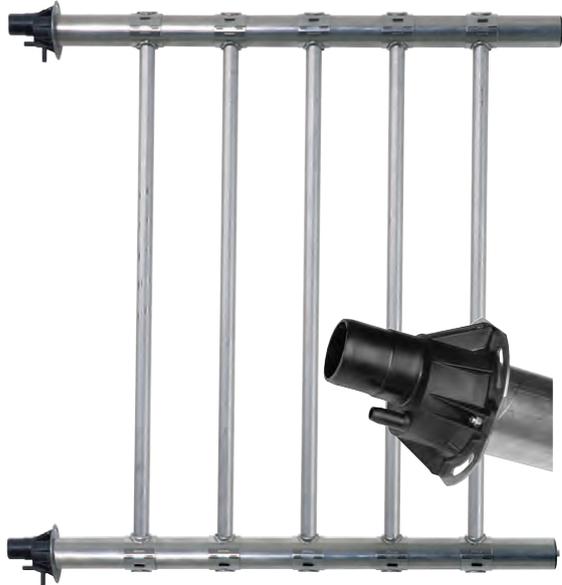


# OptiSorp

Steam distribution system



INSTALLATION AND OPERATING INSTRUCTIONS



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# 1 Notes on steam distribution system OptiSorp

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## 1.1 OptiSorp—Steam distribution system for very short humidification distance

The OptiSorp is made from stainless steel and high-grade plastic components. It is designed for connection to the Condair and Defensor steam humidifiers. The OptiSorp steam distribution system is installed directly in the air duct or in an air-handling unit. It comprises horizontal collector pipes and several vertical pipes provided with steam nozzles. The OptiSorp separates the condensate from the inlet steam and feeds this uniformly and drip-free to the air flow. In particular the steam absorption distance is considerably less compared with conventional steam distribution pipes.

**Note:** To ensure a safe support of the collector pipes we recommend the use of the specially designed support for the steam distribution system OptiSorp. The entire support is made from stainless steel and available in four different mounting sets for duct heights ranging from 450 to 3200 mm (see table in chapter 3.7). The mounting sets comprise all necessary parts for the correct support of a OptiSorp system.

## 1.2 Positioning of the steam distribution system

The positioning of the steam distribution system should be determined when laying out the air-conditioning system. The following points should be observed to ensure correct humidification of the air. The conditions must be maintained exactly to ensure that the OptiSorp system satisfies the high demands made of it. A layout based on incorrect data, an unfavourable installation position or wrong installation can result in excessive humidity with separation of condensate and therefore to damage from water. The air duct must therefore be sealed in the area of the absorption distance and provided with a water drainage tray with outlet. The system is preferably fitted immediately following the air heater (and before the cooling coils). Other installation situations require additional care. A viewing port immediately following the system is highly recommended for installation and inspection of operation of the installation. Installation of the system is always made laterally to the air flow. With vertical air flow the nozzle tubes are fitted at an angle of 20° to 30° to enable the condensate to flow away easily.

With exception of determination of the steam absorption distance, the same basic rules apply to the OptiSorp steam distribution system as to the standard steam distributor pipes (see installation and operating instructions of the humidifier).

### 1.3 Determination of steam absorption distance

Determination of the absorption distance “ $B_N$ ” depends on various factors. For simple determination of the absorption distance “ $B_N$ ” the table can be used. The nominal values obtained from the table refer to an air inlet temperature of 10 °C to 30 °C. The length of the steam absorption distance can be calculated more accurately with the SELECT software program. The result must be compared with the actual steam absorption distance or with the minimum spacings to be observed.

### 1.4 Notes on installation

Before installation check that the correct OptiSorp system is used and that the system is in accordance with the type and steam output on the specification label.

The OptiSorp is suitable for installation in air ducts or air-conditioning units. For this purpose the templates supplied are attached to the ventilation duct spaced according to the collectors. The duct plate is cut out round. The connection side of the pre-fitted system is inserted from inside through these holes. The connector pieces are then fitted on the pipes from outside and screwed to the duct wall. The collector pipes should be aligned horizontally and secured at the end on the duct wall.

For large systems or in special cases, where this type of installation is not possible, the collector pipes can be fitted individually from outside. The nozzle tubes are then inserted in the collectors in the air duct and secured with the pipe clamps and O-rings. Suitable pliers are required for the installation. All parts are supplied loose for this case if required.

Then install the steam and condensate hoses according to the instructions in the installation and operating instructions of the humidifier. It is advisable to drain the condensate separately and not return it to the humidifier owing to the increased volume.

