	Burj Dubai – The Residences	**Nasa Multiplex**
	*Client :-***Emaar Properties**	**MEP Contractor** **ETA** **M&E Division**
Method Statement Title **Installation of HVAC Duct Work**		*Method Statement No.* ETA/MS/M – 001 *Rev. No. & Date:* '2' - 17.08.2004

Burj Dubai - The Residences

Design Consultant
Woods Bagot

MEP Consultant
Roberts & Partners

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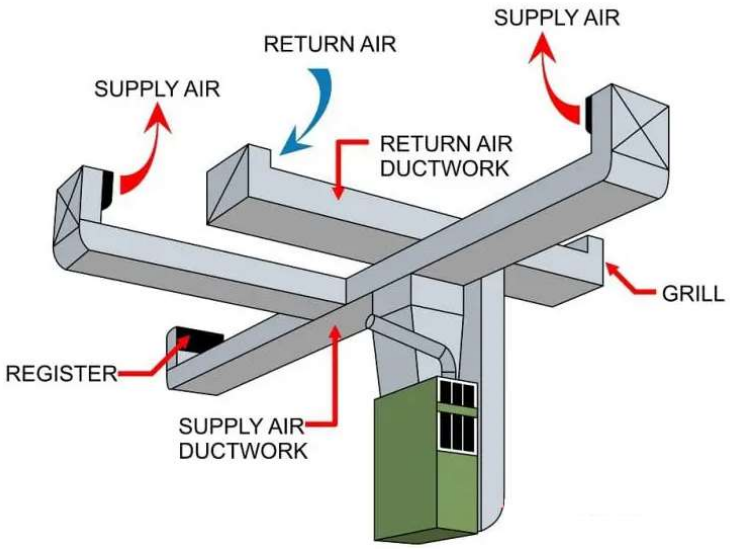
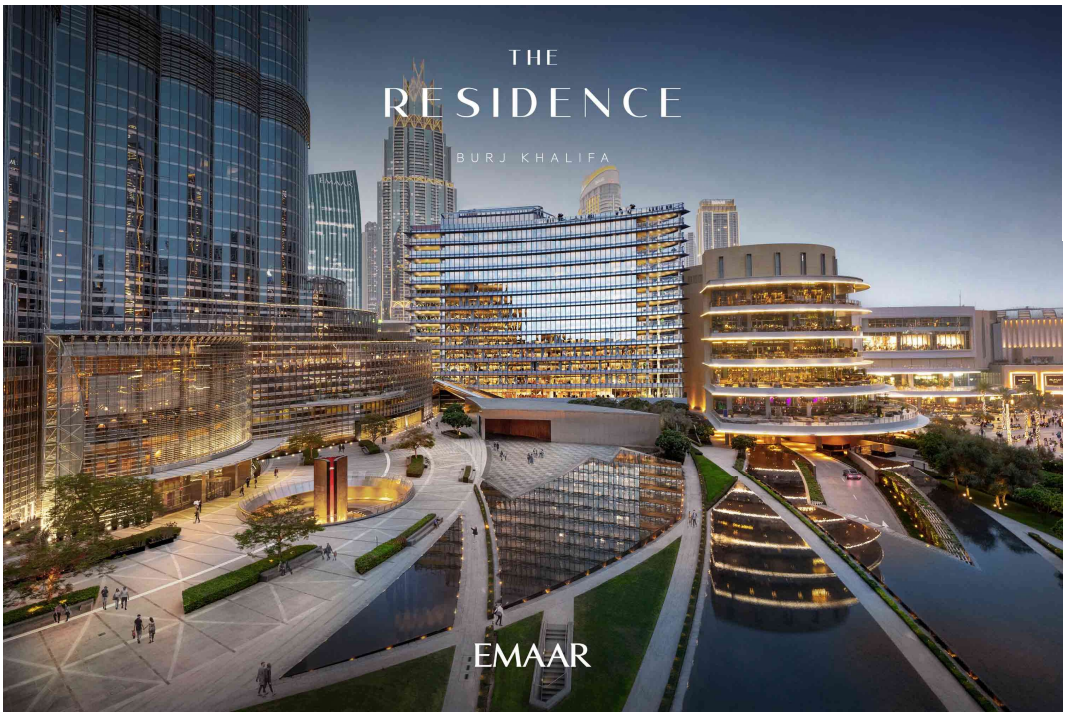
METHOD STATEMENT

FOR



INSTALLATION OF HVAC DUCTWORK



BURJ DUBAI – THE RESIDENCES

1.0 Scope :

1.1 This method statement applies to installation of HVAC Supply, Return and Exhaust ducts, dampers, fire dampers and access doors. The fire rated duct and accessories method statements will be separately submitted.

