Reduce your Carbon Footprint… Save your Energy!

Centralized Vs Decentralized

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Centralized Vs De-centralized Contamination Control Vacuum System

Noncompliance with cleanroom protocols in the electronic and semiconductor industries can have serious consequences-Contamination, shutdowns, increased production costs, recalls and damage to a company's reputation.

A single occurrence can cost a company US$10,000.00 to US$100,000.00.

A recent survey revealed that contamination source that respondents were most concerned about was particles, which was selected by 70 percent of those surveyed.

Hence, the important of a proper Contamination Control Vacuum System.

The use of small regenerative or side channels exhauster which is station close to the source of dust generation is a popular method. This is because it is simple and an economical way.

However, this is more of a wishful thinking contributed partly by traditional approach that it will do the job right. Traditional approach which had been used in time where contaminants particle are NOT so small.

In actual fact, capture particles escape the local exhauster together with its exhaust which disturb the flow condition of the cleanroom too.

In some situations, people realize this and decided to pipe the exhaust from these local exhausters out of the cleanroom.

This approach increase the installation cost and add challenges to the space planning for High Volume Semiconductor Plant.

Additionally, such exhauster are usually considered to be a differential pressure machine. In other words, the total static at the exhaust side and inlet side had to be considered in order for it to work properly.

For example, if the suction at the point requires about 2"Hg Vac with a suction flow of 100 scfm, the exhauster cannot be selected based on this alone. The static loses causes by the 100 scfm in the exhaust pipe of it have to be taken into consideration.

Otherwise, there will be a reduced capability at the suction.

PV Contamination Control Vacuum System does not have these problems. In fact, it is especially designed or developed to solve these constraints in Modern High Volume Semiconductor Plant.

PV Contamination Control Vacuum System, effectively ensure that the appropriate vacuum required for suction is continuously maintain at the source of dust/particle generation. Capture particle are conveyed at the appropriate conveying velocity within duct/pipe to a Central Filter Separator, where the particle can be effectively capture using the correct technology, before the air leave via the Exhauster to outside the factory.

In the following table, we try to compare the effectiveness of these approach to handle a situation whereby the:

• Total Contamination System Flow rate is 1600 scfm.

• A suction of 8”Hg V is required at each point of use, and

• The exhaust had to be discharged at a distance (pipe routing) of 394 Feet away.

S/N	Item	Local Exhauster	PV’s Central System	Remarks
1	Exhauster.	8 Nos x Operating exhauster.	1 No. x Operating + 1 No. on Standby.	Local Exhauster usually do not have space for a standby machine.
2	Assume Overall System Static (Suction & Exhaust Side).	12.5”Hg V	12.5”Hg V	
3	Absorbed Power during operation.	8 x 19 Kw = 152 Kw	96.98 kw	
4	Energy Cost For One Year - 365 Days; 24 Hours a day.	152kw x 24h x 365 days x S$0.2759 per kwh = S$367,366.37 per Year.	96.98kw x 24h x 365 days x S$0.2759 per kwh = S$234,389.41 per Year.	Electricity Cost is assumed to be S$0.2759 per Kw hour.

In the above example, it is clear that a PV centralized Contamination Control Vacuum System will save S$367,366.37 – S$234,389.41 = **S$132,976.96 in energy cost per year.**

In other words, using the conversion factors from DECC’s “Tool for calculation of CO2 emission from organization”, the total reduced Carbon Emission will be **252,073Kg of Carbon Dioxide Per Year.**

This is quick a significant figure!