

# SPIRO-FLEX – Flexible Duct

## SPIRO-FLEX

Spiro-flex is a super light weight flexible, compressible air duct consisting of fibreglass reinforced aluminised PET foil tape, helically wound to encapsulate a spring steel wire. It can be supplied plain or insulated. In its insulated form it is sheathed with a printed, flame retarded, seamless outer sleeve. This duct has the ability to conform to any desired duct route and its cross section may be deformed.

Spiro-flex does not retain any configuration it is formed to, being of non-metallic construction and has the advantage of compressibility for convenient packaging. A length of three metres of insulated duct can easily be compressed by hand to 300 mm and when released after storage, immediately returns to its original length.

**Spiro-flex is not self-supporting over its length and without adequate fixing ties, can move with changes in pressure. It should not be used on VAV diffuser connections where branch duct pressure may fluctuate, nor should it be used as high pressure (inlet) ducting to VAV boxes or other pressure reducing devices.**

Spiro-flex complies with AS 4254, "Ductwork for air handling systems in buildings" and with the New Zealand Building Code requirements given in C3: Spread of Fire.

The test results for Spiro-flex, both plain and insulated, are:

Ignitability 0, spread of flame 0, heat evolved 0 and smoke developed 1. These tests were carried out in accordance with AS 1530.3. "Simultaneous determination of ignitability, flame propagation, heat release and smoke release".

Spiroflex complies with ISO9705 in accordance with NZBC C/VM2 Appendix A and has a group classification number 1-S (highest available).

## Standard Construction

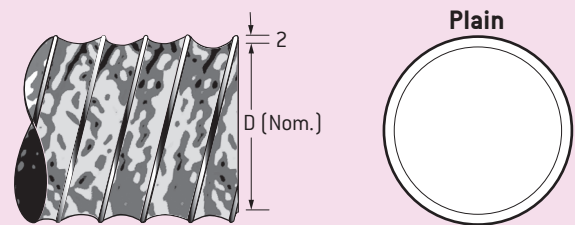
<b>Tape:</b>	Fibreglass reinforced aluminised PET foil laminate
<b>Insulation:</b>	Lofted polyester blanket, tested to AS/NZS 4859.1. Thermal resistance rating RI.0 m <sup>2</sup> K/W Thermal resistance rating RO.6 m <sup>2</sup> K/W
<b>Outer Sleeve:</b>	100 micron, flame retarded, Low density, high impact, Polyethylene vapour barrier, Printed with white lettering.

<b>Maximum Working Velocity:</b>	14 m/s
<b>Maximum Positive Working Pressure:</b>	375 Pa
<b>Maximum Negative Working Pressure:</b>	125 Pa
<b>Temperature Range:</b>	-7°C to +70°C
<b>Standard Lengths:</b>	3 and 6 metres (others available to special order).
<b>Packaging:</b>	Printed polyethylene bags.

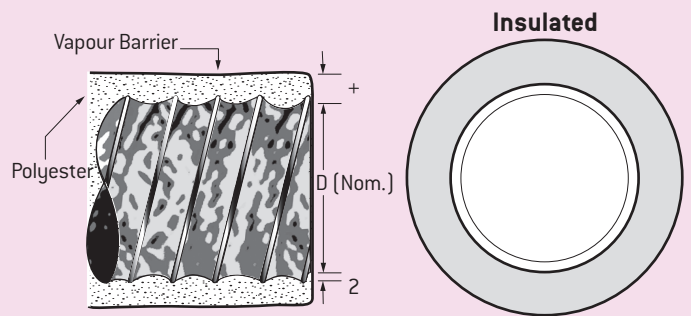
## Standard Options Available

<b>Plain:</b>	Plain, Uninsulated.
<b>Insulated:</b>	Plain, Insulated with a lofted polyester blanket and 100 micron polyethylene vapour barrier outer sleeve.
<b>Acoustic:</b>	Perforated inner, Insulated with a lofted polyester blanket and 100 micron polyethylene vapour barrier outer sleeve.

