

CANADIAN ASSOCIATED AIR BALANCE COUNCIL



For optimum HVAC System Performance, Specify CAABC

CODE OF ETHICS/ CANADIAN ASSOCIATED AIR BALANCE COUNCIL

The Code of Ethics signifies voluntary assumption by members of the obligation of self-discipline above and beyond the requirements of the law. Its purpose is to let the public know that members intend to maintain a high level of ethics and professional performance, and to declare that in return for the faith that the public places in them, the members accept the obligation to conduct their practice in a way that will be beneficial to the public. It gives clients a basis for confidence that members will service them in accordance with professional standards of competence, objectivity, and integrity.

The Code expresses in general terms the standards of professional conduct expected of test and balance firms in their relationships with clients, colleagues, members of allied professions, and the public. The Code of Ethics is mandatory when the conduct of a member firm falls below the required standards as stated in the Code.

The Council enforces the Code of Ethics by receiving and investigating all complaints of violations and by taking disciplinary action against any member who is found to be guilty of Code violation.

The reliance of clients in the accuracy of test and balance reports imposes on the profession an obligation to maintain high standards of integrity and competence. To this end, members of the Council have agreed to support the issuance of a National Project Certification Performance Guaranty. To protect the Council of any undue liabilities in this regard, strict enforcement of the Code of Ethics is necessary. The Code has evolved out of the experience of members since the Council was formed in 1966. In recognition of their obligation to the public and profession, members have agreed to comply with the following articles:



1. We will at all times serve our clients with integrity, competence, and objectivity.
2. We will perform all works for clients in accordance with the latest standards published by AABC.
3. We will assign personnel to projects who are qualified by knowledge, experience and character, and who will carry out each engagement under the direction of a certified member of the Council.
4. We will only certify work on a project which was performed by an employee of our firm, or other Canadian Associated Air Balance Council agencies subcontracted to perform the work on our behalf.
5. We will only serve a client under terms or conditions that will not impair our objectivity, independence, or integrity.
6. We will advise client personnel of any problems encountered on project and make subsequent recommendations as required.
7. We will review the work of another member only if requested by the client and shall notify the member of the fact that we have been asked to conduct such a review.
8. We will be fair in our dealings with clients and charge reasonable fees commensurate with the nature of services performed.
9. We will obey the local, provincial and federal laws, rules and regulations affecting our industry, and will abide by the Code of Ethics, policies and Bylaws of the Council.

POLICY AND PROCEDURES

I. REQUIREMENTS FOR MEMBERSHIP (refer to CAABC Bylaws and Policies for more information)

- a. Have been in business as an independent test and balance firm for a period of not less than three years; or if it has not been in business for three years, demonstrate to the Council that it has sufficient expertise and experience to adequately and properly perform test and balance work as an agency.
- b. Qualify as an independent test and balance agency, which means it cannot have any affiliation with manufacturers of equipment or system components, installing contractors, engineering firms, architects, or any other person or company which could affect the ability of the member to render an independent test and balance report.
- c. Have an established place of business, properly equipped, staffed and capable of compiling and distributing completely reliable documentation.
- d. All equipment shall be calibrated in accordance with the manufacture's recommendations or annually, whichever is less.
- e. Meet all application requirements and pass all required tests and investigations.
- f. Agree to comply with all rules and regulations governing the Council.
- g. Carry the required coverage for its employees under the provincial workers' compensation laws.



II. CERTIFICATION STANDARDS

- a. Membership in the Canadian Associated Air Balance Council is open to test and balance agencies in Canada that meet the requirements for membership as contained herein and pay all applicable fees as may be determined by the Canadian Associated Air Balance Council.
- b. Certification shall be established in the name of the person who passes the test and balance examination and in the name of the company represented by the test and balance specialist. In the case of death, departure or prolonged absence of the certified test and balance specialist, the agency has a grace period of 6 months in which to obtain proper certification as prescribed herein. Any changes in management or ownership of the test and balance agency must receive approval of the Canadian Associated Air Balance Council.
- c. Certification is valid for a period of one (1) year, at which time a review shall be made of all certified agencies and a new annual certificate issued to those found in compliance with the rules and regulations of the Council.
- d. All certified agencies have a certified test and balance specialist responsible for work performed at all offices listed in the annual directory.
- e. Each certified test and balance agency shall be issued an annual test and balance certification with a registered TBS number. The annual certification is only valid for the year indicated on the certificate.
- f. The Canadian Associated Air Balance Council has sole responsibility to award, suspend, revoke or otherwise legislate certification.
- g. The test and balance specialist is authorized to verify that all work performed by employees of the member's agency was conducted in accordance with the AABC National Standards.
- h. The test and balance specialist is authorized to certify the work performed by employees of the member's agency, or other Canadian Associated Air Balance Council agencies subcontracted to perform the work on their behalf.

