

# Dew Point & Compressed Air

*Helping you make a better measurement.*

## **Webinar Presenters & Humidity Experts**



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# Agenda & Takeaways

## Agenda

- Definition of Dew Point
- Pressure Effect
- ISO Air Classes & Dryers
- Desiccant Dryers and Efficiency
- Water in Air – practical example
- Summary

## Takeaways

- Understanding the parameter helps to make a better measurement and prevent water.
- Learn the cause of liquid water in the system.
- Understand how pressure affects the measurement.
- Understand dryer performance and dew point.

# Definition of Dew Point Temperature

- Dew point temperature is the temperature at which water vapor will begin to condense.
- The temperature at which a moist gas is saturated over a plane surface of pure liquid water.



**Note** – Dew point temperature does not change as temperature changes.

# What about Frost Point?

- The temperature at which a moist gas is saturated over a plane surface of pure ice.
- Which one are you measuring?
- Which one matters in compressed air?

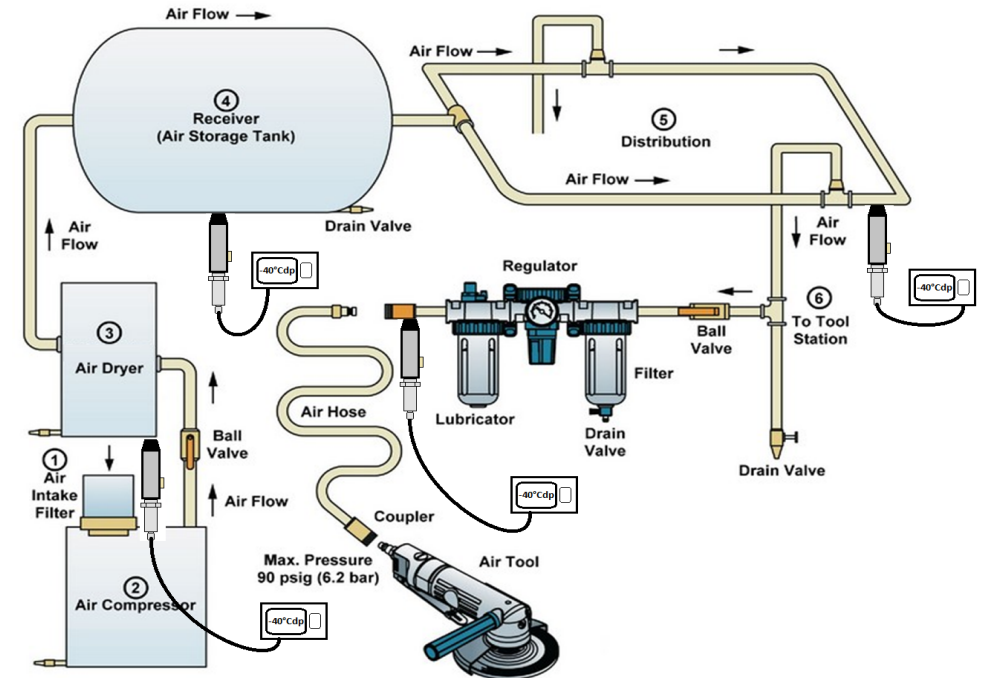


**Note** – Dew point is lower than frost point (by about 4C at -40).



# Why Is Dew Point Temperature so Important?

- Water in compressed air causes problems.
- If Dp reaches ambient temperature, condensation occurs.
- Dew point temperature changes with pressure and with dryer performance.



# Pressure Effects on Dew Point

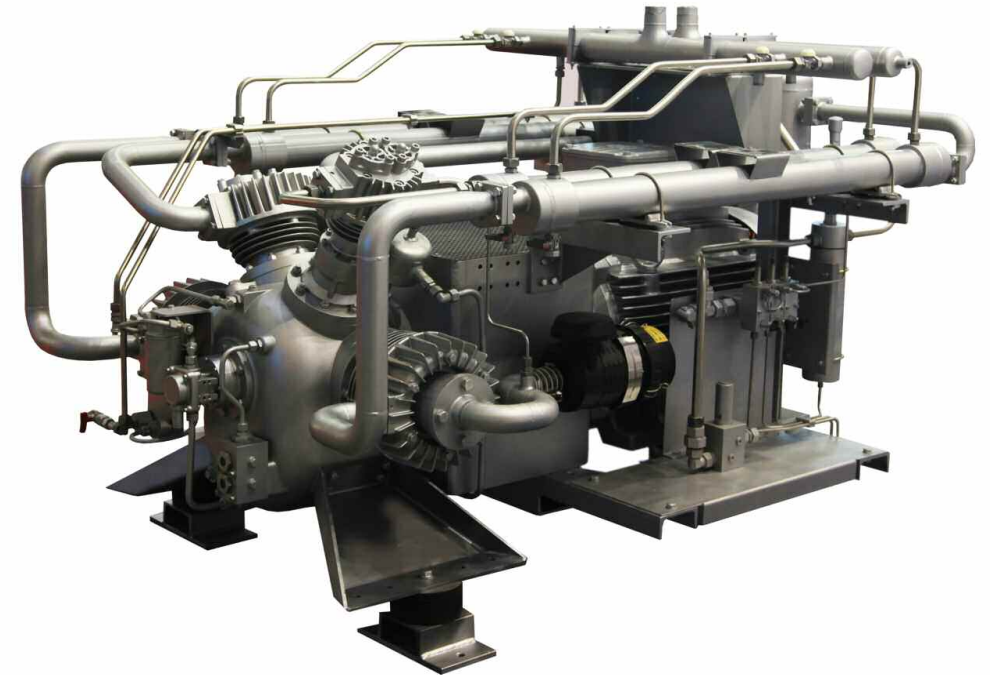
## Rule of thumb:

