SECTION 15900

AIR DUCT CLEANING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. At the time of substantial completion, the entire air distribution system shall be turned over to the owner clear of construction dust and debris. If the interior surfaces of any ducted air moving equipment or the interior surfaces of any portion of the ductwork distribution system are found, as determined by the Architect, to contain significant construction dust and debris, the entire ductwork distribution system shall be cleaned in accordance with this specification section. If proper precautions are taken to prevent construction dust and debris from entering the ductwork during construction and if the Architect finds all ductwork to be free from such dust and debris, air duct cleaning shall not be required.

B. Air duct cleaning to include site preparation, source removal of dirt and debris, chemical surface treatment, duct openings, sealing and repair of duct insulation.

1.02 QUALITY ASSURANCE

A. The publications listed below forma part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

NADCA Standard 1992-01, Mechanical Cleaning of Non-Porous Air Conveyance System Components.

SMACNA Standards, HVAC Duct Construction Standards - Metal and Flexible (HVACDCS).

1.03 AIR DUCT CLEANING CONTRACTOR

A. Obtain the services of a qualified HVAC system cleaning subcontractor to perform the air system cleaning as specified herein. Prior to commencing work under this section of the specifications, the testing organization shall have been approved by the Engineer. The criteria for determining qualifications shall be recent experience with similar projects done in accordance with National Air Duct Cleaners Association (NADCA) Standard 1992-01.

1.04 SUBMITTALS

A. Submit experience list of similar projects.

B. Submit cleaning methodologies and material safety data sheets (MSDS) for chemicals to be used.

PART 2 - PRODUCTS

2.01 APPROVED DUCT CLEANING AGENCIES

A. Air Duct Klean, a division of Kitchen Klean, Inc. - Tel # 800-736-4484

B. Maine Environmental Cleaning, a division of Mechanical Services, Inc. - Tel # 800-675-0229

C. Cochrane Ventilation, Inc. - Tel # 800-974-9055

D. Haley's Metal Shop, Inc. - Tel # 207-284-8571

E. Steamatic - Tel # 207-657-3088

2.02 PROCEDURES FOR AIR DUCT CLEANING

A. Perform work in accordance with NADCA Standard 1992-01.

B. Supply materials for cleaning, repairing and inspection work including HEPA filtered collection systems, rotary brushes, air lances, mechanical agitators, fiber optic borescopes, vacuums, or other equipment and materials necessary to perform work specified. Furnish materials and equipment that are of a reputable manufacturer. Submit Material Safety Data Sheets for chemicals utilized in this project prior to product usage.

C. Access points shall be constructed of metal or plastic. Points shall be installed in a hole that is a minimum of 1 inch in diameter. Access points shall be reusable by maintenance staff. If external insulation is removed during the installation process, repair the open edges with a similar color repair tape (as best as possible).

D. Access doors shall consist of 3 layers of precision stamped 0.030-inch (23 gauge) (0.78 mm) electro-galvanized zinc-plated steel. The inside door shall consist of two layers of metal which are spot-welded together at the rim, encapsulating high density fiberglass insulation - UL classified FHC 25/50. The inside surface shall be smooth to reduce friction. The gasket which seals the door from the inside to the duct shall consist of a closed cell neoprane gasket which is UL 94HF 1 listed with a service temperature of (ASTM D-746) 70° to 220°F (21° to 104°C). The gasket shall be permanently bonded to the inside of the door to eliminate leakage. Conical springs shall be installed over the bolts, between the inner and outer door, to facilitate opening. Access shall be accomplished by use of high impact black phenolic molded knobs that have threaded brass inserts to eliminate thread stripping. Knobs shall be easy to turn by hand without wrenches. Door shall be tested to 20 in.WG (4.9 kPa) with no leakage noted. The installed access door will be a permanent reusable access system that can be utilized for further inspections and/or repair.

E. Clean outdoor air plenums thoroughly. Vacuum or scrape inlet louvers, bird screens, dampers, turning vanes, moisture deflectors and other irregular surfaces, if necessary.

F. Vacuum the interior surfaces of the mixing chamber, removing gross debris. Sanitize the plenum, drains, and dampers with an EPA registered sanitizing agent.

G. Remove filters from the rack and prepare the area for cleaning. If filters are to be reused, clean and store in a dry area. Scrape debris from the filter rack area. Vacuum clean and/or pressure wash the filter rack system (ensure proper drainage is available before cleaning). Sanitize the filter rack system.