2.0 Purpose :

2.1 The purpose of this method statement is to outline the method of storage and installation of HVAC supply, return and exhaust ducts including fixing of dampers, fire dampers and access doors.

3.0 Application :

3.1. G.I. Sheet metal ducts are used for exhaust ducting. Pre-insulated ducts are used for supply, return and treated fresh air ducting.

4.0 Material :

4.1 Pre fabricated ducts made of G.I. Sheet.

4.2 Pre fabricated ducts made of pre-insulated panels.

4.3 Flanges and cleats for joining the G.I. ducts factory fabricated of G.I. Sheet steel as per SMACNA HVAC construction standards 1985.

4.4 Aluminium flanges and profiles, PVC cleats, etc., for joining of pre-insulated ducts as per approved submittals.

4.5 Threaded rods, G.I. angles, etc., for supporting system.

4.6 Duct sealant, Gaskets & Adhesives.

4.7 VCDs, Fire dampers and Access doors as per approved submittals/samples.

5.0 Method :

5.1 **Storage**

5.1.1 When off-loading, the ducts shall be carefully lowered to ensure no damage to edges or duct surface.

5.1.2 All ducts shall be stored properly to safeguard ducts from any abrasions and damages.

5.1.3 All delivered ducts will be stacked and covered by polythene sheets to protect from dust etc.

5.1.4 Duct sealant, adhesive, gaskets, etc., shall be stored in enclosed area in as per manufacturer's recommendations.

5.2 Preparation :

5.2.1 **G.I. Ducting**

5.2.1.1 Ducts are pre-fabricated and longitudinally pre-assembled to a maximum length of 1.2m at the workshop as per the construction schedule enclosed. Preparation/formation of flanges for transverse joints are made at workshop.

5.2.1.2 Ducts received at site as above shall be joined together on the floor, to form manageable lengths.

5.2.1.3 Wherever branch take-off collars are to be fixed, suitable cut out shall be made in the ducts. The size of cut out shall be equal to the duct cross sectional area and secured using aluminium pop rivets and the joint between collar flange and duct surface shall be sealed with approved duct sealant.

5.2.1.4 Wherever flexible ducts are to be fixed, a suitable diameter prefabricated collar shall be fixed to the main duct-using dovetail joining system. A sample of the same will be made at site for approval prior to proceeding with installation.

5.2.2 **Pre-insulated Ducting**

5.2.2.1 Ducts are pre-fabricated in the workshop and longitudinally assembled to a maximum length of 4m.

Preparation for the traverse joints including the fixing of the flanges/profiles as applicable as per the construction schedule is carried out at workshop. Please refer attached Annexure-II (revised)

5.2.2.2 Ducts received at site as above shall be joined together on the floor to form manageable lengths.

5.2.2.3 Branch take-off collars are tap-in glued type and will have shoe configuration at the take-offs. Wherever branch take-offs are to be made, suitable cut out shall be made on the main duct with 45° angle cutter to form the 45° female part of the joint. The branch/take-offs with 45° male cut ends are secured to the main duct by the joining glue. The joint is sealed with approved duct sealant and finished with self-adhesive aluminium foil tape.

5.2.2.4 Wherever flexible ducts are to be fixed, pre-fabricated G.I. collars of required diameter are fixed to the main duct by means of a pre-fabricated groove on the collar (to prevent the inward movement against the panel face) and dovetail folding at the inner side of the panel. Approved duct sealant is applied at the joint.

6.0 Installation :

6.1 The layout of duct to be installed shall be as per approved drawing.

6.2 Position of duct supports shall be marked on the underside of the slab / structural member/vertical walls as the case may be and mechanical anchor fasteners shall be installed in slab or suitable clamps shall be installed if support to be taken from structural member, to facilitate suspension of threaded rods for duct trapeze support. The support details and spacing shall be as per the DW 144 / approved drawings for G.I. ducts and as per manufacturer's recommendation for pre-insulated ducts.

6.3 Threaded rod of suitable size as per DW144 shall be fixed to the mechanical anchor fastener / clamps using proper lock nut.

6.4 G.I. angle, cut to required size of duct (to have clearance of 50mm on either side) shall be fixed to the threaded rod suspension and locked in position by suitable zinc coated nuts and washers.

