



Best Practice for Computer Rooms

CLEANING MAINTENANCE FOR THE CRITICAL ENVIRONMENT

Overview

This document has been created to provide information and an explanation as to why it is of critical importance to treat the data center environment (housing critical computer equipment) and its cleaning maintenance practices separately and uniquely from the office environment (housing people and furniture).

The Goal

It is of paramount importance to keep in mind the goal when executing a data center cleaning project. Overall, the goal is to improve uptime, to harden the data center and make it more reliable. Allowing the data center to remain reliable from a cleaning maintenance standpoint is accomplished by meeting three main objectives:

- 1) To reduce the number of potential contaminants (the only difference between a potential contaminate and an active contaminate is..... time and location); this also includes removal of fire hazards and miscellaneous debris.
- 2) To ensure proper path to ground (High Pressure Laminate floor ought to dissipate static charges at 10^9 ohms). An insulating and unsightly imbedded layer of soil will reduce the floor's ability to dissipate static charges.
- 3) Most importantly, to meet the first two goals without causing any disruption to the facility.

Practices

Employing the services of a professional firm that specializes in cleaning computer facilities brings frequently unseen (yet experienced) value in many arenas. The following list details several matters that often go unnoticed to the casual observer, but become non-negotiable when executing a cleaning project.

- 1) **Airflow and Static pressure** - To access the subfloor, a predetermined quantity of tiles (based on the site, its heat densities and static pressure) will be pulled; this may vary in given locations throughout the center. Perforated floor tiles must be replaced to exactly the same location where found – or computer equipment can quickly overheat. A watchful eye must keep computer equipment within its proper temperature ranges:

If intake air is too hot [over 80°] could lead to exposure to electro static discharge (ESD) inside of servers as warm dry air passes over components. If too cold [under 65°] corrosion could result due to condensation forming inside of servers.

- 2) **A detailed approach to cleaning** - realizing that particulate can cause problems for multiple reasons (i.e. can carry moisture / be electrically conductive, abrasive or corrosive / cause thermal insulation), a very thorough and specific approach to cleaning results in a safer operating environment for electronics.
- 3) **Industry Knowledge** (understanding the potential risks of contaminants and how to safely remove them) - enables the vendor to address special concerns (i.e. zinc whisker remediation / ceiling plenum cleaning as needed)
- 4) **Uncovering lurking vulnerabilities** (leaks, rust, corrosion, compromised floor supports, subfloor wall breaches, negative pressure, poor cable management, compromised connections, etc.). Trained and watchful eyes often prevent costly problems before they develop.

Staffing Requirements

The UpTime Institute and **ComputerSite Engineering** have found that more than half of all site infrastructure failures are caused by human activity. That is to say that, even in the most redundant of facilities it is one careless or thoughtless maneuver that can take a center to its knees.

The staffing and training requirements for a professional data center cleaning vendor must be stringent. Each team member must be a tenured employee and proficient at executing his / her tasks without compromise, considering the intricacies of the data center environment. Background checks must be performed on each staff member as a condition of employment. Training (preferably in the vendor's raised floor training facility) should include knowledge of power distribution, airflow management, do's and don'ts in a data center, as well as acceptable practice (how to safely do what is needed to be done).

Cleaning Equipment

All cleaning equipment must be selected for cleaning a critical space (i.e. properly grounded, etc.) as well as in good repair and clean before entering the facility.

Vacuum Equipment – proper filtration is paramount in order to capture particulate as small as 0.3 microns with high efficiency.

Floor Machines – must operate at very low RPM so as not to compromise electro-magnetic frequencies within the facility and cause computer failure.

Ladders – only ladders of a non-conductive material are allowed. Placement is not to be within 12 inches from computer or support equipment.

Cleaning Agents

Cleaning agents must be specially formulated for use in critical computer environments.

- 1) **No solvent based or out-gassing** products, potentially harmful to sensitive electronics
- 2) **Static dissipative formulations** providing a topical invisible layer of protection vs. static discharge
- 3) **Used in a controlled manner**, following data center best practices (as applicable)

Standards

ISO standard 14644 allows for 3,520,000 particulate at .5µm in an environment housing electronic equipment. ISO standard 14644 replaced the former standard FS209E (which had a similar range).

While this standard creates a benchmark for the quantity of particulate, it falls far short in that there is no means of qualifying the *type of particulate* (and the potential harm to the space). OSHA's standards could deem a data center's air quality acceptable for humans while it could at the same time be extremely hazardous to electronic equipment. Zinc Whiskers (tiny conductive filaments) is one example of this. **NIOSH 7300 and 0600** would suggest that the air quality is acceptable for humans (while it at the same time is wreaking havoc on power supplies in the data center space). It is not in the equipment's best interest to treat the data center space similar to an office environment.

Summary

The need for an impeccably safe operating environment has never been greater amongst high availability enterprise data centers. The control of environmental factors such as heat, static electricity and airborne particulate plays a key role in minimizing the risk of crippling downtime. When properly understood, the need for a well thought-out and properly executed cleaning maintenance program becomes apparent. An understanding of best practices within the computing environment, coupled with experienced staff, proper cleaning agents and equipment make a specialized vendor a must for critical cleaning of the data center.