Acoustic ducting is a made to order product, contact your local Holyoake branch for more information.

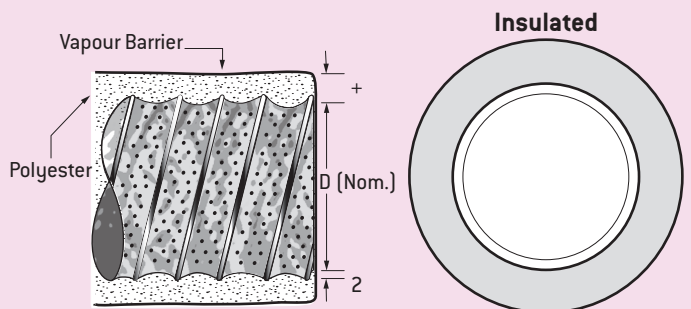


**Spiro-Flex Plain:** Sizes 100 to 500 mm.



**Spiro-Flex Insulated:** Sizes 100 to 500 mm.

+ = Insulation Thickness dependant on 'R' value.



**Spiro-Flex Acoustic:** Sizes 100 to 500 mm.

Perforated Inner

## Standard Sizes Available (mm Diameter)

100	125	150	175	200	225	250	300	350	400	450	500
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## Test Certificates

AWTA Textile Testing - Report of Testing, in accordance with AS 4254.

BRANZ - Report of Testing in accordance with NZBC C/VM2 Appendix A to ISO9705.

## Acoustic Performance

Acoustic ducting utilises perforations in the inner PET foil to increase the inherent attenuation of the duct. As a consequence, acoustic duct relies upon an unpunctured vapour barrier for its leakage performance and site conditions frequently mitigate against this.

The following table gives an estimate of the insertion loss of a 3 meter length of various diameter spiro-flex acoustic when tested in accordance with Air Diffusion Council Flexible Air Duct Test Code FD 72-R1. The ducting was tested in ideal laboratory conditions, fully extended and straight. Installation conditions on site such as bends and connections will increase the overall attenuation of the duct.

Diameter (mm)	In-Duct Insertion Loss (dB)							
	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
150	15.7	22.5	29.4	26.3	25.0	33.2	30.0	17.2
200	18.6	22.4	25.9	25.6	18.7	22.4	26.6	13.8
250	24.3	26.2	26.25	23.6	19.2	21.1	25.8	13.6
300	24.8	31.8	26.6	23.0	18.7	22.4	25.0	16.3

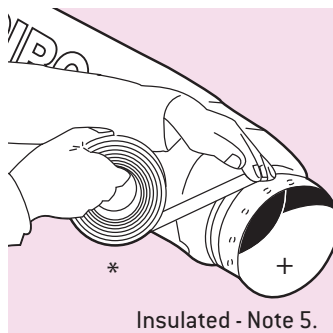
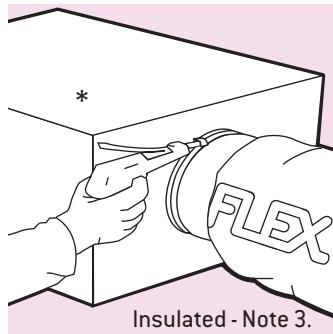
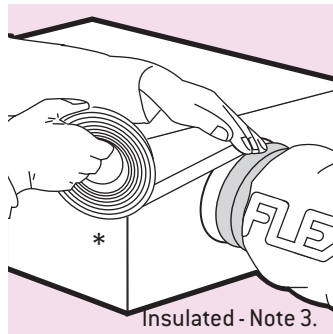
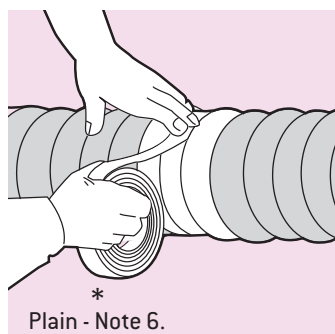
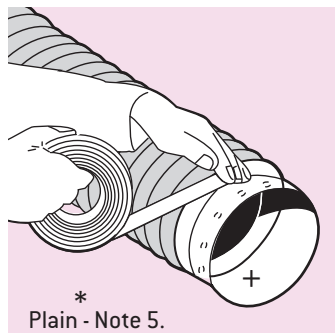
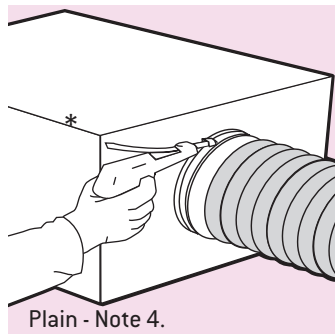
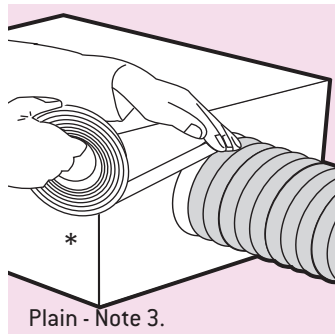


