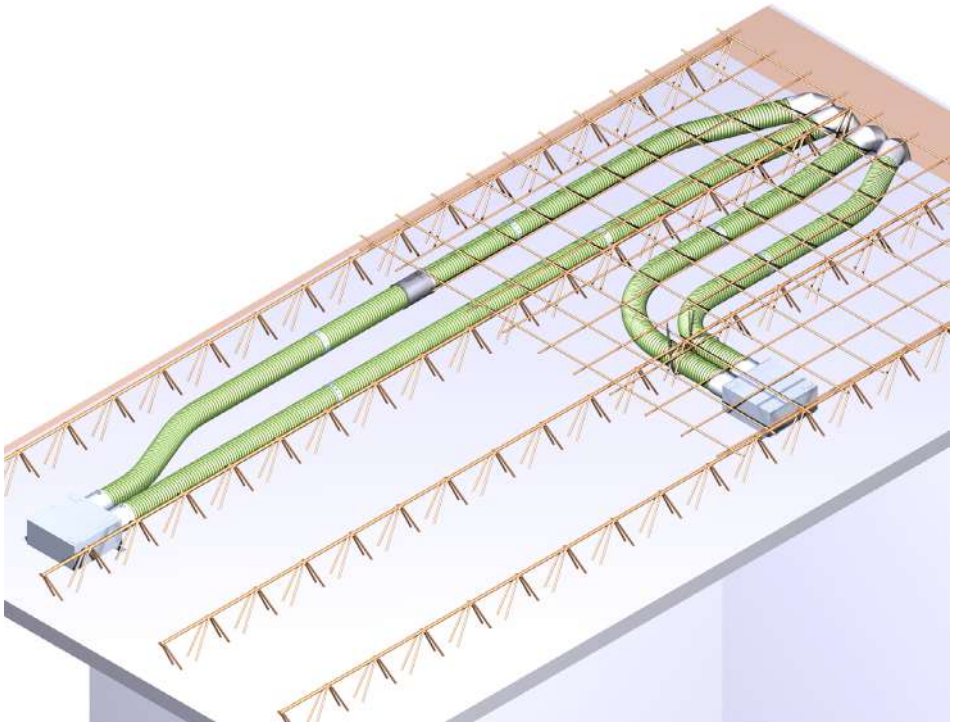
Meltem®
VENTILATION & HEAT RECOVERY

GUIDANCE NOTES

HOME VENTILATION WITH HEAT RECOVERY

Planning and Installation of Flexible Pipe Systems



Part no. 744017EN Week 05/2022 EN

Meltem Wärmerückgewinnung GmbH & Co. KG
Am Hartholz 4 · D-82239 Alling
info@meltem.com · www.meltem.com

VENTILATION THE RIGHT WAY

Contents

1 Introduction

1.1 Notes on these guidance notes

These guidance notes contain important information that should be followed when planning and installing flexible pipe systems.

► Read these guidance notes carefully before planning and installing flexible pipe systems to avoid possible risks and mistakes.

⚠ WARNING

► Follow ALL danger and warning instructions and notes on precautionary measures.

► Read section “2 Safety and planning notes” on page 4 carefully.

1.2 Description

Investing in a comfort ventilation system with heat recovery will definitely pay dividends. The reduced heating costs will also contribute to climate protection and save energy. Individual room ventilation also provides for comfort, noise reduction, the removal of stale air, not to mention a hypoallergenic environment.

Multiple rooms can be ventilated at the same time by connecting flexible pipes to the ventilation unit. These guidance notes describe the special requirements that must be considered at the planning and implementation phases for a flexible pipe system.

1.3 Target group

These guidance notes are aimed at two different target groups:

— Planners commissioned to planning a flexible pipe system for a controlled home ventilation system.

— Installers commissioned to install a flexible pipe system.

1.4 Revision index

Edition	Manual	Date
2nd edition	Guidance notes for the planning and installation of flexible pipe systems	Week 05/2022 EN

1.5 Explanation of the symbols used

► This symbol indicates an action to be taken.

— This symbol indicates a list.

1.6 Supplementary documents

► You will also need to follow the appropriate installation and operating instructions.

2 Safety and planning notes

2.1 Stress analysis and fire protection

The relevant fire protection specifications must be taken into account when running a flexible pipe system in concrete slabs. DIN 4102:2016-05 part 4 defines minimum thickness requirements for reinforced and prestressed concrete slabs in relation to the fire resistance class to be fulfilled.

The following table provides notes for running pipes in the slab with outlets in the slab. The unweakened part of the slab is above the level in which the flexible pipes and outlets are located, and thus acts as protection for the fire compartment.

These are recommendations for the minimum distances and slab thicknesses that are used as the basis for coordination with the structural engineer.

