Drip irrigation

Water saving goes huge

Aquaponics in PE

Healing therapeutic gardens

How to....
install LDPE pipe

SA Water Resources status quo
Drip irrigation

A dripper has the difficult task of delivering and maintaining a low flow rate of anything between 0.5 to 5 litres per hour through a relatively large flow path with its subsequent low velocities and at the same time keeping clean, so that the flow rate does not decrease over time from sediment build-up or even a complete blockage.

The internal features of a dripper

Fifty years ago, in the formative years of drip irrigation, a dripper’s flow path was simply a long tube with a circular cross section that created little more than simple friction loss. The shape of the whole dripper body was a cylinder whose diameter approximated that of the dripperline into which it was inserted.

A modern dripper is more sophisticated with a flow path whose cross-section is no longer circular but rectangular and whose length is designed into special shapes: specifically, teeth. The shape of the whole dripper body may be cylindrical like the old drippers or maybe a ‘boat shape’ and welded onto the inside wall of the dripperline.

In a non-pressure compensating dripper (non-PC), the main features are usually an inlet filter, an inlet orifice, a flow path whose shape is a labyrinth with teeth, an exit ‘bath’ and finally an orifice that is made through the wall of the dripperline from which the droplet leaves the irrigation system.

Pressure compensating drippers (PC) have additional features such as a flexible diaphragm that serve to keep the flow rate constant regardless of the pressure at the inlet to the dripper.

Inlet filter

The filter at the inlet is there to prevent solid particles from entering the dripper and potentially blocking its flow path. This means that the openings or gaps of the inlet filter need to be smaller than the passage of the labyrinth that follows. Thus, if a particle manages to get through the filter, it should be sufficiently small not to block the labyrinth once it gets in there.

The gaps of the inlet filter tend to be about 25 to 30% less than the width and depth of the labyrinth.

Of equal important is the actual size of the inlet filter. This needs to be as big as possible. If particles do get trapped on filter, there needs to be sufficient space on the filter for the full flow rate to get through.

Labyrinth

The dripper’s inlet filter by itself is not sufficient to keep the labyrinth clean.
Wise water use, reuse, recycling and conservation
At high levels in Western Cape

Water Purification Solutions (WPS) – headquartered in the Strand in Cape Town – has with the drought conditions in the Western Cape seen a significant escalation in the awareness of water conservation in the Western Cape. The need and interest for assurance in the conservation of water, the quality of water and the reuse of water in all sectors – agricultural, industrial and domestic – is pervasive, and for good reason, with the Western Cape recently being declared a disaster area in terms of water.

The shortages of water have revealed a lot of the facts about water to South Africans in compelling ways, and WPS is definitely seeing this new awareness in their business, as many new clients are coming on-board. For instance, industrial clients – who use water extensively for cooling (like in 24/7 data centres) – are starting to put contingency plans in place, for instance looking at boreholes and reuse of water with serious intent. Wine farmers in the Western Cape are particularly keen to conserve and recycle water on the farm and in the wine making processes. However, WPS’s clients range across a water-saving spectrum – including all sorts of farmers and even water-saving airports!

Historically Water Purification Solutions attention was mainly geared towards water purification systems that could process unusable sources such as boreholes, rivers and sea water creating usable, potable water, for clients such as farmers, industry, municipalities.

With an extensive track record in potable water production WPS has adapted the various potable water treatment systems towards industrial waste water treatment systems catering for the reclamation and re-use of industrial waste water.

Highly skilled

WPS, established in 2006, is composed of a highly skilled team of engineers, scientists and all-round water fundis. The team is committed to delivering a high quality of work and equipment to their customers. With water solutions in high demand, naturally many operators are jumping on the bandwagon. It is prudent to verify, say WPS, water firms’ business credentials and quality.

WPS, however, also work nationally, and have delivered water treatment solutions to groups such as macadamia farmers, in the Eastern Cape.

The water purification systems manufactured by Water Purification Solutions incorporate a variety of technologies suited to the clients’ specific application, like: flocculation, standard filtration, membrane filtration (i.e. micro, ultra & nano), reverse osmosis and sterilising via UV, ozone or other oxidising agents. WPS offer the client the full range and top quality water treatment systems.

