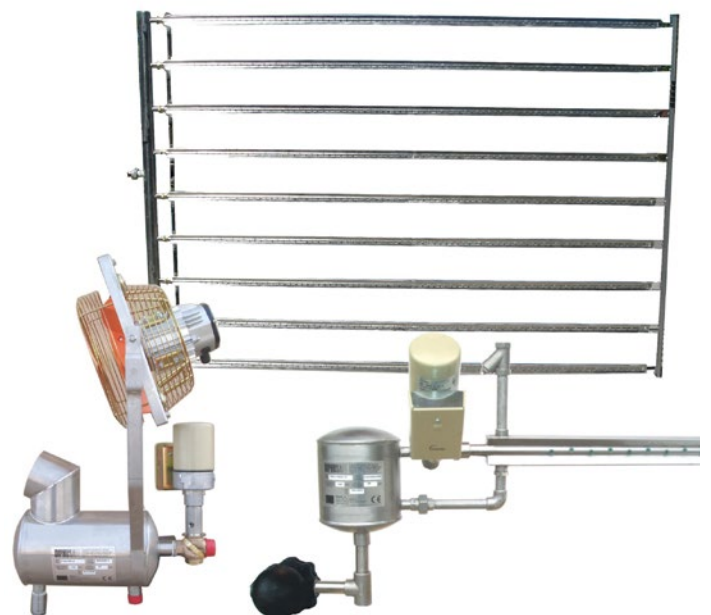




DIPHUSAIR®-FSH

Steam injection humidifiers

- Steam injection humidifiers for Ducts, AHU or Open spaces
- Optimal design for injection of dry steam
- Simple to install and easy to service
- Maximum performance with minimum operating cost





Isothermal humidification process

PSICROMETRIC PROCESS

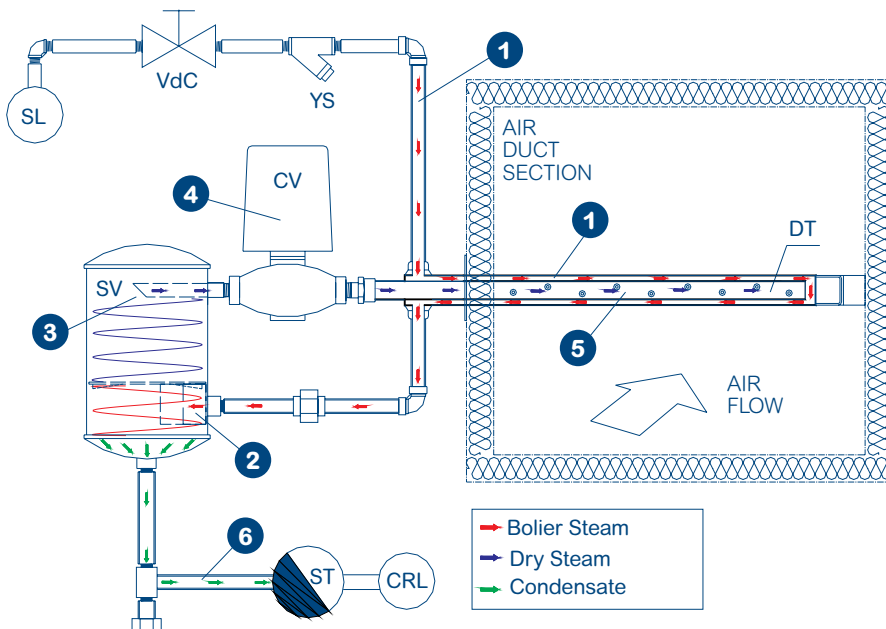
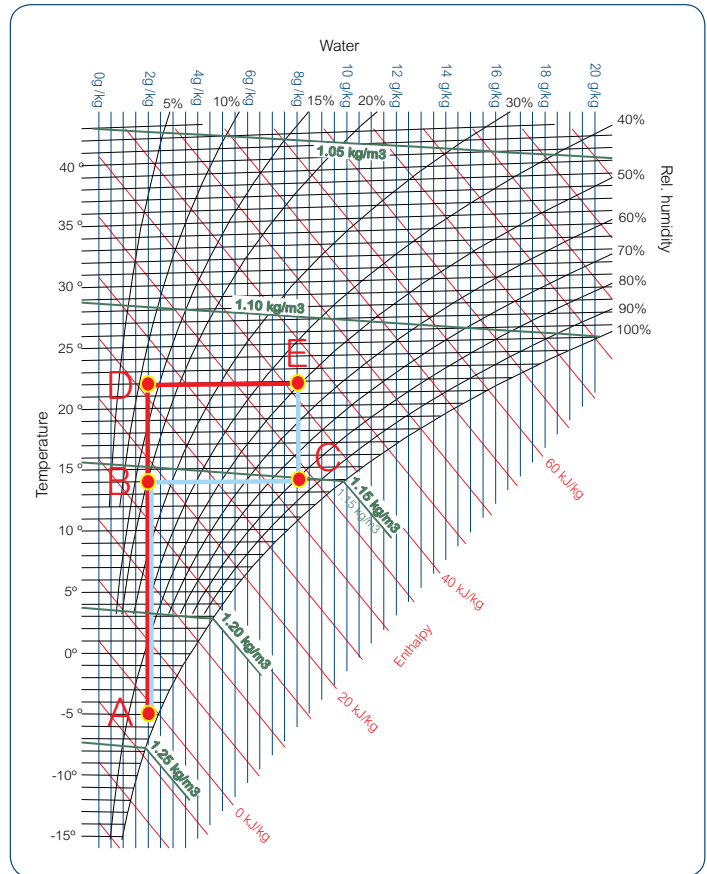
The side chart shows a sample of the usual design process for isothermal humidification. Starting from outside air at -5°C and 90% of R.H, to get air at 22°C -50%:

