PVC APPLICATIONS

OVERVIEW

Fumex Inc. has conducted/commissioned several tests involving the lasing of PVC. The testing consisted of air sampling and analysis in accordance with NIOSH method 0500 and NIOSH Method 7903. Determination of dusts was accomplished by gravimetric analysis and the determination of hydrogen chloride by ion chromatography. Our analysis and recommendations are based on the result of these tests and an analysis of the MSDS provided.

The lasing of PVC with CO2 lasers generates HCl gas and particulate matter (dust, fume), and lesser volumes of numerous other gases. The concentration of gas and particulate is dependent on the duty cycle, laser power and the environment in which the process is performed and can only be determined by on-site analysis. Particulate matter is efficiently removed using mechanical filtration, a combination of prefiltration and HEPA filters. HCl gas is removed using a chemisorbent media that attracts the HCl molecules and converts them to potassium chloride, a harmless salt; this prevents the HCl from condensing to form highly corrosive hydrochloric acid. The **chemisorbent** media is employed to chemically neutralize acidic HCl and is combined with **physically adsorptive media (activated carbon)** that attracts gases of higher molecular weight - this media combination increases both capacity for and retentivity of all contaminant gases.

Substrate Chemistry Analysis -PVC

Substrate/Contaminant	Physical State	OSHA Limits	Required Filtration	By-Product/Results
Polyvinyl Chloride	Dust	NoTLV	HEPA	99.97 % efficient
HCL	Gas	7 mg/M3	Chemisorbent	Potassium chloride. Inert 95% efficient
Trace V.O.C's**	Gas	Varies	Activated Carbon	Inert 95 % efficient
Di-phthalate	Dust	5 mg/m3	HEPA	99.97% efficient
Trioctyle Trimellitic Ester	Dust	None	HEPA	99.97% efficient
Calcium Carbonate	Dust	5 mg/m3	HEPA	99.97 % efficient
Titanium Dioxide	Dust	15 mg/m3	HEPA	99.97 % efficient
Glycol Dioleate	Gas	None	Activated Carbon	Inert 95 % efficient

*** PVC manufacturers have a variety of “recipes” and therefore a variety of VOC’s can be generated - exact by-products cannot be determined without sampling.

RECCOMENDATIONS:

FA2PVC-120
FA2PVC-240

Epoxy Coating – The Fumex FA2PVC utilizes a high build epoxy novolac coating on all internal cabinet components. The material provides superior corrosion resistance to HCL and other acid gases. Prior to application the cabinets are prepped with a sandblasting to SSSP10 and all seams are caulked per manufacturers specifications. Two (2) coats of the epoxy are applied to a DFT of 4 mils.

HCL Sensor – The Fumex FA2PVC is fitted with a continuous gas detector for the detection of Hydrogen Chloride breakthrough. The HCL gas sensor is a complete self-contained monitor consisting of an integral 115VAC power supply and factory pre-set solid-state relay alarm for activating panel-warning lamp. The system features microprocessor electronics that set the gas curves for HCl detection. The electronics continuously check the sensor cell operation 24-7 and provide immediate indication of cell failure. The sensor includes built-in temperature compensation and alarm delay to prevent nuisance alarms. Sensor electronics are housed in a steel, panel-mounted enclosure. The sensor is set at OSHA limits to insure operator safety.

AcideX Cell – The cell consists of specially impregnated activated carbons that neutralize acid gases and adsorb the VOC's generated in PVC lasing**.**

Particulate Filters - The system utilizes a 99 % @ 1.0 woven, disposable pleated dust-bag and a 99.97% @ .3 micron HEPA filter.

Filter Disposal

The spent Fumex filters are classified as "non-hazardous waste" and can be disposed of accordingly.