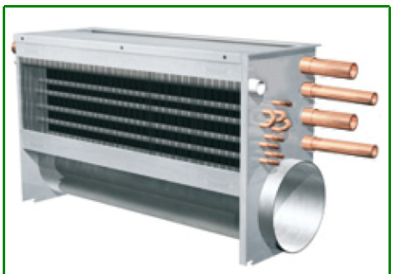
Perimeter wall system QVFC

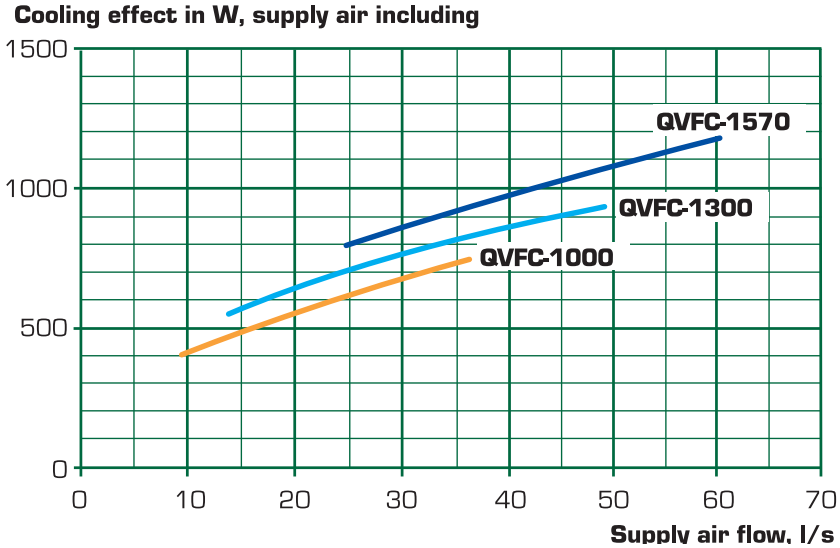
Functions

- Ventilation
- Heating
- Cooling
- Controls



Perimeter wall system QVFC with heating, cooling and ventilation functions. Perimeter wall systems use the supply air force to create an air fl ow through induction that passes through the battery, which means that heated or cooled air is blown out of the unit. The perimeter wall system is positioned along the perimeter behind purpose built window benches. QVFC provides high comfort in the occupied zone with individual control. Examples of applications for perimeter wall systems are; offi ces, shops, schools, banks, hospitals etc.

Quick Selection



The diagram shows the approximate cooling effect, p_{tot} in W with a water flow of = 0,05 l/s , temperature difference between supply air and room temperature, Δt = 8 °C and an operating pressure of 200 Pa .

Product Facts

- Heating, cooling and ventilation functions
- Positioned along the perimeter behind purpose built window benches.
- High capacity and small space requirement.
- Designed for both new build and renovation and for replacing old perimeter units.
- Automation and Control Equipment as accessory.

Product code example

QVFB-1300-40-200
Perimeter wall system QVFC with a nominal length 1300 mm , supply air flow from the unit of 40 l/s and pressure setting 200 Pa .

Technical data for cooling effect

Airflow, pressure and temperature

Several perimeter wall units connected together make an installation branch.

The installation branch connection point is connected to a supply air duct with a normal pressure of 200 Pa. At lower pressure, for example 150 Pa, a lower cooling effect is achieved. The airflow at the connection point is equal to the total supply air flow along the installation branch.

The supply air can be supplied to the room at a subnormal temperature of 8 °C cooler than the room temperature due to the special design of the supply air grille.

Heating and cooling effects

The tables on pages 2 and 3 display the cooling and heating effects for QVFC at 200 Pa.

Cooling and heating effects are shown for the following nominal lengths; 1000, 1300 and 1570 mm.

At operating pressure of 250 Pa the effects are increased by approx. 10% compared to those values given.

At operating pressure of 150 Pa the effects are reduced by approx. 10%.

The given effects apply to systems without casing. With casing the effects increases with approx. 10%.

Total cooling effect

The total cooling effect is achieved by the cooling effect from the supply air being added to the cooling effect from the battery.

The cooling effect of the supply air is calculated as follows:

$(t_{room} - t_{supply\ air}) \times q \times 1.2$; where

t_{room} = room air temperature in °C

$t_{supply\ air}$ = Supply air temperature in °C

q = Airflow in l/s

The heating capacity of the system is usually more than sufficient and therefore seldom affects the size of the system.