- As pressure increases, dew point temperature rises and approaches saturation.
- As pressure decreases, dew point temperature goes lower and the air becomes dryer (relatively speaking)



# Pressure Dew Point vs Atmospheric Dew Point

- **Pressure Dew Point** is the dew point at the actual pressure.
- **Atmospheric Dew Point** is what that dew point would be if the air were expanded to atm pressure or 0 psig.
- Know what your hygrometer is reporting – pressure Dp or Atm Dp.



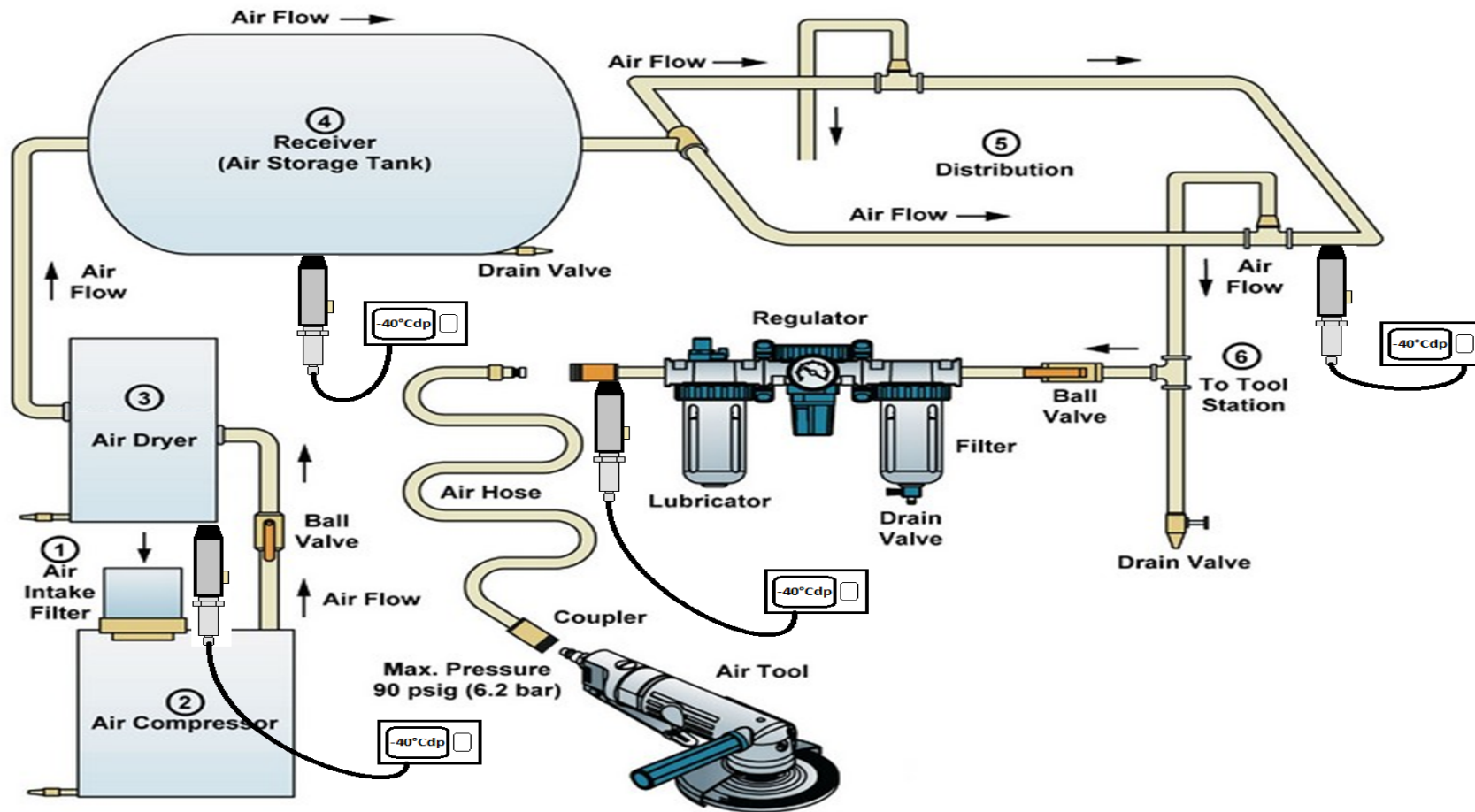


# Comments & Questions



If we don't get to your question today, we'll respond via email after the webinar.

# Where Should you Measure Dew Point?



# Air Classification - ISO 8573.1 (pressure dew point only)

| Class | Particles<br>max in microns | Dew Point C | Dew Point F | Oil<br>mg/m <sup>3</sup> |
|-------|-----------------------------|-------------|-------------|--------------------------|
| 1     | 0.1                         | -70         | -94         | 0.01                     |
| 2     | 1                           | -40         | -40         | 0.1                      |
| 3     | 5                           | -20         | -4          | 1                        |