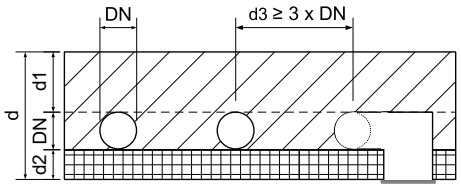
Design features	**Fire resistance class designation for ceilings; dimensions in mm**											
	Building class 1 F0			Building class 2 and 3 and basement BC 1 F 30			Building class 4 F 60			Building class 5 and basement BC 3 and 4 F 90		
	d1	d2	d3	d1	d2	d3	d1	d2	d3	d1	d2	d3
Minimum overlay*	50			80			80			100		
Minimum bedding depth		50			50			50			50	
Minimum distances between pipes			3 x DN			3 x DN			3 x DN			3 x DN
Recommended minimum slab thickness ignoring any crossing cable conduits	d = 180			d = 220			d = 220			d = 240		
Recommended minimum slab thickness including any crossing cable conduits	d = 200			d = 240			d = 240			d = 260		

Table 1: Minimum thickness of reinforced and prestressed concrete slabs made from normal concrete with ventilation pipes conforming to DIN 4102 with combustible components

* The values apply only to installation of a floating screed with a minimum thickness of 25 mm.
DN = Diameter of the ventilation pipe, e.g. 75 mm as per manufacturer's specification.
The details in Table 1 of DIN 4102 part 4 also apply when running pipes in in-situ concrete slabs.

► Make sure that the required minimum bedding depth and minimum overlay is maintained in all cases. When running in in-situ concrete, use spacers and/or fix the ceiling boxes, connecting sleeves, bends and flexible pipes appropriately to guarantee this.

NOTICE

Running flexible pipes in concrete slabs affects the stress analysis and fire protection. These guidance notes contain general information about the planning and installation work required.

In all cases, the positioning of ceiling boxes and the flexible pipe runs must be checked and approved by a planner/structural engineer. For example, it must be ensured that no flexible pipes run in areas with more stringent structural requirements (e.g. pillars or openings in the slab).

In addition, the responsible chimney sweep must be contacted during the planning phase so that any necessary safety equipment can be taken into account (e.g. low pressure or differential pressure switches for operation with fireplaces) and operation of the ventilation unit may be approved.

2.2 Running flexible pipe systems

- Observe the following recommendations when using flexible pipes to avoid unnecessary pressure losses in the pipes:
  - Always connect two flexible pipes to the flexible pipe connection.
  - As far as possible, use flexible pipes with a diameter of 75 mm.
  - The total length of each flexible pipe should not exceed 10 m.
  - Minimise the number of bends in the flexible pipes.
  - Avoid small bending radii.
  - Run the two flexible pipes of a flexible pipe connection in parallel to one another to ensure that the length of the two pipes remains roughly equal.
- When planning the installation of non-closeable overflow openings between the supply air and extract air rooms, incorporate a gap of 1.5 cm beneath the doors, for example, or use ventilation grids in doors.
- For structural analysis reasons, a minimum distance of 3x the pipe diameter should be maintained between the flexible pipes.
- Make sure that the flexible pipes are not kinked where they transition from horizontal to vertical runs. The 90° flexible pipe bend may be used for this purpose. This can also be used to implement smaller bending radii.
- The lattice girders and top flanges must not be cut through or damaged.

2.3 Relevant standards

The following standards must be observed when planning and installing flexible pipe systems:

- DIN 1946-6: Ventilation and air conditioning - Part 6: Ventilation for residential buildings - General requirements, requirements for measuring, performance and labeling, delivery/acceptance (certification) and maintenance
- DIN 18017-3: Ventilation of bathrooms and toilet rooms without outside windows
- DIN 4102: Fire behaviour of building materials and building components
- DIN 4109: Sound insulation in buildings

This is not an exhaustive list.

2.4 Designating supply air and extract air rooms

Table 2 provides an overview of those rooms/living areas that may act as supply air or extract air rooms. Note the following points:

— Supply air rooms are habitable rooms such as living rooms, bedrooms or playrooms. Outdoor air or supply air (treated outdoor air) is supplied to these areas.

— Extract air rooms are all those rooms in which the air is especially stale due to moisture and/or odours, e.g. kitchens, bathrooms or WCs. The air is extracted from these rooms.

NOTICE

Observe the notes in section 2.5 on page 7 on positioning supply air and extract air valves.

Supply air rooms	Extract air rooms
Bedroom	Bathroom
Child's bedroom	Kitchen
Guest bedroom	Utility room
Living room/dining room	WC
Study	–

Table 2: Examples of supply air and extract air rooms

Fig. 1 shows a typical application for the ventilation of a 4-room apartment with two M-WRG-II ventilation units using a flexible pipe system.