Cooling effect operating pressure of 200 Pa on air side

Nominal length = 800 mm (Coil length = 500 mm)

Water flow, q_w = 0,05 l/s

Pressure drop water, Δp_w = 5,27 kPa

q_l, l/s	P_{tot}, w Δt, °C			P_{batt}, w Δt, °C			L_{A10}, dB (A)
	6	8	10	6	8	10	
12,7	295	393	492	204	272	339	27
16,4	341	415	490	223	297	372	28
20,1	384	464	544	239	319	399	28
22,1	407	490	572	248	331	413	29

Nominal length = 1000 mm (Coil length = 700 mm)

Water flow, q_w = 0,05 l/s

Pressure drop water, Δp_w = 8,9 kPa

q_l, l/s	P_{tot}, w Δt, °C			P_{batt}, w Δt, °C			L_{A10}, dB (A)
	6	8	10	6	8	10	
16	391	483	575	276	368	460	28
22	466	568	671	308	410	513	29
25	497	603	709	317	423	529	29
29	533	641	749	324	432	540	30

Nominal length = 1300 mm (Coil length = 1000 mm)

Water flow, q_w = 0,05 l/s

Pressure drop water, Δp_w = 11,4 kPa

q_l, l/s	P_{tot}, w Δt, °C			P_{batt}, w Δt, °C			L_{A10}, dB (A)
	6	8	10	6	8	10	
22	542	669	797	383	511	639	28
24	561	690	819	388	517	646	28
30	620	755	890	404	539	647	29
37	683	821	960	416	555	694	30
42	722	861	1001	419	559	699	31

Nominal length = 1570 mm (Coil length = 1270 mm)

Water flow, q_w = 0,05 l/s

Pressure drop water, Δp_w = 2,6 kPa

(Two circuit coil gives lower pressure drop)

q_l, l/s	P_{tot}, w Δt, °C			P_{batt}, w Δt, °C			L_{A10}, dB (A)
	6	8	10	6	8	10	
27	652	804	957	458	610	763	26
32	719	881	1044	488	651	814	27
39	789	958	1127	508	677	846	28
45	834	1004	1174	510	680	850	29
50	889	1065	1241	529	705	881	30

Technical data for heating effect

Heating effect at operating pressure of 200 Pa on air side

Nominal length = 800 mm (Coil length = 500 mm)

Water flow, q_w = 0,03 l/s

Pressure drop water, Δp_w = 1,93 kPa

q_l, l/s	P_{tot}, W Δt, °C			P_{batt}, W Δt, °C			L_{A1O}, dB (A)
	20	30	40	20	30	40	
0*)	169	253	337	169	253	337	>20
12,7	751	1126	1501	446	669	892	27
16,4	863	1098	1332	469	704	939	28
20,1	957	1194	1432	475	712	949	28
22,1	1010	1249	1489	479	719	959	29

*) 0 l/s = natural convection

Nominal length = 1000 mm (Coil length = 700 mm)

Water flow, q_w = 0,03 l/s

Pressure drop water, Δp_w = 1,2 kPa

q_l, l/s	P_{tot}, W Δt, °C			P_{batt}, W Δt, °C			L_{A1O}, dB (A)
	20	30	40	20	30	40	
0*)	193	257	343	193	257	343	>20
16	655	1039	1347	693	924	1232	28
22	701	1163	1498	754	1005	1340	29
25	712	1209	1552	772	1029	1372	29
29	618	1241	1585	688	1032	1376	30

*) 0 l/s = natural convection

Nominal length = 1300 mm (Coil length = 1000 mm)

Water flow, q_w = 0,03 l/s

Pressure drop water, Δp_w = 1,5 kPa

q_l, l/s	P_{tot}, W Δt, °C			P_{batt}, W Δt, °C			L_{A1O}, dB (A)
	20	30	40	20	30	40	
0*)	271	361	481	271	361	481	>20
22	932	1260	1698	985	1313	1751	28
24	953	1289	1738	1010	1347	1796	28
30	968	1315	1777	1040	1387	1849	29
37	846	1313	1781	935	1402	1869	30
42	972	1329	1806	1073	1430	1907	31

*) 0 l/s = natural convection

Nominal length = 1570 mm (Coil length = 1270 mm)

