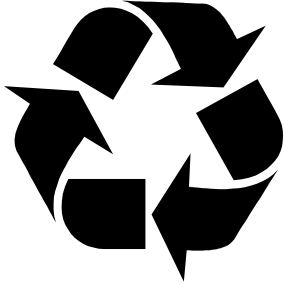


Leeaky Hose™



**Irrigation technology of
tomorrow, that's here today**

- **Made from 100% recycled materials - vehicle tyres and plastics**
- **Saves up to 70% on water usage (when buried or under mulch)**
- **Easy to install - light and pliable, no drippers or jets**
- **Low maintenance**
- **Uses standard 13mm hose fittings and connectors**
- **Will operate on high or low pressure (water tank or household tap)**
- **Uniform water distribution along entire length (up to 60 metres from one source)**
- **Fewer weeds, less plant disease, water delivered directly to roots**
- **Encourages deeper root growth - drought resistance**
- **Can irrigate any time of day or night**
- **Not affected by wind or sun (no burning of foliage)**
- **Invisible system - more attractive, less likely to be vandalised**
- **Approximate spacings - sand 1m, loam 1.7m, clay 2m**
- **Lasts 10 years or more under soil or mulch**
- **LEEAKY HOSE™ is cut to length, so you don't buy more than you need**
- **For optimum water savings and effectiveness, LEEAKY HOSE™ is best placed under mulch or buried in soil, but it can be used on the soil surface**
- **Ideal for awkward spots like narrow garden strips**
- **The low flow rates and pressure requirements of Leeaky Hose lead to significant savings in support plumbing, pumping and maintenance costs**

The Capillary Action of Soil

Soil mechanics can be quite intricate, but one basic principle of all soils is their ability to draw water by capillary action. The distance the water will travel from the source varies according to particle size. The larger the particle (eg. sand) the shorter the distance the soil can maintain mechanical tension. The smaller the particle (eg. clay) the further the distance that mechanical tension is maintained - both horizontally and vertically.

While capillary action works in all soils it has an essential ingredient. It will only work well when the background soil moisture is greater than 43%. Therefore it is essential with any irrigation system to begin watering early to keep this moisture level up. If you have left the soil to dry out all is not lost, but you will need to apply a lot of water in the initial stages to get the moisture levels up.

How Leeaky Hose Works

Leeaky Hose is designed so that water can work through its walls, without having any actual holes which would block up, or allow roots to get in from the outside. The porosity is controlled so that the water can 'sweat' though at a controlled rate over long distances at low water pressure. At pressures of 4psi (25kPa) or below, the hose will deliver moisture to the surrounding soil through capillary action as the surrounding soil dries. This ensures that the system will deliver proper irrigation to plants even in extremely low water pressure reticulation areas.

When Leeaky Hose is turned off, the residual water is gradually taken up by the surrounding soil so it does not attract roots through its walls.

Insect infestation - because it does not have any physical holes in it, Leeaky Hose is not subject to infestation by ants, which normally look for any underground highway. There are also no drippers or sprayers beckoning to spiders and insects to set up house.

Cycling

The water saving nature of Leeaky Hose will surprise you, therefore it is important not to run it excessively or your plants may suffer. It is important to understand that many of the ancillary benefits of Leeaky Hose come as a result of proper "cycling" of the system. Each time Leeaky Hose is turned on it lifts the soil moisture up to as high as 90%. When this is achieved the hose should be turned off. Over the ensuing three or more days the soil moisture level will gradually reduce, encouraging plants to root more deeply as they follow the water down (also picking up more nutrients from the soil as they go).

How often to water is hard to define because of differing soil types and weather conditions. Initially try once a week, watering for three hours and then vary this as conditions change, plants get bigger, weather gets drier etc. Try to make sure your soil remains moist at all times, so capillary action continues to work.

Operating Pressures

Leeaky Hose is a low pressure system and delivers greater quantities of water evenly at the lower pressures. As pressure is increased, water friction will force more water out of the first few metres of the hose and starve the hose at the other end. This characteristic has been documented by the Dept of Engineering at Melbourne University.

Leeaky Hose will carry water for at least 60 metres from a single water source, so if the end is being starved, the most likely cause will be too much pressure.

Leeaky Hose on Very Low Pressure (Under 4m Head - 6psi or 40kPa)

When Leeaky Hose is supplied it is in an uncured state, and is capable of leaking at a rate exceeding 70 litres/metre/hour (l/m/h). This is easily controlled by inserting a tap inline with the hose. Over time the rubber composite cures and the porosity drops. **This is normal**. After a few months of curing the leak rate will naturally drop to around the nominal leak rate of 2 l/m/h. However, no further adjustment of the flow rate will be necessary.