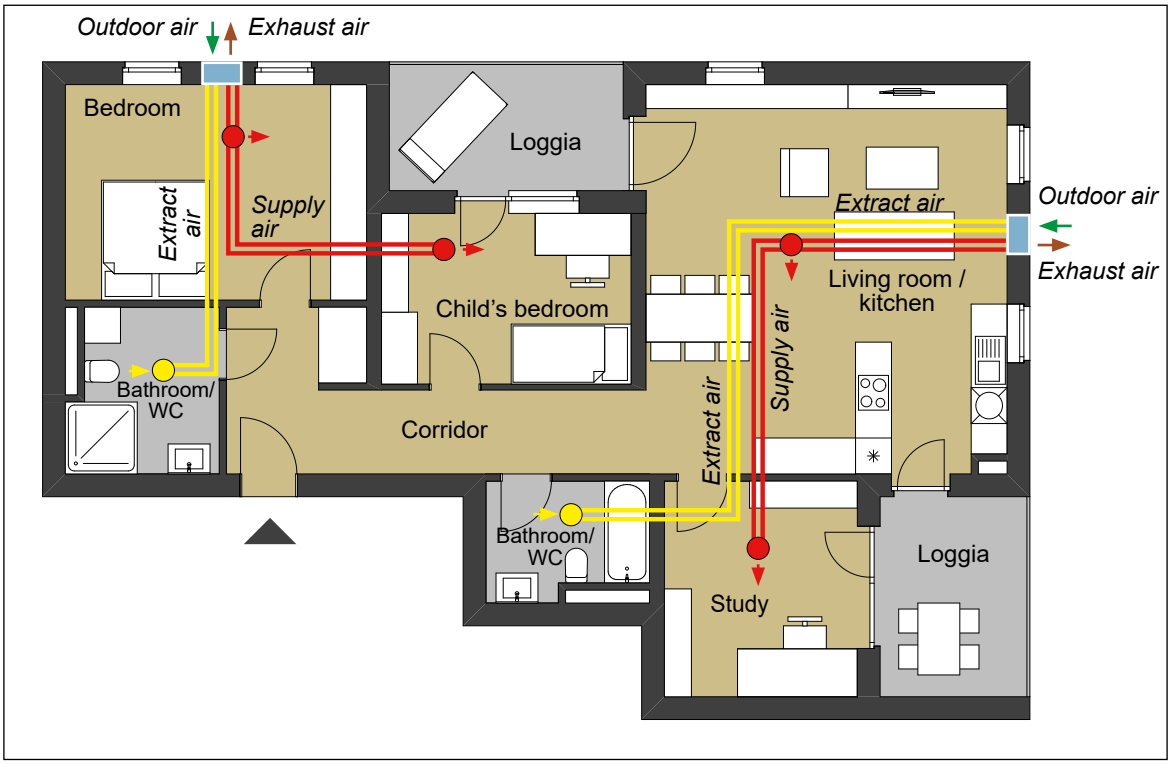


Fig. 1: Ventilation of a 4-room apartment using a flexible pipe system

2.5 Notes on positioning supply air and extract air valves

- Observe the minimum distances between valves and internal walls or room corners (see Fig. 13 on page 13):
  - Supply air valve: 35 cm
  - Extract air valve: 20 cm
- Make sure that supply air and extract air openings are not covered when the room is subsequently decorated and furnished (e.g. by curtains, cupboards, etc.).
- Do not position supply air and extract air valves in the immediate vicinity of where people stop (e.g. bed, dining table, workstation, etc.) to avoid draughts.
- Do not install extract air valves directly above heaters, bathtubs or in the shower.
- In kitchens, do not position the extract air valve used to extract the stale ambient air in the vicinity of cookers so as to avoid a grease build-up in the flexible pipes.

3 Notes on installing flexible pipe systems

3.1 General notes

The following general notes must be observed when installing flexible pipe systems:

- The installation must be carried out in accordance with the generally acknowledged rules of technology.
- Until they are installed, store all components of the flexible pipe system (flexible pipes, ceiling boxes, crosspieces, etc.) in their original packaging and in a clean, dry place out of the light.
  In particular, protect the flexible pipes against exposure to direct sunlight.
- During the construction phase, close off all unused openings in the components of the flexible pipe system to prevent the ingress of dirt.
- Before connecting components, make sure that the inside is free of dirt. For example, remove plastic swarf from inside a flexible pipe after cutting it to the required length.
- Recommendation: Use cold-shrink tape to fix the connection between flexible pipe and connecting piece to prevent the ingress of concrete.
- When installing, identify the flexible pipes as “supply air” or “extract air” as shown on the planning documents to ensure they are connected correctly.
- **Before pouring the concrete, make sure that:**
  - All components of the flexible pipe system are undamaged.
  - All openings in the components of the flexible pipe system are closed off.
  - The flexible pipes are fixed to the lattice girders with suitable fixings (e.g. cable ties) to prevent the flexible pipes floating up when the concrete is poured.
  - Also follow the notes in section 3.2 on page 8.

3.2 Illustration of the extract air and supply air pipe runs with reference to a sample installation

NOTICE

— Before pouring the concrete, make sure that the flexible pipes have been correctly connected as shown in the planning documents or manufacturer's specifications and run into the assigned extract air or supply air room.

— **Make sure that you have NOT confused the extract air area (yellow) with the supply air area (red).** For example, never connect a bathroom/WC to the flexible pipe system for the supply air area to avoid odour nuisances.