WPS’s Shandor Cylvan says that they have certainly observed the demand for their water treatment services switch into high gear in recent years. Their clients include farmers of all sizes, industry and domestic users. They treat dams, rivers and boreholes, and more, for their clients.

“WPS as the name suggests offers turnkey water treatment systems for any water related issues. Our core focus being the design, manufacture, installation & operation of industrial water treatment systems,” he says.

WHO specs

The team at WPS work to very high specifications (“specs”), indeed using the World Health Organisation specifications.

Shandor relates the story of a farmer in the Caledon area who has an excellent yield of water from boreholes but was experiencing terrific problems with dissolved metals such as Iron & Manganese and acid levels. The WPS team assisted in analysing, developing and installing a suitable water treatment plant for the farmer to alleviate these water quality problems.

In general, comments Shandor, farmers have also become more aware of water quality problems, such as salinity and acidity, which can have dire effects on the operability of irrigation systems and even on crops or livestock. “We have seen more interest from farmers in issues of water quality, which is important to overall health of an environment and is becoming highly pertinent with regards to meeting standards for exporting crops. Increasingly, South African consumers are also becoming highly attuned to matters such as water conservation and quality.”
Gardens feed the body, mind and soul – and the healing power of gardens and gardening is, not surprisingly, taking off formally as vital in many areas of therapy.

Joanne Aquilina, founder and former CEO of Therapeutic Gardens Australia and also CEO at the LNA Master Landscapers’ Association recently chatted to SABI magazine about her innovative consulting firm’s focus and profound work in the field of healing gardens.

Joanne tells us that there is excellent reason for the rise of therapeutic gardens in the healing spectrum.

“Some of the research to date demonstrates that even simply gazing at nature through a window or taking a stroll through nature can heal the speed of recovery from surgery and aid recovery times. It is likely that the reason for this is that interacting with nature boosts our immune system. “

“Therapeutic gardens have positive impacts across a vast range of conditions and the goal is to allow for regular interaction with nature to achieve maximum health benefits, physical and mental - and to create an appropriate space to conduct a range of therapies with specific desired results unique to the individual."

Interestingly gardens as a resource for health fell out of favour in the 20th century, in favour of drug-based and surgical western medicine.

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The Mondelēz International Foundation, and community partners INMED Partnerships for Children recently unveiled their first ever aquaponics gardening system in Port Elizabeth. This innovation will provide school children in low-income communities of Port Elizabeth access to fresh, nutritious produce year-round. The Mondelēz portfolio features billion-dollar brands Cadbury, Cadbury Dairy Milk and Milka chocolate, LU, Nabisco and Oreo biscuits, Tang powdered beverages and Trident gum.

The new gardening system supports the Foundation’s Health in Action program – a primary-school-based initiative that is implemented by INMED and focuses on promoting healthy living in local communities in South Africa. Health in Action South Africa reaches more than 100,000 primary school children in 116 schools across 13 at-risk communities in Gauteng and the Eastern Cape in South Africa. Its three main goals are to ensure school children from disadvantaged communities have access to nutritious food, get enough physical exercise and learn about nutrition.

The innovative and cost-effective food production hub is located at the Nelson Mandela Metropolitan University (NMMU) Missionvale Campus. The unit, built within the NMMU Medicinal Garden at Missionvale Campus, is a medium-sized aquaponics system that includes a protective greenhouse over the fish tanks, with complimentary water catchment or storage facilities and solar power systems.

Well-balanced diet

This collaboration with the university also boasts research opportunities, with an MTech Agriculture student having since been granted an opportunity to conduct research on the unit that looks at factors affecting the viability of aquaponics in the Nelson Mandela Bay region. MTech Agriculture student Mpendulo Ngcakani, who is managing the aquaponics system as part of his postgraduate research work.

The Port Elizabeth aquaponics system is approximately 223 square meters in size and will at maximum capacity produce approximately two tonnes of various greens and approximately 1.9 tonnes of fish annually. While the fish will be harvested twice a year, vegetables will be available throughout the year and will be donated to local schools to supplement the government’s school feeding scheme program — benefiting thousands of school children.

At the launch Deputy Vice-Chancellor Research and Engagement Prof Andrew Leitch of NMMU thanked the partners INMED South Africa and Mondelēz South Africa for their role in implementing this innovative and cost-effective food production hub.

