

1. GENERAL

1.1 Scope

- .1 Pipe hangers and support.
- .2 Duct hangers and supports.
- .3 Flashing for mechanical equipment.
- .4 Sleeving for mechanical equipment.

1.2 Reference Standards

- .1 Duct hangers shall follow the recommendations of the current edition of the SMACNA Duct Manuals.
- .2 Pipe supports shall meet the requirements of current edition of ANSI B31.1, Power Piping.

1.3 Submittals

- .1 Submit shop drawings of each factory manufactured component.

1.4 General Requirements

- .1 Provide hangers and supports to secure equipment in place, prevent vibration, maintain grade, provide for expansion and contraction and to accommodate insulation; provide insulation protection saddles.
- .2 Install supports of strength and rigidity to suit loading without unduly stressing building. Locate adjacent to equipment to prevent undue stresses in piping and equipment.
- .3 Select hangers and supports for the service and in accordance with the manufacturer's recommended maximum loading. Hangers shall have a safety factor of 5 to 1.
- .4 Fasten hangers and supports to building steel or inserts in concrete construction.
- .5 Provide and set sleeves required for equipment, including openings required for placing equipment. Provide sleeves for all pipe and duct penetrations through walls, ceilings, floors and footings.
- .6 Dielectrically isolate dissimilar metals.
- .7 Obtain approval from the Contract Administrator prior to drilling for inserts and supports for piping systems.
- .8 Obtain approval from the Contract Administrator prior to using percussion type fastenings.
- .9 Use of piping or equipment for hanger supports is not permitted.

- .10 Use of perforated band iron, wire or chain as hangers is not permitted.
- .11 Do not weld piping, ductwork or equipment supports to building metal decking or building structural steel supports unless prior written authorization has been obtained from the Contract Administrator.
- .12 Where deemed necessary by the Contract Administrator the Contractor shall, at his own cost, employ a structural consultant to design equipment supports and/or pipe anchors.

2. PRODUCTS

2.1 Inserts

- .1 Inserts shall be malleable iron case or galvanised steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms.
- .2 Size inserts to suit threaded hanger rods.

2.2 Pipe Hangers and Supports

- .1 Hangers: pipe sizes to 100 mm (4 in.): adjustable clevis, material to MSS SP69, clevis bolt with nipple spaces and vertical adjustment nuts above and below clevis.
- .2 Trapeze Hanger: refrigeration piping: unistrut channel with clamps and grommers.

2.3 Hanger Rods

- .1 Provide steel hanger rods, threaded both ends, threaded one end, or continuous threaded.

2.4 Duct Hangers and Supports

- .1 Conform to current edition of SMACNA handbooks.

2.5 Flashing

- .1 Steel Flashing: 0.55 mm (26 ga) galvanised steel.
- .2 Lead Flashing: 25 kg/m² (5 lb/ft²) sheet lead for waterproofing, 5 kg/m² (1 lb/ft²) sheet lead for soundproofing.
- .3 Safes: 25 kg/m² (5 lb/ft²) sheet lead or 0.5 mm (0.02 in) neoprene.
- .4 Caps: Steel, 0.7 mm (24 ga) thickness minimum, 1.6 mm (16 ga) thickness at fire resistance structures.

2.6 Sleeves

- .1 Pipes through Floors: Form with 1.2 mm (18 ga) galvanised steel.

- .2 Pipes through Beams, Walls, Fire Proofing, Footings, Potentially Wet Floor: Form with steel pipe or 1.2 mm (18 ga) thickness galvanised steel.
- .3 Ducts: Form sleeves with galvanised steel.
- .4 Size large enough to allow for expansion with continuous insulation.

2.7 Finishes on Hanger Rods, Hangers and Supports

- .1 All steel hanger rods, hangers and supports shall be galvanised or factory primed with alkyd red oxide primer to CGSB 1-GP-40m.