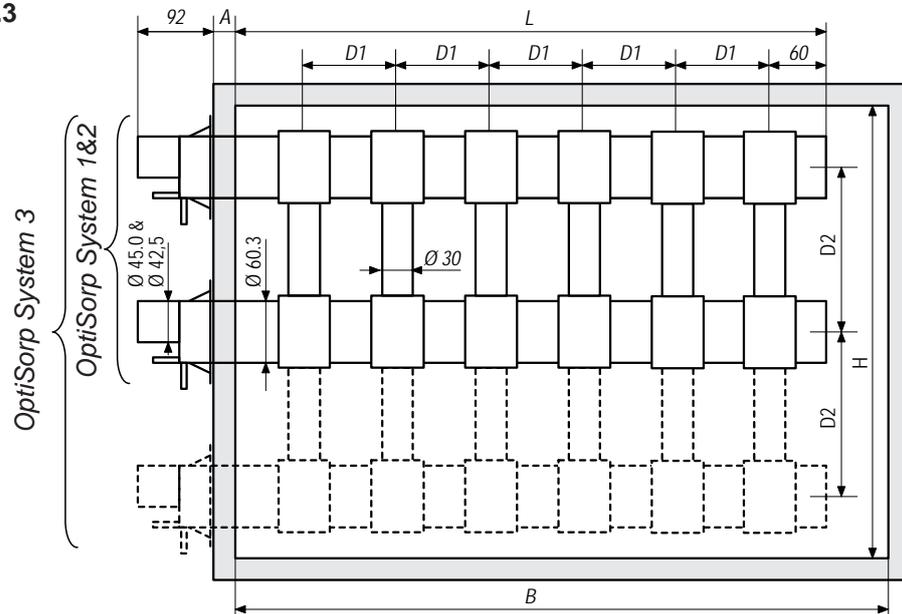
## 2 Notes for the planning engineer

### 2.1 Layout

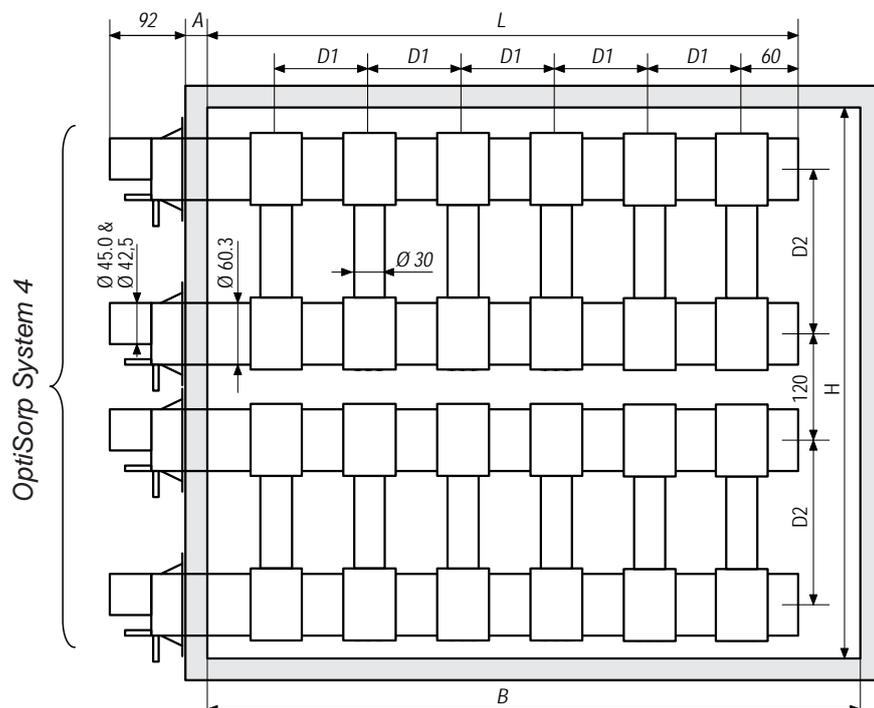
The choice of the OptiSorp steam distribution system can be made with the SELECT software programme or from the layout tables. The system is determined by the number of steam connections of the steam humidifier. This also determines the maximum steam output. The maximum possible collector lengths and collector spacing is selected depending on the duct width and height.

### 2.2 Dimension diagrams

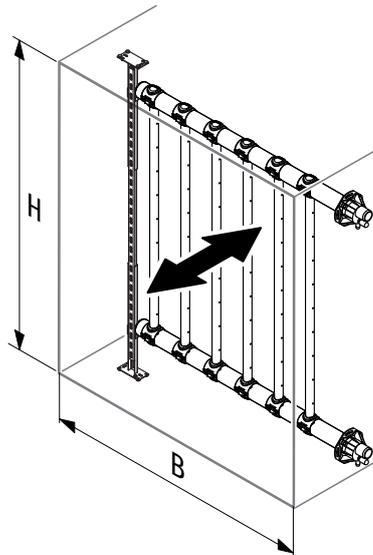
#### Systems 1...3



#### System 4



## 2.3 Power selection diagram OptiSorp Systems 1...4



|          | L          | mm   | 350 | 500 | 650  | 800  | 1000 | 1200 | 1500 | 1800 | 2000 | 2300 | 2500 |
|----------|------------|------|-----|-----|------|------|------|------|------|------|------|------|------|
|          | B min.     | mm   | 450 | 600 | 750  | 900  | 1100 | 1300 | 1600 | 1900 | 2200 | 2500 | 2700 |
| System 1 | $m_D$ max. | kg/h | 30  | 45  |      |      |      |      |      |      |      |      |      |
|          | D2         | mm   | 350 | 500 | 650  | 800  | 1000 | 1200 | 1500 |      |      |      |      |
|          | H min.     | mm   | 450 | 600 | 800  | 950  | 1150 | 1350 | 1650 |      |      |      |      |
| System 2 | $m_D$ max. | kg/h | 60  | 90  |      |      |      |      |      |      |      |      |      |
|          | D2         | mm   | 350 | 500 | 650  | 800  | 1000 | 1200 | 1500 | 1800 | 2000 |      |      |
|          | H min.     | mm   | 450 | 600 | 800  | 950  | 1150 | 1350 | 1650 | 1950 | 2200 |      |      |
| System 3 | $m_D$ max. | kg/h | 90  | 135 |      |      |      |      |      |      |      |      |      |
|          | D2         | mm   | 325 | 400 | 500  | 600  | 750  | 900  | 1050 | 1200 | 1350 | 1500 |      |
|          | H min.     | mm   | 800 | 950 | 1150 | 1350 | 1650 | 1950 | 2300 | 2600 | 2900 | 3200 |      |
| System 4 | $m_D$ max. | kg/h | 120 | 180 |      |      |      |      |      |      |      |      |      |
|          | D2         | mm   | 300 | 375 | 475  | 575  | 725  | 875  | 1050 | 1200 | 1350 | 1500 |      |
|          | H min.     | mm   | 800 | 950 | 1150 | 1350 | 1650 | 1950 | 2300 | 2600 | 2900 | 3200 |      |