Note: A complete range of Ductwork Accessories and Tools are available, refer to Section K (Accessories).

# SPIRO-FLEX – Installation Instructions

## Plain Ducting

1. Install the duct in accordance with AS 4254.1-2012.
2. Grasp the duct close to the end and twist it onto the duct spigot or fitting.
3. Using Holyoake Duct Tape\*, apply a minimum of three overlapping, wraps around the duct and fitting, each layer overlapping the previous layer by approximately 50%.
4. Further mechanical fixing should be applied to the duct core using suitable Plastic Duct Ties or Stainless Steel clamping Bands.
5. For joining lengths, push and twist the end of the duct over a Holyoake Spin Connector+, tape and band, as in steps 3 and 4.
6. Slide the second length over the opposing end and repeat 5.
7. Finally attach the end of the duct to the terminal device or fitting, ensuring it is fully supported and extended in accordance with the 'General Rules For Installation' below.
8. If this necessitates cutting, fully extend duct, allowing sufficient surplus to slide over fitting and mark cut position.
9. With a sharp knife or scissors slide this between two adjacent supporting ribs and cut through duct membrane, finally cutting the inner support rib with diagonal cutting pliers and tuck the end of the rib back inside the duct.
10. Finish by smoothing the inside edge of the duct and sliding over the fitting, repeating steps 3 and 4.
11. On Oval collars the duct core shall be permanently fastened with corrosion-resistant self-tapping screws and 25mm diameter washers, at a maximum of 75 mm centres, located behind the collars retaining swage. To provide an air seal, repeat step 3 above.



## Insulated Ducting

1. Install the duct in accordance with AS 4254.1-2012.
2. Pull out the inside core sufficient to cover the duct spigot or fitting and smooth the inside edge of the duct by running the hand around the rim. Grasp the duct close to the end and twist it onto the duct spigot or fitting.
3. Follow steps 3 and 4 under Plain Ducting.
4. Pull the insulation forward to butt against the fitting and cover cuff of the jacket. Repeat step 3 under Plain Ducting.
5. For joining lengths, pull out inside core and fit to a Holyoake Spin Connector+, as per 2 - 4 above, repeat for second length, overlapping the jacket ends, to ensure insulation and vapour sealing continuity.
6. Finally attach the end of the duct to the terminal device or fitting, as 7 - 10 under Plain Ducting, ensuring insulation extends fully and mark cut position on inner liner and outer sleeve.
7. Pull out inside core and repeat 9 under Plain Ducting.
8. Carefully cut around the outer sleeve and through the insulation with a suitable knife and scissors.
9. Smooth the inside edge of the duct liner and slide over the fitting, repeating step 3 above, whilst ensuring the outer sleeve and insulation butt up to the fitting, repeating step 3 under Plain Ducting.