III. ADMISSION PROCEDURES

- a. The applicant shall file a completed application for membership to the Membership Chairman of the Canadian Associated Air Balance Council along with all prescribed application fees.
- b. The application shall include all requested information before being considered by the Canadian Associated Air Balance Council.
- c. With a successful review of the application, the Canadian Associated Air Balance Council President will appoint a member of the Council to conduct the investigation phase. This includes an on-site interview, including inspection of facilities, instrumentation and job-site procedures. The applicant shall be expected to pay for reasonable expenses incurred during the investigation process conducted by the Council.
- d. If the applicant is successful at this stage, he is invited to write the CAABC examination.
- e. If the applicant receives a passing score of 70% or better on the exam, the applicant will be forwarded a copy of the Code of Ethics. Upon signing and returning same, the applicant will be accepted into membership of the Canadian Associated Air Balance Council and certified by the Associated Air Balance Council.

IV. GUARANTY

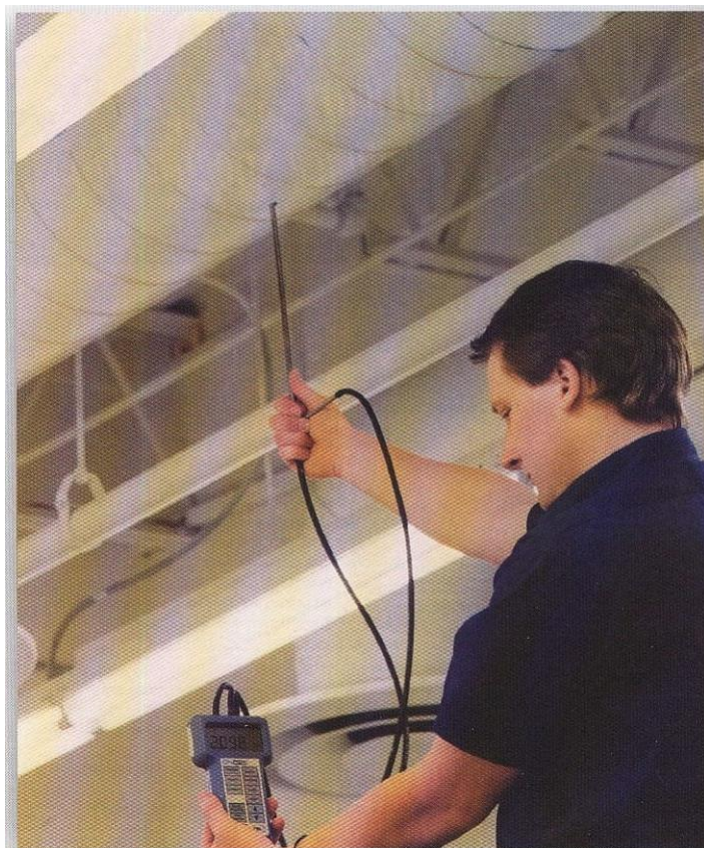
- a. Members of the Canadian Associated Air Balance Council are authorized by the Council to issue a Canadian Associated Air Balance Council National Performance Guaranty on all work performed. This assures the client that the project will be balanced in accordance with the AABC National Standards and to achieve optimum systems performance.
- b. Canadian members are not authorized to issue a performance guaranty for work performed in the United States. Same rule applies to U.S. members working in Canada.
- c. If for any reason a member is found in violation of the guaranty and is unable to provide adequate personnel to correct the matter, the project shall be supervised by another member at minimum cost. If unable to secure adequate funds from the party at fault, all members shall pay an equal pro-rata share to satisfy any outstanding financial obligations concerning the project.
- d. The Guaranty is an implied Warranty which is valid on all projects undertaken in countries where the guaranty is established.
- e. The guaranty is enforced by the following procedures outlined in the policy and procedural manual under "Complaint and Appeal Procedures" and "Disciplinary Action."