3. EXECUTION

3.1 Inserts

- .1 Use inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams wherever practicable.
- .2 Set inserts in position in advance of concrete work. Provide reinforcement rod in concrete for inserts carrying piping over 100 mm (4 in) or ducts over 1500 mm (60 in) wide.
- .3 Where concrete slabs form finished ceiling, finish inserts flush with slab surface.
- .4 Where inserts are omitted, drill through concrete slab from below and provide rod with recessed square steel plate and nut above slab.

3.2 Pipe Hangers and Support

- .1 Support horizontal steel and copper piping as follows:

Nominal Pipe Size	Distance Between Supports		Hanger Rod Diameter
	<u>Steel</u>	<u>Copper</u>	
15 mm (½ in)	1.8 m (6 ft)	1.5 m (5 ft)	10 mm (0.4 in)
20 mm to 40 mm (¾ in - 1½ in)	2.1 m (7 ft)	1.8 m (6 ft)	10 mm (0.4 in)
50 mm & 65 mm (2 in - 2½ in)	3.0 m (10 ft)	2.4 m (8 ft)	10 mm (0.4 in)
80 mm & 100 mm (3 in - 4 in)	3.6 m (12 ft)	3.0 m (10 ft)	16 mm (0.6 in)
150 mm to 300 mm (6 in - 12 in)	4.2 m (14 ft)	4.0 m (13 ft)	22 mm (¾ in)
350 mm to 450 mm (14 in - 18 in)	6.0 m (20 ft)	--	25 mm (1 in)

- .2 Install hangers to provide minimum 12 mm (½ in) clear space between finished covering and adjacent work.
- .3 Place a hanger within 300 mm (12 in) of each horizontal elbow.
- .4 Use hangers, which are vertically adjustable 40 mm (1½ in) minimum after piping is erected.
- .5 Support vertical piping at every other floor.
- .6 Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- .7 Where practical, support riser piping independently of connected horizontal piping.
- .8 Use oversized hangers to accommodate pipe insulation thickness. For pipes up to 50 mm (2 in) use high density rigid pipe insulation at hanger location, with an insulation protection shield. For pipes 65 mm (2½ in) and over, use insulation protection saddle.

3.3 Low Velocity Duct Hangers and Supports

- .1 Hanger Minimum Sizes:
 - .1 Up to 750 mm (30 in) wide: 25 x 1.6 mm (1 in x 16 ga) at 3 m (10 ft) spacing.
 - .2 790 to 1200 mm (31 to 48 in) wide: 40 x 1.6 mm (1½ in x 16 ga) at 3 m (10 ft) spacing.
 - .3 Over 1200 mm (48 in) wide: 40 x 1.6 mm (1½ in x 16 ga) at 2.4 m (8 ft) spacing.
- .2 Horizontal Duct on Wall Supports Minimum Sizes:
 - .1 Up to 450 mm (18 in) wide: 40 x 1.6 mm (1½ in x 16 ga) or 25 x 25 x 3 mm (1 x 1 in x 11 ga) at 2.4 m (8 ft) spacing).
 - .2 480 to 1000 mm (19 to 40 in) wide: 40 x 40 x 3 mm (1½ x 1½ x 11 ga) at 1.2 m (4 ft) spacing.
- .3 Vertical Duct on Wall Supports Minimum Sizes at 3.65 m (12 ft) spacing:
 - .1 Up to 610 mm (24 in) wide: 40 x 1.6 mm. (1½ in x 16 ga)
 - .2 640 to 900 mm (25 to 36 in wide): 25 x 25 x 3 mm. (1 x 1 in x 11 ga.)
 - .3 940 to 1200 mm (37 to 48 in) wide: 30 x 30 x 3 mm. (1.2 x 1.2 in x 11 ga.)
 - .4 Over 1200 mm (48 in) wide: 50 x 50 x 3 mm. (2 x 2 in x 11 ga.)
- .4 Vertical Duct Floor Supports Minimum Sizes, riveted or screwed to ducts:
 - .1 50 x 50 x 3 mm. (2 x 2 in x 11 ga.)