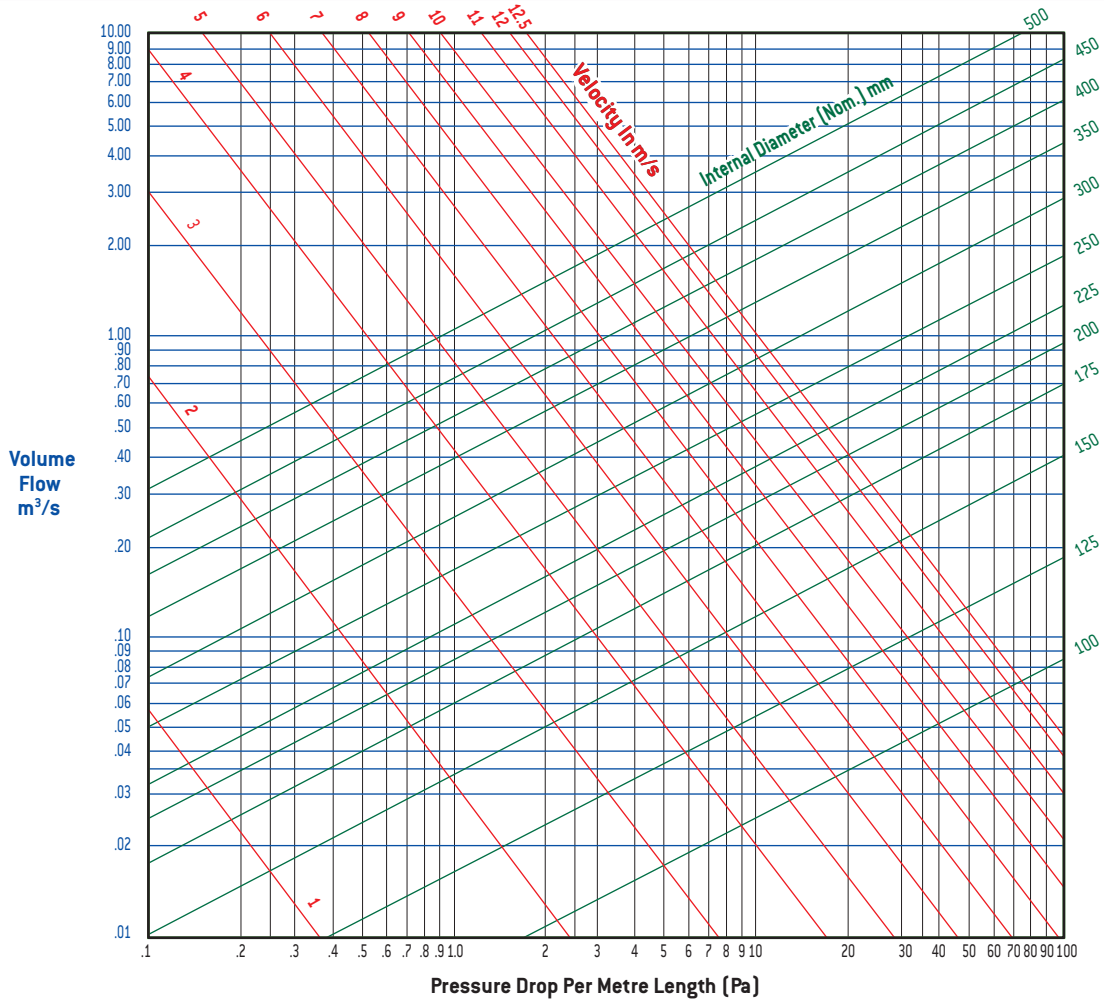
\* += A full range of HVAC Duct Tools, Duct Ties, Duct Tape, Duct Hangers and Spin Collars/ Connectors are available – Refer to Section K.

