Air Dryers

Air dryers should be used when the compressor is operated in freezing or high humidity conditions. In both cases it is necessary to remove as much moisture as possible from the air supplied to the pumps.

There are three types of drying systems available:

- **Refrigerated**
- **Regenerative Desiccant**
- **Membrane**

Refrigerated dryers are selected when the air temperature will remain above 350ºF. Desiccant dryers are preferred in low temperature conditions below 350ºF. Membrane dryers are usually chosen for applications where there is relatively low air consumption.

Refrigerated Dryers

Refrigerated air dryers use mechanical refrigeration to lower the air temperature of the compressed air. This lowers the dew point that causes the moisture in the air to condense into liquid and be removed from the compressed air stream.

Regenerative Desiccant

These dryers use a dual tower design, each filled with a desiccant media that will remove water from the air stream. The dual tower design allows one tower to dry the air while the other tower is regenerated. Maximum bed life is from 3 to 5 years. These dryers consume about 10% of the air supply produced by the compressor for regeneration of the desiccant bed.

Membrane Dryer

The compact membrane dryers use a molecular design that can provide atmospheric dew points as low as 400ºF. The system comprises densely packed hollow fiber membranes to diffuse the water vapor. No power source is required and the only maintenance needed is the periodic changing of a pre-filter element when the indicator on the dryer shows red.

Water Flow & Pressure Loss

Pipe Size (Sch 40)

Flow (gpm)	1/4" Pipe (.364" ID)		1/2" Pipe (.622" ID)		3/4" Pipe (.824" ID)		1" Pipe (1.049" ID)		1 1/4" Pipe (1.380" ID)		1 1/2" Pipe (1.610" ID)		2" Pipe (2.067" ID)	
	Velocity (ft/sec)	Press. Drop (psi/100 ft)	Velocity (ft/sec)	Pressure Drop (psi/100ft)	Velocity (ft/sec)	Pressure Drop (psi/100ft)	Velocity (ft/sec)	Pressure Drop (psi/100ft)	Velocity (ft/sec)	Pressure Drop (psi/100ft)	Velocity (ft/sec)	Pressure Drop (psi/100ft)	Velocity (ft/sec)	Pressure Drop (psi/100ft)
0.25	0.77	0.583	0.26	0.043	0.15	0.011	0.09	0.003	0.05	0.001	0.04	0.000	0.02	0.000
0.5	1.55	2.103	0.53	0.155	0.30	0.039	0.19	0.012	0.11	0.003	0.08	0.002	0.05	0.000
0.75	2.32	4.453	0.79	0.328	0.45	0.084	0.28	0.026	0.16	0.007	0.12	0.003	0.07	0.001
1	3.09	7.581	1.06	0.559	0.60	0.142	0.37	0.044	0.22	0.012	0.16	0.005	0.10	0.002
2	6.19	27.331	2.12	2.016	1.21	0.513	0.74	0.159	0.43	0.042	0.32	0.020	0.19	0.006
3	9.28	57.865	3.18	4.268	1.81	1.086	1.12	0.336	0.65	0.088	0.47	0.042	0.29	0.012
4	12.37	98.527	4.24	7.268	2.41	1.850	1.49	0.571	0.86	0.150	0.63	0.071	0.38	0.021
5	15.47	148.880	5.30	10.982	3.02	2.795	1.86	0.864	1.08	0.227	0.79	0.107	0.48	0.032
6	18.56	208.604	6.36	15.388	3.62	3.917	2.23	1.210	1.29	0.319	0.95	0.151	0.58	0.045
8	24.75	355.189	8.47	26.201	4.83	6.669	2.98	2.060	1.72	0.543	1.26	0.256	0.77	0.076
10	30.93	536.714	10.59	39.591	6.04	10.077	3.72	3.113	2.15	0.820	1.58	0.387	0.96	0.115
15	46.40	1136.350	15.89	83.823	9.05	21.336	5.59	6.591	3.23	1.736	2.37	0.820	1.44	0.243
20	61.86	1934.857	21.19	142.725	12.07	36.328	7.45	11.223	4.30	2.955	3.16	1.396	1.92	0.414
25	77.33	2923.697	26.48	215.667	15.09	54.894	9.31	16.959	5.38	4.466	3.95	2.109	2.40	0.625
30	92.80	4096.544	31.78	302.182	18.11	76.915	11.17	23.761	6.46	6.257	4.74	2.956	2.88	0.876

Data based on pipe I.D.

Cells highlighted in light blue have minimal pressure loss.
Cells highlighted in dark blue are for non-recommended flows.

Calculated using the Hazens Williams equation for head loss.
h=((0.002083)(L)((100/C)^1.85)((q)^1.85))/(dh)^4.8655
Where: h = ft head loss/ft pipe
L = length of pipe = 100 ft
C = Constant = 130 for smooth pipe
q = Flow rate in gal/min
dh = Hydraulic dia = ID" for circular tubes
Pressure Loss (psi) = h/2.31