V. COMPLAINT AND APPEAL PROCEDURES

- a. A complaint lodged against a member of the Canadian Associated Air Balance Council must be filed in writing with the President of the Canadian Associated Air Balance Council before the Council can respond.
- b. Upon receipt of a complaint, the member against whom the complaint was lodge shall be promptly notified of its receipt by the Canadian Associated Air Balance Council and provided a copy of the complaint. The member shall have 15 days from the date of receipt of the complaint in which to respond with any comments in regard to the complaint.
- c. The Canadian President shall be responsible for coordinating any meetings with the parties concerned and establishing criteria essential to the settlement of the dispute. The Canadian President may, at his discretion, delegate this responsibility to another member.
- d. The Canadian President will specify a date and location at which the parties are to meet to discuss the complaint and give the client and the member against whom the complaint was lodged ample notice of the meeting to prepare and present any facts.
- e. The Canadian President is empowered to render a decision on whether the complaint is valid, and to make subsequent assignments of responsibility to correct the problem at hand. If any of the parties involved disagree, or take exception to the terms specified, the Canadian President shall defer the matter to the earliest opportunity for a General Membership Meeting.
- f. Any decision rendered by the Canadian President shall be in writing and sent to all concerned parties. The notice shall advise the parties that they have the opportunity to ask the Canadian President to review or reconsider the decision by sending written notice to the Canadian Associated Air Balance Council President along with a written summary of its basis for appeal.
- g. Upon receipt of appeal, the Canadian President shall advise the party if additional information is required, and/or if the member or client should appear in person before the next General Meeting to present additional information.
- h. Within a reasonable time, the Canadian President shall render his opinion, which shall be final and binding.

VI. DISCIPLINARY ACTION

- a. The Canadian President may at his discretion, in consultation with other members at the earliest possible meeting, determine a form of disciplinary action to be taken against a member for just cause. This would include any conduct or act which violate the rules and regulations of the Canadian Associated Air Balance Council or is deemed to have an adverse effect on the Council.
- b. Disciplinary action may be in the form of a warning, fine or assessment, probation, or expulsion from membership.
- c. The degree of discipline imposed by the Canadian President shall depend on the severity of the infraction and past record of the member and shall be in addition to any corrective measures issued by the Canadian Associated Air Balance Council members in consensus.
- d. If found to be at fault, the member shall be assessed the total sum of reasonable expenses incurred by members during the investigation of the complaint, in addition to any labour costs, at local rates, involved as a result of corrective measures taken on the project.
- e. If a member fails to comply with the directives issued by the Canadian President in regard to a complaint, the member is subjected to dismissal from the Council.
- f. If a complaint is lodged against a member who is found not to be at fault, the client shall be promptly notified, and given an explanation for the ruling. The Canadian Associated Air Balance Council is thereby liable for any expenses incurred as a result of the investigation of the complaint.
- g. Where expenses are incurred as a result of investigation procedures or corrective measures taken, and the member who is subject to the complaint resigns or is expelled from the Canadian Associated Air Balance Council, the member shall be held fully liable for all expenses until such time as all financial obligations are satisfied.



I, the undersigned of a certified Test and Balance firm, accept to follow the above Code of Ethics in the mutual interest of all concerned.

I recognize the Canadian Associated Air Balance Council as the sole authority to evaluate, judge and/or apply sanction in case of breaking the Canadian Associated Air Balance Council governing rules.

