Matrix Development

A Prerequisite for A Successful Cleanroom Design

Most Common Mistake in a Cleanroom Design

- Starting Design before all the requirements have been determined
- Programming and Planning must occur first.

What is Programming?

- A term utilized by the design community to make information gathering look more attractive
- Management of preliminary project data assembled in a fashion to help determine design parameters

What are the three most important steps in successfully executing a cleanroom design?

- Assembling an Equipment Data Base
- Creating a Utility Requirement Summary (Matrix)
- Developing an Equipment/Tool Layout

How do we get started?

- Assemble an Equipment Information Sheet for each tool
- Which is a data sheet detailing pertinent information, requirements, and characteristics of the equipment

How do we find the data we need?

- Similar facility that repeats the process (Pilot or R&D tool set)
- Equipment data from existing Plant
- Tap into existing Data Bases
- Research O&M Manuals
- Utilize Vendor Data from Catalogs

What Kind of Data do we need?

- Utilities required
- Environmental Parameters (Temp/RH)
- Size and Accessibility Requirements
- Support Equipment Requirements

What do we do with the data now that it is collected?

Tabulate it on a Spreadsheet also called

- Utility Matrix
- Process Utility Summary
- Tool Matrix
- Utility Requirement Spreadsheet

What can we determine from the summary?

- » Exhaust Requirements
- » Heat Loads
- » Process Cooling Loads
- » DI Water Requirements
- » Spec Gas Requirements
- » Process Gas Requirements

How does the summary effect the cleanroom design?

- Exhaust requirements help to determine MUA requirements
- MUA requirements along with humidity requirements helps to specify MUA air handler
- Which combined with heat generation information and process cooling water needs helps us to size a chiller
- Once we have the chiller sized we can size pumps and piping

How can this process turn bad?

- We guess on the exhaust required for a certain tool.
- Because we guessed we add 20% safety factor.
- This adds to our MUA volume, again because we guessed on some of our inputs, we add a 20% safety factor
- This increases our humidifier and chiller sizes by that 20% + the previous 20%

- Now we size our boiler with the 20% + 20% + 20% factors
- Our course we add another 20% safety factor

Other than cost is this truly bad?

- An over capacity within a facility is every bit as problematical as an under capacity
- In fact more so
- You can add capacity easier than taking it away
- We often do accommodate the requirement for added capacity

Particular Issues

- Chillers don't work efficiently at low capacity
- Boilers are down right temperamental

Getting back on track

- We have our matrix complete and know the size of our support equipment
- Now we need to lay out our cleanroom

The Equipment Layout

- If we have completed our tool information sheets accurately that information has sizing info and is grouped by process

Determine the net cleanroom area required

- Group equipment by discipline or work cell
- Determine space required for each tool
- Include access and service requirements
- Determine access and service corridors

Now you're ready to design your cleanroom

- Questions?

Thank you