Psychrometrics..... and your Compressor System

There is water on your car's windshield in the morning and it did not rain the night before. Where did the water come from? **Psychrometry** or **Hygrometry** are terms used to describe the field of engineering concerned with the determination of physical and thermodynamic properties of gas-vapor mixtures. Although the principles of psychrometry apply to any physical system consisting of gas-vapor mixtures, the most common system of interest is the mixture of water vapor and air, more commonly known as the **Dew Point**.

Dew point is the temperature at which water vapor begins to condense out of the air. Alternatively, it can be defined as the temperature at which air becomes completely saturated with moisture. In dehumidification by cooling and condensation, it is the temperature to which the moist air must be cooled to allow water removal. The lower the absolute amount of moisture in the air, the lower the dew point of that air sample will be.

Dew points can be defined and specified for ambient air or for compressed air. The higher the pressure of the air, the higher the "pressure dew point" will be. Pressure dew point can be used as a proxy for allowable moisture content. In many cases, pressure dew points are specified for air drying and handling equipment to avoid condensation in compressed air distribution lines exposed to low temperatures.

So you ask **"What does this have to do with my compressor maintenance?"** First, you must understand that your compressor's health is dependent upon the rotor bearings capability to maintain zero axial motion. When this capability is diminished, the rotors will begin to contact the compressor housing, and failure is imminent. Second are the components that make up your unloading circuit that provides compressed air, or not as the operator requires.

There are several key points of interest in your compressor circuit that require regular maintenance, to ensure compressor health and correct operation.

1. Start by draining the moisture that has condensed in your air/oil tanks at the end of every shift. Allow at least fifteen minutes after shutting down for the water to separate from the oil. Then open the drain valve observing the flow that typically starts as oil then clear water then back to oil. Close the valve.

2. Use suitable compressor oil that meets the ASTM D665 rust inhibitor requirement that should prevent water in your oil from oxidizing on the axial control bearings.
3. Drain the coalescing filter in the unloading controls circuit as environmental conditions require. This could be as often as once an hour when there is a high relative humidity condition. Failure to drain this filter will cause water carryover that will lead to component failure in the pneumatic unloading controls. Pilot valves, running blowdown valve, inlet control cylinder, etc.
4. Change the coalescing filter element (Schramm Inc. part number 5000-7205) at 1000 hour intervals or once a year.

Following these simple steps can lead to a long and healthy compressor life and proper operation of the pneumatic unloading circuit components.

Below Freezing

When approaching winter months or higher elevation colder climates we need to remember the physical properties of water once the temperature goes below 32°F/0°C. Anyone who has started to operate their compressor on a day where the overnight temperatures were below freezing is familiar with the sound of a safety valve blowing off when they expect the compressor to unload. Schramm Inc. has introduced the *air*-Control unload system as an alternative to eliminate some of the maintenance issues associated with pneumatic unloading control circuits.

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