

HEXATECH	Method Statement For Ductwork, Grilles, Diffuser & Louvres Installation	Issue No.: 1	Document Effective Date: 01 Aug 2022	Page 1 of 7
		Revision No.: 0		Document Ref: MS-A005

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INSTALLATION OF DUCTWORKS & DIFFUSERS

1.0 *Scope of Work*

To supply and install of new Ductworks consisting air-conditioning and exhaust system as detailed in the approved shop drawings.

2.0 *Standard Reference*

This method statement shall be read in conjunction with the following documents:

- Healthy, Safety and Environment Plan (HSE Plan)
- Approved Shop Drawings.
- The relevant Malaysian Standards (MS), British Standards (BS), American Standards (ANSI, ASME, NFPA, ASHRAE etc.) and other Codes of Practice where applicable.

3.0 *Methodology*

3.1 Manufacturing of Ductworks

- a. Fabricated ducting will be approved by the Consultant / Client and installed in accordance with the approved shop drawings and manufacturers technical recommendations.
- b. All sheet metal ducting will be manufactured and constructed in accordance with the standard and recommendation made in the latest edition of the SMACNA standard. The tabulation of thickness of sheet metal, tie rod are used, size of rod and distance for the tie rods are installed as per below :-

INSULATED DUCT SUPPORT FROM FLOOR SLAB

DUCT SIZE (mm)	SUPPORT SIZE " D " (mm)
UP TO - 1250	32 x 32 x 4
1251 - 1600	40 x 40 x 4
1601 - 2500	50 x 50 x 5
ABOVE 2501	65 x 65 x 5

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RECTANGULAR DUCT HANGERS (MINIMUM SIZE)

MAXIMUM HALF OF DUCT PERIMETER	PAIR AT 1.2 m SPACING (STRAP)	PAIR AT 1.2 m SPACING (WIRE / ROD)
P / 2 = 760	25.4 x 0.85	2.7
P / 2 = 1830	25.4 x 0.85	6.4
P / 2 = 2440	25.4 x 0.85	6.4
P / 2 = 3050	25.4 x 1.00	6.4
P / 2 = 4270	25.4 x 1.31	9.5
P / 2 = 4880	25.4 x 1.61	9.5

FIRE RATED DUCT CONSTRUCTION TABLE (BW11 FLAMEBAR SPRAY)

DUCT DIMENSION (mm)	SHEET METAL GAUGE (THK. mm)	SECTIONAL LENGTH (mm)	L - ANGLE FOR HANGER SUPPORT (mm)	HANGER SPACING (mm)	HANGER ROD SIZE (mm)
0 - 400	G 24 (0.6mm)	1220	40 x 40 x 5	1220	8
401 - 1000	G 22 (0.8mm)	1220	40 x 40 x 5	1220	8
1001 - 1200	G 20 (1.0mm)	1220	40 x 40 x 5	1220	10
1201 - 1600	G 20 (1.0mm)	1220	50 x 50 x 6	1220	10
1601 - 2500	G 20 (1.0mm)	1220	50 x 50 x 6	1220	12
2501 - 4800	G 18 (1.2mm)	1220	65 x 65 x 6	1220	14

SCHEDULE OF VANES FOR SQUARE ELBOWS

ELBOW WIDTH " W " (mm)	VANES TYPE	PLATE THICKNESS (mm)	MAX. DISTANCE BETWEEN RUNNER PLATES (mm)	DUCT HANGER		DISTANCE BETWEEN BLADES DIMENSION " X "
				PLATE THICKNESS (mm)	PLATE WIDTH (mm)	
0 TO 600	TYPE B	0.6	600	0.6	115	28
ABOVE 600	TYPE A	0.8	900	0.8	200	56

SCHEDULE FOR LINEAR DIFFUSER FIXING

	LINEAR DIFFUSER WIDTH						
	2 SLOT	3 SLOT	4 SLOT	5 SLOT	6 SLOT	7 SLOT	8 SLOT
A	85	125	160	200	240	275	315
B	154	192	230	268	306	345	382
C	137	175	213	251	289	327	365

Where : A = Plenum Width, B = Overall Width (Flange To Flange), C = False Ceiling Opening

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- c. The majority of the ducts will be manufactured off site. Generally, the ducts will be formed into 'L' shaped sections (for rectangular ducts) and 'round' sections (for spiral duct). Ducts will then be delivered to site and checked by supervisor responsible before unloading by hand. Delivery of ducts and materials to site will be carefully coordinated with the installation programme so as to avoid accumulation of unfixed ductwork and double handling. Ducts and materials will stored under cover, sheltered from weather to ensure that they remain dry and clean.
- d. In some instances, ducts may be delivered to site as flat sheets and then trimmed and folded to shape on site.

3.2 Duct Support

- a) Ducts will be supported using trapeze hangers consisting of galvanized steel straps or angles, with galvanized steel threaded rod and post drilled expanding wedge anchors. The location of support hangers is marked on the soffit of the slab according to the routing of the ducts shown in the approved shop drawing.
- b) The holes for the anchors are drilled at the centres and size according to the hanger spacing and using the correct size drill bit and to a depth to suit the anchor manufacturers recommendations. The size of the anchor will depend on the size of the hanger rod to be used. The length of the hanger will be cut to suit the cross section of the duct and clearance between duct and soffit of slab.
- c) After ducting installation, hanger rods trimmed if required so that only the minimum length protrudes below the hanger bracket.

