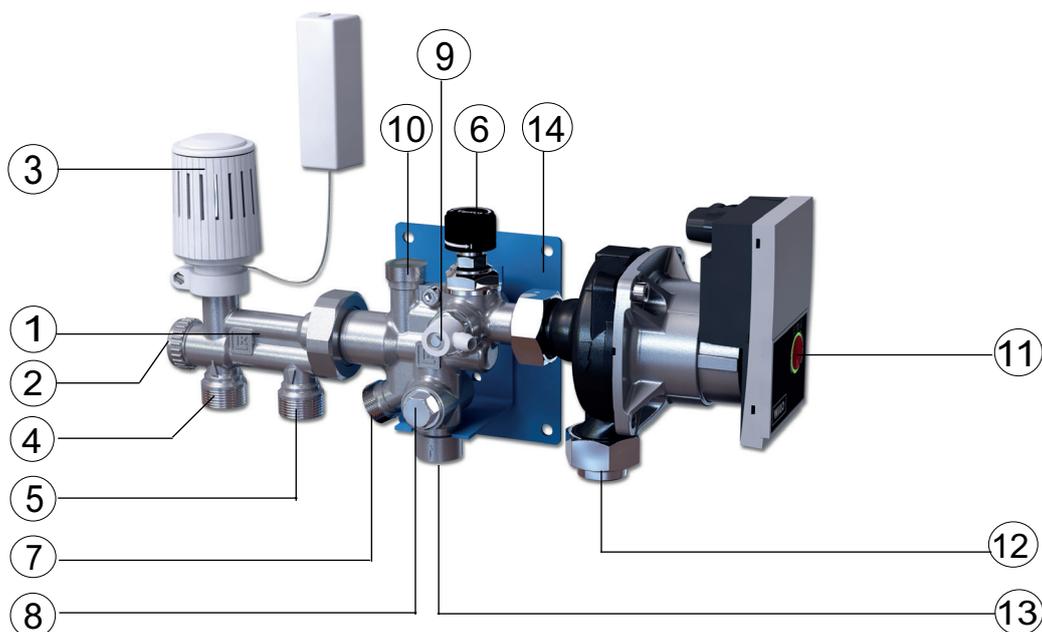


# LK Minishunt M60



## DESIGN

The LK Minishunt M60 is intended for use in smaller under floor heating areas (up to 60 m<sup>2</sup> depending on heating requirements/laying procedures etc.) and is connected to an existing heating system. The shunt unit consists of an automatic speed-controlled circulation pump for the under floor heating circuit, a maximum limit function for the feed temperature, a return valve for the under floor heating circuit, a fill/discharge and air bleed valve plus a thermostatic valve unit, fitted with a thermostat and a sensor, connected to a capillary tube.

Connectors for a under floor heating circuit and mini manifolds for 2, 3 or 4 under floor heating circuits are provided as accessories. Possible pipe connections for floor heating are dim. 8, 12, 16 and 20 mm. The installation can be concealed in built-in or wall-mounted cabinets, see heading *Installation cabinets*.

1. Thermostat valve.
2. Switching between single or twin pipe radiator systems and shutting-off against the return connection of the primary side. When delivered, the minishunt is set for a twin pipe radiator system with the outer hex-screw spindle (dim. 10 mm hex.) screwed in and the inner hex-screw spindle (dim. 4 mm hex.) screwed out. For single pipe systems the outer hex-screw spindle is gradually screwed out until correct

temperature is achieved to the radiators. Shutting-off against the return connection of the primary side is achieved by turning closed the outer and then the inner hex-screw spindle.