## 2.4 Type key

X / XXX / XXX / XXX

No. OptiSorp system \_\_\_\_\_

Collector length "L" in [mm] \_\_\_\_\_

Collector distance "D2" in [mm] \_\_\_\_\_

Steam capacity " $m_D$ " in [kg/h] \_\_\_\_\_

## 2.5 Determination of the humidification distance “ $B_N$ ”

| Entering humidity<br>$\phi 1$ in % r.H. | Leaving humidity<br>$\phi 2$ in % r.H. |        |        |        |        |        |
|---|--|--------|--------|--------|--------|--------|
|   | 40                                     | 50     | 60     | 70     | 80     | 90     |
| 5                                       | 0.22 m                                 | 0.28 m | 0.36 m | 0.48 m | 0.66 m | 1.08 m |
| 10                                      | 0.20 m                                 | 0.26 m | 0.34 m | 0.45 m | 0.64 m | 1.04 m |
| 20                                      | 0.16 m                                 | 0.22 m | 0.30 m | 0.41 m | 0.58 m | 0.96 m |
| 30                                      | 0.10 m                                 | 0.17 m | 0.25 m | 0.36 m | 0.52 m | 0.88 m |
| 40                                      |  | 0.11 m | 0.20 m | 0.30 m | 0.45 m | 0.79 m |
| 50                                      |  |        | 0.13 m | 0.24 m | 0.38 m | 0.69 m |
| 60                                      |  |        |        | 0.16 m | 0.30 m | 0.58 m |
| 70                                      |  |        |        |        | 0.20 m | 0.45 m |

The length of the absorption distance  $B_N$  in m is for ducts with <600 mm about 50% longer

## 2.6 Planning data OptiSorp steam distribution system (for faxing!)

| Layout data required                                   |                   | Installation 1 | Installation 2 | Installation 3 | Installation 4 |
|--|-------------------|----------------|----------------|----------------|----------------|
| 1. Clear height of air duct “B” (without insulation)   | mm                |                |                |                |                |
| 2. Clear width of air duct “H” (without insulation)    | mm                |                |                |                |                |
| 3. Wall thickness of air duct “A” (without insulation) | mm                |                |                |                |                |
| 4. Air volume per hour or                              | m <sup>3</sup> /h |                |                |                |                |
| 5. Air speed   | m/s               |                |                |                |                |
| 6. Air duct static pressure                            | Pa                |                |                |                |                |
| 7. Temperature after humidification                    | °C                |                |                |                |                |
| 8. Abs. humidity before humidification                 | g/kg              |                |                |                |                |
| 9. Humidity increase ( $\Delta x$ ) or                 | g/kg              |                |                |                |                |
| 10. Rel. humidity after humidification                 | %                 |                |                |                |                |
| 11. Humidifier capacity                                | kg/h              |                |                |                |                |
| 12. Steam humidifier selected                          | type              |                |                |                |                |
| 13. Number of steam connections                        | pcs.              |                |                |                |                |
| 14. Following air-cond. components                     | type              |                |                |                |                |
| 15. Existing humidification distance                   | m                 |                |                |                |                |
| <b>OptiSorp System selected</b>                        | <b>type</b>       |                |                |                |                |
| – Collector length (L)                                 | mm                |                |                |                |                |
| – Collector spacing (D2)                               | mm                |                |                |                |                |
| – Steam output at 500 Pa ( $m_D$ )                     | kg/h              |                |                |                |                |
| <b>Order</b>   | <b>No.</b>        |                |                |                |                |

## 3 Mounting

### 3.1 Safety

The OptiSorp steam distribution system must only be installed by **adequately qualified personnel**.  
**Observe and comply with all safety instructions in the installation and operating instructions of the steam humidifier.**

### 3.2 Delivery

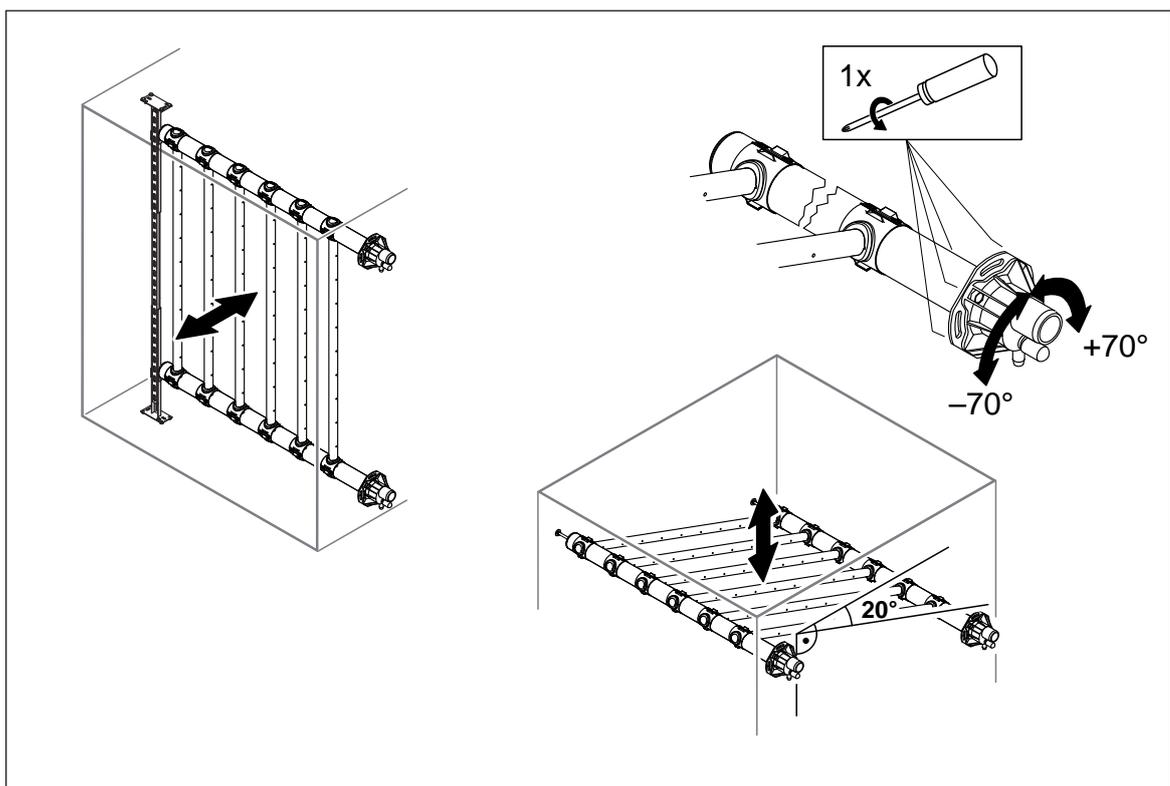
The OptiSorp steam distribution system will be delivered either premounted or as single components. Observe the corresponding mounting instructions.