Water flow, q_w = 0,03 l/s

Pressure drop water, Δp_w = 1,8 kPa

q_l, l/s	P_{tot}, W Δt, °C			P_{batt}, W Δt, °C			L_{A1O}, dB (A)
	20	30	40	20	30	40	
0*)	318	424	565	318	424	565	>20
27	1129	1527	2058	1194	1592	2123	26
32	1152	1561	2107	1229	1638	2184	27
39	1139	1549	2097	1232	1643	2191	28
45	963	1499	2035	1071	1607	2143	29
50	1050	1440	1960	1170	1560	2080	30

*) 0 l/s = natural convection

The above effects apply at the following Δt:

8 °C for cooling and 30 °C for heating.

Correction of effects at other Δt

Example:

Δt at cooling effect 10 °C = effect in the table x (10/8) i.e. Pbatt x 1.25

Δt at cooling effect 6 °C = effect in the table x (6/8) i.e Pbatt x 0.75

etc

Pressure drop factors

Pressure drop factors cooling at 0,05 l/s (28 mm)

	C-C 1,2 m Antal apparater				
Storlek	1	3	6	9	12
800	77,7	78,0	78,3	78,6	78,9
1000	87,4	87,7	88,0	88,3	88,6
1300	99,0	99,3	99,6	99,9	100,2
1570	42,9	43,2	43,5	43,8	44,1

$\Delta p_{water} = (q_{water} \times k_{coooling})^2$

	C-C 2,4 m Antal apparater				
Storlek	1	3	6	9	12
800	77,7	78,2	78,7	79,2	79,7
1000	87,4	87,9	88,4	89,0	89,6
1300	99,0	99,5	100,0	100,6	101,2
1570	42,9	43,4	43,9	44,5	45,1

$\Delta p_{water} = (q_{water} \times k_{cooling})^2$

	C-C 3,6 m Antal apparater				
Storlek	1	3	6	9	12
800	77,7	78,6	79,5	80,4	81,3
1000	87,4	88,3	89,2	90,0	90,9
1300	99,0	99,9	100,8	101,6	102,5
1570	42,9	43,8	44,7	45,5	46,4

$\Delta p_{water} = (q_{water} \times k_{coooling})^2$

Pressure drop factors heating at 0,03 l/s (22 mm)

	C-C 1,2 m Antal apparater				
Storlek	1	3	6	9	12
800	46,3	46,6	46,9	47,2	47,5
1000	50,9	51,2	51,5	51,8	52,1
1300	57,3	57,6	57,9	58,2	58,5
1570	61,4	61,7	62,0	62,3	62,6

$\Delta p_{water} = (q_{water} \times k_{Heating})^2$

	C-C 2,4 m Antal apparater				
Storlek	1	3	6	9	12
800	46,3	46,8	47,3	47,8	49,3
1000	87,4	88,0	88,6	89,2	89,8
1300	99,0	99,6	100,2	100,8	101,4
1570	42,9	43,5	44,1	44,7	45,3

$\Delta p_{water} = (q_{water} \times k_{Heating})^2$

	C-C 3,6 m Antal apparater				
Storlek	1	3	6	9	12
800	46,3	47,2	48,1	49,0	49,9
1000	87,4	88,3	89,2	90,0	90,9
1300	99,0	99,9	100,8	101,6	102,5
1570	42,9	43,8	44,7	45,5	46,4

$\Delta p_{water} = (q_{water} \times k_{Heating})^2$

Dimensioning example

Dimensioning example

- Calculate the heating-/cooling requirement and air volumes.
- Perimeter wall systems are normally installed in series along the perimeter and together create an installation branch. The airspeed in the this branch must not exceed 7 m/s, which corresponds to 140 l/s at a duct size of Ø 160 mm .

Example ”air side”

If each room should have 15 l/s , an installation branch can distribute air to 8 rooms because the duct size is Ø 160 mm . A QVFC with Ø 200 mm air duct can also be used, in which case contact your nearest Fläkt Woods sales office.

Example ”water side”

When dimensioning the water side, available pressure is dimensioned. One should not try to exceed 25 kPa in loop pressure drop. The valve authority must also be achieved on the unit valves, on both the heating and cooling side.

Casing

Purpose built casing must have open gap of at least 60 mm along the floor.