3. Thermostat with capillary tube connected sensor, length 2 m.
4. Feed connection from the primary side, 3/4" male EuroCone. Connectors for 15 mm Cu are supplied.
5. Return connection to the primary side, 3/4" male EuroCone. Connectors for 15 mm Cu are supplied.
6. Temperature limiter. Maximum limiter of the feed temperature to the under floor heating.
7. Return valve (dim. 8 mm hex.).
8. Connection 1/2" female thread for system refill upon installation.
9. Ventilation valve with hose nipple.
10. VF valve (dim. 8 mm hex.). Must only be used for installations with low available drive pressure from the circulation pump of the primary side.
11. Circulation pump, Wilo Yonos Para RSB15/6-RKA with automatic speed control.
12. Connection feed floor heating 1/2" female thread.
13. Connection return floor heating 1/2" female thread.
14. Bracket

## FUNCTION & REQUIREMENTS

In order for the correct operation of the LK Minishunt M60/under floor heating system, the existing heating system must be fitted with a circulation pump and preferably with a weather dependent flow temperature control. With the LK Minishunt M60 the temperature of the heating system is adapted to the lower temperature that is required by the under floor heating circuit. Prior to assembly, the heating system must be flushed through and must not contain any impurities or additives, which can damage the shunt.

## ASSEMBLY

The LK Minishunt M60 must be mounted at a higher level than the under floor heating installation in order to assist air bleeding. Pay attention to any structure-borne noise from the minishunt when placing it. The shunt should preferably be placed in specially designed cabinet to fulfil Sweden's plumbing safety regulations, see heading **Installation cabinets**.

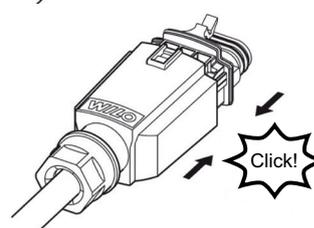
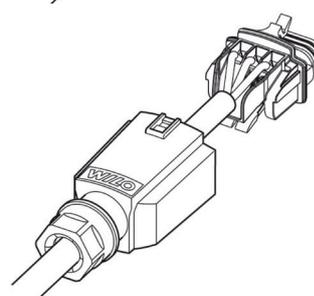
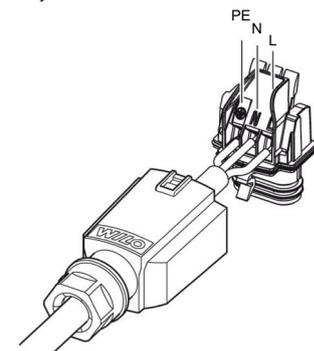
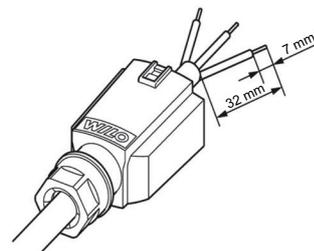
### Pipe connection

The minishunt's primary connection is provided with a 3/4" EuroCone thread. Pipe connection to the primary side is made using the enclosed fittings for 15 mm Cu Connectors for Cu 12 mm and to PEX-/PAL pipes dimension 16x2, 20x2 and 20x2, 8 mm are available as accessories. The secondary connections of the minishunt have 1/2" female thread. The under floor heating pipes are connected for a floor heating circuit using LK Connection Coupling 1/2" male thread for pipe dim. 8,12,16 or 20 mm. For more circuits, LK Mini Manifold 2, 3 or 4 circuits for pipe dim. 8, 12, 16 or 20 mm, are available.

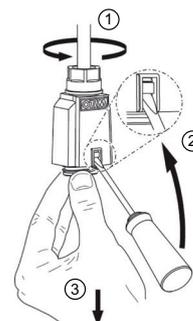
### Electrical connection of circulation pump

Electrical connection of the pump must be carried out by a qualified electrician in accordance with applicable regulations. The pump is equipped with a fixed 3-core cable and Wilo-connector with integrated strain relief. The Wilo-connector replaces the requirements for 2-pole circuit breaker. Connect the supply cable L, N, PE to the Wilo-connector according to the following sequence. The electrical connection must be fused with Max 10 A slow blow fuse. Note that at any maintenance/repair work the pump power supply must be disconnected. Motor protection for the circulation pump is not required.