SIGNED AND DELIVERED

CERTIFIED MEMBER FIRM

.....
Name

.....
Title

.....
Signature

.....
Witness

CANADIAN ASSOCIATED AIR BALANCE COUNCIL PRESIDENT

.....
Name

.....
Title

.....
Signature

.....
Witness



3.0 GENERAL BALANCING PROCEDURES

1. The Test and Balance Agency shall cooperate with the Owner's Representative and all Trades to perform the work in such a manner as to meet the job schedule, providing that sufficient lead time for Test and Balance has been allowed.
2. The Test and Balance Agency shall leave all system components in proper working order, such as:
 - A. Replace belt guards
 - B. Close access doors
 - C. Close doors to electrical switch boxes
 - D. Restore thermostats to specified settings
3. All recorded data shall represent a true, actually measured, or observed condition.
4. Any abnormal conditions in the mechanical systems or conditions which prevent Total System Balance, as observed by the Test and Balance Agency, shall be reported as quickly as possible to the Design Engineer.
5. If, for design reason, a system cannot be properly balanced, it shall be reported by the Test and Balance Agency as soon as observed to the buyer of balancing services.
6. Should additional balancing devices be required, the Test and Balance Agency shall bring it to the attention of the buyer of balancing services.

4.0 WORK TO BE PERFORMED

1. Pre-construction check and construction review
2. Air systems balancing
3. Hydronic systems balancing

5.0 PRE-CONSTRUCTION PLAN CHECK AND CONSTRUCTION REVIEW

1. The work required shall be as hereinafter specified. Pre-construction plan checks and two on-site mechanical construction inspections shall be provided by the Test and Balance Agency with a written report.