Water temperature

The following temperatures are recommended: Incoming hot water temp: max 60 °C , Δt= 8 - 10 °C . Incoming cold water temp: min 14 °C , Δt= 3 - 4 °C .

The input hot water temperature should be as low as possible, preferably 40 °C . At this temperature heat from heat pumps can be used. The chilled water should have a constant flow temperature, for example 14 °C . There should also be some form of condensation sensor to ensure function and to prevent water spillage on the floor.

The coil in the system normally permits differences between the room air temperature and the chilled water average temperature of up to 10 °C without risk of condensation build up.

The supply air is cooled down to 14 °C on hot days and/or when there is high moisture content in the air. The air is dehumidified to reduce the risk of condensation over the battery and to increase available capacity.

Operating Pressure

Perimeter wall system QVFC is pressure tested to 1000 kPa kPa before delivery. The highest recommended working pressure in an installation branch is 600 kPa . The units can be delivered pressure tested up to 1600 kPa , intended for working pressure up to 1000 kPa .

Special editions

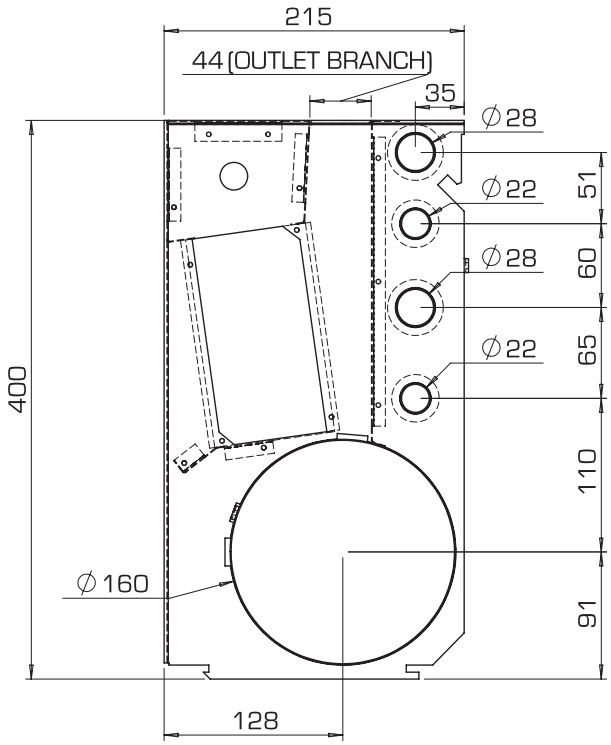
Certain types of special edition of QVFC can be ordered, for example:

- Air duct 200 mm .
- Water pipes are positioned at the front edge of the unit to allow pillars to be bypassed.

These deviations must be described in plain text when ordering.

Dimensions

Dimensions



Dimensions of the grille

Size	Width	Length
800	70	534
1000	70	734
1300	70	1034
1570	70	1304

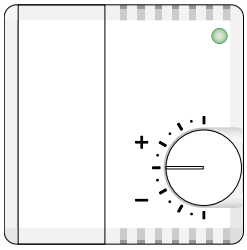
Weight

Size	Weight, kg
800	10
1000	11,5
1300	15
1570	19

Control equipment

Digital controller QFZC-02-7

Control with electro thermal actuators



Description, controller QFZC-02-7

- Simple controller with setpoint knob and LED for indication of actual output
- Built in temperature sensor
- Controls effectively and energy saving
- PI control
- Heating and cooling in sequence
- Automatic valve excersice, one time a day
- Mechanical scale range adjustments possible
- CE approved

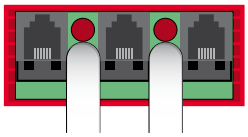
Standard functions / values

Control function	PI regulation
Actual temperature range	0 - 31,9 °C
Set point range	19 - 25 °C
P-range, heating	1,5K
P-range, cooling	1K
Dead zone	1K
I time	20 min
Valve exercise	3 minutes fully open (Once daily)
Cooling output	24V
Heating output	24V
Output function	Heating NC*, cooling NC*
Outputs, 24V	Time proportional on/off 24V AC (max 20VA)
Supply voltage	24V AC ±10%
Power consumption	1 VA
Protection class	IP30
Ambient temperature	Storage: 0 to + 70 °C . Operating: + 5 to + 40 °C
Electrical connections	4 wire, modular cable (QFZC-07-1)
Recommended cable type	0,5 mm^2 , multicore cable
Sizes	77 x 77 x 27 mm
Light indication	Green = Cooling, red = heating, out = dead zone
Zone Controls product code	R101M

*NC = normally closed, NO = normally open.