## Assembly

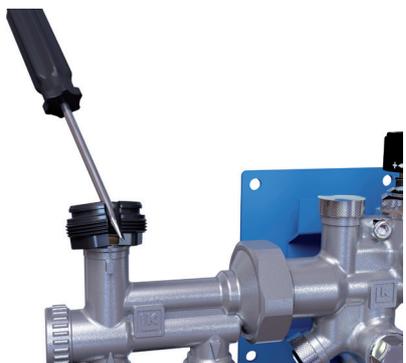
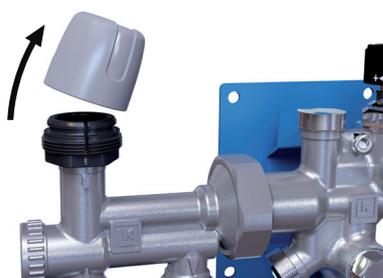
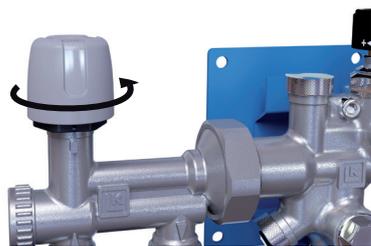


## Disassembly



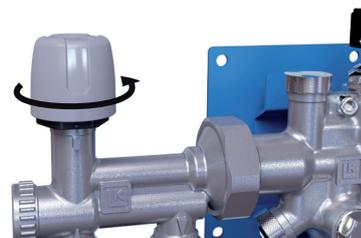
### Assembly of supplied thermostat

To install the supplied thermostat with capillary tube connected sensor, dismantle the hand actuator and the black threaded adapter according to the sequence below. The capillary tube connected sensor is preferably placed on a interior wall. As accessory a thermostat with 5 m capillary tube, alternatively LK's electronic wired or wireless room control can be used.



### Assembly of LK Actuator

Wireless or wired electronic room control for LK Minishunt M60 are available as accessories. The enclosed thermostat with capillary tube connected sensor is then replaced with an electric LK Actuator and is installed according to the sequence below.



## INSTALLATION CABINETS

To conceal the installation there are cabinets available to be built-in or mounted on the wall. The cabinet fulfils Sweden’s plumbing safety regulations. The cabinets are made of 1 mm powder coated steel plate. The cabinet has a rigid base complete with pipe entry-holes sealed by rubber gaskets. The base of the cabinet is fitted with an outlet for leakage indication so that any leakage water can be drained.

The cabinet is supplied complete with door and frame. The hatch of the cabinet is fitted as standard with a screwdriver lock. Lock and keys are available as accessories.



LK Minishunt M60 assembled in LK Cabinet M60 WP.

Article no.	Denomination	Intended for
241 94 49	LK Cabinet M60 WP	LK Minishunt M60
241 94 50	LK Cabinet M60 WP-XL	LK Minishunt M60 with assembled LK Mini Manifold or LK Heater
241 94 51	LK External Cabinet M60 WP	LK Minishunt M60
241 94 52	LK External Cabinet M60 WP-XL	LK Minishunt M60 with assembled LK Mini Manifold or LK Heater

## START UP

### Air bleeding

**Flush through the system with hydraulic pressure in order to air bleed it and remove any impurities as follows:**

- Close against the primary side using the thermostat valve (3).
- Screw both hex-screw spindles to closed position for the valve (2).
- Next, close the return valve (7).
- Assemble the hose connection (8).
- Flush the floor heating side via connection (8) and air bleed/drain through (9) until the water runs clear.
- Close the ventilation valve (9) and disassemble the hose connection.
- Reset (2) and (3) whereupon the primary side can be switched on.
- Air from the primary side can now be bled out via air vent (9).
- Open the return valve (7).
- Start the circulation pump and use the pump’s automatic venting routine to remove accumulated air in the pump. See heading **Circulation pump**.