With very low pressure we recommend having the hose in as much contact with the soil as possible, ie. buried or under mulch. The capillary action in the soil is a very important factor when operating on these low pressures.

Use Stored Rainwater

Rainwater can be collected from the roof of your house, shed or greenhouse and stored in an elevated tank. Did you know that 10mm of rain on 1 square metre of your roof produces 10 litres of water (2.19 UK gallons)? Even a small shower during the summer period could provide useful water for your garden.

Feeder Hoses on Low Pressure

If your Leeaky Hose is a long way from the source you may need a larger diameter feeder hose. We recommend inexpensive thinwall polypipe which comes in 13, 16, and 19mm diameters. Reducers can be used to drop down to 13mm so it matches Leeaky Hose. 16 and 19mm polypipe and fittings are available at specialist irrigation companies - look in the Yellow Pages to find your nearest one.

Doubling the diameter of the feeder hose increases the cross sectional area by four times, so a small increase in diameter gives a lot more volume, and enables much longer supply lines.

Water Timers on Very Low Pressure

If you are planning to use a timer with low pressure irrigation, check with the supplier that the solenoid valve used to shut off the water will operate on low pressure. Many solenoid valves are designed in such a way that the incoming pressure assists the valve to close. As strange as it may sound, a valve of this type may not shut off a low pressure supply, so in effect it will be useless. To get around the problem you can put a solenoid on the high pressure side of the pressure reducing valve or regulating tap. If using a tank, you will have to find a valve that operates on low pressure.

Leeaky Hose on a Household Tap

Connect the hose using a standard garden hose and fittings. Turn the tap on a little and wait until the hose starts to drip. This may take a few minutes, depending on how long your hose is. Increase the water flow slowly until you just begin to see very fine spurts of water coming from the hose, then turn the tap back until they disappear. Do not run the hose on full pressure or with spurts - it will be damaged.

A More Permanent Installation of Leeaky Hose on a High Pressure Supply (Over 75kPa - 10.5psi)

DO NOT apply high pressure directly to Leeaky Hose, as this will damage it. If you see a lot of little spurters, the pressure is **too high**. Leeaky Hose is a slow soaker system and is not designed for high flow rates.

Leeaky Hose may be used if you have a high pressure water supply, however you will need to regulate the flow of water running into the Leeaky Hose by means of an in-line tap or pressure reducing valve set to no more than 75kPa (10.5psi).

If using a Wingfield or Plassay type in-line tap you need to do the following calculations in order to set the flow rate:

The nominal rate of leakage is 2 litres per metre per hour. If, for example, you are running a 50 metre length of Leeaky Hose, the amount of water delivered to the soil in an hour over the length of the hose would be 100 litres. Divide the total volume (in this case 100 litres) by 60 (to get the rate per minute). This would give you a flow rate of 1.6 litres per minute.

Now run water through the in-line tap where it joins the hose and adjust the flow rate until a 1.6 litre container is filled in 1 minute. The position of the in-line tap is now set, and can be left with the hose (see back page). This only needs to be approximate.

The formula would read as follows:

$$\frac{\text{hose length} \times 2 \text{ litres/minute}}{60} = \text{rate per minute}$$

We have included the following table to help you						
length, metres	10	20	30	40	50	60
litres / minute	0.33	0.66	1.0	1.33	1.66	2.0

Alternative System for a High Pressure Supply

Break the pressure by using a ball cock in a tank. The tank is elevated to provide the pressure, whilst the ball cock keeps the tank topped up. The advantage of this system is that it is easier to monitor the amount of water applied if you turn off the incoming water once the tank is full. It is also very easy to apply liquid feed. No atmospheric losses are experienced as the nutrients are delivered directly to the root zone.

CAUTION: Do not use fatty or oily fertiliser such as liquid fish or Nitrosol through the hose, as these will block it.

How Deep, How Wide

The rate of capillary action of water through the soil varies depending on the size of the soil particles. Water travels more slowly, but further, in fine soils like clay, and more quickly, but not as far, in coarse-grained soil like sand. Loam and mountain soils are somewhere in between.

To work out the optimum spacing for Leeaky Hose, it is recommended that the hose be placed on the ground and run for a few hours. Then the spread of water to either side should be measured to gauge the optimum spacing for your type of soil. When operating properly beneath the soil, the soil surface remains dry (less disease and weeds). Moisture can be found by digging down into the soil. This moisture is found progressively deeper the further you are from the hose. This deep moisture encourages deep roots, which is highly desirable.

The following table will give a general indication of spacing of Leeaky Hose in each soil type.