Supply box QFZC-12-1

Control with electro thermal actuators



Description, supply box QFZC-12-1

- Used as a connection unit to the QFZC-02-7 controller
- Consists of a connection unit with three modular sockets and 2 actuators for heating and cooling.
- CE approved.
- Max number of QFZC-12-1 in series: 4 pcs. heating / cooling

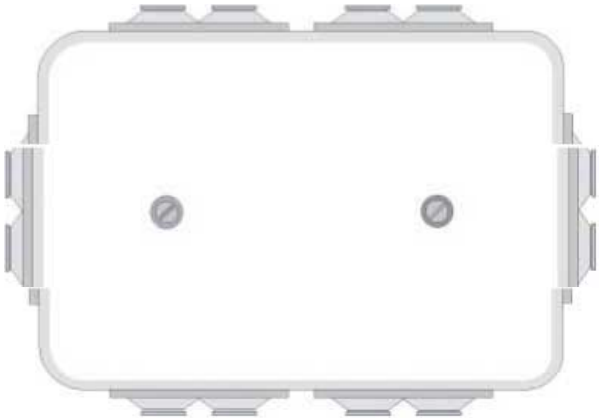
Technical data

Heating actuator	Electro thermal actuator 24V AC-NC**
Cooling actuator	Electro thermal actuator 24V AC - NC**
Supply voltage	24V AC ±10%
Power consumption (at start)	6 VA
Power consumption (permanent)	3 VA
Actuator closing and opening time	approx. 3 min
Protection class	IP44
Ambient temperature	Max 60°C
Connections	3 pcs modular connections (4/4)
Recommended cable type	
- for the controller	4 wire, modular cable (QFZC-07-1)
- between supply boxes	4 wire, modular cable (QFZC-07-3 or QFZC-07-6)
Size	22 x 52 x 21 mm
Zone Controls product code	D1-2

*NC = normally closed, NO = normally open.

Control equipment

Amplifying unit QFZC-13-1



Description, amplifying unit QFZC-13-1

- Amplifying unit QFZC-13-1 is used where more than four units are controlled by the same room controller.
- CE approved.

Technical data

Input signal, from connection box	24V AC signals to heating or cooling actuator
Output signal, to connection box	24V AC signals to heating or cooling actuator
Supply voltage	24V AC ±10%
Power consumption	2 VA
Connections	3 pcs modular contacts (4/4)
Recommended cable type	4x0,14mm ^{2} , modular cable (QFZC-07-3 or QFZC-07-6)
Protection class	IP44
Size	80 x 122 x 40 mm
Zone Controls product code	D63

Transformer QFZC-11-1

Description, transformer QFZC-11-1

- The transformer is supplied with 230V AC
- Can serve up to four perimeter wall units
- CE approved.

Technical data

Supply voltage	230V AC
Output	24V AC
Effect	20 VA
Protective fuse, secondary	PTC 40°C
Protective fuse, primary	–
Connection, primary	Wall socket
Connection, secondary	Modular switch 4/4
Protection class	IP44
Zone Controls product code	T20-21M

Modular cable QFZC-07

Description, modular cable QFZC-07

- Modular cable type QFZC-07-1 connects the room controller with the connection box. Standard length = 3 m
- Modular cable type QFZC-07-3 or QFZC-07-6 connects the junction boxes between two perimeter wall units.

Technical data

Cable	4-wire
Connections, modular contact (QFZC-07-3/QFZC-07-6)	4/4+4/4
Connections, modular contact (QFZC-07-1/QFZC-07-4	4/4 + 6/4
Zone Controls product code (modular connection both ends)	K4
Zone Controls product code (Modular cable for connection between connection box D1-2 and room controller R101M)	K41

