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CLEANING INSTRUCTIONS FOR SMOG-HOG CELLS

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Effective cleaning of the SMOG-HOG is the single most important factor contributing to a successful air cleaning installation. Manual cleaning is the most common type of maintenance, as well as the most effective. Even units with automatic cleaning systems will periodically require manual cleaning to return them to peak operating condition.

While there are many methods of manual cleaning, there are several key cleaning criteria which contribute to the effectiveness of any method. They are:

A. Type of detergent

In general, the detergent used will be alkaline in nature. As such, it is extremely important that the detergent have a proper buffering agent in it which will prevent attack on aluminum. This information will always be given on the detergent spec sheet.

Cell Soak 521 (powder)

Cell Soak #380 NF (liquid for soak tank)

Acid Cell Soak II (weld smoke) **Call for Pricing**

Powdered detergent is usually the most cost-effective. Liquid detergent is somewhat easier to use, since it mixes readily in the hot water. (You do not need to worry about dissolving this material as you would with the powdered detergent.)

For most common contaminants (w/s coolants, machining oils, plasticizers, etc.), Cell Soak 521 (powder) and Cell Soak 380NF (liquid) detergent, available through Dynacom, Inc. have proven most effective. Product data sheets are available from Dynacom. **Using the wrong detergent can damage collection components.**

B. Detergent Strength

This requirement will vary among detergents ranging from 1:1 to 5:1 to even 25:1. The best course is to follow the manufacturer's directions and see how it works. More detergent may be required to cut the contaminant. Perhaps less could be used and still do an effective job, translating into savings on detergent costs. Experimentation is nearly always necessary.

C. Water temperature.

SMOG-HOG components come cleaner in hot water. Detergents can be up to twice as effective in hot water, and hot water itself can be more effective in softening built-up residue. Ideal water temperature is 150ºF to 160ºF.

D. Cleaning cycle duration.

In most cleaning methods, adequate time must be allowed for the detergent to solvate the contaminant thoroughly. The contaminant is then easily removed by agitation or the rinse procedure.

E. Agitation/Impingement.

These are actually the same things, with impingement being the most extreme form of agitation. Any fluid movement past built up residue will naturally brush off some of the solvated contaminant, allowing the detergent to work on the next layer. The result can be a drastic reduction in cleaning time. Sometimes agitation is provided by something as simple as introducing compressed air into the soak tank.

F. Rinse procedure.

The clean components must be rinsed off to remove any remaining loosened contaminant. However, even if the component appears to be clean, chances are that a detergent residue remains. This should be removed for two reasons. First, the residual may cause voltage to bleed down when the unit is back online. Second, even though

the detergent is buffered, prolonged contact with the aluminum could cause minor corrosion. Both are good reasons for rinsing. Again, hot water is preferred.

G. Dry out time.
The components should be dried before the unit is put back online. Repeated failure to do so can shorten the life of the power pack. Set collecting cells, ionizers, and mesh filters in a warm room until they have completely drained and are dry to the touch. Twenty minutes is normally sufficient. Air movement (fans or compressed air) can speed this process. A hot water rinse also results in faster drying time.

Here are several cleaning methods:

A. Cold Soak
This method involves soaking the components in a cold water/detergent solution for a prolonged period of time. The cycle time required for complete cleaning necessarily will be relatively long du to the lack of heat and agitation. For this reason, cold soak is normally restricted to installations with intermittent operations or where spare components are utilized in a rotational method. Low initial investment and operating costs are the principal advantages of the cold soak.

B. Hot Detergent Bath
This method involves placing the components in an agitated solution of hot water and detergent. It is probably the most effective method, for, with proper detergent selection, it will quickly remove practically any contaminant which a precipitator will collect. Although the hot detergent bath requires a higher initial investment, **it is the recommended method of cleaning**.

C. High Pressure Spray Wash
This method uses a self-contained pressure spray unit where hot water is injected with detergent and supplied at high pressure through a spray nozzle. High pressure spray relies on the physical impingement of the spray for rapid removal of most contaminants.

D. Portable Steam Generator
The use of a self-contained steam generator equipped with a spray wand can be an effective cleaning method, providing it is used with caution. Care must be taken not to expose the cell plates to close-up and prolonged blasts of superheated steam because the cell plates will start to deform when continuously exposed to 180ºF. When applied from a distance of more than a few inches, however, the steam with detergent can do a very good job with most contaminants.

E. Automatic Parts Washers
Cabinet-type pressure washers are commercially available which combine and automate the features necessary for effective cleaning, including water heating, detergent injection, and agitation. Dynacom can provide additional information on these washers.

INSPECTION OF COMPONENTS AFTER CLEANING

The Ionizer Assembly

The ionizer is constructed of extruded aluminum channel and stamped aluminum plates. This assembly is secured together with threaded rod and self-locking nuts. The insulators are molded ceramic material which is glazed through a baking procedure. The ionizer wire support rods are stamped steel assemblies. The ionizer wire springs are spring steel and the ionizer wires are tungsten. Completely assembled and energized with a high voltage DC power, the ionizer is subjected to the contaminated airstream. Its function of generating a field evenly across its grid work will cause contaminant to collect on the ground plates. As these plates collect, the contaminant will run off and cost the lower surfaces of the ionizer assembly. Again, with high voltage applied, a field is generated on or around all parts in varying strengths. Contaminant collects on grounded surfaces, requiring periodic cleaning.

