

2.8 FLEXIBLE DUCTWORK

2.8.1 Construction

Flexible ductwork shall be constructed in accordance with one of the following methods:

- (a) *Metal* The ductwork may comprise either—
- (i) corrugated duct, helically wound with lockseam capable of being bent or set by hand without spring back and without deforming the circular section; or
 - (ii) single or multiple layers of strip formed into corrugations and wound in helical or annular form, without an obvious seam or joint.

Strip thickness shall be not less than 0.127 mm.

- (b) *Reinforced fabric* The ductwork may comprise either—
- (i) tough, flexible laminate; or
 - (ii) tough, tear-resistant, airtight material liner and cover incorporating a reinforcing former to retain circular section and permit flexibility with minimal spring back when formed to the required shape.

2.8.2 Compliance with test criteria

All insulated and non-insulated flexible ductwork shall be tested in accordance with UL 181 and the requirements of Table 2.8.2. All tests shall be carried out on 300 mm internal diameter duct. All tests shall be carried out on the duct system, i.e. the assembled final product, as opposed to individual layers. The duct core shall be separately tested in accordance with Clause 2.8.3(d).

The UL 181 burning test shall be carried out with the following qualifications:

- Gas used shall be propane with a fuel content of approximately 93 MJ/m³ 2500 btu/cu.ft.
- Bunsen burner shall have a 9.5 ±0.1 mm inside diameter.
- Fuel/air mixture shall be such that a half blue/half yellow flame is produced.
- The flame height shall be approximately 63 mm and half of the flame shall impinge on the duct.
- The sample shall be conditioned for 24 h at 20 ±2°C and 65 ±5% RH.
- Ambient conditions in the laboratory shall be between 10 and 30°C and 15 and 80% RH.
- The sample surface shall be clean and fully extended prior to testing.

TABLE 2.8.2
TEST PROGRAM

Test	Air duct	Joining materials
Burning	X	—
Mould growth and humidity	X	X
Temperature (see Note 1)	X	—
Puncture	X	—
Static load	X (see Note 2)	—
Impact (see Note 2)	X	—
Pressure (see Note 3)	X	—
Collapse (see Note 4)	X	—
Tension	X	—

LEGEND:

X = Test applicable

— = Test not applicable

NOTES:

- The low temperature test shall be carried out at -10°C and the high temperature test at 80°C for both interior and exterior surfaces. High temperature tests shall be carried out for a minimum period of 7 d.
- The impact test does not apply to metal duct as defined in Clause 2.8.1.
- The pressure test shall be carried out at 1000 Pa on a representative sample of 300 mm internal diameter duct.
- The collapse test shall be carried out at 200 Pa on a representative sample of 300 mm internal diameter duct.
- Where an uninstalled duct (duct core) passes the pressure, collapse, impact and tension test, it need not be retested as an insulated duct as long as an identical duct core construction is used.

2.8.3 Fire performance

All flexible ductwork shall comply with the following requirements:

- (a) Bulk insulation shall have a smoke developed index not greater than '3' and spread of flame index not greater than '0' when separately tested in accordance with AS 1530.3.
- (b) Duct system, i.e. the assembled final product, shall have a smoke developed index not greater than '3' and spread of flame index not greater than '0' when tested in accordance with AS 1530.3.
- (c) Duct system, i.e. the assembled final product, shall pass the UL 181 burning test.
- (d) Duct core, when separately tested shall pass the UL 181 burning test.

2.8.4 Installation

Joints in flexible ductwork shall be made as follows:

- (a) Collars to which the duct is to be connected shall be a minimum of 50 mm in length.
- (b) Sleeves used for joining two sections of duct shall be a minimum of 100 mm in length.
- (c) Collars and sleeves shall be inserted a minimum of 25 mm into duct before fastening.
- (d) Flexible duct shall be secured to collars and sleeves by means of sealant and a draw band. If the collar or sleeve exceeds 300 mm diameter the draw band shall be positioned behind a bead on the collar or sleeve.
- (e) Seal joints in duct and jacket with 50 mm wide tape (Clause 2.2.2).

2.8.5 Hangers and support systems

Flexible ducts shall be supported in the following manner:

- (a) At manufacturer's recommended intervals but at no greater distance than 1.5 m (see Figure 2.8.5(A)).
- (b) Maximum permissible sag between supports shall be 40 mm/m of support spacing (see Figure 2.8.5(A)).
- (c) Ducting shall extend for a minimum of 100 mm from a connection before any change of direction.
- (d) Hanger or saddle material in contact with the duct shall be of sufficient width to prevent any restriction of the internal diameter of the duct when the weight of the supported section of the duct rests on the hanger or saddle. Under no circumstances shall the width of the material in contact with the duct be less than 25 mm (see Figure 2.8.5(B)).
- (e) Hangers shall be adequately attached to the building structure.
- (f) Terminal devices connected by flexible duct shall be supported independently of the flexible duct.
- (g) Ductwork installed in subfloor situations shall be supported such that no part of the duct shall be in contact with the ground.

