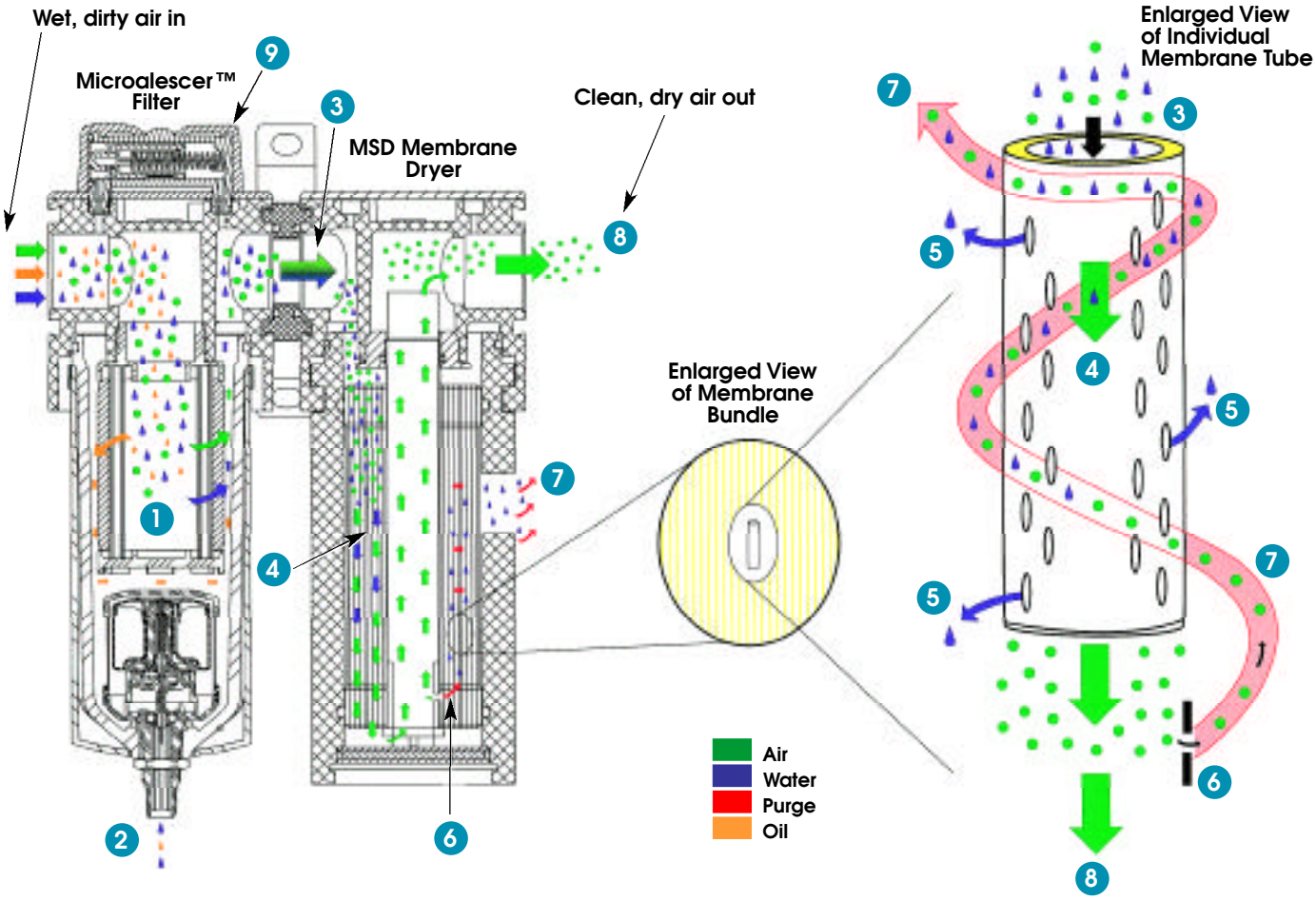
MSD Membrane Dryers

How the Wilkerson MSD membrane dryer functions



To achieve optimum performance and high quality compressed air for your application, it is imperative to install a Wilkerson Microalescer™ filter with automatic drain. The coalescing-filter prevents dirt particles and oil and water aerosols from contaminating the membrane. This drawing illustrates a typical clean, dry air system.

How it Works:

Dirty saturated air enters the Wilkerson coalescing micro-filter (1) where solid particles, liquids and aerosol contaminants are efficiently trapped. The coalesced oil and water is then discharged through the float-type automatic drain. (2)

The clean, saturated compressed air now enters the dryer (3) and goes into the module (4) that consists of a densely packed bundle of hollow fiber membranes. As the compressed air flows through the membranes, the water vapor diffuses through the walls of the membrane. (5) A portion of the dried air from the outlet of the cartridge (6) is diverted and expanded to atmospheric pressure for use as purge air.

The counter flow purge air then sweeps over the outer surface of the hollow membrane fibers, removing the water molecules, where they are vented to atmosphere (7) .Clean,dry air is now supplied to the application. (8)

The principle of membrane dryer operation is very elementary. Saturated air has a higher partial vapor pressure than dry air. As a result, there is a constant migration of water molecules through the membrane (5) walls from inside the hollow fiber membrane, where you have wet compressed air, to outside, into the lower partial vapor pressure of the purge air stream.

The MSD membrane air dryer is designed to operate continuously—24 hours per day, 7 days per week. The only maintenance required is changing the coalescing filter element when the standard pressure differential indicator (9) shows red. Due to our innovative quick disconnect bowl design, element change out is less than five minutes.

