

Aerosol distribution systems are needed when the humidification tasks required superficial aerosol distribution. This is the case in many production processes, e.g. in foil, fleece and cloth production. These applications are usually production processes where products are prepared for further processing.

But aerosol distribution systems are also needed for the storage of delicate goods. In supermarkets, fruit and vegetables must be kept humid, but not wet.

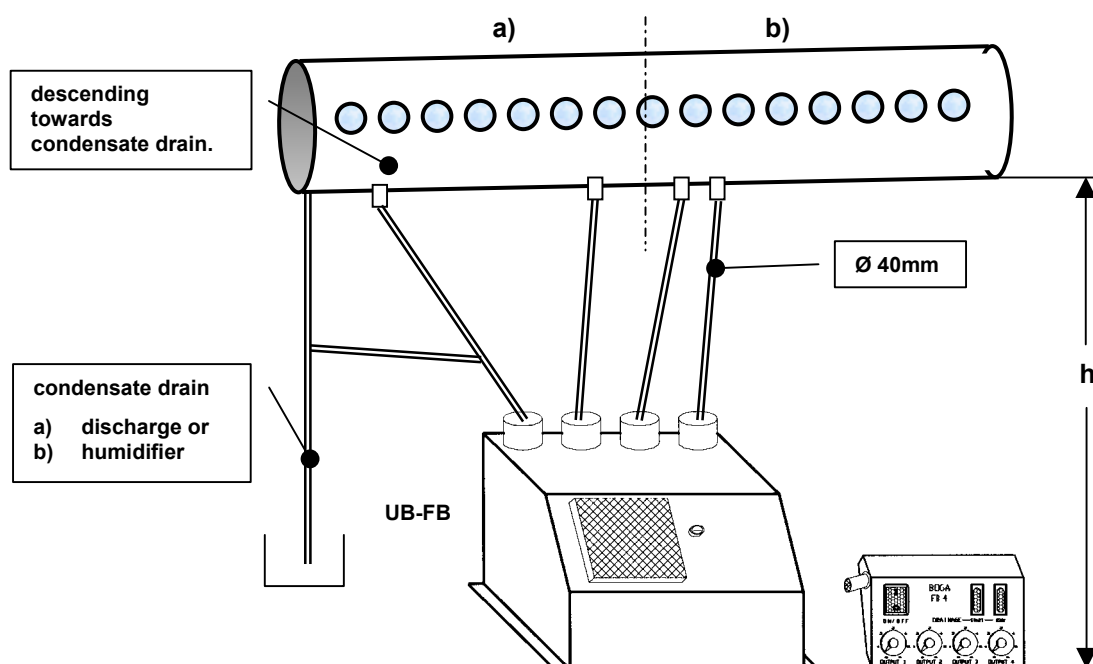
Numerous applications have already been realized with the universal humidifier AIRWIN, series UB-Hyg, UB-Reg, UB-FB, UB/P and UB/P-D with aerosol distributions systems.