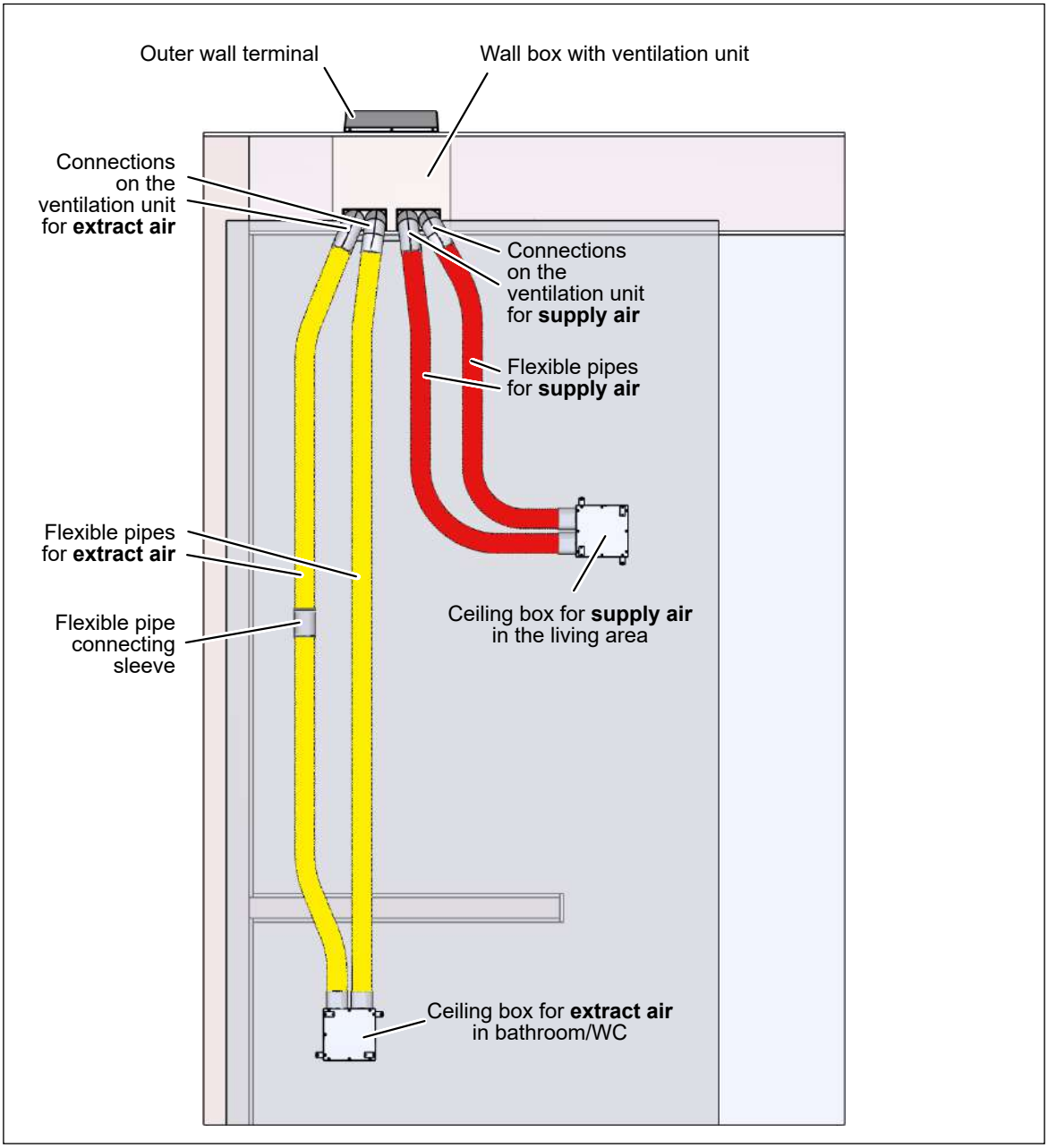


Fig. 2: Running extract air flexible pipes and supply air flexible pipes

4 Tools and equipment required

— Cold-shrink tape
— Cutter for cutting the flexible pipes to length
— Expanding foam with abP (national technical test certificate of the DIBt) approval (“exact gap” foam is recommended)
— Fixings (perforated tape, cable ties, wire etc.)
— Tape measure

5 Fitting flexible pipes

5.1 Cutting flexible pipes to length

► Always cut flexible pipes to length in the “valleys” (see Fig. 3) using a suitable tool (e.g. cutter).

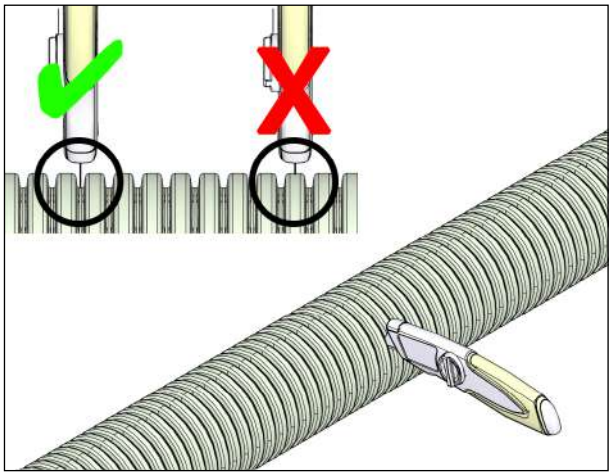


Fig. 3: Cutting flexible pipe to length

5.2 Inserting sealing rings

► Always insert a sealing ring in the 2nd valley of the flexible pipe before you push the pipe into a connecting sleeve, bend or ceiling box.
► **Recommendation:** For ease of fitting, apply a suitable lubricant (e.g. Vaseline) to the sealing ring before inserting.

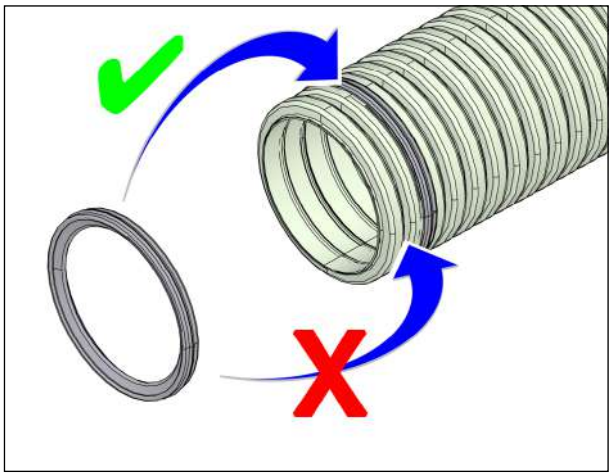


Fig. 4: Inserting sealing ring into 2nd valley in the flexible pipe

5.3 Connecting flexible pipes

- ► Join 2 flexible pipes with the flexible pipe connecting sleeve to cover long distances. The total length of each flexible pipe should not exceed 10 m.
- ► **Recommendation:** Wind cold-shrink tape around the joints to prevent the ingress of concrete.

