PREAMBLE TO SCHEDULE OF QUANTITIES

1. The quantities in the schedule of quantities are approximate and are liable to vary due to exigencies of work. Such variations in quantities of work executed by him at the contract rates of each item of work.

2. All the items of work shall be executed strictly in accordance with technical specifications, equipment schedule, drawings and schedule of quantities read in conjunction with codes/standard specified and intent of the specifications. Equipment offered shall be of standard design and or normal manufacturing range. It shall be obligatory on the part of the tender to furnish all technical data relevant to the tender alongwith his offer. Incase contractor fails to furnish relevant technical data of equipment, tender specifications shall be applicable and their offer is liable for rejection.

3. The rate of each item of work specified in the schedule of quantities shall unless expressly stated otherwise, include the following (but not limited to the list given below) –

    a. All materials, equipment, accessories, components, labour, tools, tackled, plants, hoists, scaffolding, transport and incidentals etc. required for the full and entire execution and completion of work.
    b. Wastage of materials and labour.
    c. Loading, unloading, transportation, handling/double handling, hoisting to all levels, setting out of work, fixing in position, safe custody, security, disposal of debris and all other labour necessary for full and complete execution of the work as per specifications. The agency should include complete foundation work for all the A. C. equipment, civil works for supporting pipes and ducts, including refilling of earth for earthing work etc. and other connected civil work in their scope of work.
    d. Liabilities risks and obligations arising out of conditions of contract.
    e. All taxes and duties, octroi insurance, packing and forwarding, insurance at site till handling over, labour insurance etc.
    f. All requirements of specifications, equipment schedule and drawing shall be read as part of schedule of quantities.

4. The schedule of quantities furnished hereinafter shall be fully priced and the totals duly checked. Tender with lumpsum pricing will be rejected.

5. Unless otherwise stated the measurements shall be carried out strictly in accordance with mode of measurement laid down.

6. The term equivalent or equal shall mean the equivalent as approved in writing by employer. The provision equivalent shall operate only if the specified make of material or equipment not available in the market or production of such material is discontinued by the manufacture. Documentary evidence is required to be furnished to establish in such case as it.

7. The prices shall be firm and no escalation shall be available.

8. The drawings indicating the nature of work has been issued alongwith the tender. The detailed drawings will be issued to the successful tender for preparation of his shop drawings and execution drawings. The contractor on award of work shall prepare his shop drawings and detailed execution drawings/layouts etc. and submit the same to the employer for approval before start of work.

9. The approval of execution drawings/shop drawings/layout drawings shall not absolve the contractor of his obligation to fulfill the intent of the specifications.

10. It shall be contractor's responsibility to provide adequate security and safe guard to the materials supplied at the site and materials/equipment installed at the site till the job is completed and handed over to the employer.

11. The drawings furnished by the employer described the nature of work to be carried out and do not necessarily guarantee full accuracy of heights, dimensions and measurements of spaces, plenums etc. It shall be the contractor's responsibility to check the dimensions, heights etc. at site and report to the engineer-in-charge the actual position, so that corrective measures can be incorporated at appropriate stage to bring out the final product as envisaged by employer.

12. The contractor may be required to make sample of interior works via false ceiling, partition walls etc. using standard materials from the approved list given in the tender for approval by the consultants/employer before actual execution of the work.

2. MODE OF MEASUREMENTS –

Mode of Measurement for payment of items of ducting and piping & their insulation shall be as follows :

2.1 DUCTING :

Payment for ducting shall be on the basis of the external surface area of the ducting including all material and labour for installed duct. The Rate/Sq.mtr. of the external surface shall include all wastage flanges, gaskets for joints, bolts and nuts, duct supports and hanger vibration isolation pads or suspenders, flexible connections, inspection, doors, dampers, running vanes, straight vanes and any item which will be required to complete the external insulation and acoustic lining. The external area shall be calculated by measuring the over all width and depth including the corner joints) in the center of the duct section from flange face to face incase of ducts length with inform cross section.