3.2.1 Duct Assembly

- a) The two 'L' shaped pieces of ducts will be assembled on site to form rectangular sections of ducts. For spiral duct is factory ready made according to size and length from approved shop drawing.
- b) Ducts may be connected using the SMACNA T25 Connector Systems, the Slip & Drive (S&D) Connector System, or equivalent system.
- c) For the T25 Connector type, installing four corner pieces for bolting together completes the end joining flanges. Sealant is then applied to the corner and a self-adhesive foam-jointing gasket is placed around one end of the duct flange prior to jointing.
- d) Some ducts sizes may require reinforcement in the centre (Tie Rod Centre – TRC) and some may be require at the flanges (Tie Rod Flange –TRF) as indicated in the SMACNA standard.
- e) Adjoining duct sections are then bolted at the four corners and clips are then clamped at onto all four sides of the connector flange at spacing as indicated in the SMACNA standard.

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- f) For Slip & Drive connections, the two 'L' shaped duct sections are joined and ducts are joined using slip and drive connectors. Corners are then filled with sealant.

3.2.2 Duct Bends, Elbow, Tee and Branches

- a) Duct bends, elbows and tees are fabricated and installed in similar manner to the straight sections of duct. Radius bends will be used wherever possible, unless space and structural limitation preclude their use, in which case bends with splitters will be used. These situations will be shown on the shop drawings, together with sizes and radii for all bends and elbows.
- b) Once all main ducts have been installed, branches and take-off are installed with any smaller ducts line. All connections will be made with fabricated sheet metal branches, connected and sealed properly.
- c) During installation, open duct ends will be covered with plastic to prevent ingress of dirt and unwanted materials.

3.3 Ductwork Insulation

3.3.1 External Insulation

- a) External insulation material will be approved by the Consultant / Client and installed in accordance with the approved shop drawings and manufacturers technical recommendations.
- b) External insulation for rectangular ducting is Poly Glasswool Blankets (1" 2lb) with aluminium foil.
- c) 20mm G.I strip will be installed externally in distance 350mm for fire rated ductwork. Fire rated paint will be applied at the external ducting surface before implement item (b) and (c).
- d) Only skilled, experienced and competent personnel shall carry out preparation and application of all insulating material after ducting has been installed.
- e) All insulation materials shall be delivered to the site in a dry condition and shall be housed in a dry store until drawn up for use.
- f) Prior to the application of insulation, external duct surface shall be cleaned and dry using non-abrasive linen.
- g) Apply appropriate adhesive on 150mm brush width at 300mm intervals.
- h) The type, thickness and density of duct insulation used shall comply the technical specification or approved shop drawing

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- i) Cut insulation so that longitudinal and circumference seams are covered with a minimum of 75mm vapour barrier overlaps.
- j) All air-conditioned air ducts unless acoustically/internally lined, shall externally insulated.
- k) Seal joint and flaps with vapour barrier adhesive. Extreme care shall be taken at all joint to ensure a vapour tight installation.

3.3.2 Internal Insulation (Rectangular Ducting)

- a) Only skilled, experienced and competent personnel shall carry out preparation and application of the acoustic insulating material.
- b) The acoustic lining material used shall comply to the technical specification or approved shop drawing.
- c) The length of duct to be lined acoustically shall be as per technical specification or as shown in the approved shop drawing.
- d) All acoustic insulation materials shall be delivered to the site in a dry condition and shall be housed in a dry store until drawn up for use.
- e) Prior to installation of ducting on hangers, internal surfaces of the duct sections to be internal insulated will be cleaned and dried. For spiral and rectangular duct internal insulation will be applied using polyethylene foam and glued inside the internal area of the ducts.

3.3.3 Grilles & Diffuser Installation

- a) Mark the diffuser / grilles location at ceiling. (Follow coordination dwg)
- b) Request for inspection before make opening at ceiling. (Plaster Ceiling)
- c) Make opening at plaster ceiling.
- d) Mount the diffuser / grilles to the ceiling and hang with wire rope at four corner of the diffuser / grilles.
- e) Connect the branch duct to the diffuser / grilles using flexible duct.
- f) Make good at the grilles / diffuser connection using 50mm aluminium tape.

3.3.4 Louvres Installation

- a) Mark the louvres location wall.
- b) Request for inspection before make opening at wall.

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- c) Make opening at the wall as per neck size of the louvres.
- d) Place the louvre at the wall and connect to the ducting from inside.
- e) Make good of the wall opening.

4.0 List of Site Installation and Test

- a) Doc No. AC-005

Please refer the attachment (CL/INST/DUCT)

5.0 HSE Requirement

- 1) The objective is to implement the quality control on site, which shall be followed by the construction team so that the Contractor without any costly re-work would finally accept the finished work.
- 2) All workers will be provided with appropriate personnel protection equipment (PPE) and this must be worn during the work .Workers who failed to comply with this requirement will be removed from site.
- 3) Unauthorized personnel are not permitted within construction area.
- 4) Safety Officer will closely supervise and checked the safety of the construction area. Safety measure will be intensified when the risk are higher during period of work.
- 5) To prepare scaffolding and stage work (relevant works).
- 6) To select and provide waste area.
- 7) To provide safe area for the storage of equipments.

6.0 List of Tools

- Hand Tools – hammer, screw driver, spanner etc
- Hand Drill
- Ladder
- Scaffolding
- Welding set

End