3.4 Medium and High Velocity Duct Hangers and Supports

- .1 Hanger Minimum Sizes:
 - .1 Up to 900 mm (36 in) wide: 2 at 25 x 1.6 mm (1 in x 16 ga) at 3 m (10 ft) spacing.
 - .2 940 to 1520 mm (37 to 60 in) wide: 2 at 25 x 1.6 mm (1 in x 16 ga) at 2.4 m (8 ft) spacing and 50 x 50 x 6 mm (2 x 2 in x 0.25 in) trapeze.
 - .3 1550 to 3050 mm (61 to 120 in) wide: 2 at 38 x 2.6 mm (1½ in x 12 ga) at 2.4 m (8 ft) spacing and 50 x 50 x 7 mm (2 x 2 in x 0.3 in) trapeze.
 - .4 2070 to 6700 mm (121 to 264 in) wide: 3 at 10 mm (½ in) diameter at 1.2 m (4 ft) spacing and 65 x 65 x 5 mm (2½ x 2½ x 0.2 in) trapeze.
- .2 Round Duct Hangers Minimum Sizes at 3 m (10 ft) spacings:
 - .1 Up to 460 mm (18 in) diameter: 25 x 1.6 mm. (1 in x 16 ga.)
 - .2 480 to 900 mm (19 to 36 in) diameter: 25 x 2.6 mm. (1 in x 12 ga.)
 - .3 940 to 1270 mm (37 to 50 in) diameter: 40 x 2.6 mm. (1½ in x 12 ga.)
 - .4 1300 to 2130 mm (51 to 84 in) diameter: 2 at 40 x 2.6 mm (1½ x 12 ga) from girth reinforcing angle.
- .3 Vertical Duct Floor Supports Minimum Sizes:
 - .1 50 x 50 x 3 mm. (2 x 2 in x 11 ga.)
 - .2 Rivet to duct and tie angles together with rod, angles or band Iron.
 - .3 Angle reinforcing may be used for support omitting trapeze.

3.5 Flashing

- .1 Flash and counterflash where mechanical equipment passes through weather or waterproofed walls, floors, and roofs.
- .2 Flash floor drains over finished areas with lead 250 mm (10 in) clear on sides with minimum 920 x 920 mm (36 x 36 in) sheet size. Fasten flashing to drain clamp device.
- .3 Provide curbs for mechanical roof installations minimum 200 mm (8 in) high. Flash and counterflash with steel; solder and make waterproof.
- .4 Provide continuous lead or neoprene safes below air supply casings, built-up mop sinks, shower stalls, shower room floors located above finished rooms. Solder at joints, flash into floor drains and turn up 150 mm (6 in) into walls or to top of curbs and caulk into joints.

- .5 Provide lead flashing around ducts and pipes passing from equipment rooms, installed according to manufacturer's data for sound control.

3.6 Sleeves

- .1 Set sleeves in position in advance of concrete work. Provide suitable reinforcing around sleeve.
- .2 Extend sleeves through potentially wet floors 25 mm (1 in) above finished floor level. Caulk sleeves full depth and provide floor plate.
- .3 Piping and duct work passing through floor, ceiling or wall, close off space between duct and sleeve and non-combustible insulation. Provide tight fitting metal caps on both sides and caulk.
- .4 Piping passing through mechanical room floor, roof or wall, close off space between pipe and sleeve with synthetic rubber compound mechanical type seals.
- .5 Sleeves provided through walls or floors where liquids could potentially pass from one side to the other, provide sleeves with a 25 mm (1 in) "flange" welded to the external face of the sleeve at the mid point of the thickness of the structure to provide a water stop.
- .6 Install chrome plated escutcheons where piping passes through finished surfaces.

END OF SECTION