

Assessment, Cleaning and Restoration of HVAC Systems Standard 200X

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Foreword

Assessment, Cleaning, and Restoration of HVAC Systems (ACR 200X) is a performance based industry standard that has evolved from procedural based guidelines, standards of care, and research originating from the National Air Duct Cleaners Association (NADCA) along with associated organizations. This Standard establishes performance objectives required for assessing existing HVAC systems, evaluating the cleanliness of HVAC system components, and for maintaining and restoring systems to a specific cleanliness level while preventing exposure to workers and occupants and preventing Cross Contamination to the indoor environment.

It is important to note that, prior to this current Standard; the prior standard was developed as a procedural standard. While well intended, it is the opinion of the NADCA Standards Committee that the complexities of various mechanical systems, indoor environments, state-of-the-art cleaning methodologies and other factors demonstrate that procedural methods may not apply to the specific project and, as a result, fail to achieve a cost effective and reasonable approach to Maintenance and Restoration services. Furthermore, experience has shown that procedural standards are often subject to many interpretations, become unwieldy, are often misunderstood and fail to deliver the desired results due to their inherent complexities.

To supplement this Standard, a guideline has been developed which provides “how to” information using industry accepted practices to achieve the results as set forth within this Standard. This guideline further details applicable safety requirements, documentation methods, quality control/quality assurance processes, Maintenance and Restoration processes, and several types of Containment strategies that may be employed to control the migration of Contaminants, including Particulate, unwanted gasses, and vapors.

DISCLAIMER

Users of this document shall consult applicable federal, state and local laws and regulations. NADCA does not, by the publication of this document, intend to urge action that is not in compliance with applicable laws and this document shall never be construed as doing so. The most stringent requirements of this Standard and applicable Authorities Having Jurisdiction shall apply to the assessment, cleaning, or restoration of HVAC systems. NADCA does not warrant, assure, certify or guarantee that adherence to this Standard will prevent environmental exposure to humans or animals or result in extended life for components that were maintained or restored or result in any energy savings.

PURPOSE: This Standard defines the performance goals required to accomplish proper Maintenance and Restoration services performed on Heating, Ventilation and Air Conditioning (HVAC) Systems.

SCOPE: This Standard applies to all HVAC Maintenance and Restoration services as defined herein. It does not include the mechanical repair of electrical or pneumatic components of any kind, repair of high pressure vessels, gas/oil controls or preventative maintenance tasks as prescribed by, or recommended by, the original equipment manufacturer (OEM).

LIMITATIONS: This Standard does not specifically address any and all hazards or risks that could be encountered when performing work in accordance with this Standard. Instead, the user is directed to rely on the Authority Having Jurisdiction in such cases. Those performing work to this Standard shall be properly qualified and possess relevant training, knowledge and experience before performing work of any type on HVAC Systems.

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Standard Requirements

1. Project-specific Safety: A written safety plan shall be provided for each work project. All personnel are required to adhere to the safety plan. The safety plan shall strictly adhere to any and all safety regulations as required by the Authorities Having Jurisdiction.

2. Pre-project Assessment: A pre-project assessment shall be performed. The pre-project assessment shall properly address the specific needs of the building environment, type of occupancy, which HVAC components are to be maintained and/or restored and other factors, as required, to accomplish work tasks. The pre-project assessment shall include a risk assessment, in accordance with the Authorities Having Jurisdiction, to provide for the protection of human health and the welfare of all personnel who could be affected by the Inspection, Maintenance and Restoration process.

3. Level of Cleanliness: All Maintenance and Restoration procedures shall properly remove non-adhered surface debris to, at minimum, a Visibly Clean condition. This Standard shall not prohibit a cleanliness level exceeding Visibly Clean, provided that 1) the contract documents clearly describe the specified level of cleanliness, and 2) all parties agree that the specified level can be achieved and verified and, 3) the verification method is clearly described including the pass/fail criteria and, 4) the testing method is based on and conducted in accordance with Industry Accepted sampling procedures.

4. Contractual Documents, Warranty, Guarantee, and Disclaimers: All contractual documents, including the written work plan, shall clearly state any warranty, guarantee, or disclaimers associated with the Inspection, Maintenance and Restoration process. This includes compliance with all applicable regulatory requirements associated with the contractual documents and project. Contractual documents (1) shall clearly identify which components are to be maintained or restored, as well as those components not included in the process; (2) shall clearly state the level of Containment required to prevent Cross Contamination; (3) shall clearly state the Maintenance and Restoration methods to be used; and (4) shall clearly state the level of cleanliness required on the project which, at all times, should meet or exceed the minimum level of visibly clean.

5. Written Work Plan: A written work plan shall be provided as part of the Inspection, Maintenance and Restoration project. This plan shall effectively communicate responsibilities and specific tasks associated with the Inspection, Maintenance and Restoration project.

6. Pre-project Cleaning, Maintenance and Calibration of Tools and Equipment: All devices used in the cleaning and restoration project shall be maintained to a job-ready status prior to delivering the tools, instruments and equipment onto the worksite and shall be properly maintained while on-site.

7. Containment Practices: Containment practices, including appropriate pressure relationships, shall be maintained at all times, in accordance with Authorities Having Jurisdiction, prior to and during the maintenance and restoration project, to prevent Cross Contamination. Any and all Collection Devices, negative air systems, and vacuum systems that exhaust indoors shall be provided with HEPA filtration. Proper negative pressure and air flow (i.e., clean to less clean) shall be maintained at all times in the component(s) being cleaned to prevent Particulate emissions and Cross Contamination.