6.5 Assembled, as above, ducts shall be lifted and shall be installed on trapeze.

Similarly the next length of duct shall be erected and two are joined together by means of suitable cleats, zinc coated bolts, nuts, washers, gaskets, etc., as applicable as per the construction schedules for G.I ducts. Care shall be taken to seal the corners and transverse joints with approved duct sealant.

Pre-insulated ducts are joined either by glue in type male & female joints or with PVC H bayonet cleats for flanged joints as applicable as per the construction schedule. Duct sealant is applied at the male and female joint and finished by self-adhesive aluminum tape. For flanged joints, sealant is applied on all 4 corners and the corners are finished with PVC lock-in type corner caps.

6.6 On laying the ducts as detailed above to form the required layout, the ducts shall be properly aligned and levelled to maintain B.O.D. and distances as per approved drawing.

6.7 Riser / Shaft Ducts: Necessary scaffolding arrangement to suit site conditions shall be made. Duct supports shall be taken at each floor / vertical wall as the case may be and shall be as per approved drawings. Successive ducts shall be installed starting from low level as the successive higher floors are constructed. The open end of the upper most ducts shall be sealed properly.

6.8 The insulation of the flexible ducts shall be rolled upto 100mm from the edges and the flexible duct shall be slipped on to the collar fixed on the main duct and shall be secured firmly using G.I. Straps and clips. Then the insulation of flexible duct shall be rolled back and fixed firmly on to spigots and adjoining duct surface and finished with self-adhesive aluminium foil tape.

6.9 Flexible ducts installed as above shall be supported using 25mm G.I. strip wound around the duct and suspended from slab if the flexible duct length exceeds 1 metre.

Suitable plenum box as applicable shall be connected to main duct through pre-insulated flexible ducts. These diffuser plenums shall be prefabricated as detailed above, connection through round collars fixed to plenum. Diffuser plenum boxes shall be suspended from underside of slab using central hanger made of galvanized threaded rod fixed to mechanical anchor fastener and secured using zinc coated nuts and washers. The single rod suspension shall be limited to square diffuser plenums of size upto 300mm and multiple suspensions shall be provided for higher size. For slot diffuser plenum boxes suspension rod shall be provided on center of two shorter sides of the plenum.

6.10 Manual volume control dampers as approved shall be fixed in the ducting system wherever mentioned in the drawing. The type of fixation shall be a companion flange. Care shall take to allow the operation of VCD handles.

6.11 Insulation of VCDs installed in the pre-insulated ducts shall be carried out using closed cell electrometric foam insulation.

6.12 Fire damper shall be installed as per approved drawing / manufacturer installation details.

6.13 Access doors shall be provided for fire dampers wherever applicable. Suitable cut out to suit the size of the access door shall be made in the duct either in the bottom or side as per site conditions. The mounting frame of access door is fixed to the duct using dovetail joint system for G.I. ducts or with aluminium profiles glued-in type for pre-insulated ducts. The door is secured in position within the mounting frame using cam locks provided in the access door. The access door shall be pre-insulated panel type for pre-insulated ducts and double skin type with sandwiched insulation for G.I. ducts. For smaller duct sizes where providing access door is not feasible, access to the fire damper will be made through a small length of duct removable by providing flanged joints (Refer sketch attached vide Annexure-III).

6.14 Diffusers plenum/droppers shall be leveled properly to suit false ceiling.

6.15 The ducts are identified (service wise) as per approved identification labels (directional arrows).

7.0 Inspection :

7.1 After the duct installation ETA's QC shall inspect the complete installation and offer the same for consultant's inspection.

7.2 On fixation of final fix items like grilles / diffusers etc, consultant's engineer shall be invited for final inspection and certification.

8.0 Safety :

8.1 Safety precautions shall be followed inline with established project safety plan.

8.2 People shall use PPE such as safety harnesses, safety shoes, helmets, etc.

8.3 Safety Officer shall check and ensure that all safety precautions are taken before starting the work in the shafts and heights (including proper lighting and ventilation in the shafts).

8.4 Safety Officer shall check and ensure that all scaffoldings used are having duly signed tags.

9.0 References :

9.1 Specification section # 15800.

9.2 Material submittals Ref:M-004, M-006

10.0 Attachments :

10.1 Annexure-I Ductwork construction schedule for G.I. ductwork.

10.2 Annexure-II Ductwork construction and method statement for pre-insulated ductwork (revised).

10.3 Annexure-III Access arrangement for fire dampers installed on duct sizes 150mm & below.

10.4 Annexure-IV Pre insulated riser duct support arrangement.