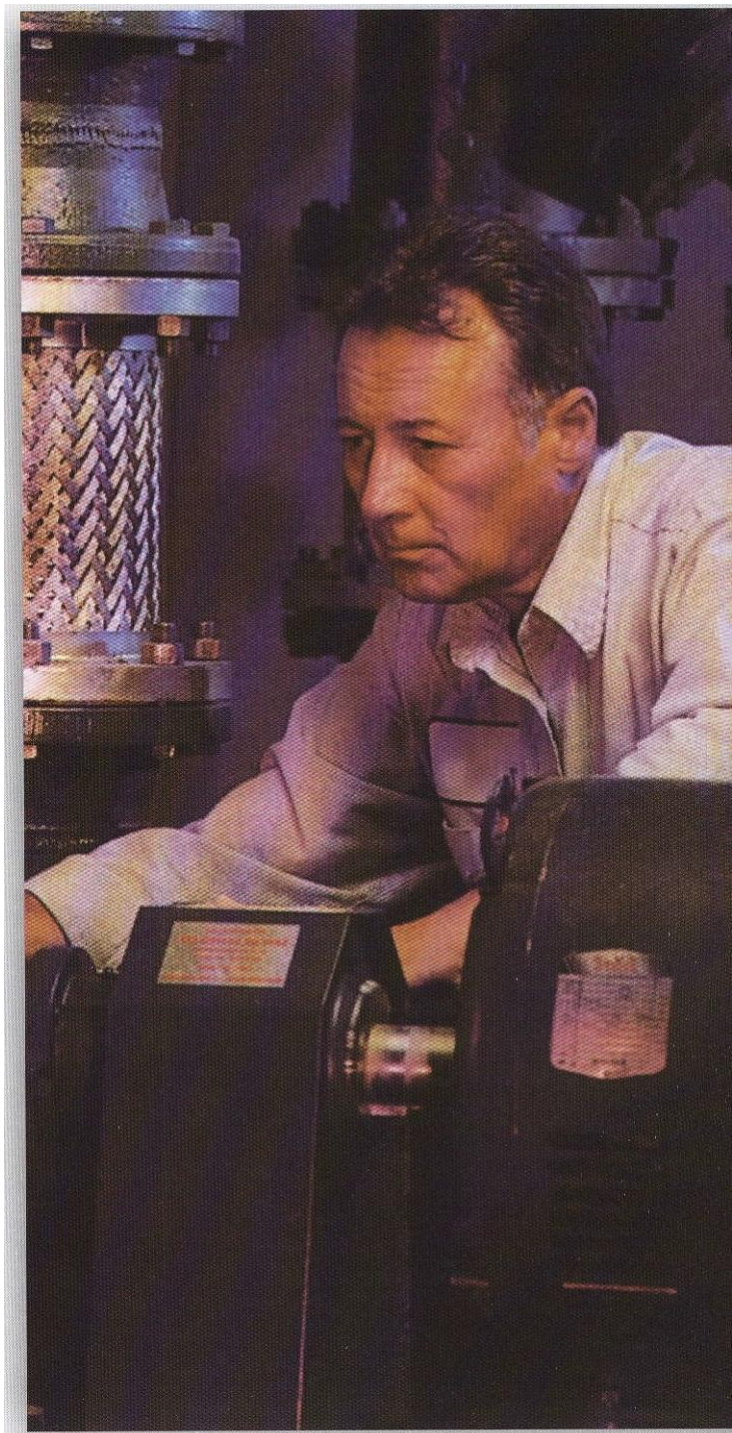
6.0 AIR SYSTEMS BALANCING

The Test and Balance Agency shall perform the following work:

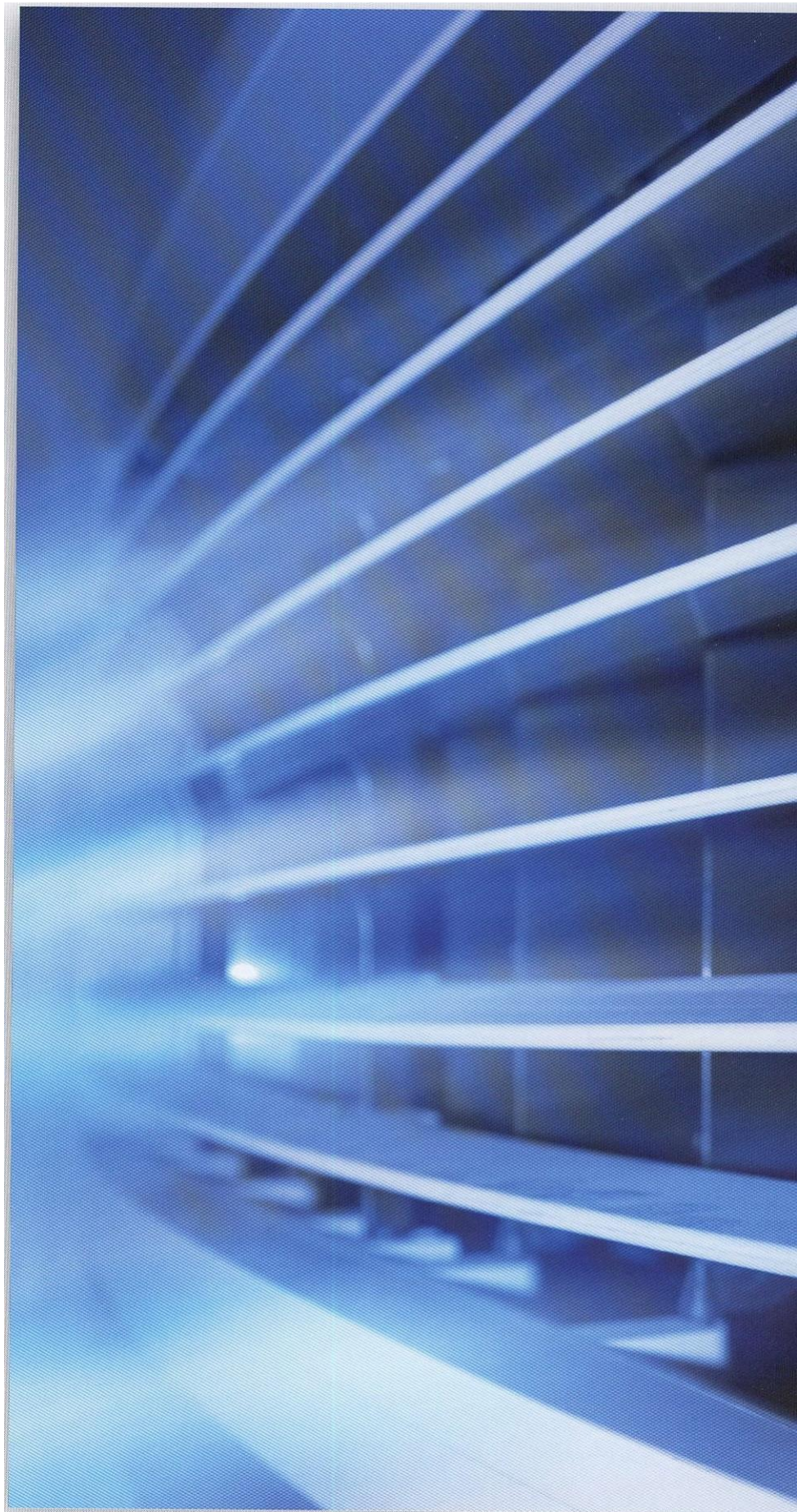
1. Test and adjust fan RPM to design air flow requirements.
2. Test and record motor full load amperes.
3. Make pilot tube traverse of main ducts and obtain design air flow at fans.
4. Test and record fan static pressures, suction and discharge.
5. Test and adjust system for design recirculated air flow.
6. Test and adjust system for design outside air flow.
7. Test VAV boxes for design air flows.
8. Adjust all main return air ducts to proper design air flow.
9. Test and adjust each diffuser, grille, and register to within 10% of design air flow.
10. Identify each diffuser, grille, and register as to location and size.
11. Record air flow trends and air pressure relationships between adjacent rooms and corridors in critical areas with proper sepsis control, such as isolation rooms.
12. Test and Balance Agency is to verify control system operation as specified, and report on any installation problems observed. The Test and Balance Agency shall limit its activities to setting controls to a proper fixed mode to prevent any changes during the balancing procedure. This also provides a verification of control operation which is valuable to all parties. Physical changes in the control system - such as relocating sensors, or calibrating controllers - is the responsibility of the Control Contractor. The Test and Balance Agency shall work closely with control trade to identify and correct problems.