| 4     | 15                          | 3           | 38          | 5                        |
| 5     | 40                          | 7           | 45          | >5                       |
| 6     | -                           | 10          | 50          | -                        |
|       |                             |             |             |                          |

# Heatless Desiccant Dryers Dew Point

## Dewpoint Demand Switching

- Heatless regenerative dryers
- High cost in purge air is reduced
- Some HDD consume up to 15% of their rated capacity in purge air without DDS.

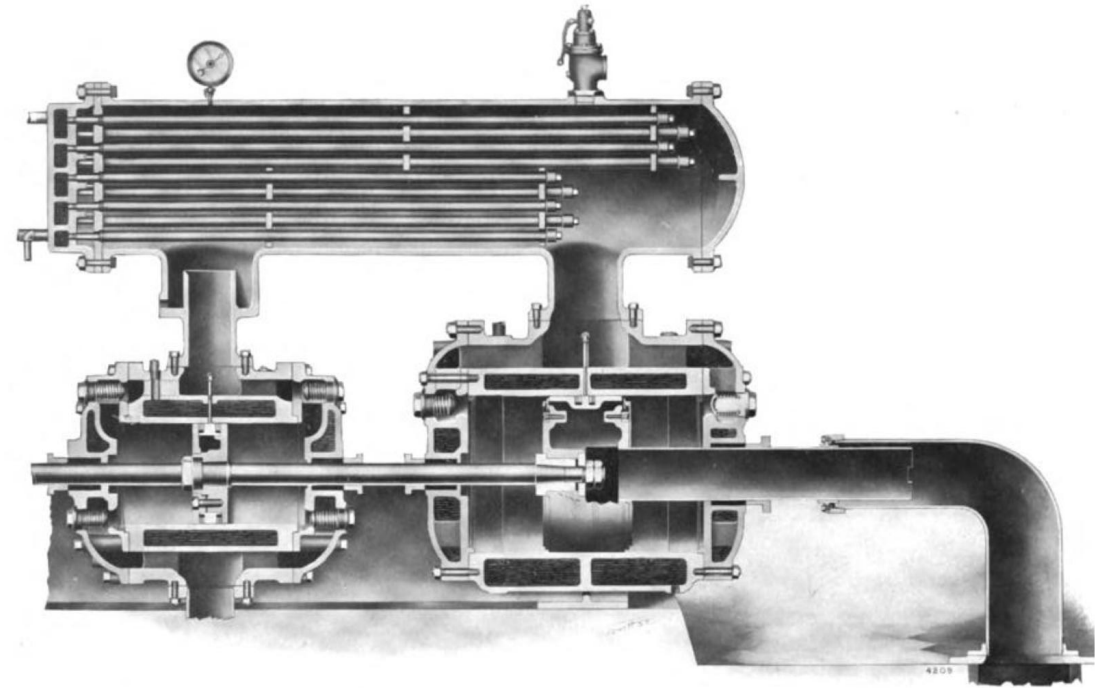
### For example:

- If a dryer is rated for -40 Dp at 1000 cfm, it requires 150cfm just for purge air.
- This is equal to a 35HP compressor running 24/7 just to purge the dryer.



# Practical Examples

1. Dew point = 38F; airline goes outside in 30F; frozen water
2. Dew point instrument reads -20F Dp; what is true pressure Dp?
3. Pressure Dp=+38F at 70 psig; atm Dp = -2F
  - Increase pressure to 150 psig;  
Pressure Dp= +55F





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