### 3.3 Mounting positions

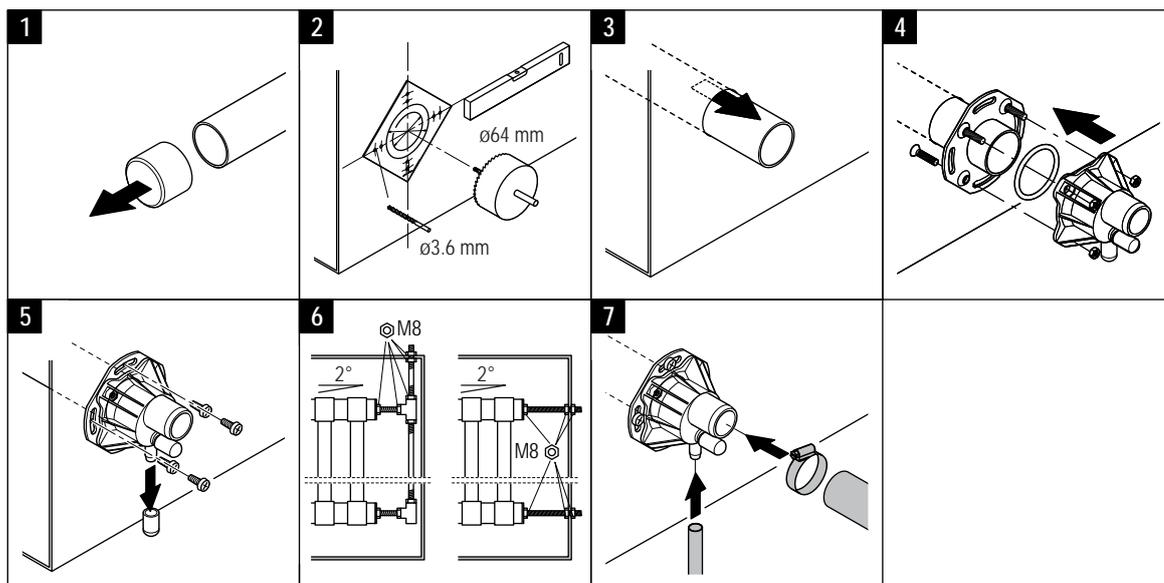
The OptiSorp steam distribution system can be installed in **horizontal** or **vertical ducts**. When mounting in a vertical duct the nozzle pipes must have a minimum declination of  $20^\circ$  and the end pieces of the collector pipes must be turned, so that the vertical condensate connection directs straight downwards (see figure below).

Note: Before mounting the OptiSorp system check the type designation and steam capacity on the data plate to ensure that the correct OptiSorp system is installed in the right place.

In addition to this installation and operating instructions please observe and comply with the instructions regarding the steam installation (positioning, max. length of steam pipe, etc.) in the installation and operating instructions of the steam humidifier.

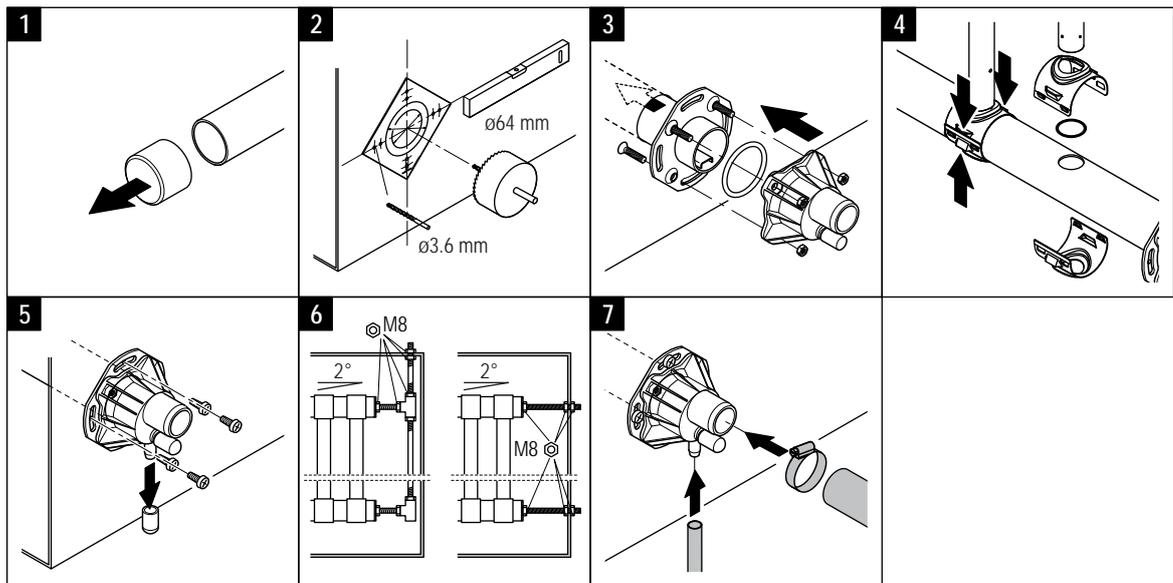


### 3.4 Mounting the premounted OptiSorp system



1. Remove the protection covers.
2. Measure the distance of the collector pipes and affix the installation template on the duct wall at the designed place with this distance (permissible variation  $\pm 3$  mm) and cut out the openings.
3. From inside of duct, insert the collector pipes through the prepared openings.
4. Slip from the outside flange, O-ring and steam hose connections onto the tube and fix them by the four screws. Pay attention that the condensate drains are below the steam hose connection.
5. Starting with the lowest collector pipe fix the steam hose connections with the 4 screws at the duct wall.
6. Align the collector pipes with a down-slope of  $2^\circ$  against the steam connector. Then, fasten the pipe ends on the duct using M8 threaded rod or the specially designed support available as accessory (see mounting drawing in chapter 3.7).
7. Connect the steam hose and the condensate hose to each collector pipe according to the instructions in the installation and operating instructions of the humidifier.  
 Note: with the system 1 connect the steam hose DS80 or Z10 to the lower steam connector DV81 and close the upper steam connector with the sealing cap supplied.