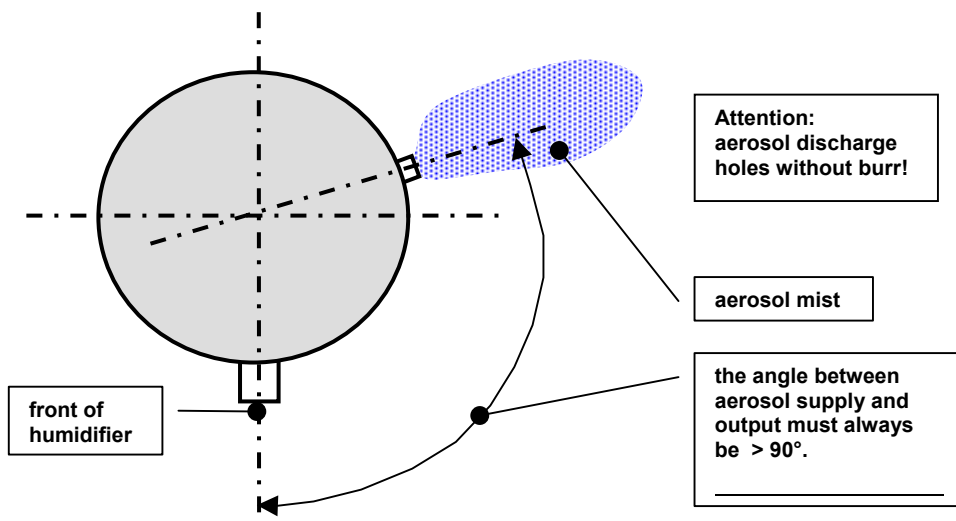
1. Basic precondition

- 1) The humidifier may never be operated without aerosol distribution (hose/pipe).
- 2) Aerosol distribution may not be effected in such a way that the humidifier takes the air in again through the integrated axial fan and thus treating it in a circular movement. This may damage the humidifier.
- 3) A precondition for perfect distribution of the aerosols and high humidification capacity is that the sum of the free cross-sectional areas of all discharge pipes corresponds to
 - a) the cross-sectional area of the distribution pipe and
 - b) the sum of the cross-sectional areas of the numerous discharge drill holes in the distribution pipe.

2. Aerosol distribution pipe

2.1 Plan of aerosol distribution pipe





- Attention:**
- a) The distribution pipe must always be inclined in the direction of the condensate drain.
 - b) The height difference h between humidifier and distribution pipe must be as small as possible. The greater the difference h , the lower the output capabilities at the aerosol outlet holes (percentage of condensate increases).
 - c) The connection of the flexible hoses at the distribution pipe can be effected according to a) or b). a) is optimal, because the aerosol density can be distributed equally throughout the entire length of the distribution pipe, where as with b) the aerosol density decreases almost linearly towards the end of the distribution pipe.

The capacity of the transversal flow fan in the humidifier is approximately the same with both versions.

2.2 Determining the humidification capacity per meter of the distribution pipe

Humidification capacity per m distribution pipe depends on humidity requirement.

Example: In order to humidity a 2m-long fruit counter, max. theoretical humidification capacity per meter is calculated as follows for a UB4-FB:

$$\frac{2\text{kg/h}}{2\text{m}} = \frac{1\text{kg/h}}{\text{m}}$$

Please note that the output capabilities depend on the length of the distribution pipe and the height difference between the distribution pipe and the humidifier (percentage of condensate increases).

2.3 Max. distribution pipe length – depending on the fan capacity

distribution pipe	unit		UB1		UB2		UB3		UB4	
	a	b	a	b	a	b	a	b	a	b
max. length *	m	kg/h	1	500	1,5	666	2	750	2,5	800
max. length **	m	kg/h	2	250	3	333	4	375	5	400

* = series // with one axial fan

** = with two axial fan in series (Option)

a = pipe length

b = humidification capacity per meter

Distribution pipe	unit		UB/P..D8		UB/P..D10	
	a	b	a	b	a	b
max. length *	m	g/h	5	800	6,5	769

a = pipe length

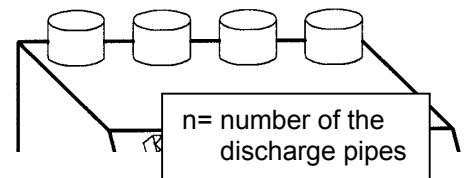
b = humidification capacity per meter

2.4 Calculation free cross-sectional area of the discharge pipes and the diameter of the distribution pipe.

Specification	unit	UB1	UB2	UB3	UB4	UB/P..D8	UB/P..D10
Cross sectional area ¹	mm ²	1.018	2.036	3.054	4.072	8.143	10.178
∅ min. distribution pipe ²	mm	36	51	63	72	102	113

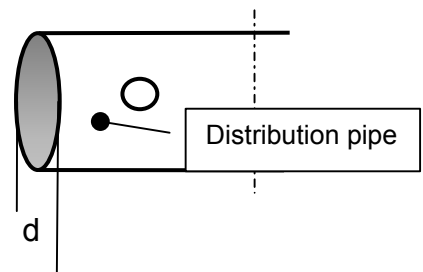
Formula: 1) Free cross-sectional area of the 1/2/3/4/8/10 discharge pipes.

$$A = \frac{d^2 \times \pi \times n}{4}$$



2) Diameter distribution pipe

$$d = \sqrt{\frac{A \times 4}{\pi}}$$



UB3

diameter	8mm	9	10	12	15	17	20	25	30
0,5 m	----	----	----	----	27,8	35,7	50	71,4	100
1,0 m	16,4	20,8	25,6	37	55,6	71,4	100	142,9	200
1,5 m	24,6	31,3	38,5	55,6	83,3	107,1	150	214,3	300
2,0 m	32,8	41,7	51,3	74,1	111,1	142,9	200	285,7	400
2,5 m	41	52,1	64,1	92,6	138,9	178,6	250	357,1	500
3,0 m	49,2	62,5	76,9	111,1	166,7	214,3	300	428,6	600
3,5 m	57,4	72,9	89,7	129,6	194,4	250	350	500	700
4,0 m	65,6	83,3	102,6	148,1	222,2	285,7	400	571,4	800
pipe length	dimensions mm - //// drill hole sequence = g								