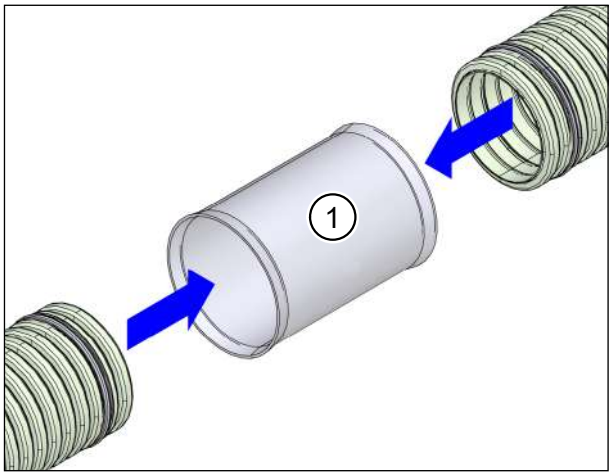


Fig. 5: Connecting flexible pipes

NOTICE

This recommendation applies to all flexible pipe connections and joints on ceiling boxes, crosspieces, flexible pipe bends, etc.

5.4 Crossing flexible pipes

- ► Use a crosspiece (item 1 in Fig. 6) if the structural conditions require the extract air and supply air pipes to cross.

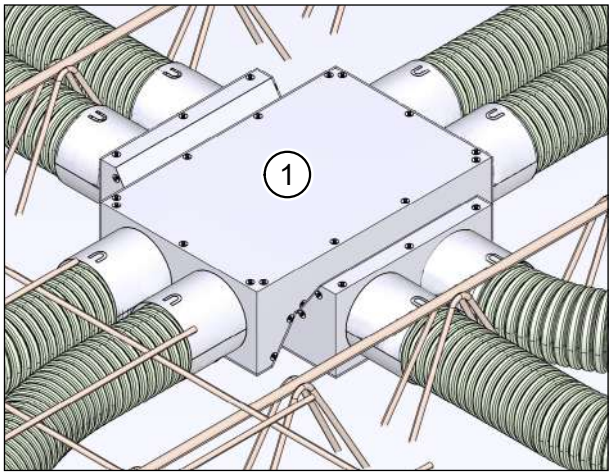


Fig. 6: Crossing flexible pipes

NOTICE

The specifications for installing ceiling boxes (see section “6.3 Connecting flexible pipes to the ceiling box” on page 14 and “6.4 Fixing the ceiling box” on page 15) also apply when installing crosspieces.

5.5 Running flexible pipes

5.5.1 Minimum distance between flexible pipes

- ► Run the two flexible pipes of a flexible pipe connection in parallel to one another.
- ► The minimum distance between 2 flexible pipes should be 3x the pipe diameter.
- ► Make sure that the flexible pipes do not protrude over the lattice girder.