7.0 HYDRONIC SYSTEMS BALANCING

1. Hydronic System Balance shall not begin until the Test and Balance Agency has verified the following:
 - A. System is completely filled.
 - B. System is clean.
 - C. System is free of air.
 - D. All service valves are open.
 - E. All strainers are provided with clean sleeves having correct perforations.
 - F. Three-way valves are properly piped.
 - G. All coils are correctly piped.
 - H. Coil fins are straight and clean.Proper balancing devices are in place and correctly located:
 1. Meters
 2. Pressure taps
 3. Thermometer wells
 4. Balancing valves
- J. Automatic temperature control systems have been proven and are in operation.
- K. There is no entrained air in the suction piping to pumps in an open system which can have a negative effect on the pump performance.
- L. The pressure is adequate to completely fill the system and vent all air.



2. The Test and Balance Agency shall measure the amperes of all pump motors before hydronic balancing is started and shall take proper steps to correct and report any overloads.
3. The Test and Balance Agency shall not continue the hydronic balancing if at any time hazardous conditions are observed. These conditions shall be reported before proceeding further.
4. Fluid flow quantities shall be measured using the installed meters provided by others.
5. The Test and Balance Agency shall apply any necessary correction factor to the indicated value to account for the density of the fluid flowing in the system.
6. The design and final flow rates of all meters and balance valves shall be included on the Canadian Associated Air Balance Council Report Form. All pertinent information shall be listed, such as:
 - A. Designation of terminal B. Manufacturer
 - C. Type D. Size E. Performance
1. Flow Rate
2. Pressure differential
7. If specified, pitot tube traverse shall be taken where required on the drawings, provided valved openings are properly installed.
8. Where flow meters are not installed, measure circulation pump capacities by differential pressure measurements, amperage and brake horsepower method using the pump manufacturer's capacity curve. Position all automatic valves, hand valves and balancing valves for full flow through coils, converters, etc. during pump adjustment.
9. Coordinate the setting of controls to maintain coil water inlet design temperatures, with coil valves positioned for full flow through coil during adjustment. Balance individual water coils at full flow to obtain specified flow rate.
10. Coordinate converter, heat pump, and chiller performance with the manufacturer's representative.
11. Chilled Water Pumps
 - A. Design Flow Rate B. Balance Flow Rate
 - C. Motor Nameplate Ratings
 - D. Operating Performance
 1. Head
 2. Flow Rate
 3. Amperage Draw
12. Cooling Tower Pumps
 - A. Design Flow Rate
 - B. Balance Flow Rate
 - C. Motor Nameplate Ratings
 - D. Operating Performance
 1. Head
 2. Flow Rate
 3. Amperage draw
13. Heating Pumps
 - A. Design Flow Rate
 - B. Balance Flow Rate
 - C. Motor Nameplate Ratings
 - D. Operating Performance
 1. Head
 2. Flow Rate
 3. Amperage draw
14. Heating, Reclaim, and Cooling Coils
 - A. Coil type and manufacturer
 - B. Design Flow Rate
 - C. Balance Flow Rate
 - D. Operating Performance