- Process 1: Heating-Humidification-Heating (A-B-C-E)
- Process 2: Heating-Humidification (A-D-E)

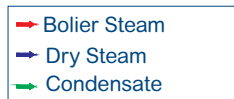
Remark: Process 1 has a higher absorption non-wetting distance. Overtaking values of 40% of more distance.

PRINCIPLE OF OPERATION

- (1) Pressurised boiler steam passes through the strainer before entering the dispersion tube jackets, thereby raising the temperature of the inner dispersion tube to that of the steam supply. This causes any condensate which may have found its way into the dispersion tube to be instantly re-evaporated.
- (2) The steam enters the separator, striking a deflector plate which forces the steam flow to rotate. The centrifugal force causes larger water droplets to adhere to the separator sidewall, while smaller droplets are trapped by a circular, multi-baffle plate through which the steam passes on its way up to the outlet.
- (3) The dry steam is finally led out of the separator via a chicane, which ensures that there is no carry-over of any water droplets which may be left.
- (4) The control valve regulates the amount of dry steam supplied to the steam dispersion tubes. The steam pressure drops virtually to atmospheric and the steam expands ensuring the re-evaporation of any condensate.
- (5) Steam is discharged via the tubelets into the air stream. Careful calibration of the orifice sizes ensures that dispersion is uniform over the entire length of each dispersion tube. The tubelet design and heated tube jackets ensure condensate-free humidification steam.
- (6) Condensate formed in the jackets is collected by the steam separator and drained via a steam trap (Single Tube) or drained via a separate steam trap (POLITUBE).