Total area will be arrived at by adding up the area of all duct sections. Incase of taper pieces average width and depth will be worked out as follows –

W 1 = Width of small cross section
W 2 = Width of large cross section
D 1 = Depth of small cross section
D 2 = Depth of large cross section

$$\text{Average Width} = \frac{W1 + W2}{2} \qquad \text{Average Depth} = \frac{D1 + D2}{2}$$

Incase of Elbow pieces, the length of mid radius multiplied by the cross section with the flanges shall be considered for measurements.
Width and depth in the case of taper pieces shall be measured at the edge of the collar of the flange for duct sections flatted with angle iron flanges, otherwise at the bottom of the flange where the flanges are of duct sheet. For circular piece the diameter of the section midway between large and small diameters shall be measured and adopted as the mean diameter for calculating the surface area of the taper piece.

Duct measurements for calculating of area shall be taken before applications of insulation. For the special pieces like bends, branches and tees etc. same principles of area measurements as for liner and outer periphery along the curvature angle of the piece shall apply.

2.2 DUCT/ACOUSTIC/UNDERDECK INSULATION :

The item is provided separately for various thickness and shall be paid for an area basis of un-insulated duct. The area of the duct to be insulated shall be measured before application of insulation. The underdeck insulation shall also be paid on the basis of the area to be covered. This includes the measurement of beam circumference to be insulated.

2.3 GRILLS AND DAMPERS :

These shall be measured on the basis of physical dimensions of the damper and grilles installed at site. The physical measurement shall exclude the flanges on all sides and would be clear inside the measurements of the damper, grille area.

3. TESTS AT SITE :

3.1 GENERAL :

The contractor must perform all inspection and tests of the system as a whole and of components individually as required, under the supervision of the Engineer, in accordance with the provisions of the applicable 'ASHRAE' standards or approved equal and as per site requirements. All tests shall be recorded in the format approved by Consultants/Owner.

3.2 DUCT WORK :

All braches and outlets shall be tested for air quantity, and the total of the air quantities shall be within plus three percent (3%) of fan capacity. For dampers, volume control and splitter dampers shall be tested for proper operation.

3.3 BALANCING AND ADJUSTMENT :

All air handling/ventilation equipment, ductwork and outlets shall be adjusted and balanced to deliver the specified air quantities indicated, at each inlet and outlet. If these air quantities can not be delivered without exceeding the speed outlet. If these air quantities can not be delivered without exceeding the speed range of the sheaves or the available Horsepower, the Engineer shall be notified before proceeding with the necessary rectification and balancing of air distribution system. Water circulating system shall be balanced for required water quantities at various equipment such as pumps, chillers, air handling units, fan coil units and cooling tower etc.

3.4 ELECTRICAL EQUIPMENT :

All electrical equipment shall be cleaned and adjusted at site before connection of power. The contractor as per relevant IS/IE rules shall carry out the following minimum tests.

Wire and Cable continuity tests :

Insulation resistance test, phase to phase and phase to earth and phase to neutral on all circuits and equipment, using a 1000 Volt Megger. The earth resistance between conduit system and earth must not exceed half (0.5) OHM.

The Phase Rotation Tests :

Operating tests on all protective relays to prove their correct operation before energizing the main equipment including secondary injection test at site. Operating tests on all starters, circuit breakers etc.

3.5 PERFORMANCE TESTS :

The installation as a whole shall be balanced and tested upon completion and all relevant information including the following shall be submitted to the Owner.

a. Air volume passing through each unit duct, grille etc.
b. Electrical current reading in Amperes of full and average load running and starting together with name plate, current in each electrical motor. Daily records should be maintained of hourly readings, taken under varying degrees of internal heat load and use and occupation, of wet and dry bulb temperature. The current and voltage drew by each machine. Any other reading shall be taken which the Engineer may subsequently specify.

3.6 MISCELLANEOUS :

The above tests are mentioned here in amplification but not by way of limitation to the provisions of conditions of contract and specification. The date of commencement of all tests listed above shall be subject to the approval of the Engineer and in accordance with the requirements of this specification. The contractor shall supply the skilled staff and all necessary instruments and carry out any test of any kind on a piece of equipment, apparatus, part of system or on a complete system if the owner requests such a test for determining specified or guaranteed data as given in the specifications or on any damage resulting from the tests shall be require and/or damaged material replaced all to the satisfaction of the owner. In the event of any repair or any adjustment having to be made giving sufficient notice, in order that Bank Engineer or his nominated representative may be present.

The contractor must inform Bank Engineer when such tests are to be made, giving sufficient notice, in order that Bank Engineer or his nominated representative may be present. Complete records of all tests must be kept and 3 copies of these and location must be furnished to the Bank's Engineer.