### Adjustment

As the LK Minishunt M60 is intended for connection to existing heating systems, the available drive pressure and flow on the primary side are often unknown. Without this information the theoretical adjustment values of the minishunt cannot be calculated. In this case, adjustment should be carried out as described below.

If the available drive pressure and flow on the primary side are known, the theoretical adjustment for the minishunt can be calculated, refer to the project planning instructions for LK Floor Heating.

1. Carry out air bleeding of the floor heating system and the minishunt, as shown above.

2. Start the pump. Upon start up, use the automatic venting routine to remove accumulated air in the pump. The automatic venting routine starts after 3 seconds and proceeds for 10 min. The venting routine is indicated with a fast flashing green diode light. After completing the venting process, the constant pressure curve that best matches the requirements of the system is chosen. See capacity chart below.
3. Set the switch (2) for single or twin pipe radiator systems (twin pipe radiator system is factory set at delivery). For single pipe systems the outer hex-screw spindle is gradually screwed out until correct temperature is achieved to the radiators. The inner hex-screw spindle must be screwed out. For twin pipe systems the outer hex-screw spindle (dim. 10 mm hex.) must be screwed in and the inner hex-screw spindle (dim. 4 mm hex.) screwed out.
4. Set the primary temperature from the heating source to the minishunt to approx. 55 °C.
5. Set the temperature limiter (6) as given in the table below. Normal setting is approx. 50 °C.
6. Set the thermostat (3) as given in the table below.
7. Allow the system to stabilize for approx. 10 min.
8. The feed temperature should now be between 35-45 °C.
  - If the temperature is too low, see heading **Trouble shooting**. Note that at start up a system in an unheated concrete slab, can take up to 24 hours before the feed temperature has reached the correct level.
  - If the temperature is too high, adjust the feed temperature using the temperature limiter (6) as given in the table below.
9. Finish off by resetting the primary temperature to normal temperature.

Setting of the temperature limiter for the feed temperature of the under floor heating.

Dial settings from open position	Max. temperature
0,0	65 °C
0,5	57 °C
1,0	50 °C
1,5	43 °C
2,0	35 °C

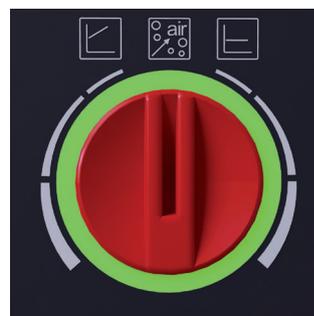
Setting of the thermostat with the capillary tube connected sensor.

Marking on thermostat	Room temperature
1	8 °C
2	14 °C
3	20 °C
4	26 °C
5	32 °C

### CIRCULATION PUMP

The circulation pump has automatic speed control, which reduces power consumption and gives a quieter operation as the pump adjusts the flow according to the requirements of the system. A cast arrow on the pump housing indicates the direction of the flow. For under floor heating it is recommended that the pump is set to constant pressure control. Chose the constant pressure curve that best matches the requirements of the system, see capacity chart below. Ensure that the pump never runs dry and the system is well vented before use. Use the pump’s automatic venting routine at start up.

### Setting the pump function selector



### Automatic venting routine

When the floor heating system is filled, flushed and vented the circulation pump can be started. At start up, use the pump's automatic venting routine to remove accumulated air in the pump's rotor chamber. The automatic venting routine start after 3 seconds and lasts for 10 minutes. Venting routine indicated by a fast flashing green diode light. After complete venting, choose the constant pressure curve that best matches the requirements of the system, see capacity chart below. If no choice is made, the pump operation automatically switches to constant pressure with max capacity.



### Constant pressure curve

For under floor heating it is recommended that the pump is set to constant pressure control. Select the constant pressure curve that best matches the needs of the system, see capacity chart below.