DUCT LEAKING TESTING SPECIFICATIONS

1.0 DUCT LEAKAGE TESTING

An independent agency who is a certified member of the Canadian Associated Air Balance Council shall:

1. Measure and record duct leakage rate.
2. Report any unusual conditions at time to test.
3. Identify leakage source in any non-complying situation.
4. Submit verification report.
5. All openings in the duct system shall be carefully sealed shut by the Contractor. Sealing shall conform to the recommendations of the Balancing Agency.
6. Duct systems shall be separate and sealed in sections according to the recommendations of the Balancing Agency.
7. The test kit shall consist of:
 - Test Blower • Calibrated orifice tube • Two manometers • Flexible tubing for connection to the duct system
8. The Contractor shall provide test connections where required by the Balancing Agency for connection of the test apparatus.
9. The system static pressure tap shall be in the system duct and shall be at 300 mm from the test connection. Static pressure taps in the orifice tube shall not be used to read system static pressure.
10. The inlet opening of the test blower shall be blocked off before the test blower is started. The inlet opening shall then be opened slowly to prevent over pressuring the system.
11. All low-pressure supply, return and exhaust ductwork shall be tested at 500 Pa W.G. static pressure with a maximum leakage rate of 1.5%.
12. All medium pressure supply and exhaust ductwork shall be tested at 750 Pa W.G. static pressure with a maximum leakage rate of 1.5%.
13. All high-pressure ductwork shall be tested at 2.50 kPa static pressure with a maximum leakage rate of 1.5%.

SOUND & VIBRATION SPECIFICATIONS

1.0 SOUND LEVEL TESTING SPECIFICATION

1. An independent testing and balancing agency, who is a certified member of the Canadian AABC, shall perform the sound level measurements required at ten locations as directed by the Engineer.
2. Three copies of the certified report shall be submitted containing the following sound level data at each location.
3. Source of sound and location.
4. Diagram of description of relationship of sound source to the measuring instrument.
5. Take a linear scale reading:
 - With equipment being tested turned off • With equipment being tested turned on.
6. Take dbA scale reading:
 - With equipment being tested turned off • With equipment being tested turned on.
7. Take readings at each of the following 8 octave band frequencies:
 - 63, 125, 250, 500, 1000, 2000, 4000, 8000: • With equipment being tested turned off • With equipment being tested turned on
8. Determine the NC level at each sound level testing location.
9. Determine the RC level at each sound level testing location.
10. Where measured sound levels exceed acceptable levels, each of the 8 octave band frequency readings shall be plotted on the noise criteria curves, ASHRAE Handbook 1980 Systems.
11. Submit with your report the model and type of sound level meter, octave band analyzer, microphone and calibration used.
12. The responsibilities of the Engineer are:
 - Specify the allowable sound pressure levels • Clearly specify areas to be tested • Specify the typical spaces within the area to be tested
13. The responsibilities of the others are:
 - Analyze the readings taken by the Testing and Balancing Agency • Take any needed corrective action.

VIBRATION TESTING SPECIFICATION

1. A Canadian Associated Air Balance Council independent agency shall perform vibration measurements for vibration isolators and equipment as specified. The equipment, when mounted and placed in operation, shall not exceed a self-excited vibration maximum velocity when measured with a vibration meter on bearing caps of machine in vertical, horizontal and axial directions, or measured at equipment mounting feet if bearings are concealed. Each point shall be read, then compared with allowable tolerance for the respective unit of equipment and proved unsuccessful, a separate report shall be forwarded to the Consultant Engineer with recommended action.
2. Provide a sketch of each piece of equipment showing the location where the tests are taken.
3. Take velocity, displacement and acceleration readings in the horizontal, vertical and axial positions.