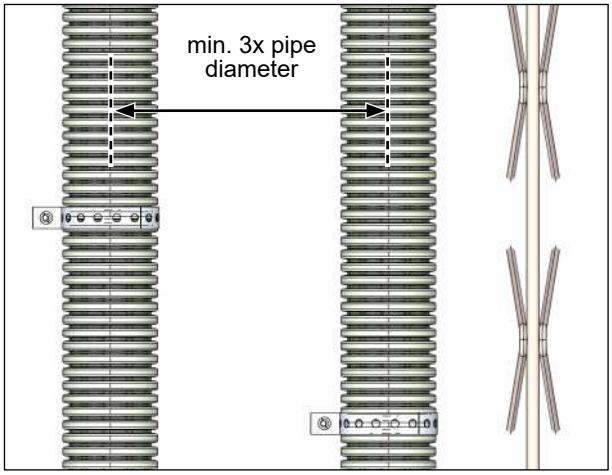


Fig. 7: Minimum distance between flexible pipes

5.5.2 Minimum bending radii of flexible pipes

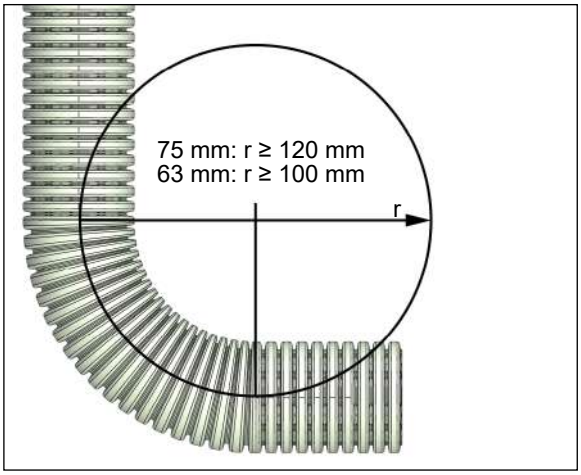


Fig. 8: Minimum bending radius of flexible pipes

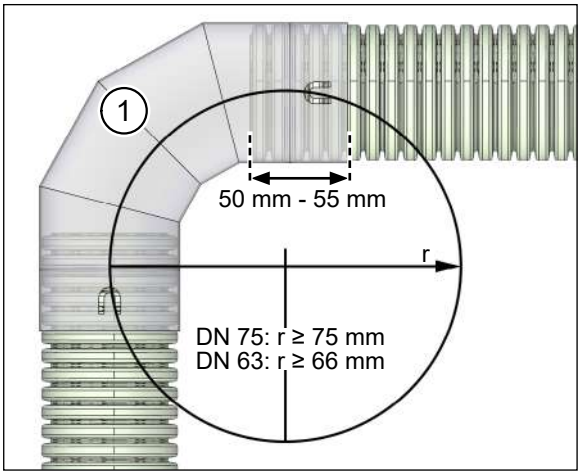


Fig. 9: 90° flexible pipe bend

- ► Observe the following minimum bending radii when running flexible pipes (see Fig. 8):
  - — The bending radius for a 75 mm flexible pipe should be at least 120 mm.
  - — The bending radius for a 63 mm flexible pipe should be at least 100 mm.
- ► Use the 90° flexible pipe bend (item 1 in Fig. 9) to achieve smaller bending radii (see Fig. 9):
  - — The bending radius for a 90° flexible pipe bend, DN 75, is 75 mm.
  - — The bending radius for a 90° flexible pipe bend, DN 63, is 66 mm.
- ► Push the flexible pipe roughly 50 mm - 55 mm into the 90° flexible pipe bend to guarantee an optimum air flow.

5.6 Fixing flexible pipes

- ► Before pouring the concrete, fix the flexible pipes in position with suitable fixings, e.g. cable ties (item 1 in Fig. 10) or perforated tapes (item 1 in Fig. 11) to prevent the flexible pipes floating up. The distance between two fixing points should be 150 to 200 cm.
- ► Press the retaining tabs (item 2 in Fig. 10) on components such as ceiling boxes, crosspieces or 90° flexible pipe bends into the indentations in the flexible pipes to fix them securely.
- ► **Recommendation:** Wind cold-shrink tape around the joints to prevent the ingress of concrete.

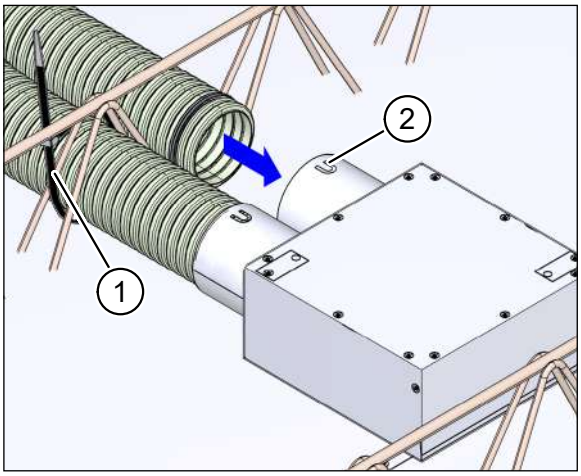


Fig. 10: Fixing flexible pipes with cable ties

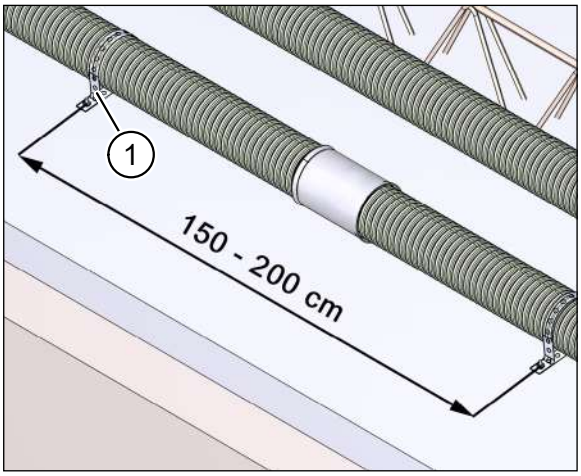


Fig. 11: Recommended distance between fixing points

5.7 Closing off openings in the flexible pipe system

- ► During the construction phase, close off all unused openings in the components of the flexible pipe system to prevent the ingress of dirt (see, for example, Fig. 12 or Fig. 14 and Fig. 15 on page 14).

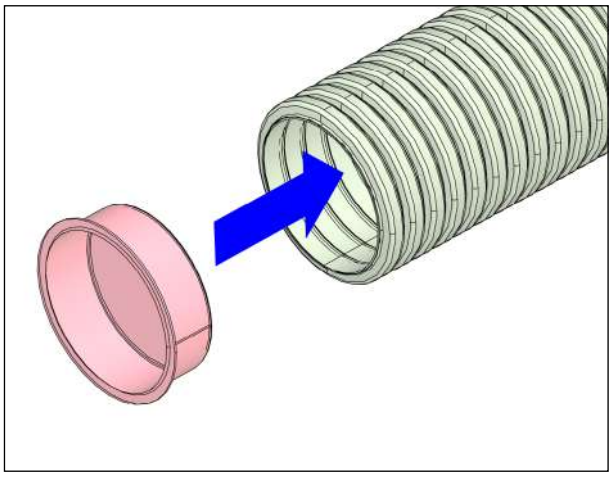


Fig. 12: Example for closing off an opening in the flexible pipe

6 Fitting ceiling boxes

The flexible pipe system passes from the slab into the living area using ceiling boxes. Three different models are available, each with a 75 mm / 63 mm flexible pipe connection:

— Plastic ceiling box: M-WRG-DK 2x75/100, part no. 5056-10/75 or M-WRG-DK 2x63/100, part no. 5056-10/63

— Sheet steel ceiling box: M-WRG-II DK 2x75/100, part no. 732010 or M-WRG-II DK 2x63/100, part no. 732012

— Sheet steel ceiling box with distributor: M-WRG-II DKV 4x75/100, part no. 732011 or M-WRG-II DKV 4x63/100, part no. 732013

6.1 Cored hole for ceiling box – minimum diameter and distances

► If necessary, drill the cored hole for the ceiling box. The diameter of the hole will depend on the ceiling box model (see Fig. 13).