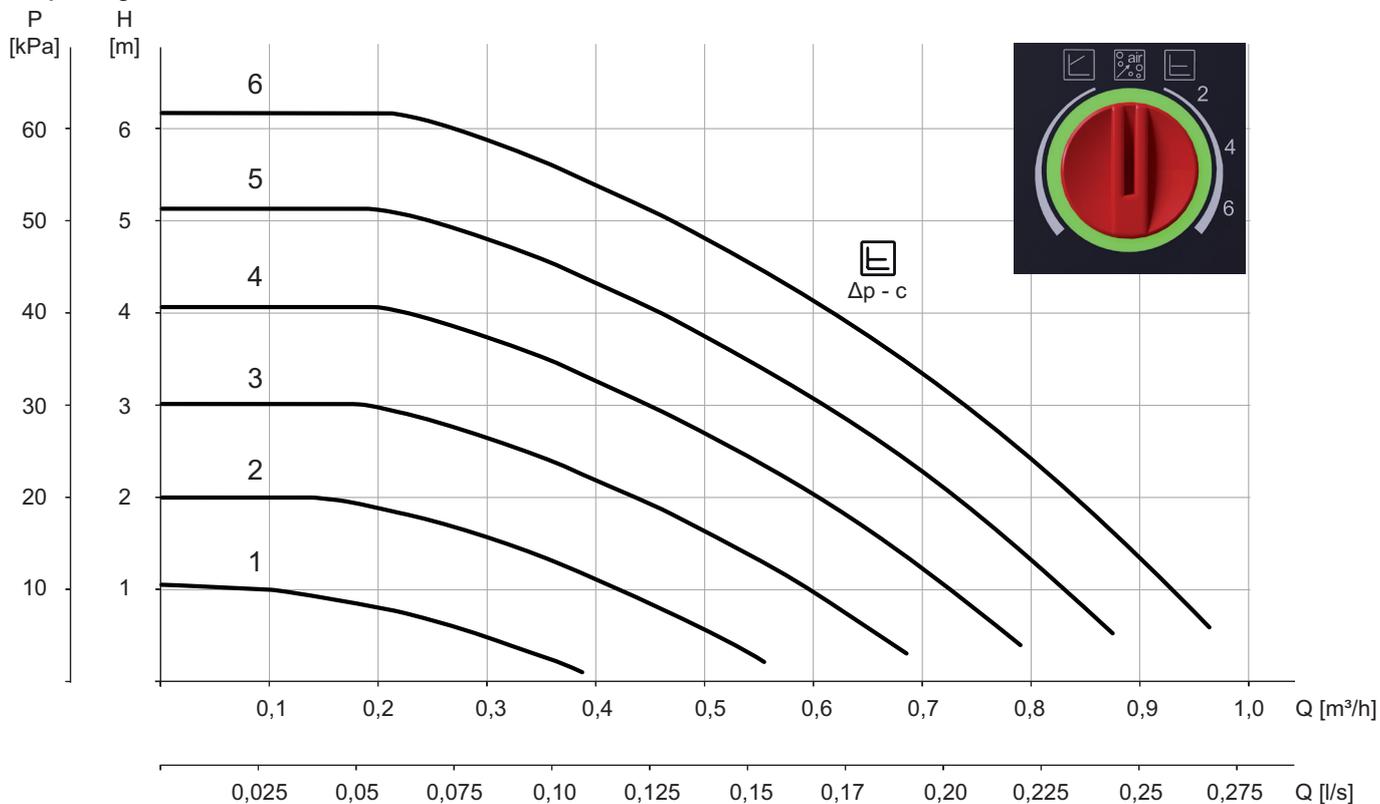


### Proportional pressure curve

Proportional pressure setting is normally not used for floor heating.



### Capacity chart



Capacity chart LK Minishunt M60 with Wilo Yonos Para RSB 15/6-RKA.