### 3.5 Mounting the different parts of the OptiSorp system

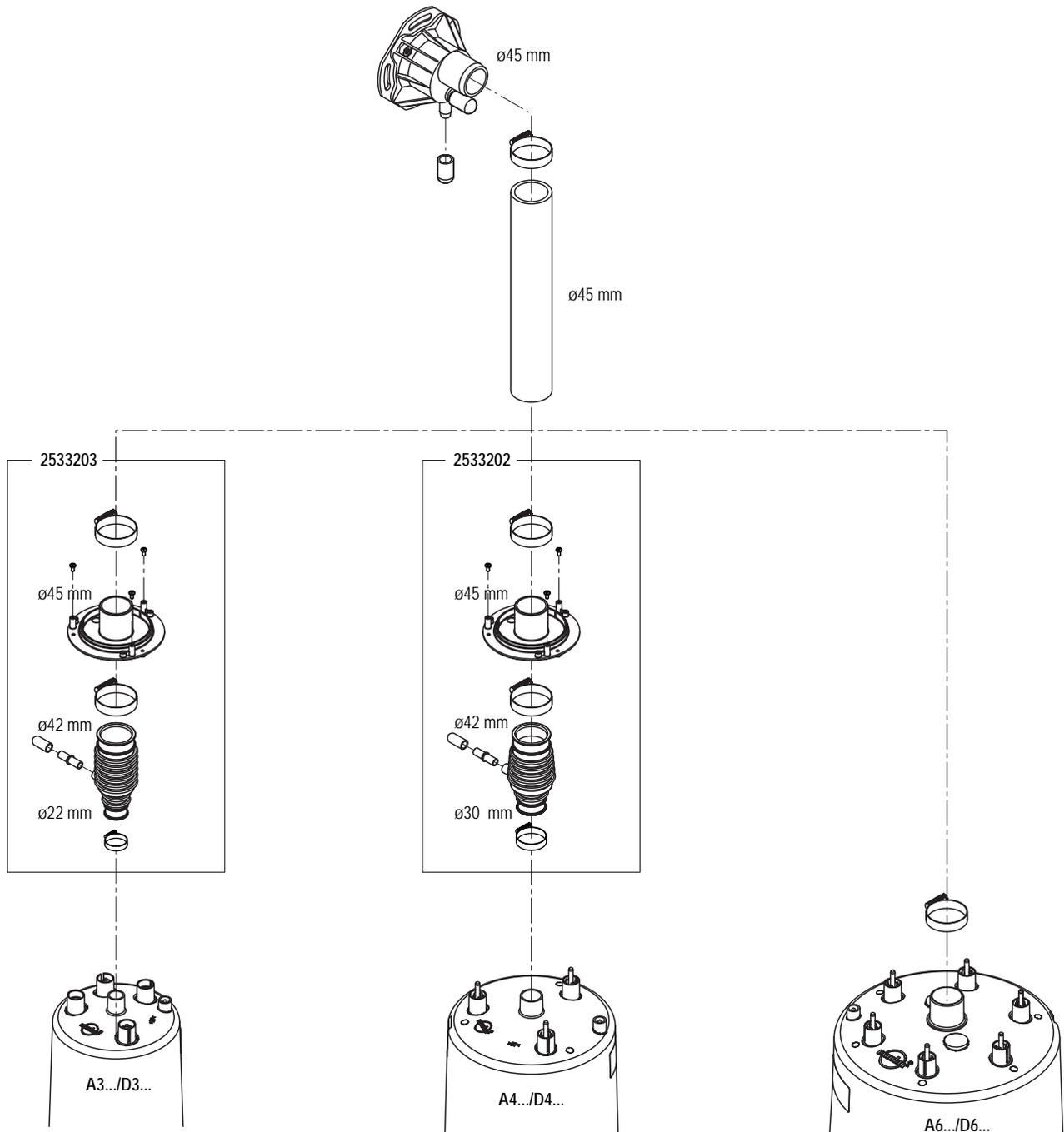


1. Remove the protection covers.
2. Measure the distance of the collector pipes and affix the installation template on the duct wall at the designed place with this distance (permissible variation  $\pm 3$  mm) and cut out the openings.
3. From inside of duct, insert the collector pipes through the prepared openings.
4. Slip from the outside flange, O-ring and steam hose connections onto the tube and fix them by the four screws. Pay attention that the condensate drains are below the steam hose connection.
5. Starting with the lowest collector pipe fix the steam hose connections with the 4 screws at the duct wall.
6. Align the collector pipes with a down-slope of  $2^\circ$  against the steam connector. Then, fasten the pipe ends on the duct using M8 threaded rod or the specially designed support available as accessory (see mounting drawing in chapter 3.7).
7. Connect the steam hose and the condensate hose to each collector pipe according to the instructions in the installation and operating instructions of the humidifier.  
 Note: with the system 1 connect the steam hose DS80 or Z10 to the lower steam connector DV81 and close the upper steam connector with the sealing cap supplied.