Soil Type	Spacing
Sand	1.0 metres
Loam	1.7 metres
Clay	2.0 metres

Depth is not critical to good watering, as water will travel towards the surface through capillary action. Leeaky Hose can be put anything between 1 and 30 cm below ground (15 cm in coarse sand) and still provide sufficient water for shallow rooted plants, as long as the system is turned on sufficiently often to match the plants' demands. Initially, conventional watering may be required a couple of times to get the plants established, especially with seedlings.

Installation

Leeaky Hose should be laid as level as possible in the area to be irrigated. It could leak irregularly for a week or so, as the rubber 'cures'. Thereafter the leak rate will be consistent for the full length of the hose. Our 12mm hose will deliver water consistently for up to 60 metres from a single input. A run of 120 metres is quite effective if water is being fed into both ends of the hose, or from the middle.

Slopes

Leeaky Hose should not be laid down slopes of more than 2.5° - but it can be. Leeaky Hose is, in fact, a preferred product for preventing erosion on steep slopes. It should be laid across the slope and spaced according to soil porosity. This can be achieved by running normal hose or poly pipe down the slope and running the Leeaky Hose from it.

DOWN SLOPE - Leeaky Hose can run down slopes more than 2.5°, but a flow restricter is required every metre of fall. The simplest and most effective method is to work up from the bottom of a run, setting the in-line taps for the right flow at each metre fall level. Slopes of 10° require a tap about 4.6 metres distant, and this distance increases or decreases with the fall or rise of angle respectively. These only have to be set once and are then left with the hose.

Fittings

Leeaky Hose uses standard 13mm fittings such as elbows, 'T' joiners and end plugs (the same as those used for drip and spray systems), which are available from most hardware stores and garden centres. Nylex, Wingfield, Plassay and Hardie fittings are all suitable.

Note: You can utilise the fittings from your old microjet overhead irrigation system.

How Long Does It Last?

Products made from the same raw materials as Leeaky Hose are still functioning below ground after more than 12 years. Leeaky Hose is made from non-volatile and non-reactive materials and could be expected to last 10 years or more below ground.

Using Dam or Creek Water (Dirty Water)

Leeaky Hose is not subject to blocking under normal circumstances, no matter how dirty the water. However, sediment can accumulate in the hose and over time the area through which water can leak is reduced. The solution to this is to remove the end plug from each run and flush the system using a slightly higher pressure. When the water starts running clear (or the same colour as the ingoing water) the hose should now be cleared, and the end plug can be put back in. Remember to leave the ends exposed for periodic flushing.

In a larger installation using dirty water it may be preferable to invest in a 200 mesh filter so the system can be cleaned at one point, rather than periodically flushing every hose end in the system. **If using pressures higher than 25kPa (4psi), you MUST use a filter. This is because at pressures greater than this, the dirt particles are driven into the pores and may not be easily removed by flushing. This also applies to the inline tap method of pressure control.**

Leeaky Hose in the Vegetable and Flower Garden

Leeaky Hose works extremely well in the vegetable garden. A system that works well is to form raised beds, and then before planting, place Leeaky Hose 100 to 150mm deep in a trench directly below where you intend to place your plants. Leeaky Hose will then provide moisture to the root zones of your vegetables all summer long, and in autumn, you can easily lift the hose if you want to cultivate. Follow on with the same procedure the following season. Lettuces, zucchini and tomatoes especially benefit from the dry surface conditions (less disease)

Annual flower beds can also benefit, and if you only put the hose just below the soil surface, you can easily lift it at the end of the season. You will appreciate the lower number of weeds over the summer period.

Wide Range of Uses

- Vegetable and flower gardens
- Turf growing in high traffic areas
- To reduce plant losses in initial landscaping
- Naturally fed unattended irrigation systems
- Aeration of fish farms and mobile fish transportation tanks
- Terrace irrigation without erosion
- To reduce needs for herbicides and pesticides in orchards and broad acre planting
- Hydroponics
- Organic farming
- Cut flowers
- Parks and reserves

USEFUL CONVERSION FACTORS

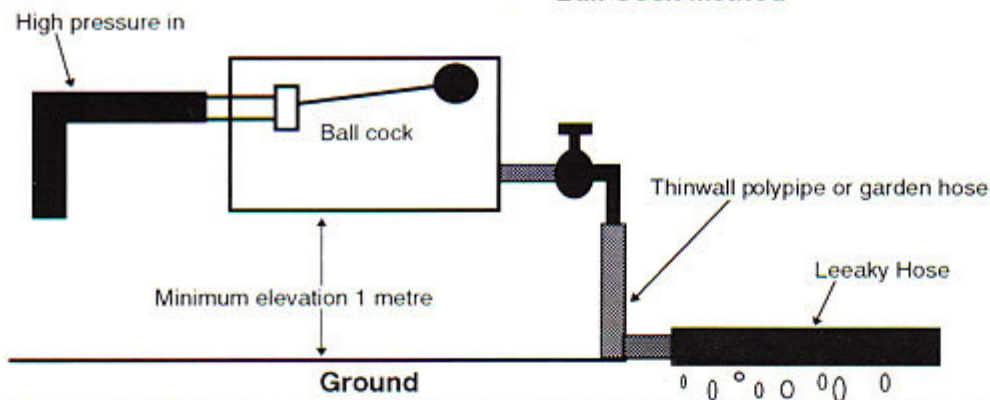
1.0 metre of elevation = 10kPa = 1.45psi (**min pressure**)