— Cored hole diameter D_P for plastic ceiling box:
min. 105 mm / max. 110 mm

— Cored hole diameter D_S for sheet steel ceiling box:
min. 103 mm / max. 110 mm

► Observe the necessary minimum distances between the cored hole and adjacent surfaces (see Fig. 13). The minimum distance will depend on whether an extract air or supply air valve is fitted in the cored hole.

— Cored hole distance A_{ETA} for extract air valve: min. 200 mm

— Cored hole distance A_{SUP} for supply air valve: min. 350 mm

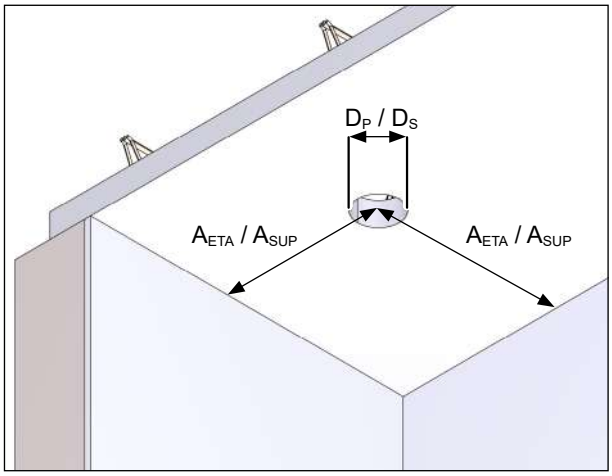


Fig. 13: Cored hole for ceiling box – minimum diameter and distances

NOTICE

Recommendation for filigree slabs, especially exposed concrete slabs:

► In the basement, create opposing formwork to ensure the minimum bedding depth and to ensure that it terminates flush with the underside of the slab.

6.2 Inserting the ceiling box

- ► Cut the ventilation pipe (item 1 in Fig. 14 or Fig. 15) for the ceiling box to length as shown in the planning documents. Be careful to provide the minimum bedding depth (see Table 1 on page 4).
- ► Deburr the cut edge and remove any swarf from the ventilation pipe.
- ► Close off the opening in the ventilation pipe with the red sealing cap (item 2 in Fig. 14 or Fig. 15) to prevent the ingress of dirt.
- ► Insert the ceiling box into the cored hole in the slab.
- ► **Recommendation:** Use expanding foam around the ventilation pipe in the cored hole if necessary (e.g. to fill a large gap between hole and pipe). This recommendation is especially important if the plastic ceiling box is used.

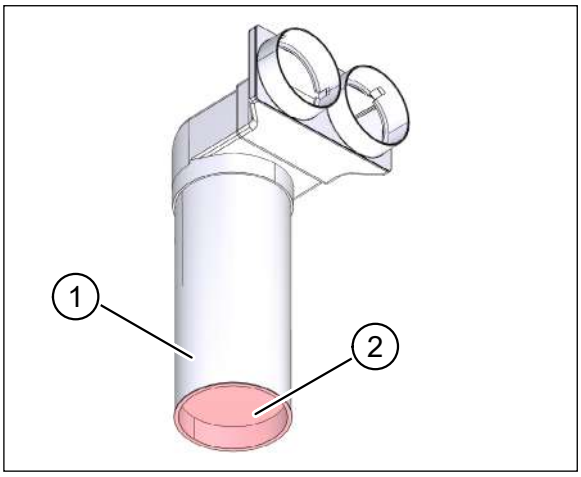


Fig. 14: Inserting the plastic ceiling box

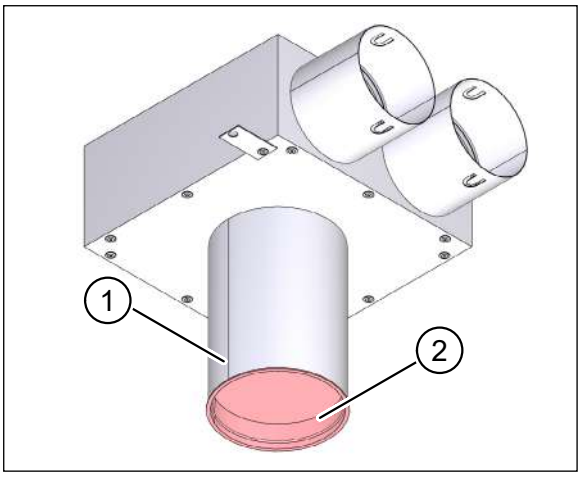


Fig. 15: Inserting the sheet steel ceiling box

6.3 Connecting flexible pipes to the ceiling box

- ► Cut the flexible pipes (item 1 in Fig. 16) to the required length as shown in the planning documents. Follow the installation instructions in section “5 Fitting flexible pipes” from page 9.
- ► Connect the flexible pipes to the ceiling box (item 2 in Fig. 16).
- ► On sheet steel ceiling boxes, press the two retaining tabs (item 3 in Fig. 16) into the indentations in the flexible pipes to fix them securely in the ceiling box.
- ► **Recommendation:** Wind cold-shrink tape (item 4 in Fig. 16) around the joint between connecting piece and flexible pipe to prevent the ingress of concrete.
- ► Close off all openings to prevent the ingress of dirt or concrete.