H. Remove standing water from the condensate pans or base of the plenum. Clear the drains associated with each pan, ensuring proper operation before cleaning. If fins are bent prior to cleaning, straighten fins utilizing a coil combing system after the cleaning process. High-pressure-water clean the coil section. First apply a biodegradable cleaning solution to penetrate into the coil section (follow manufacturer's guidelines). Repeat process on the other side of the coil section. Rinse each side. Continue process until clear water can penetrate coil section on entire coil face. After cleaning, sanitize coil section with an approved biocide-utilizing atomizing system. Report existing damage to the coil section or improper drainage in writing to the Architect.

I. Vacuum clean the fan housing and motors to remove debris. Hand scrape fan impellers and remove loose debris from the internal surfaces of the fan housing. Take precautions not to damage the impellers, alter blade shape or weight, or affect impeller balance.

J. Vacuum the internal surfaces of the plenums associated with the air handler. Remove gross debris and other debris or excess equipment that may be present. In severe cases, the internal plenum surface may be high-pressure-water cleaned to remove grease, dirt, and debris. After interior surfaces and equipment are cleaned, sanitize the unit with an approved sanitizer utilizing an atomizing system.

PART 3 - EXECUTION

3.01 DUCTWORK CLEANING PROCESS

A. Equipment used shall be portable and sized to enter these areas. Coordinate electrical requirements through the Owner's electrical or maintenance department, as appropriate. Modifications to accommodate electrical requirements will be at the Contractor's expense.

B. Address each main duct section by first securing debris collection equipment to diffuser branch ducts or to an isolated section of main trunk ductwork.

C. Collectors shall be fan powered, high velocity dust and particle collection systems which will be utilized in areas where debris is being removed from the system. Equip collection systems with HEPA filtration (99.97% collection efficiency for 0.3 micron size). The collection systems shall be self-contained, with appropriate components to adequately prevent dirt and debris loosened from upstream duct mains and branches during cleaning operations from entering the diffuser plenums by capturing this debris within the collection device. The components of the collector that connect the base collection unit to the duct or diffuser plenum shall be air-tight and reusable from area to area.

D. Agitate the loose debris on the interior surfaces to introduce the debris into the air flow produced and controlled by the collection systems. Collection systems shall be able to produce a minimum of 0.42 in.WG (104 Pa) in the targeted section of duct to be cleaned. Debris shall travel through the ductwork to the point of collection.

E. Ductwork shall be cleaned by inserting air powered brush systems, air powered extended whip sections, electric rotary brush systems, skipper balls, or air sweeps through the installed access. Utilize equipment that will best contact surfaces of the duct regardless of shape or size.

F. Where duct is large enough and able to support the weight of a worker, hand tools and vacuums may be used. Install collection equipment in the section of duct to be cleaned by hand as a precautionary measure to catch any residual debris.

G. Whenever the grilles, registers, or diffusers are removable, they shall be removed, washed, rinsed, dried, and then replaced. If for any reason they are not removable, they shall be vacuumed in place. Contractor is not responsible for existing improperly installed grilles, registers, and diffusers; for example, grilles, registers, or diffusers screwed directly into porous ceiling tiles. Whenever possible, reinstall grilles, registers, and diffusers that were originally improperly installed to the best of the Contractor's ability in a timely manner. Report inability to reinstall grilles, registers, and diffusers in a proper manner in writing to the Architect.

H. Perform sanitizing of the air distribution system as required using an air sprayer or fogging device to cover the interior surfaces of the ductwork. Make certain that surfaces are kept wet for at least 10 minutes. Sanitizing fluid shall be registered with the Environmental Protection Agency. Sanitizing shall be accomplished through installed access doors and access points.

I. Perform duct cleaning and sanitizing only at a time when the targeted air distribution systems can be shut down and the facility cleared of occupants. Schedule the duct cleaning for an appropriate time. Note: "Occupants" does not include maintenance or supervisory personnel who take proper precautions.

J. Replace, at no additional cost to the Owner, any ceiling tiles or gridwork that is/are damaged during the ductwork cleaning process.

K. De-activate and re-activate duct smoke detectors during the duct cleaning process. Coordinate with and receive approval from the local Fire Department and/or local Code Enforcement Officials prior to the de-activation and re-activation of smoke detectors.

3.02 PROJECT ASSESSMENT

A. Provide inspection access to the Architect any time during or immediately after the cleaning of the air delivery system or systems. Inspection shall be visual in nature by means of installed access doors and points with the benefit of a fiber optic borescope where necessary. Meet the guidelines set down in the NADCA Standard 1992-01 for Mechanical Cleaning of Non-Porous Air Conveyance System components.

B. Perform the NADCA vacuum test and submit report for approval.

C. Show exact locations of access doors installed as part of the cleaning process on the Record Drawings.

END OF SECTION