### 3.6 Connecting the Condair CP3 to the OptiSorp system

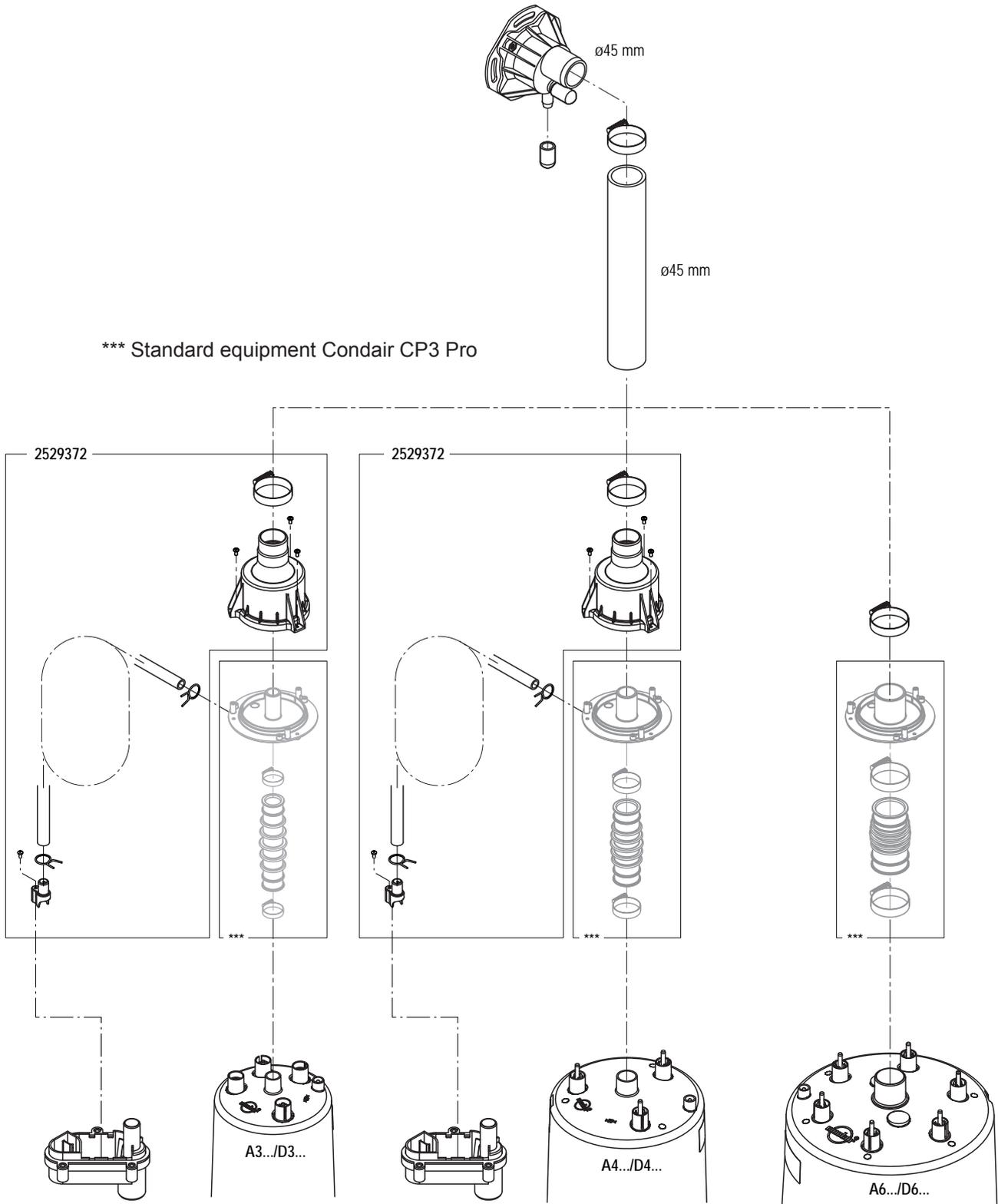
#### 3.6.1 Connecting the Condair CP3 Basic to the OptiSorp system

| Accessories   | Art./SAP-No. |
|---|--------------|
| Adapater set OptiSorp for Condair CP3 Basic 5...8 kg/h  | 2533203      |
| Adapater set OptiSorp for Condair CP3 Basic 9...15 kg/h | 2533202      |



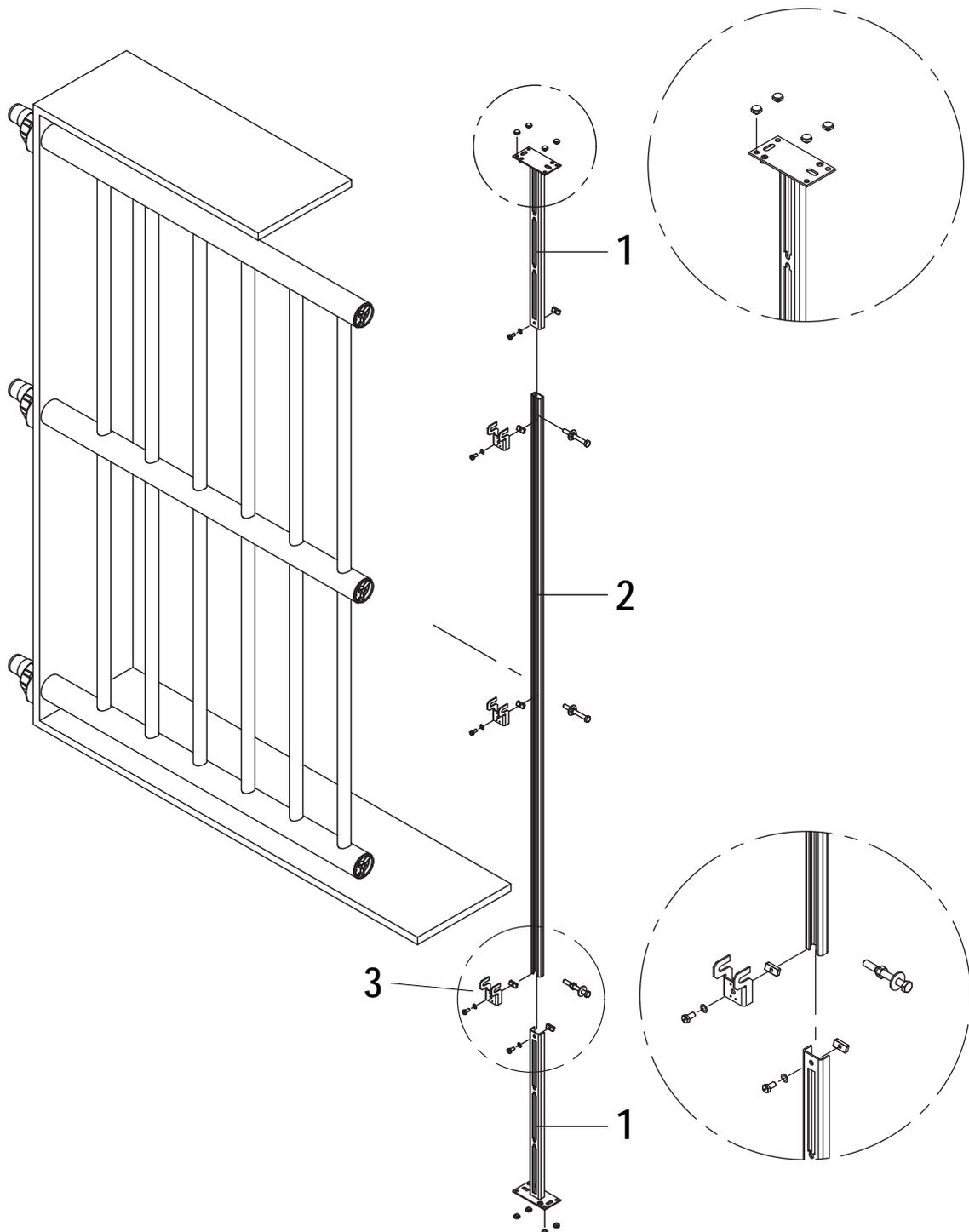
### 3.6.2 Connecting the Condair CP3 Pro to the OptiSorp system