8. Maintenance and Restoration Procedures: All Maintenance and Restoration procedures shall be conducted in a manner that is in accordance with Industry Accepted practices and all Authorities Having Jurisdiction. The Maintenance and Restoration procedures shall achieve the minimum level of Visibly Clean or the specified level of cleanliness as defined in the contractual documents for all components within the project scope of work. Air distribution components shall be properly marked, cleaned and returned to their original setting.

9. Maintenance and Restoration Verification: All completed Maintenance and Restoration work shall be inspected to verify compliance with this Standard and contractual documents.

10. Mandatory Documentation: Documentation showing compliance with each requirement above (one through nine) shall be provided for all work performed. Documentation shall include organized and legible written and visual records.

Definitions

Adhered Substance: A material, such as mastic, that is not removable by direct contact vacuuming.

Adhered Material or Particulate: Any material not intended or designed to be present in an HVAC system, and which shall be dislodged using methods not ordinarily performed as part of this standard.

Air distribution components: Air registers, grilles, opposed balancing dampers, duct extractors, adjustable splitter dampers, louvers, and similar devices that direct or control the flow of air.

Appropriate Negative Pressure: Pressure required to prevent cross contamination and to prevent undesired changes to the indoor environment (i.e. adverse effects on gas flue, isolations rooms, etc).

Assessment: A comprehensive review and evaluation of the HVAC system, or representative portions thereof, to make a preliminary determination of which general forms of contamination are present and to document the overall system cleanliness level.

Authority Having Jurisdiction: A recognized governmental body that sets forth rules and regulations that are considered mandatory for compliance.

Biological Contaminants: Living organisms or their byproducts or remains, including but not limited to bacteria, fungi (mold and mildew), spores, viruses, animal dander, mites, insects, and pollen.

Calibration: A set of operations which determines the accuracy of the reading of a measuring device to a stated uncertainty, by comparison to a known standard.

Cleaning: The removal of visible particulate and biologicals to a level defined within this document.

Containment: An engineered space within a work area designed to control the migration of contaminants to adjacent areas during assessment or cleaning procedures.

Collection Devices: Equipment specifically designed to capture and contain debris removed from cleaning or maintenance procedures.

Contaminant: Any substance not intended to be present that is located within the HVAC system.

Cross Contamination: A condition where the environment, item, component, or system becomes adversely affected as a result of certain work activities or failure to contain debris in a contaminated area.

HEPA: High Efficiency Particulate Air. To be called a true HEPA filter, or certified HEPA filter the filter shall have a documented filtration efficiency of 99.97% at 0.3 micron-sized particles.

HVAC System: The heating, ventilation, and air conditioning (HVAC) system includes any interior surface of the facility's air distribution system for conditioned spaces and/or occupied zones. This includes the entire heating, air-conditioning, and ventilation system from the points where the air enters the system to the points where the air is discharged from the system. The return air grilles, return air ducts to the air-handling unit (AHU), the interior surfaces of the AHU, mixing box, coil compartment, condensate drain pans, humidifiers and dehumidifiers, supply air ducts, fans, fan housing, fan blades, air wash systems, spray eliminators, turning vanes, filters, filter housings, reheat coils, and supply diffusers are all considered part of the HVAC system. The HVAC system may also include other components such as dedicated exhaust and ventilation components and make-up air systems.

Industry Accepted: Work practices, procedures or tasks that are, or have been, peer reviewed, or published in a consensus document or standard.

Inspection: A gathering of information for use in making determinations and assessments.

Job-ready Status: Applies to all tools, instruments, equipment used for the project. Requires that these items are safe, calibrated, in good working order, and has been cleaned and inspected prior to delivery onto jobsite.

Maintenance: Cleaning and removal of adhered particulate and/or debris. Conducting on-going tasks related to the cleanliness of the HVAC system, excluding routine mechanical maintenance tasks.

Negative Air System: A HEPA-filtered air filtration device designed primarily for collecting particulate and limiting particulate migration while controlling workspace pressure differentials. These machines may or may not be ducted outside the building envelope.

Non-adhered Substance: Any material not intended or designed to be present in an HVAC system, and which can be removed by contact vacuuming.

Particulate: Any non-adhered substance present in the HVAC system that can be removed by contact vacuuming.

Properly: In strict accordance with industry accepted practices.

Requirement: Mandatory practice for compliance with this standard.

Restoration: To bring back to, or put back into, a useable and functioning condition. The level of restoration may be limited due to existing field conditions and other factors.

Shall: When the term *shall* is used in this document, it means that the practice or procedure is mandatory.

Specified: As written in bid documents, or contractual documents.

Standard of Care: Practices common to reasonably prudent members of the trade who are recognized in the industry as qualified and competent.

Visual Inspection: Visual examination with the naked eye of the cleanliness of the HVAC system.

Verified: Confirmed or demonstrated by relying upon an industry accepted protocol or clearly described written procedure.

Visibly Clean: A condition in which the interior surfaces of the HVAC system are free of non-adhered substances and debris and conditions have been verified as follows: A visual inspection, (naked eye with no magnification) of components is considered visibly clean when it is free from non-adhered substances and debris. In the event the visibly clean level is challenged then a surface comparison test shall be conducted.