The 4 Most Important Components of Choosing Your HVAC System

The HVAC is the most important part of any cleanroom, so choosing the right system is essential in the planning phase.

It controls your cleanroom's air pressure, temperature, cleanliness and humidity.

Your decision is largely made by how many air changes per hour your space will require, with HEPA filtered air circulating into the cleanroom. To give you an idea of the air quality required, a conventional HVAC system provides 2-4 changes per hour. A cleanroom requires anywhere from 15 to 250 (sometimes even more) changes per hour.

Today we will examine how the airflow, humidity/temperature, pressure differential and space requirements will dictate which HVAC system is perfect for your cleanroom.

Airflow (CFM)

Generally speaking, the cleanliness level is determined by your cleanroom's class (ISO 5-6-7-8, GMP A-B-C, etc).

However, there are a number of other factors such as:

- The number of people working in the cleanroom and their movement
- How much and the type of equipment, furniture, and instruments inside the cleanroom
- The size of your cleanroom
- The number of rooms within your cleanroom
- Estimated heat gain

You can find lots of online air changes per hour (ACH) calculators. However, these tools do not factor in any of the variables above.

Temperature and Humidity

Temperature and humidity control is crucial and must be as precise as ±0.25°C and ±2% in a cleanroom setting.

All of the factors listed above will dictate the amount of heat generated, as human bodies move and equipment is utilized.

Pressure Differential

Your HVAC system also creates pressure differentials to keep pressure cascades in between the divisions inside and outside of the cleanroom. Most cleanrooms are held in positive pressure to ensure unfiltered air particulates do not enter or contaminate the cleanroom.

The cleanroom's air output must be compensated with fresh air to maintain the correct air pressure.

Space Requirements

Your cleanroom could be in a small space with limited headroom, which raises questions about the overall height needed for your fan filter modules.

Even if your unit physically fits in the space available, the amount of free space you have above the unit may restrict air intake and the performance of the fan filter module.

The best solution is a SmartHEPA, with an absolute minimal "low net profile," measuring only 16" in height from finished ceiling to the top of the pre-filter housing.

They can be installed with as little as 2" of free space above the unit. This means full SmartHEPA performance can be achieved in a limited interstitial space of only 18", with air flow rates up to 750 cfm, despite the space limitations.

We Are Trusted Cleanroom Specialists

Our company's roots began in 1983 in commercial heating and air conditioning and evolved over the years combined with our expertise in temperature and humidity control which helped us find our calling in cleanrooms in the late 1990s.

Today, Environmental Systems Corporation designs critical environments and builds cleanrooms to ISO 14644 4, 5, 6, 7 & 8 Requirements.

Ready to discuss your project? Click here to contact us anytime.