Product Code

Modular cable
QFZC-07-b

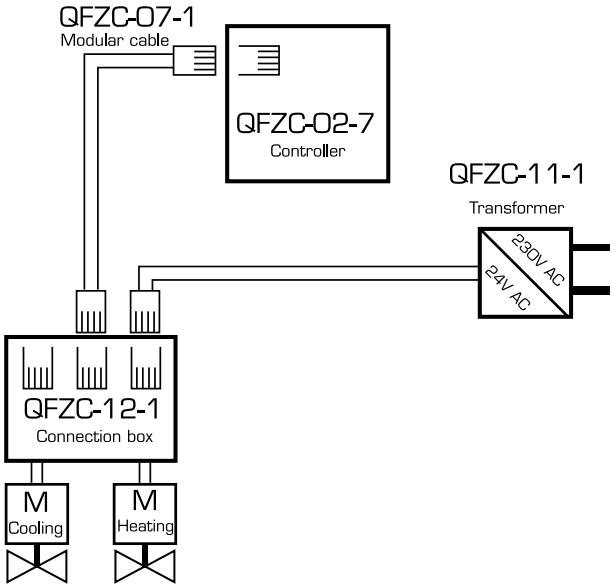
Connection and cable length (b)
1 = Modular connection at both ends between connection box QFZC-12-1 and controller QFZC-02-7 cable length 3 m .
3 = Modular connection at both ends cable length 3 m .
4 = Modular connection at both ends between connection box QFZC-12-1 and controller QFZC-02-7 cable length 6 m .
6 = Modular connection at both ends cable length 6 m .

Note!

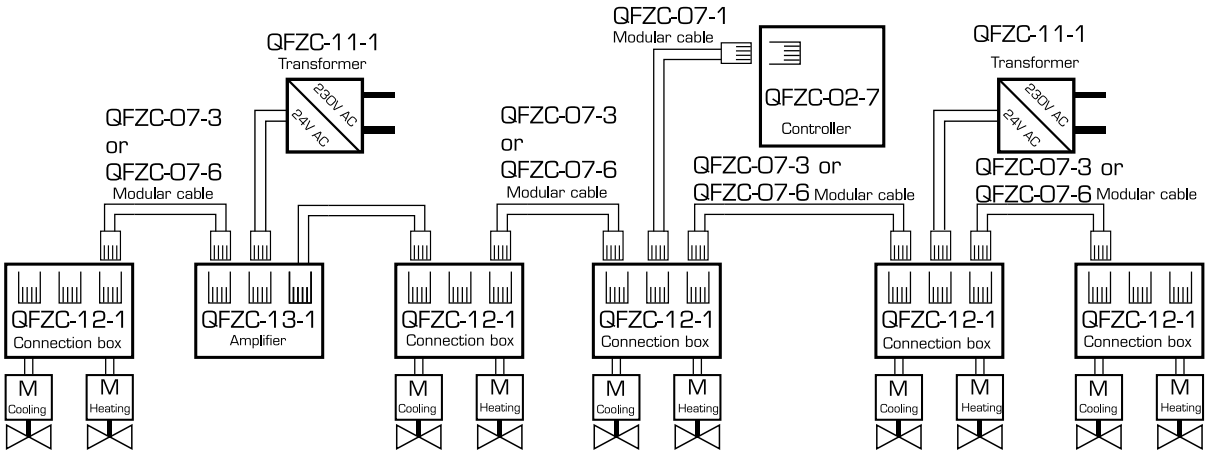
- Control valves are included in all QVFC perimeter wall systems. There is one valve for heating and one valve for cooling – both with adjustable kvs value.
- QVFC is delivered without nipples and control.

Application example

Heating and cooling, one perimeter wall system



Heating and cooling, five or more perimeter wall system



An amplifier QFZC-13-1 and a transformer QFZC-11-1 are needed for every third unit.

Product code and accessories

Product code

Perimeter wall system
QVFC-aaaa-bb-ccc

Nominal length, mm (aaaa)
800, 1000, 1300, 1570

Supply air flow from unit, l/s (bb)

Pressure setting/Operating pressure in unit, Pa (ccc)

Note!
QVFC is delivered without nipples and control.
Control valves are included in all QVFC perimeter wall systems.

Accessories

Wall bracket, length 1900 mm
QVFZ-01

Outlet sleeve, fixed dimension, not telescopic
QVFZ-02-bbb

Height, mm (bbb)
50-200

Water couplings

Fixed coupling/Sliding socket pipe
QVFZ-03-bb

Size, mm (bb)
22, 28

Flexible coupling 22
QVFZ-04-bb

Size, mm (bb)
22, 28

Pipe terminations with air nipple
QVFZ-05-bb

Size, mm (bb)
22, 28