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**PART 1      GENERAL**

**1.1      SUMMARY**

.1      Section Includes:

- .1      Materials and methods for pressure testing ducts over 5 m in length, forming part of a supply, return or exhaust ductwork system directly or indirectly connected to air handling equipment.

**1.2      RELATED SECTIONS:**

- .1      Section 01 33 00 - Submittal Procedures.
- .2      Section 01 45 00 - Quality Control.
- .3      Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4      Section 01 78 00 - Closeout Submittals.

**1.3      REFERENCES**

- .1      Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1      Material Safety Data Sheets (MSDS).
- .2      Sheet Metal and Air Conditioning Contractor's National Association (SMACNA)
  - .1      SMACNA HVAC Air Duct Leakage Test Manual.

**1.4      SUBMITTALS**

- .1      Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2      Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties. Include pressure test information and results as follows:
  - .1      Submit proposed report form and test report format to Department Representative for approval at least three months before proposed date of first series of tests. Do not start tests until approval received in writing from Department Representative.
  - .2      Prepare report of results and submit to Department Representative within 24 hours of completion of tests. Include:
    - .1      Schematic of entire system.
    - .2      Schematic of section under test showing test site.
    - .3      Required and achieved static pressures.
    - .4      Orifice differential pressure at test sites.
    - .5      Permissible and actual leakage flow rate (L/s) for test sites.

- .6 Witnessed certification of results.
- .3 Include test reports in final TAB report.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5 Instructions: submit manufacturer's installation instructions.
- .6 Manufacturer's field reports specified.

## 1.5 QUALITY ASSURANCE

- .1 Pre-Installation Meetings:
  - .1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations.
    - .1 Verify project requirements.
    - .2 Review installation and substrate conditions.
    - .3 Co-ordination with other building subtrades.
    - .4 Review manufacturer's installation instructions and warranty requirements.

## PART 2 PRODUCTS

### 2.1 TEST INSTRUMENTS

- .1 Test apparatus to include:
  - .1 Fan capable of producing required static pressure.
  - .2 Duct section with calibrated orifice plate mounted and accurately located pressure taps.
  - .3 Flow measuring instrument compatible with the orifice plate.
  - .4 Calibration curves for orifice plates used.
  - .5 Flexible duct for connecting to ductwork under test.
  - .6 Smoke bombs for visual inspections.
- .2 Test apparatus: accurate to within +/- 3 % of flow rate and pressure.
- .3 Submit details of test instruments to be used to Department Representative at least three months before anticipated start date.
- .4 Test instruments: calibrated and certificate of calibration deposited with Owner's Representative no more than 28 days before start of tests.
- .5 Re-calibrated every six months thereafter.

### 2.2 EQUIPMENT LEAKAGE TOLERANCES

- .1 Equipment and system components such as VAV boxes, duct heating leakage: 2%.

## **PART 3      EXECUTION**

### **3.1      MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

### **3.2      TEST PROCEDURES**

- .1 Maximum lengths of ducts to be tested consistent with capacity of test equipment.
- .2 Section of duct to be tested to include:
  - .1 Fittings, branch ducts, tap-ins.
- .3 Repeat tests until specified pressures are attained. Bear costs for repairs and repetition to tests.
- .4 Base partial system leakage calculations on SMACNA HVAC Air Duct Leakage Test Manual.
- .5 Seal leaks that can be heard or felt, regardless of their contribution to total leakage.

### **3.3      SITE TOLERANCES**

- .1 System leakage tolerances specified are stated as percentage of total flow rate handled by system. Pro-rate specified system leakage tolerances. Leakage for sections of duct systems: not to exceed total allowable leakage.
- .2 Leakage tests on following systems not to exceed specified leakage rates.
  - .1 Small duct systems up to 250 Pa: leakage 2 %.
  - .2 VAV box and duct on downstream side of VAV box: leakage 2 %.
  - .3 Large low pressure duct systems up to 500 Pa: leakage 2 %.
  - .4 HP duct systems up to 1000 Pa pressure classification, including upstream side of VAV boxes: leakage 1%.
- .3 Evaluation of test results to use surface area of duct and pressure in duct as basic parameters.

### **3.4      TESTING**

- .1 Test ducts before installation of insulation or other forms of concealment.
- .2 Test after seals have cured.
- .3 Test when ambient temperature will not affect effectiveness of seals, and gaskets.
- .4 Flexible connections to VAV boxes.

### **3.5            FIELD QUALITY CONTROL**

- .1      Manufacturer's Field Services.
  - .1      Have manufacturer of products, supplied under this Section, review Work involved in the handling, installation/application, protection and cleaning, of its products and submit written reports, in acceptable format, to verify compliance of Work with Contract.
  - .2      Manufacturer's Field Services: provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
  - .3      Schedule site visits, to review Work, at stages listed:
    - .1      After delivery and storage of products, and when preparatory Work, or other Work, on which the Work of this Section depends, is complete but before installation begins.
    - .2      Twice during progress of Work at 25% and 60% complete.
    - .3      Upon completion of the Work, after cleaning is carried out.
  - .4      Obtain reports, within 3 days of review, and submit, immediately, to Department Representative.
- .2      Performance Verification:
  - .1      Department Representative to witness tests and to verify reported results.
  - .2      To be certified by same TAB agency approved by Department Representative to undertake TAB on this project.

### **3.6            CLEANING**

- .1      Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**