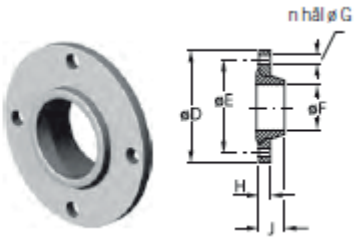
QLAZ 11, 15, 41, 42, 43, 44



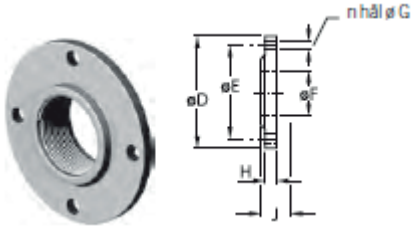
Weld flange, steel QLAZ-11-bb
For connection on the water or steam side. Size (bb): See the table below.



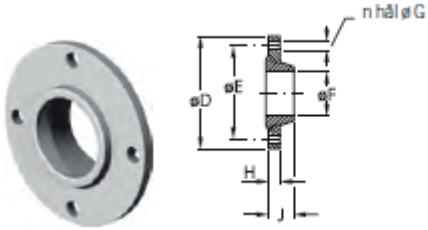
Threaded flange, steel QLAZ-15-bb
For connection on the water or steam side. Size (bb): See the table below



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.



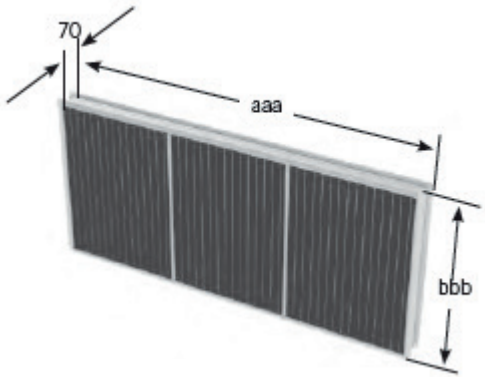
Threaded flange bronze/steel QLAZ-43-bb
For connection on the water or steam side. Size (bb): See the table below.

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	20	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 are 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

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

About Modine

For more than 100 years, Modine Manufacturing Company has been leading the way in thermal management. We provide the commercial, industrial and vehicular markets with trusted systems and solutions to manage heating and cooling and improve air quality. We're at work in practically every corner of the world, inside the things you see every day.

Modine Söderköping AB
SE-61481, Sverige
Tel:+46 121 19100
modine.soderkoping@modine.com

modinecoolers.com
modinecoils.com

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