| Accessories   | Art./SAP-No. |
|---|--------------|
| Adapater set OptiSorp for Condair CP3 Pro 5...15 kg/h | 2529372      |



### 3.7 OptiSorp Support (accessory)

| Range duct height [mm] | Art.-No. | Foothold (Pos. 1) No. x Length [mm] | Rail (Pos. 2) [mm] | Bracket (Pos. 3) |
|------------------------|----------|-------------------------------------|--------------------|------------------|
| 450...950              | 1117477  | 1 x 450 mm                          | 500                | 4                |
| 950...1350             | 1117478  | 2 x 450 mm                          | 500                | 4                |
| 1350...2300            | 1117479  | 2 x 450 mm                          | 1400               | 4                |
| 2300...3200            | 1117480  | 2 x 450 mm                          | 2300               | 4                |



## 4 Putting into operation and operation

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### 4.1 Putting into operation

When connected to several basic units these should be operated in parallel. Otherwise condensate runs into the units switched off and fills these until overflow occurs. Problems can then arise when switching on again.

**The following should be ensured when putting into operation:**

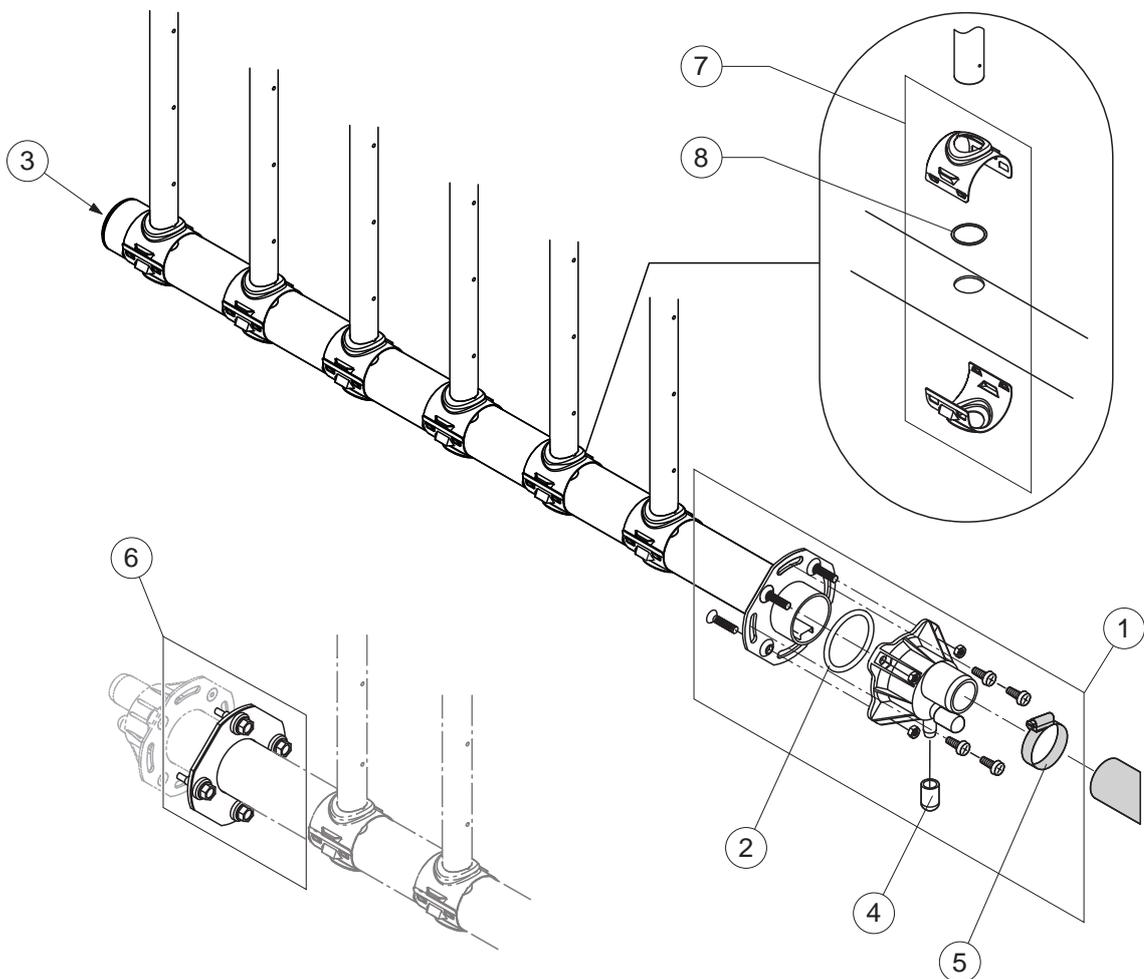
1. that the system pressure don't increase over 1500 Pa. The system pressure is componed of the airduct static pressure, the pressure drop over the OptiSorp system (typical 500 Pa) and the back pressure in the steam hose (typical 100 Pa/m)
2. that no water splashes from the steam distribution system and the condensate runs out of the system satisfactorily. Condensating formation may be caused by:
  - Steam supply pipe not properly drained
  - Metallic steam pipe inadequately insulated
  - Overstressed steam generator feeds water through steam pipe
  - System condensate drain is blocked
  - Extreme back-pressure in condensate hose
  - Incorrect installation of condensate hose

