



ESCC

ENVIRONMENTAL SYSTEMS CORPORATION

Design / Build & Maintenance of Controlled Environmental Systems

Cleanroom Temperature / Humidity Set Point & Range

The selection of the solution for the Heating / Ventilation / Air Conditioning (HVAC) Systems for your Cleanroom can vary with the requirements.

Temperature – Set Point:

Temperatures for user comfort are normally between 64°F (18°C) to 70°F (21°C). This is due to the fact that Cleanroom Gowning Fabrics do not “breathe” like our street clothing, so our bodies can not use their normal means of regulating our temperature.

Temperature Set Points outside these norms are usually a requirement of the process in the Cleanroom, and must be dealt with during design.

Temperature – Range:

The range or fluctuation in Temperature is normally a function of the process in the space. If close tolerance is not a requirement, a typical set point could be 68°F (20°C), with a +/- Range of 3°F (1.5°C). This allows a window of operating temperature between 65°F (18.5°C) and 71°F (21.5°C).

Closer tolerances are usually a requirement of a process.

Temperature – Variable Set Point:

If a variation of the set point temperature is required, please be sure to note this as an additional requirement. An example would be a process that may require different room conditions at different times or in an R&D facility where you may require the ability to try the process under varying conditions.

This is a very important consideration as a system that will be designed to meet the outside of the Set Point & Range on a peak condition, may not reach your required conditions.

Humidity – Set Point:

Humidity Ranges for user comfort are normally between 35% to 55%. Humidity is usually a requirement of a process. We have dealt with humidity's from 5% to 90%.

Humidity – Range:

The Range or fluctuation in Humidity is normally a function of the Process in the space. If close tolerance is not a process requirement, a normal set point could be 35%, with a +/- range of 20%. This allows a window of operating humidity between 15% and 55%. Mould growth is accelerated in areas of humidity above 60%.



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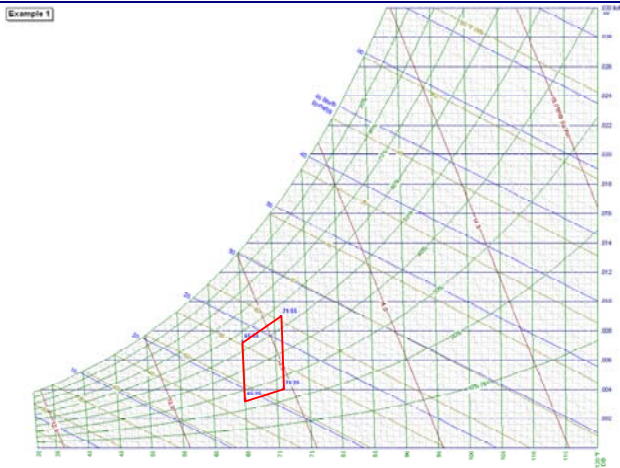
Cost Considerations:

Ranges for economical Temperature / Humidity Control are 68°F (20°C), with a +/- Range of 3°F (1.5°C), & a Humidity Set Point of 40%, with a +/- Range of 15%.

On a Psychrometric Chart (Example 1) this is a relatively large window to control, and can be maintained with HVAC equipment with limited modification or specialization.

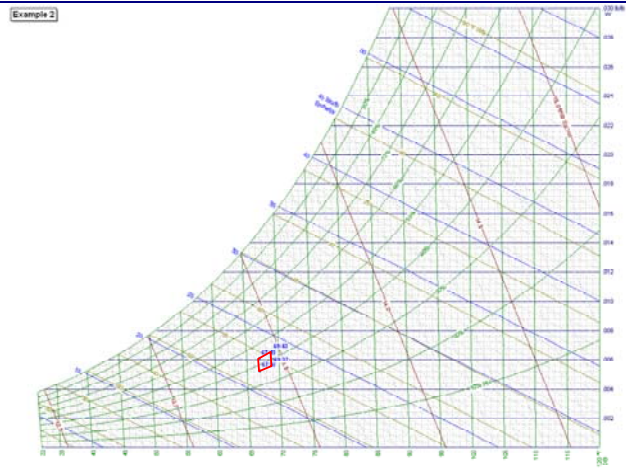
Example 1

Temperature of 68°F (20°C), +/- 3°F (1.5°C),
& Humidity of 40%, with a +/- 15%.



Example 2

Temperature of 68°F (20°C), +/- 1°F (0.5°C),
& Humidity of 40%, with a +/- 3%.



As you can see the “Window” for Example 2 is quite small compared to Example 1, therefore the cost in equipment, control systems, sensors, and energy use will be higher.

There is a close relationship between temperature and humidity, the Psychrometric Chart shows that as Temperature Increases, the Humidity % will decrease.

The closer the tolerance for humidity will therefore drive the tolerances for temperature. A good rule of thumb is that the temperature range must be ½ °F or ¼ °C of the Humidity Range. For example a +/- Humidity Range of 4%, must have a temperature Range of +/- 2°F (1°C).