UB4

diameter	8mm	9	10	12	15	17	20	25	30
0,5 m	----	----	----	----	----	26,3	38,5	55,6	83,3
1,0 m	12,3	15,6	19,2	27,8	43,5	52,6	76,9	111,1	166,7
1,5 m	18,5	23,4	28,8	41,7	65,2	78,9	115,4	166,7	250
2,0 m	24,7	31,3	38,5	55,6	87	105,3	153,8	222,2	333,3
2,5 m	30,9	39,1	48,1	69,4	108,7	131,6	192,3	277,8	416,7
3,0 m	37	46,9	57,7	83,3	130,4	157,9	230,8	333,3	500
3,5 m	43,2	54,7	67,3	97,2	152,2	184,2	269,2	388,9	583,3
4,0 m	49,4	62,4	76,9	111,1	173,9	210,5	307,7	444,4	666,7
4,5 m	55,6	70,3	86,6	125	195,7	236,8	346,2	500	750
5,0 m	61,7	78,1	96,2	138,9	217,4	263,2	384,6	555,6	833,3
pipe length	dimension mm - //// drill hole sequence = g								

UB/P8

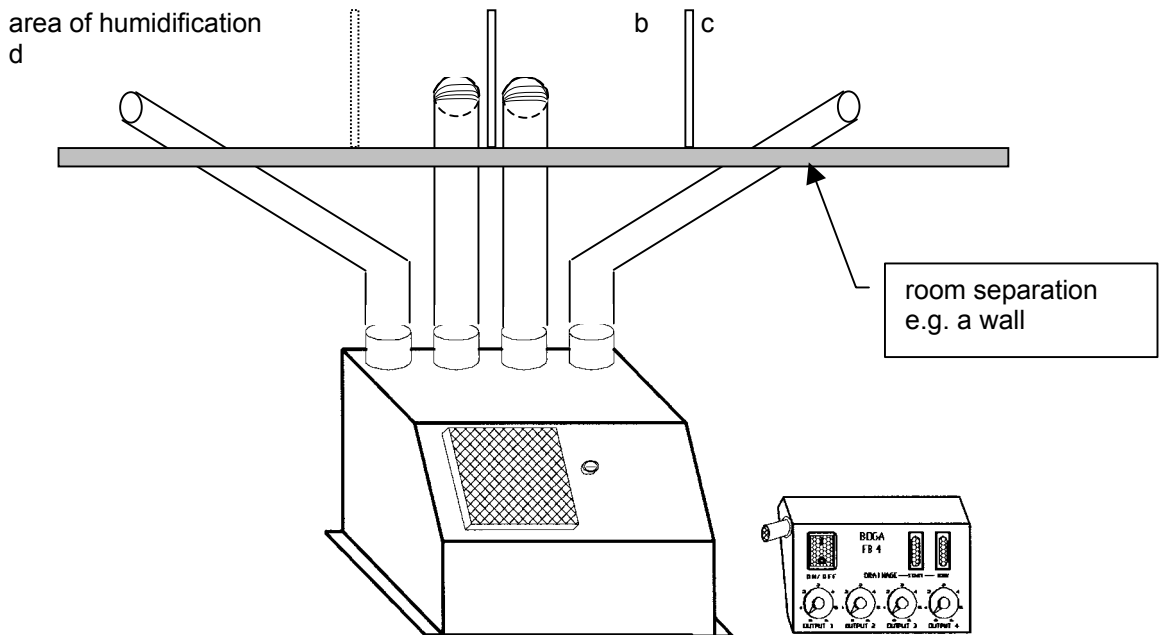
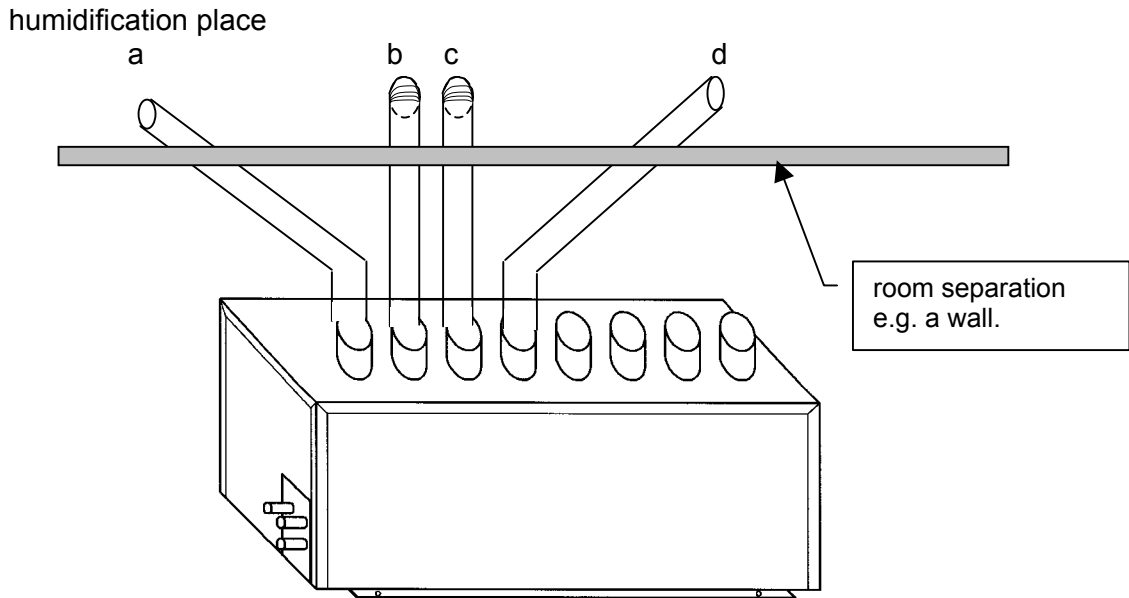
diameter in mm	8	10	12	14	16	18	20	22	25	30	35
2,0 m	--	--	27,7	37,7	48,7	62,5	76,9	90,9	117,6	166,6	222,2
2,5 m	15,4	24,0	34,7	47,7	60,9	78,1	96,7	113,6	147,0	208,3	277,7
3,0 m	18,5	28,8	41,6	56,6	73,7	93,7	115,3	136,3	176,4	250,0	333,3
3,5 m	21,6	33,6	48,6	66,0	85,3	109,3	134,6	159,1	205,8	291,6	388,8
4,0 m	24,7	38,4	55,5	75,4	97,5	125,0	153,8	181,8	235,3	333,3	444,4
4,5 m	27,7	43,2	62,5	84,9	109,7	140,6	173,0	204,5	263,7	375,0	500,0
5,0 m	30,8	48,0	69,4	94,3	121,9	156,2	192,3	227,2	294,1	416,6	555,5
pipe length	dimensions mm - //// drill hole sequence = g										