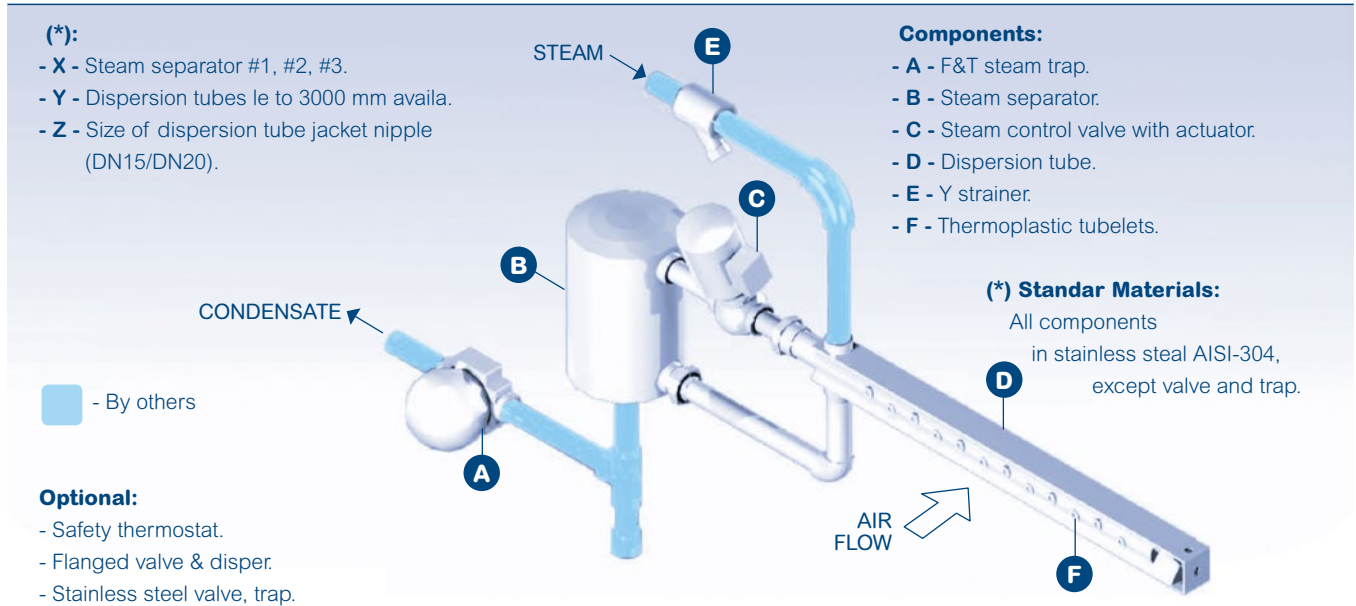


- SL: Steam Line
- YS: Y Strainer
- SS: Steam Separator
- CV: Control Valve
- DT: Dispersion Tube
- ST: Steam Trap
- CRL: Condensate Return Line

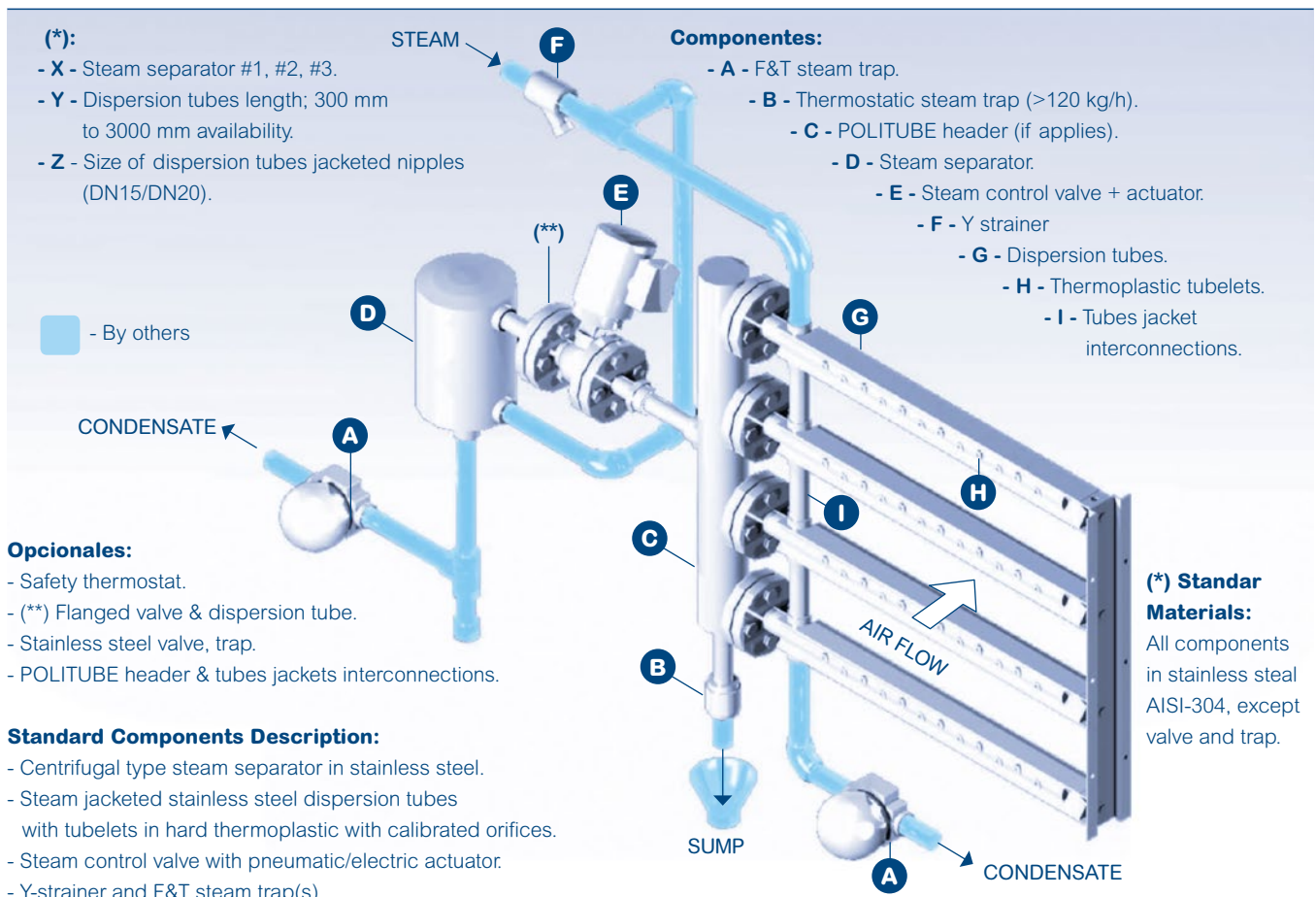


Single & multiple tube configuration Diphusair®-FSH

Single Tube Humidifiers: FSH - X - YYYY/ZZ type (*), standard assembly.