- (h) Flexible ducts shall be installed with a bend radius to duct diameter ratio in accordance with the following:

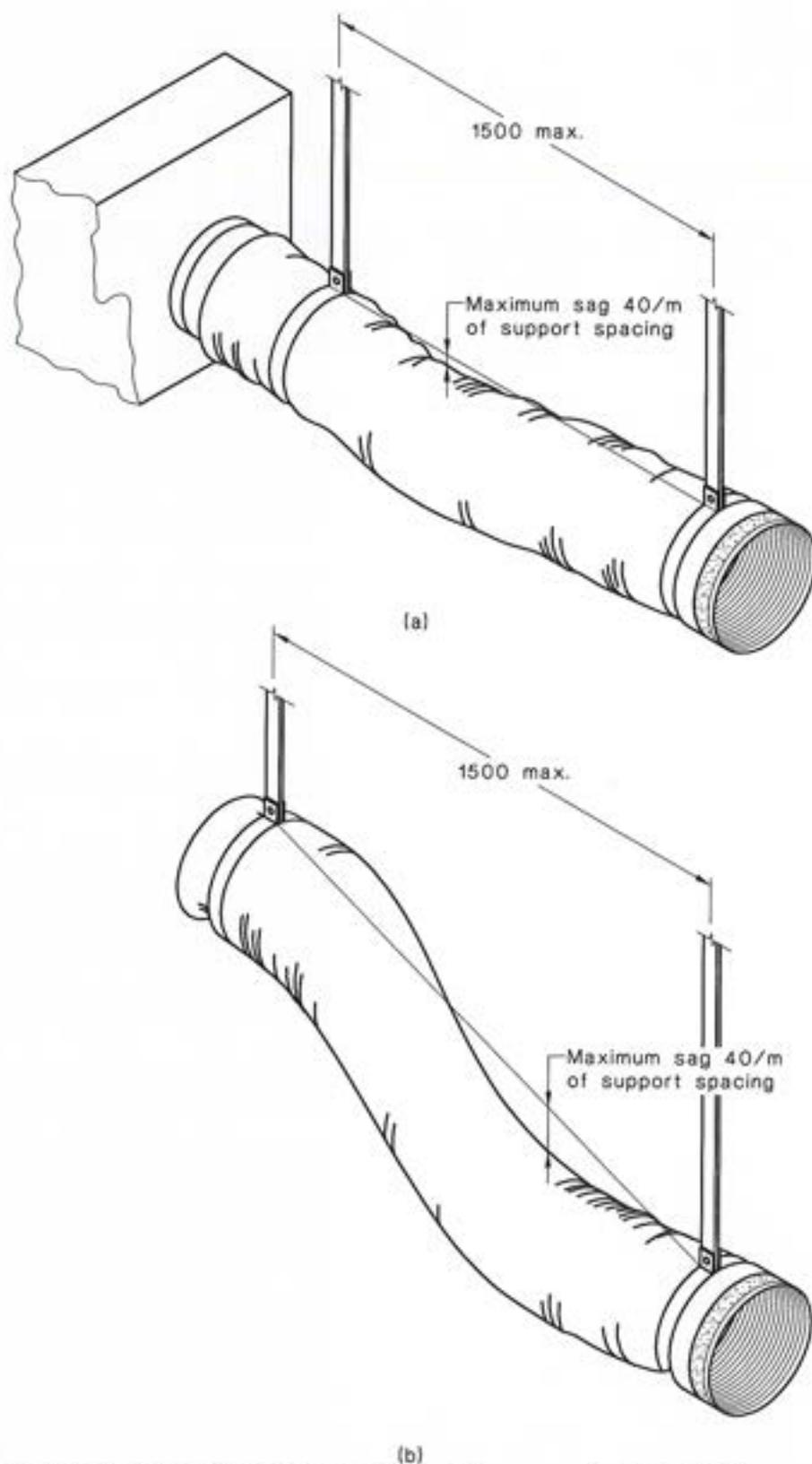
Duct velocity		R/D ratio centreline radius to duct diameter
Up to	5 m/s	0.6
	8 m/s	1.0
Above	8 m/s	1.5

NOTE: It is recommended that flexible duct be installed in lengths not exceeding 6 m between a duct spigot and a terminal device.

