



## NEUDORFER ENGINEERS, INC.

Consulting Engineers

5516 1st Avenue S. - Seattle, Washington 98108

(206) 621-1810 Fax (206) 343-9820



Last Updated 4/6/2006

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## Standard Services available from Neudorfer Engineers, Inc.

### Testing, Adjusting and Balancing:

We provide NEBB-certified independent testing, adjusting, and balancing services for all types of building HVAC systems. Our employees have the expertise and technical knowledge to provide the TAB services for all of today's and yesteryears complex HVAC systems.

We perform TAB services on over 700 projects a year and after being in business for 36 years, we have literally balanced every type of system and the hybrids of those systems.

Our Services include air & water balancing of new and existing systems to a most efficient operational point while still meeting the design intent requirements.

### Cleanroom Testing and Certification:

We provide cleanroom testing and certification of all classes of cleanrooms to the ISO 14644 Standards or to the FED 209E Standard, we will use your facilities Standard Operating Procedure (SOP) or we can suggest an appropriate testing methodology and procedure for your facility.

Our field engineers and technicians are trained in all aspects of test, certification, and repair of all types of air filtration devices, including Laminar Flow Benches, Biological Safety Cabinets, chemical hoods, fume hoods and other types of air filtration devices. Our depth of experience ensures an economical solution to all your contamination control requirements.

We perform Airborne Particle Counts, Air Velocity, Air Volume, HEPA Filter Leak testing, Pressurization Tests, Recovery tests, Parallelism Tests, Integrity Tests, Lighting Level Tests, Noise Level Test, Temperature and Humidity Tests, Vibration Tests, in our customers' Cleanrooms.

### Lab Ventilation Management:

Our customers have a high quality, single-source laboratory ventilation service when they contract with Neudorfer Engineers to perform the Air Balancing, Fume Hood Certification, and Validation of their lab.

### Commissioning:

As a NEBB-certified systems commissioning agent, we are certified to commission a building's HVAC, controls, and plumbing systems in order to ensure that those systems are operating properly. Neudorfer Engineers has extensive experience in Building Commissioning services and providing Test Engineer services to the construction industry. We are actively involved in providing these services to the Health Care, Aeronautical, Pharmaceutical, Research Laboratories, Educational, Low Rise and High Rise Offices, Waste Water Treatment, Industrial, Marine and Military Facilities. We provide a customized commissioning plan for each of our customer's unique requirements.



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### **Fire & Life Safety Testing:**

We are certified to perform life Safety Testing that includes elevator pressurization and stairwell pressurization testing. We perform Atrium Smoke Management testing per the IBC, UBC and the SBC.

### **Duct Air Leakage Testing (DALT):**

Duct Air Leakage Testing is an extremely important service that as a company we believe should be done on every project no matter how large or small the ductwork system. Ductwork that leaks is the major source of wasted energy in a building and contributes to indoor air quality, room pressurization issues, TAB deficiency issues, and noise issues. We have seen many duct work installations that leak between 30% - 40% and most all duct work leaks above 10% when fire / smoke dampers, access doors, instrumentation holes, volume dampers, etc. are installed. We have various machines that will test systems in either a positive or negative pressure as high as 100 PSI ( 230.7 feet of W.C., 2,768 inches of W.C.) or as low as 5.2 CFM. We can also provide alternate testing methods which meet ANSI-N510 and ERDA requirements which can test to zero leakage (that's right truly zero leakage).

We perform leakage testing on approximately 80 building sites a year, which includes the Allowable Duct Leakage Calculations and certification of the system. Our extensive knowledge also allows us to help our customer with not only the testing but also the troubleshooting aspects of determining the best methodology of finding and repairing the leaks.

### **Building and Room Air Leakage Test:**

The building and room air leakage can be defined as “the uncontrolled movement of air into and out of a building which is not for the specific and planned purpose of exhausting stale air or bringing in fresh air”.

In fact, the impact of air leakage in which uncontrolled air leakage enters or leaves a building imposes a significant energy penalty on the building. In addition to the direct energy penalty imposed by air leakage, there are other associated problems that usually occur, these include:

The occupants discomfort due to drafts

Degradation of the building fabric due to interstitial condensation

Poor indoor air quality due to the ingress of fumes, dust, molds, etc.