A clean ionizer will display these characteristics:

1. All aluminum channels and plates free of process oils and other contaminants, showing a clean aluminum appearance. Do not expect the ionizer to have a bright aluminum appearance after cleaning.
2. All ceramic insulators (4) free of build-up and other contaminants. Clean insulators have a white appearance. When cleaned and rinsed, the insulators should be checked for any signs of carbon tracking. Carbon tracking appears as a grayish to black discoloration usually running the length of the insulator. This

is usually found on the lower radius of the insulators when inadequate cleaning is performed. If this condition is present, the insulator must be replaced since the glazing has carbonized and is now partially conductive, allowing high voltage to bleed to ground.

3. Ionizer wires, free of all build-up and other contaminants. All wires should be in place and taut. The ionizer wires receive a coating of contaminant mainly from the impingement of the aerosol particles. This contaminant has been observed to solidify in some cases. If this condition exists, the wires should be scraped before dip cleaning. Again, when this condition is present and is overlooked during maintenance, the efficiency of your unit will begin to decrease. This decrease of efficiency is directly related to the loss ionization field from the build-up or coating of the ionizer wires.
4. All bent, broken or missing parts should be corrected before the ionizer is ready for installation into the unit. The ionizer should be dry before reinstallation.

The Collector Cell Assembly

The collector cell is constructed of numerous aluminum plates of alternating size. The air gap between the cell plates is maintained by a series of aluminum spacers. The cell assembly is secured together by threaded rod and self-locking nuts. The end plates and corner angles are of aluminum material and held in place with self-locking nuts and rivets. The insulators (8 per cell) are constructed of glass and resin, held in place with steel rivets.

Completely assembled and energized with high voltage DC power, the cell plates suspended by the insulator support network project a positive polarity or negative polarity. As the contaminant particle previously charged by the ionization field enters the collector cell, the charged plates help push the particle to the ground plate. As the contaminant builds up on these plates (within process operating temperatures of the precipitator), it will begin to drip or run off. With good run-off, intervals between cleaning will be extended.

A clean collector cell will have these characteristics:

1. All aluminum surfaces should be free of build-up and other contaminants showing a clean aluminum appearance. Do not expect the collector cell to have a bright aluminum appearance after cleaning.
2. All glass/resin insulators free of build-up and other contaminants. Carbon tracking will appear as a darkened to black area in a path from the high voltage DC cell rod to ground. If this condition is observed, and cleaning is not effective, the insulator must be replaced.
3. Under severe conditions, the back side of the triangular cell insulators (the side adjacent to the cell end plate) may become coated with conductive material. This may cause arcing from the shoulder nut (charged component) to the support rivets (grounded components). Clean this insulator surface thoroughly with a soft wire brush or with a pressure washer to remove contaminant.
4. The collector cell shall be dry before reinstallation.

The Mesh Pre/Afterfilters

The mesh filter is constructed of aluminum channel and aluminum mesh. In the prefilter use, the media will stop the larger particles from entering the electrostatic components. Used as the afterfilter, the media will stop any possible re-entrainment of process oils that could possibly drip off the collector cells. The secondary purpose of these components is to create a pressure loss which will help in distribution of air across the face of the SMOG-HOG.

A clean mesh filter will have these characteristics:

1. Media and aluminum channel free of all process oils and other contaminants, showing an appearance of clean aluminum.
2. The filter should be square with all media intact.
3. Locate notched holes on filter channel to the bottom of element for drainage.

Mist Impingement Baffles

Some SMOG-HOGS are equipped with optional mist impingement baffles located in the inlet plenum. These baffles provide a tortuous path for the contaminated air, forcing larger mist droplets to impinge upon these baffles and drop out of the airstream. These adjustable baffles should be cleaned periodically using the same procedure employed for other components. Frequency of cleaning will be determined by the quantity and type of contaminant in the airstream.

Access Door - Feed Thru Insulators (SG & APC series units. SH series units have feed thru insulators located at the back of the cabinet. They are removable for inspection and cleaning.)

The feed-thru insulators (2 ea. per door) located on the interior of the access door are constructed of molded ceramic material which is glazed through a baking procedure. The insulators are attached to the door to the H.V. wires connected to the DC power supply.

Inspection & Cleaning are essentially the same as with the other main electrical components. All surface areas should be kept free of all build-up. These insulators should be wiped clean and dried of all moisture before operating the DC supply. After cleaning, the surface should be white and checked for carbon tracking. If carbon tracking is observed or broken insulators are found, the feed-thru insulator should be replaced immediately.

WARNING High voltage is present throughout the unit when operating.
Always de-energize module before handling electrostatic components.

The SMOG-HOG Cabinet

From time to time it may become necessary to clean the internal surfaces of the SMOG-HOG cabinet. This normally discretionary maintenance unless contaminant has built up to the point where it agglomerates and becomes re-entrained in the airstream or when the tracks on which the components are mounted build up a layer of contaminant and a good ground contact between the component and the track cannot be established.

It is recommended that whenever time allows that all internal surfaces of the cabinet, the tracks and the doors be cleaned using any type of high pressure or steam sprayer.