### Diode indicator on the pump

Diode	Meaning	Note	Action
Lights green	Pump in operation.	Normal operation.	
Fast flashing green	Pump is running venting routine during 10 min. Then, the required pump capacity must be set.	Venting routine active.	
Flashes red/green	The pump is ready for operation, but will not start. The pump starts automatically as soon as the error is no longer present.	Under- or over-voltage $U < 160 \text{ V}$ , $U > 253 \text{ V}$ .	Check the power supply $> 195 \text{ V}$ / $< 253 \text{ V}$ .
Flashes red	The pump is not working, pump blocked.	The pump does not restart automatically.	Check the pump housing, if necessary replace the pump.
Diode not lit	No power supply or damaged electronics.		Check the power connection, cable connection, if necessary replace the pump.

### TROUBLE SHOOTING

The under floor heating circuit does not get warm

- Check that the shut-off valves for (2) and the return valve (7) are open.
- Check the setting on the maximum limiter valve (6).
- Check the connection, operation and setting of the circulation pump.

If the above adjustments have been performed and there is still no heat reaching the under floor heating circuit, this can be an indication of low available drive pressure from the primary side. Begin by checking that the circulation pump of the primary side can be stepped up. If this does not rectify the situation, the circulation pump of the minishunt can help to "draw" the water from the primary side to the under floor heating side by gradually closing (clockwise) the VF valve (10) until the correct temperature has been achieved.

Return temperature of the under floor heating circuit is too low

- Open the return valve (7).
- Increase the speed of the circulation pump using the function selector.

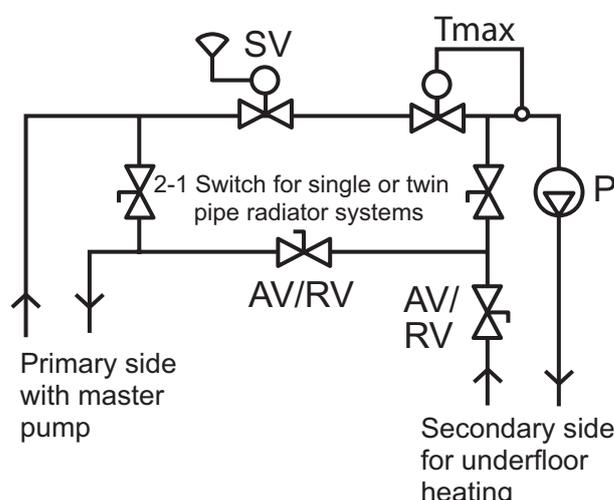
The radiators after the minishunt do not get warm for the single pipe radiator systems

The LK Minishunt M60 is supplied in the twin pipe design. For the single pipe system, switching will need to be carried out, see heading *Start up/ Adjustment*.

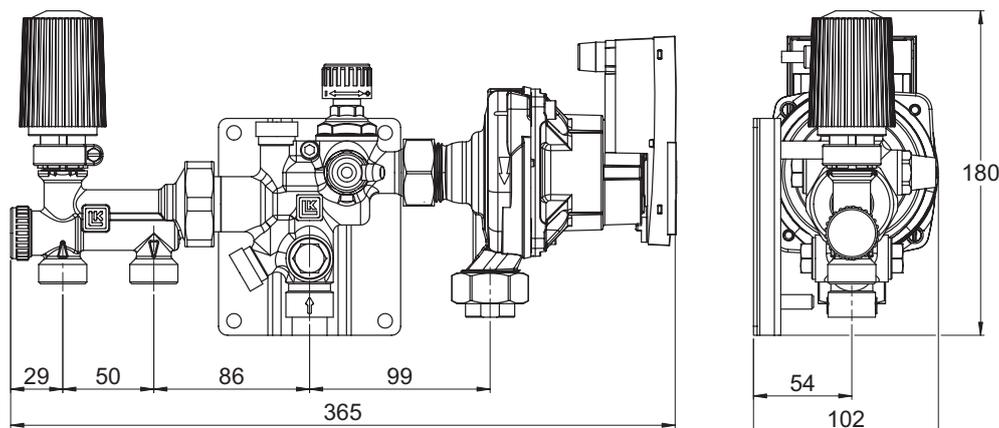
### TECHNICAL DATA

Article no.	241 80 85
Max. operating pressure	0,6 MPa
Operational temperature secondary	+12 - +63 °C
Ambient temperature	Max +35 °C
Circulation pump	Wilo Yonos Para RSB 15/6-RKA
Voltage	1 phase 230 V +10%/-15% 50/60 Hz, PE
Output	Max 45 W
Current	Max 0,44 A
Protection class	IP X4D
Insulation class	F
Valve capacity	Kvs 1,12, with self-acting thermostat Kv 0,51

