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Actual Moisture Content in Compressed Air at Specific Dew Points

by Brian S. Elliott

For the average compressed air user, the measurement of water content in the system is usually indicated in dew point. Simply stated, dew point is the temperature at which the water vapor in compressed air will start to condense, hence its indication in °F or °C. The most significant problem with using dew point as an indicator of water content is that it references a logarithmic scale. That is to say, as the dew point temperature lowers, the water content in the compressed air drops at a decreasingly lower rate. As an example, the percentage difference of water vapor between 100°F and 50°F is 5.2%. The percentage difference between 50°F and 38°F is just .3%. The temperature difference seems like a large amount, however, the actual difference in water content is, practically speaking, insignificant. This is the very reason that most refrigerated dryers are rated at both 50°F and 38°F. In most cases, achieving an additional .3% reduction in moisture content is simply not worth the additional equipment, operating, and maintenance costs associated with the lower temperature.

Most compressed air applications are considered general-purpose in nature. A 50°F dew point is perfectly adequate for these applications. Lower dew points are generally not necessary and the additional expense for achieving them is unwarranted. The chart below shows the actual percentage of compressed air that is water vapor at various dew points. Take notice that a 99% removal rate is achieved at approximately 50°F. Any lower temperatures are achieved at a significant rate of diminishing returns.

Dew Point in °F	Water Vapor Content in %	Clean Air in %
130°F	25.50	74.50
120°F	12.00	88.00
100°F	6.30	93.70
80°F	5.00	95.00
50°F	1.10	98.90
38°F	0.80	99.20
0°F	0.10	99.90
-20°F	0.04	99.96
-40°F	0.01	99.99
-60°F	0.004	99.996

Actual Water Vapor Content Versus Dew Point

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