Multiple Tube Humidifiers: FSH - X - YYYY/ZZ x tube number (+ POLITUBE header, if applies), standard assembly (*).





Humidifier selection Diphusair®-FSH

ESSENTIAL PROJECT DATA

Steam load (kg/h) to be added to the air stream and the dimensions of the duct/AHU section where the steam injection unit will be installed, plus the nature and distance downstream of any obstacles, i.e. bends, coils, fans etc. The supply steam pressure at the humidifier inlet is also required we recommend a maximum of 250 kPa(g).

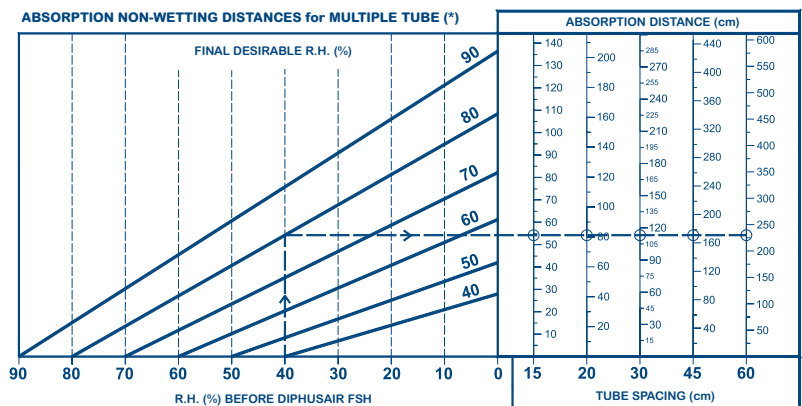
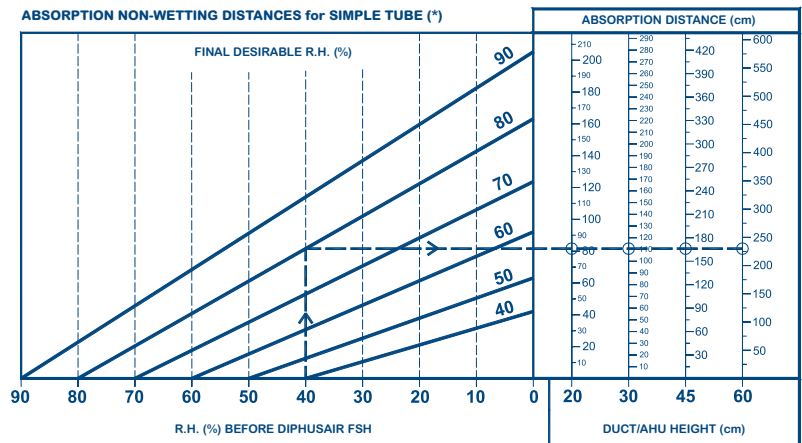
SEPARATOR MODEL AND VALVE KVS SELECTION

Separator model	Valve	(*) Capacity (kg/h)												
		Steam Pressure kPa(g)												
		Ø	Kvs	25	50	75	100	125	150	175	200	225	250	275
1	1/2"	0,35	3,9	5,6	6,8	8	8,9	9,7	10,5	11,2	11,9	12,5	13,1	13,8
		1,1	12,6	17,9	21,7	25,2	28	30,8	33,4	36	38,2	40,2	42,1	44,1
		1,9	20,1	29,1	35,5	41,5	46,2	50,8	55,4	59,2	63,2	67,1	71	73,6
		3,8	39,8	58	71,2	83	93,1	102,6	112,2	121	129,2	137,2	145,6	153,2
2	3/4"	4,8	47,2	70,2	86	100,2	112,9	125,2	137,4	148	159,2	170,2	181	190,9
		6,5	60,3	87,6	107,8	126,8	144,1	160,7	177	192,5	207,9	223,1	238,4	253
3	1"	8,7	72,5	104,4	128,3	151,5	174,2	195,3	215,5	235	255,3	275,3	294,5	314,4
		10,4	76,8	113,6	140,2	166	191,1	215,3	238,5	259,8	282,4	305,1	328,2	351,5

(*) For higher capacities please contact us.

HUMIDIFIER SELECTION

- 1°) From the capacity chart above select separator size, and the size and flow coefficient (Kvs) of the control valve. Always select the capacity next above the required steam load at the specified supply pressure.
- 2°) Select the length of the dispersion tube(s) nearest to the duct/AHU width.
- 3°) Select the number and spacing of the dispersion tubes using the Absorption Distance charts beside, taking into consideration the internal height of the duct/AHU and the available non-wetting space downstream.



(*)
REMARK: Empirical charts for an air flow of 14°C and velocities < 8 m/s.