### FLOW DIAGRAM



## DIMENSIONS



### DIMENSION SKETCH FOR THE LK UNDER FLOOR HEATING WITH MINISHUNT M60

The table is based on a heat output of approx. 50 W/m<sup>2</sup> and an indoor temperature of 20 °C. The primary temperature is calculated at 55 °C and with a floor temperature at approx. 40/33 °C. Under floor heating systems 1-7 respectively 10-13 are calculated using 14 mm laminated parquet. Systems 8 and 9 are calculated using 22 mm laminated parquet.

	5m <sup>2</sup>	10m <sup>2</sup>	15m <sup>2</sup>	20m <sup>2</sup>	25m <sup>2</sup>	30m <sup>2</sup>	35m <sup>2</sup>	40m <sup>2</sup>	45m <sup>2</sup>	50m <sup>2</sup>	55m <sup>2</sup>	60m <sup>2</sup>
<b>1. Clip Rail 8 c/c 120 mm</b>	1x43m	2x43m	3x43m	4x43m								
<b>2. Clip Rail 12 c/c 150 mm</b>	1x35m	1x70m	2x53m	2x70m	3x58m	3x70m	4x61m	4x70m				
<b>3. Clip Rail 16 c/c 320 mm</b>	1x17m	1x35m	1x52m	2x35m	2x44m	2x53m	3x41m	3x46m	3x53m	4x44m	4x48m	
<b>4. Clip Rail 16 c/c 240 mm</b>	1x23m	1x46m	1x69m	2x46m	2x58m	2x69m	3x54m	3x61m	3x69m	4x58m	4x63m	4x69m
<b>5. Clip Rail 16 c/c 160 mm</b>	1x35m	1x70m	1x105m	2x70m	2x88m	3x70m	3x82m	3x93m	4x79m	4x88m	4x96m	
<b>6. Clip Rail 20 c/c 300 mm</b>	1x19m	1x38m	1x57m	1x76m	2x48m	2x57m	2x67m	2x76m	3x57m	3x63	3x70m	3x76m
<b>7. HeatFloor 22 pipe dim. X16 c/c 200 mm</b>	1x29m	1x57m	2x43m	2x57m	2x70m	3x57m	3x67m	3x76m	4x64m	4x70m	4x78m	4x85m
<b>8. Floor Joist Plate 16 c/c 200 mm</b>	1x29m	1x57m	2x43m	2x57m	3x48m	3x57m	4x50m	4x57m				
<b>9. Cross battening with distribution plate 16 c/c 200 mm</b>	1x29m	1x57m	2x43m	2x57m	3x48m	3x57m	4x50m	4x57m				
<b>10. Floating floor EPS 30 pipe dim. X16 c/c 200 mm</b>	1x29m	1x57m	1x85m	2x57m	2x70m	2x85m	3x67m	3x76m	4x64m	4x70m	4x78m	4x85m
<b>11. Floating floor EPS 50 pipe dim. X16 c/c 200 mm</b>	1x29m	1x57m	1x85m	2x57m	2x70m	2x85m	3x67m	3x76m	4x64m	4x70m	4x78m	4x85m
<b>12. HeatFloor 22 XPE pipe dim. X16 c/c 200 mm</b>	1x29m	1x57m	1x85m	2x57m	2x70m	2x85m	3x67m	3x76m	4x64m	4x70m	4x78m	4x85m
<b>13. EPS 16 pipe dim. 12 c/c 150</b>	1x35m	1x70m	2x53m	2x70m	3x58m	3x70m	4x61m	4x70m				