The project forms part of the broader Health in Action programme launched in 2015 to promote healthy lifestyles, address obesity and alleviate hunger amongst primary school children.

Two tonnes of veggies

The unit comprises five fish tanks and nine grow beds planted with a variety of vegetable crops, such as lettuce, spinach, peppers, and cucumbers. At maximum capacity, the system will produce roughly 2 tons of vegetables and 1.9 tons of fish annually. While the fish will be harvested twice a year, vegetables will be available throughout the year and will be donated to local schools to supplement the government’s school feeding scheme program — benefiting thousands of school children.

"Daily consumption of fresh produce is widely acknowledged as key to a well-balanced diet, yet for many in low-income communities in South Africa, healthy food choices are often out of reach," said Joost Vlaanderen, Mondelēz South Africa’s managing director. “The aquaponics facilities will help address this challenge.”

Aquaponics is an innovative food production technique that combines aquaculture (fish farming) with hydroponics (soil-less crop production, with the cultivation of plants in water). The technique uses up to 90 percent less water than traditional gardening methods and produces up to 10 percent more crops. This is especially important as drought has been threatening the water supply and food security in the Nelson Mandela Bay region.
How to ...

Install LDPE Pipe

Low density polyethylene pipe is one of the most commonly used utility pipes in the irrigation sector. Various quality grades of pipe are available as well as a mix of fittings and adaptors. This editorial will focus on jointing procedures for LDPE pipe and also includes some discussion on proposed specification changes relating to future pipe diameters - by Mike de Villiers

INTRODUCTION

Polyethylene piping is a widely used raw material for irrigation piping. It is an extremely ductile material which gives the piping flexibility and toughness as well as excellent resistance to pressure fluctuations, such as water hammer. Polyethylene piping is supplied in its high density form, known as HDPE, which is used for higher pressure applications up to PN 16 (16 bar) and larger diameters up to DN 1000 mm. In its low density form, it is used extensively for small diameter low pressure distribution pipe systems in conjunction with sprinklers and micro irrigation emitters. LDPE piping is available in sizes DN 10 to DN 80 mm and in pressure classes PN 3 and 6 (3 bar and 6 bar). Both HDPE and LDPE pipe systems have their own dedicated jointing systems and adaptors, which have been in use in the RSA since the 1970’s.

Specifications

South African Bureau of Standards (SABS) specifications have been in existence since the 70’s for polyethylene pipe, however the old SABS 533 (part 4) specification for HDPE was replaced by SANS ISO 4427 in 2008. (SANS is a relatively new notation and stands for a South African National Standard). This left the old SABS 533 (part 1) specification in place to cover the LDPE range of pipes. These specifications differ in that the SANS ISO 4427 specification covers the full range of outside diameter pipe sizes and the SABS 533 (part 1) specification only covers inside diameters. This indicates why the two pipe systems have different jointing systems, namely compression and electro-fusion fittings for HDPE and insert fittings such as Full flow® for LDPE.

In 2008 the SANS 533 (part 1) specification for LDPE pipe was scrapped by the SABS working committee and replaced by the SANS ISO 4427 specification. This effectively meant that all new production of SABS certified polyethylene pipes would have to change to outside diameter dimensions, thus creating a pipe range that cannot be used with the current range of locally made insert fittings. Due to representations from the irrigation component manufacturing industry, the inside diameter dimension tables from the SABS 533 specification were included in the SANS ISO 8779 specification in 2013, but only for a period of 5 years. These developments will have to be managed by the pipe and fittings manufacturing industry in the near future, however, note that these developments only apply to SABS accredited pipe.

The bulk of the irrigation market has been using non-certified (non-SABS) utility pipe since its inception. This means that the quality standard of the pipe relating to production tolerances and raw materials has been determined by the individual manufacturer, with the pipe diameters being based on the SABS 533 (part 1) specification. In most cases this does not imply inferior quality, as many of the ISO 9000 accredited manufacturers produce both SABS and non-SABS grades of pipe. However, the lack of accreditation may result in variations in the quality of the pipe due to the absence of quality monitoring, carried out routinely by the SABS on their mark bearing products. Inadequate control of the quality and quantity of recycled raw materials, used in utility pipe, leads to changes in the ductility of the pipe and inconsistent shrinkage rates, both of which impact on joint quality and hence the lifespan of the system.