7.5 metre of elevation = 75kPa = 10.5psi (**max pressure**)

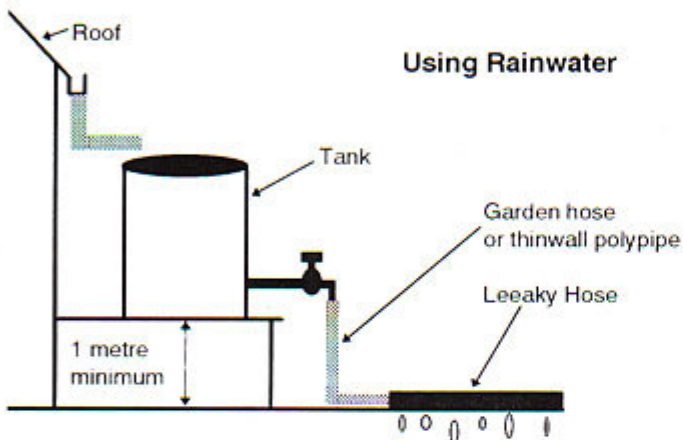
1.0 litre = 1000 millilitres

1.0 metre = 3 feet and 3 inches

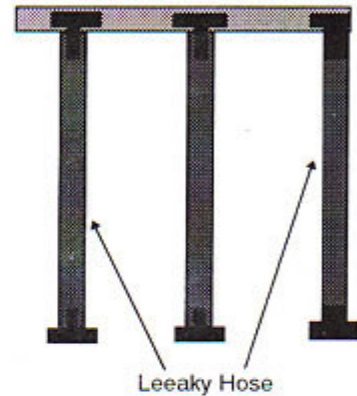
Ball Cock Method



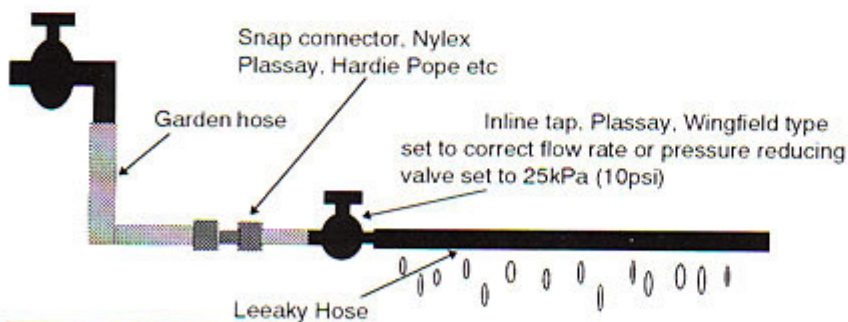
Using Rainwater



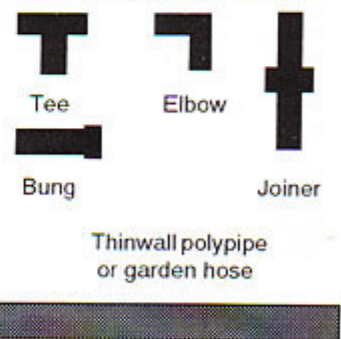
Wide Lawn or Vegetable Patch



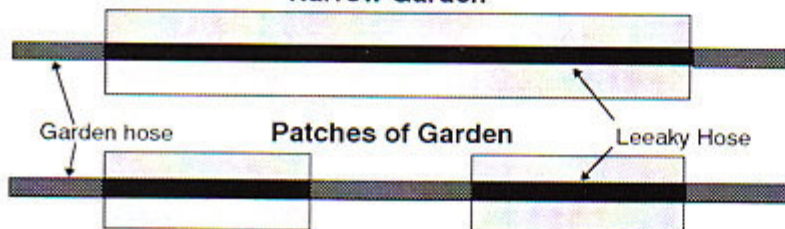
High Pressure or Domestic tap



Standard 13mm Fittings



Narrow Garden



Available from



And remember, if your hose doesn't leak, you're probably wasting water.