2.8.6 Insulation of flexible ductwork

The insulation of flexible ductwork shall be achieved by integrating the insulation material into the construction of the duct.

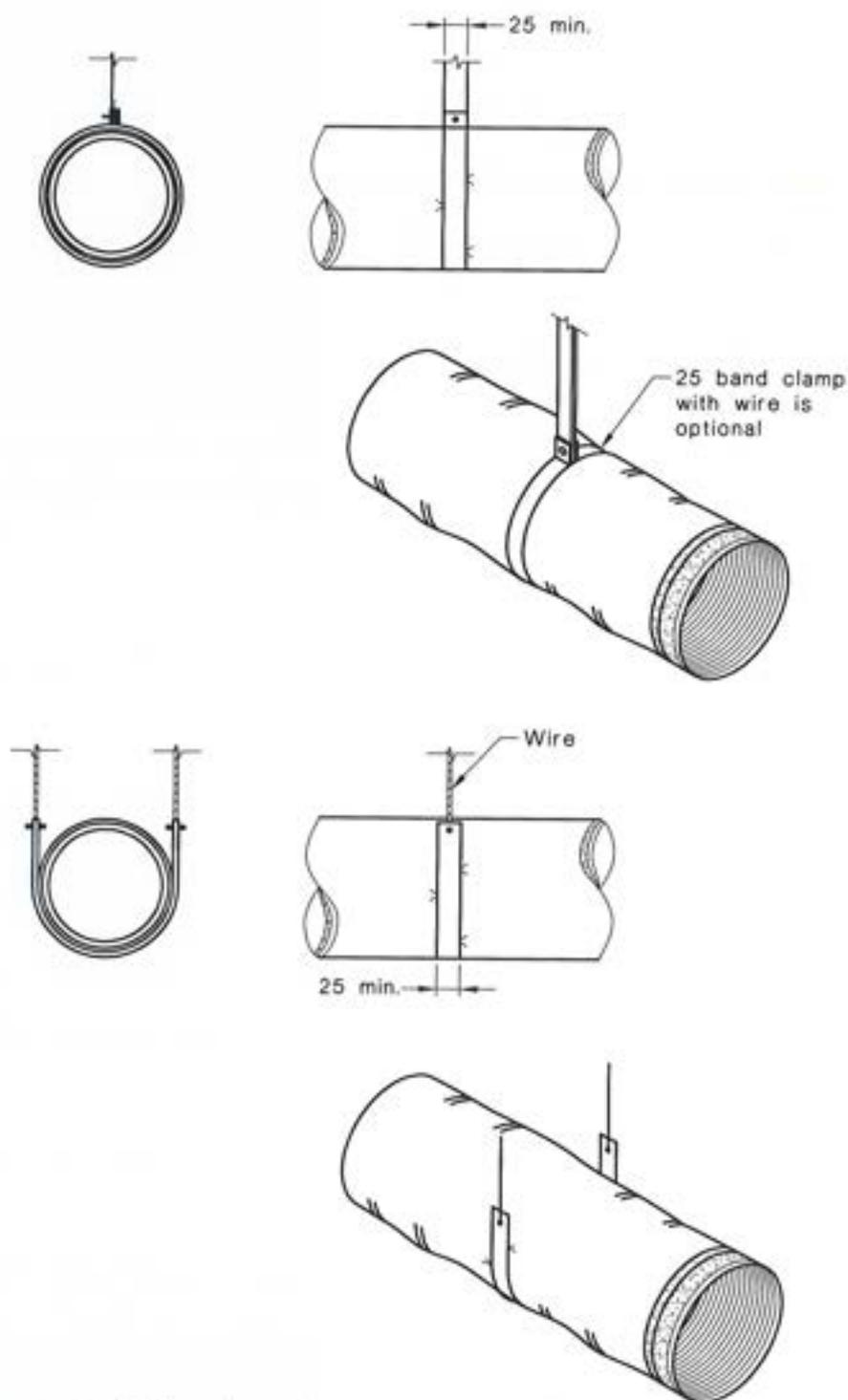
All flexible ductwork with integral insulation shall be tested in accordance with the requirements of Clause 2.8.2.



NOTE: Duct should extend straight for not less than 100 mm from a connection before bending.

DIMENSIONS IN MILLIMETRES

FIGURE 2.8.5(A) FLEXIBLE DUCTWORK—INSTALLATION



NOTE: Support system shall not damage duct, cause out-of-round shape, or compress insulation to the point where thermal bridging could occur.

DIMENSIONS IN MILLIMETRES

FIGURE 2.8.5(B) FLEXIBLE DUCTWORK—TYPICAL SUPPORT SYSTEMS