### 4.2 Operation

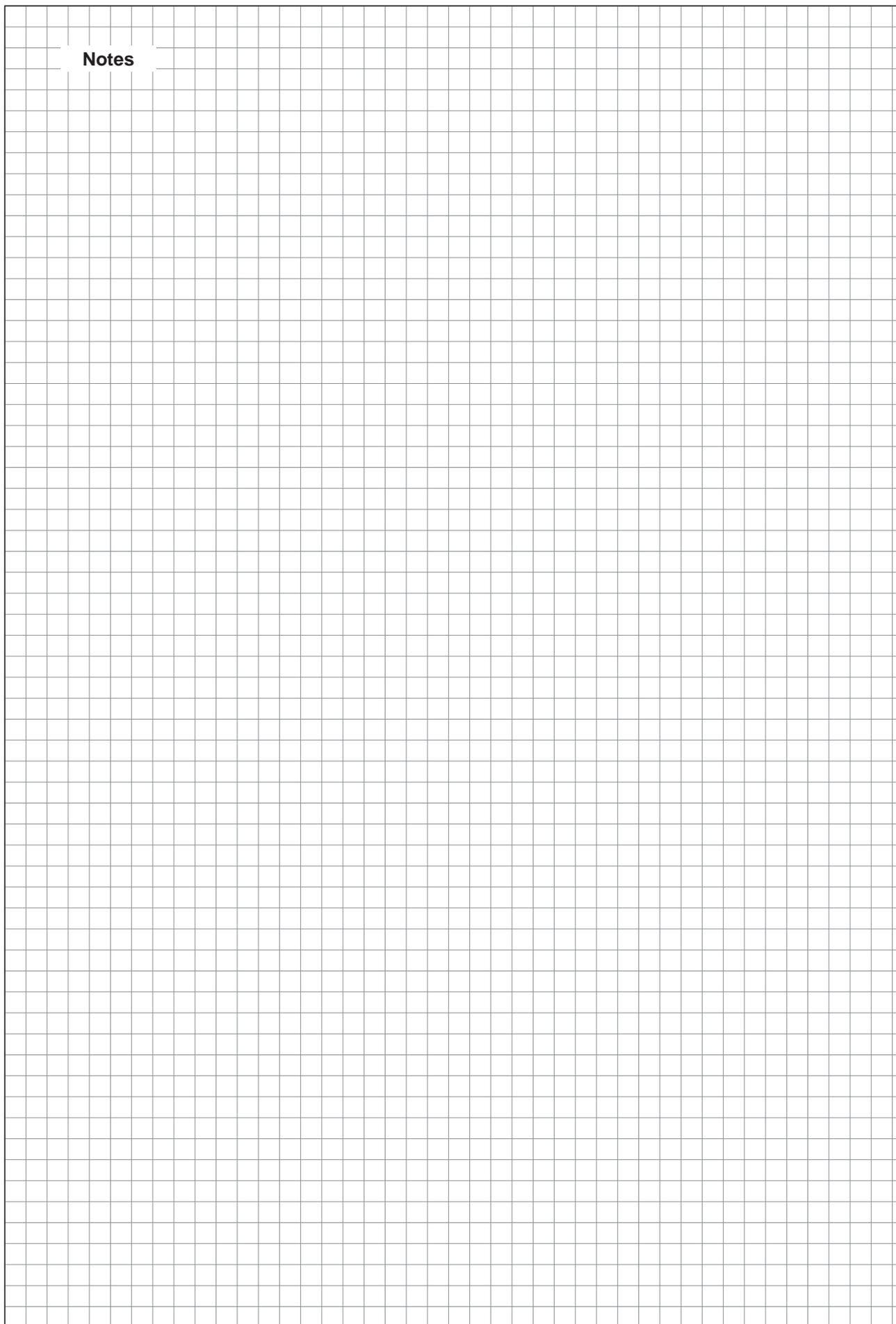
- Carry out visual checks periodically
- Further details according to the installation and operating instructions of the humidifier

## 5 Spare parts list

| Pos. | Article                       | Type                            | Art.-/SAP-No.      |
|------|-------------------------------|---------------------------------|--------------------|
| 1    | Flange connection cpl. DV81   | ø45                             | 1113746            |
| 2    | O-ring (3 pcs)                | ø59.69 x ø5.34                  | 1119190            |
| 3    | Sealing cap with fixation     |                                 | 1117559            |
| 4    | Sealing cap ø10               |                                 | 1104660            |
| 5    | Hose clamp (2 pcs)            | DV81 with DS80<br>DV81 with Z10 | 2538896<br>2538898 |
| 6    | Internal sealing              | DV81                            | 2526236            |
| 7    | Pipe clamp with O-ring        |                                 | 1117893            |
| 8    | O-ring for pipe clamp (5 pcs) |                                 | 1118549            |
| ---  | Sealing cap ø41               |                                 | 1115334            |



**Notes**



**Notes**