The inability to achieve the required pressure conditions in controlled environments, difficulties in balancing air handling systems, noise transfer through the leakage paths.

We use three different methodologies in determining the path of the air leakage:

1. Hand held smoke generators
2. Large-scale smoke generators
3. Infrared thermography.

Depending upon the size of the room or building, we can both pressurize and / or de-pressurize the building.

We recommend, that the buildings requiring an air leakage test an on-going inspection services be performed while the building is being built. These inspections should begin as soon as the foundations are in and the framing has begun. This ensures that the means and methods of the construction are “in line” with what it takes to deliver a building to the required acceptance criteria.



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### **Under floor Air Leak Tests:**

The impact of air leakage in which uncontrolled air leakage leaves an under floor supply air plenum (displacement air system) imposes a significant impact on the building. There are several problems which usually occur, these include: severe occupant discomfort, the inability to achieve the required pressure conditions in controlled environments, difficulties in balancing the air handling and duct work distribution systems and noise being transferred through the leakage paths. ASHRAE currently recommends that a under floor displacement air system have a leakage rate no greater than between 0.15 and 0.25 CFM per square foot.

### **Indoor Air Quality Survey:**

We specialize in performing Phase 1 Environmental Site Assessments (ESA's) and Building Diagnostic Evaluations. Our Phase 1 ESA's include visual assessments, review of water damage history, interviewing the site operators, non-destructive moisture checks of interior finishes and the critical aspects of measuring the HVAC system. Our testing usually also includes measuring the temperature, humidity, air exchange rates, air distribution patterns, inspecting the buildings for microbial reservoirs and amplifiers, odor sources, chemical contamination and combustion products. These are all critical for determining the source of the contamination and ultimately mapping out a plan for the elimination of the contamination causing the poor IAQ.

The main source of poor indoor air quality is the HVAC system, which includes improper settings of the building control systems, the improperly balanced system(s), and poor or improper building maintenance. All of these contribute to the causes of poor IAQ.

### **ANSI N510 Testing:**

Neudorfer Engineers is knowledgeable in ERDA, ANSI-N510 and ANSI-N509 requirements. NEI offers a complete in-place leak testing and airflow adjustment services for Nuclear Air Treatment Systems. These tests include:

- ~~///~~ Visual inspection,
- ~~///~~ Duct & Housing Leak and Structural Capability Tests
- ~~///~~ Mounting Frame Pressure Leak Testing
- ~~///~~ Airflow Capacity and Distribution Tests
- ~~///~~ Air Aerosol Mixing Uniformity Test
- ~~///~~ HEPA Filter Bank in Place Test
- ~~///~~ Absorber Bank In-Place Test
- ~~///~~ Duct Damper Bypass Test, System Bypass Test
- ~~///~~ Air Heater Performance Test



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### **Validation & Calibration:**

NEI offers a complete plan and technical specification review service and a complete training service. In addition, NEI can provide the service of writing your companies Standard Operation Procedures (SOP's) and validation of the facility.

Neudorfer Engineers validation services include the generating of Standard Operation Procedures (SOP's) and protocol development, Installation Qualification (IQ), Operational Qualification (OQ), and Performance Qualification (PQ).

### **We can also perform on-site calibration services as follows:**

- ~~///~~ Specialized Testing of HVAC Systems
- ~~///~~ Cooling Tower Thermal Performance
- ~~///~~ Energy Audits
- ~~///~~ HVAC Troubleshooting
- ~~///~~ Pre-design Services
- ~~///~~ Technical Specification Writing and Editing
- ~~///~~ Review of Conceptual Design
- ~~///~~ Review of Detail Design Documents
- ~~///~~ Independent Value Engineering Phase Representation
- ~~///~~ Construction Document Review
- ~~///~~ Approved Submittal Review

### **Pre-design Services:**

- ~~///~~ Technical Specification Writing and Editing
- ~~///~~ Review of Conceptual Design
- ~~///~~ Review of Detail Design Documents
- ~~///~~ Independent Value Engineering Phase Representation
- ~~///~~ Construction Document Review
- ~~///~~ Approved Submittal Review