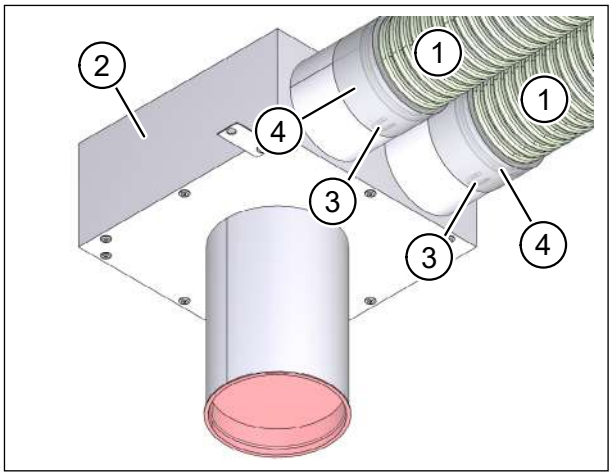


Fig. 16: Connecting flexible pipes to the ceiling box

6.4 Fixing the ceiling box

► Secure the ceiling box with suitable fixings to prevent it floating up when the concrete is poured:
— Fig. 17: fixing on the filigree slab
— Fig. 18: fixing flush with the formwork for the in-situ concrete slab (e.g. with cable ties or wire)

NOTICE

► The sheet steel ceiling box can also be fixed to the fold-out retaining tabs (item 1 in Fig. 17 and Fig. 18).

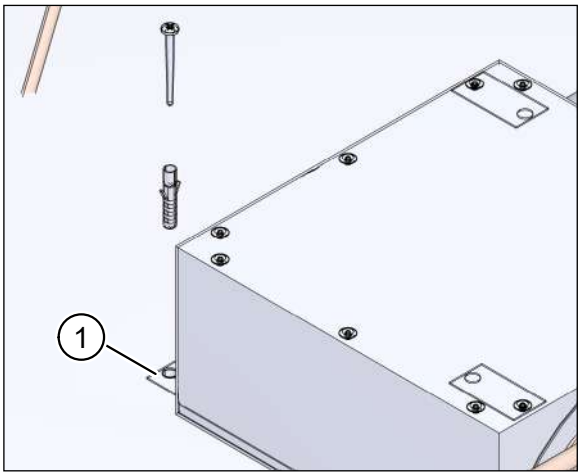


Fig. 17: Fixing the sheet steel ceiling box to filigree slab

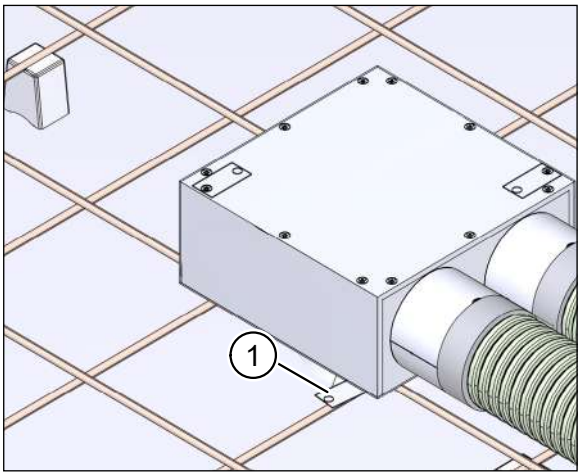


Fig. 18: Fixing the sheet steel ceiling box to in-situ concrete slab

6.5 Inserting poppet valves

► When installation is complete (after painting, etc.), insert the appropriate poppet valve for extract air (item 1 in Fig. 19) or supply air into the ventilation pipe for the ceiling box as shown in the planning documents.

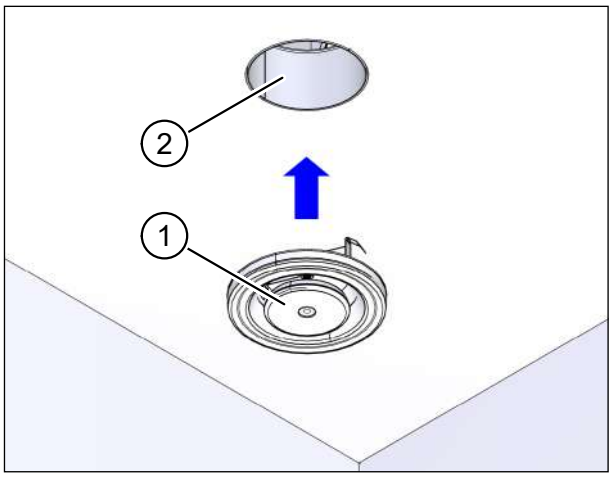


Fig. 19: Inserting poppet valve (extract air)

Meltem®
VENTILATION & HEAT RECOVERY

Meltem Wärmerückgewinnung GmbH & Co. KG
Am Hartholz 4
D-82239 Alling
Germany

Tel. +49 8141 404179-0
Fax +49 8141 404179-9
Internet: www.meltem.com
Email: info@meltem.com

Go to
Meltem download area