## General Rules For Installation

1. Spiro-flex must be installed fully extended to produce optimum results. Pressure Loss can increase greatly if this is not done.
2. Maximum sag between any two adjacent suspension points should not exceed 40 mm per metre.
3. Distance between any two adjacent suspension points should not exceed 1.5 metres.
4. Definite changes in direction should be anchored to prevent movement with changes in static pressure.
5. A semi-rigid, fire resistant load bearing strip a minimum width of 75 mm shall be in contact with the duct for at least a quarter of its circumference and be placed between the duct and the hanger/saddle material, (this being a minimum of 25 mm), to spread the flexible duct weight.
6. Connections to branch spigots or spin collars/spin connectors, should be given further support within 300 mm to avoid stress on the joint.
7. Take care to avoid direct contact with hot surfaces, such as steam or hot water pipes, etc.
8. Ducting shall extend 100 mm Minimum from a connection before any change of direction.
9. Terminal Devices shall be independently supported of the ductwork.
10. In Sub Floors, no part of the duct shall come into contact with the ground.
11. It is recommended that flexible duct be installed in lengths not exceeding 6 m between duct spigot and terminal.

**Note: Take suitable safety precautions for Hand and Eye protection.**

## Friction Resistance



Test data upon which the above chart was produced, was obtained in ideal laboratory conditions, with each tube fully extended and straight.

This type of duct is chosen instead of semi-rigid Spiro-set in most cases because of its ease of handling and the amount of field abuse it can withstand. As a compressible (floppy) duct, it is impossible to predict exactly what its configuration will ultimately be, and therefore impossible to predict pressure loss.

Where pressure loss is important, Spiro-set (semi-rigid) aluminium ducting should be used. Where Spiro-flex (or any similar type of duct) is chosen, the following should be borne in mind:-

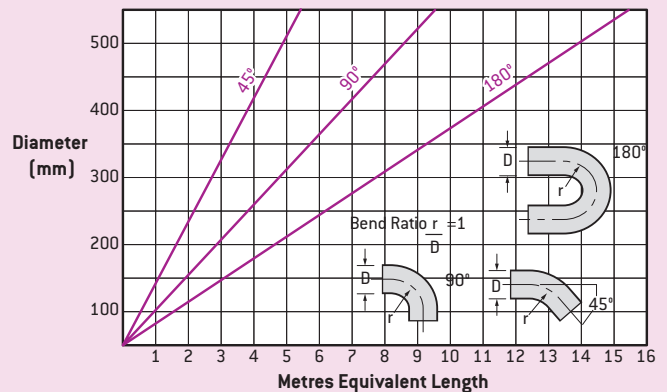
1. No excess pipe should be left in a run. Where a length is allowed to reduce by just 20%, the increase in pressure loss can be anywhere between 3 and 7 times the extended straight duct figure.
2. If excess duct is left in a run, it will be likely to expand to somewhere near its nominal length with back pressure from a diffuser damper or when air velocity reaches about 6 m/s. This will result in two or more sharp bends and the consequent increase in friction.
3. It is impractical to expect the installer to ensure a bend radius with a ratio of better than  $r/D = 1$ . Unless some form of guide bar is taped to the duct, it will not retain a longer radius, especially in the typical case where a run out has to turn through 90° vertically to connect to a diffuser. A duct anchor should be used in these cases to prevent a bend closer to 180° and a reverse set to line up with its feeder spigot.

### Note

Above data is for air density of 1.2kg/m³.

4. "Floppy" duct should never be used on high pressure connections to duct terminals such as VAV or mixing box inlets. While the duct is physically strong enough to withstand 1000 Pa static pressure, it will move as pressures change, and will naturally resist anything other than sharp changes of direction.

### Additional Friction For Bends



For pressure drop calculations, measure the full length of duct around the centre line, or to centre line intersection points.

The pressure drop created by changes in direction as determined by the equivalent length chart is additional to the pressure drop of the measured length.