UB/P10

diameter in mm	8	10	12	14	16	18	20	22	25	30	35
2,0 m				30,3	39,2	50,0	60,6	14,1	95,2	133,3	181,8
2,5 m	12,3	19,2	27,8	37,9	49,0	62,5	75,8	92,6	119,0	166,7	227,3
3,0 m	14,8	23,1	33,3	45,5	58,8	75,0	90,9	111,1	142,9	200,0	272,7
3,5 m	17,2	26,9	38,9	53,0	68,6	87,5	106,1	129,6	166,7	233,3	318,2
4,0 m	19,7	30,8	44,4	60,6	78,4	100,0	121,2	148,1	190,5	266,7	363,6
4,5 m	22,1	34,6	50,0	68,2	88,2	112,5	136,4	166,7	214,3	300,0	409,1
5,0 m	24,6	38,5	55,6	75,8	98,0	125,0	151,5	185,2	238,1	333,3	454,5
5,5 m	27,1	42,3	61,1	83,3	107,8	137,5	166,7	203,7	261,9	366,7	500,0
6,0 m	29,6	46,2	66,7	90,9	117,6	150,0	181,8	222,2	285,7	400,0	545,5
6,5 m	32,0	50,0	72,2	98,5	127,5	162,5	197,0	240,7	309,5	433,3	590,9
pipe length	dimensions mm - //// drill hole sequence = g										

3. Direct aerosol distribution

Aerosol distribution can also be effected directly without distribution pipe. In this case aerosols are ducted through pipes or hoses directly to the place of humidification. This may also be situated in another room with aggressive medium.



The pipes or hoses may only be installed in such a way that runback of the condensate is possible throughout the entire pipe/hose length.

It has to be made sure that the flow resistances of the exhaust systems are equal towards each other.