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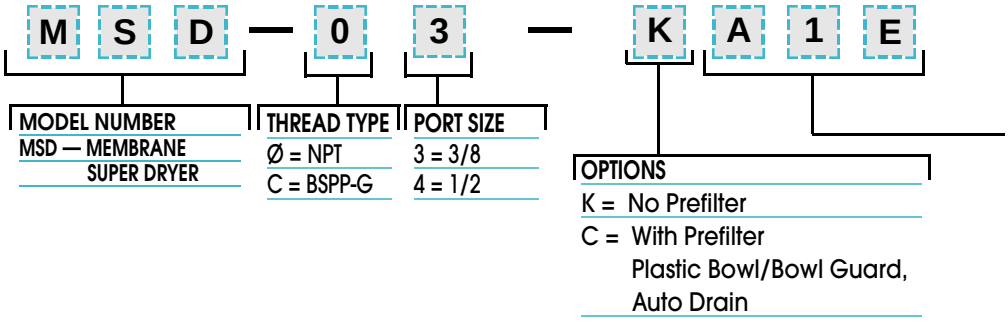
How to Select Your Membrane Dryer

MODEL NUMBER



Refer to Table A for Dew Point and Flow Capacity Selection. Last three positions of Model numbers are determined by selection of dryer in table A

Table A:
MEMBRANE DRYER FLOW CAPACITIES

Model Number	ADP[1] °F (°C)	Outlet Air Flow[2] scfm (L/min)	Purge flow scfm (L/min)	Required Inlet Flow[3] scfm (L/min)
MSD-03-KA1E	-4 (-20)	1.8 (50)	0.3 (8)	2.1 (58)
MSD-03-KA2E	-4 (-20)	3.5 (100)	0.5 (14)	4.0 (114)
MSD-03-KB1E	-4 (-20)	7.1 (200)	1.1 (30)	8.2 (230)
MSD-03-KB2E	-4 (-20)	10.6 (300)	1.6 (44)	12.2 (344)
MSD-03-KA1D	-4 (-20)	3.5 (100)	0.9 (25)	4.4 (125)
MSD-03-KA2D	-4 (-20)	7.1 (200)	1.8 (50)	8.9 (250)
MSD-03-KB1D	-4 (-20)	14.1 (400)	3.5 (100)	17.6 (500)
MSD-03-KB2D	-4 (-20)	21.2 (600)	5.3 (150)	26.5 (750)
MSD-03-KA1D	-40 (-40)	1.4 (40)	0.9 (25)	2.3 (65)
MSD-03-KA2D	-40 (-40)	2.8 (80)	1.8 (50)	4.6 (130)
MSD-03-KB1D	-40 (-40)	5.7 (160)	3.5 (100)	9.2 (260)
MSD-03-KB2D	-40 (-40)	8.5 (240)	5.3 (150)	13.8 (390)

[1] **Atmospheric Dew Point**

[2] **Flow rates based on: 100 psig (6,9 bar) inlet, 77° F (25° C) inlet air temperature, and 77° F (25° C) ambient temperature. Tested according to ANSI/CAGI Standard ADF 700**

[3] **Required inlet flow is combined outlet flow plus purge flow**

Table B:
Pressure Correction Factors (all models)

Inlet Pressure psig (bar)	Multiply outlet flow by:
60 (4,1)	1.82
80 (5,5)	1.33
100 (6,9)	1.00
120 (8,3)	0.83
140 (9,6)	0.74
150 (10,3)	0.67

Table C:
Inlet Air Temperature Correction Factors

Inlet Temp °F (°C)	-40°F(-40°C) ADP	-4°F(-20°C) ADP
	Multiply outlet flow by:	
41 (5)	0.78	0.77
59 (15)	0.89	0.80
77 (25)	1.00	1.00
95 (35)	1.11	1.18
113 (45)	1.23	1.33
122 (50)	1.30	1.43

TO SELECT A DRYER FOR YOUR APPLICATION:

The outlet flows in Table A are based on 100 psig (6,9 bar) inlet pressure,and 77°F (25°C) inlet air temperature.For proper model selection in your specific application, you must adjust the outlet air flow requirement for the actual inlet air temperature and pressure where the dryer will be installed. This is accomplished by using the correction factors found in Tables B and C (above). ***FOR EXAMPLE:*** I have an application which requires a -40°F (-40°C) atmospheric dew point, 6 scfm(170 L/min) of air (this would be application consumption), system pressure (dryer inlet pressure) at 140 psig (9,6 bar),and an inlet air temperature of 95°F (35° C). ***TO ADJUST FOR PRESSURE:*** Take the 6 scfm (170 L/min) application air flow, and from Table B, ***MULTIPLY*** by 0.74, which equals 4.44 scfm (126 L/min). ***TO ADJUST FOR TEMPERATURE:*** Take the resulting 4.44 scfm (126 L/min) pressure-adjusted air flow from the above calculation,and from Table C, ***MULTIPLY*** by 1.11,giving 4.93 scfm (140 L/min). **This is the NORMALIZED AIR FLOW RATE for the application.The Outlet Air Flow Capacity from Table A for the selected membrane dryer must meet or exceed the Normalized Air Flow Rate so calculated for the prescribed atmospheric dew point to be attained.**

From Table A, the model which would be best suited for this application is the MSD-03-KB1D, which has an outlet air flow of 5.7 scfm (160 L/min).

On the same line, you will see the purge at 100 psig is 3.5 scfm (100L/min) and the TOTAL INLET FLOW REQUIRED (outlet + purge) is 9.2 scfm (260 L/min) for this model. Please contact Applications Engineering if your application cannot be adjusted using these tables.