IRRIGATION & WATER TECHNOLOGIES

FACT SHEET

KISSS minimises the risk from using recycled water

Sub-surface irrigation is a much safer way of using recycled water than sprinkler or surface drip (Oron *et al* 1992, Enriquez *et al* 2003, Song *et al* 2005, Anon 2006). However, not all sub-surface systems are equal.

Features of the Australian designed KISSS sub-surface textile irrigation system add another layer of **safety,** when **recycled water** is used in public areas, by improving the uniformity of application and reducing losses to the surface and to ground water. These benefits are obtained through clever use of three key components:

1. The key component - a geotextile cover - ensures lateral and longitudinal spread of water. The material conducts water 10 000 times faster than soil.

2. A plastic tape glued on the geotextile above the emitters deflects the discharged water and prevents tunnelling into the surrounding soil.

3. An impermeable polyethylene base membrane under the drip line that restricts drainage and encourages longitudinal spread of water.

Advantages

- **No tunnelling**. With conventional drip line, water discharged from the emitter can mine its way to the surface producing an open channel or tunnel. Once a tunnel has formed, a puddle of contaminated water will appear on the surface every time the irrigation occurs.

  The KISSS design prevents tunnelling by dispersing the water through the full surface of the geotextile between emitters, greatly reducing the force of the discharge to the soil. KISSS can be operated even when the disposal area is in use without risk to the public.

- **Reduced deep drainage and groundwater contamination**. Water drains below a subsurface irrigation line when the surrounding soil becomes saturated. This is minimised when the discharge rate is close to the soils capacity for water absorption by capillary action. Even the lowest discharge rate (1L/hr) from a conventional drip pipe is too high because it is focussed around the emitter (point source).

  KISSS can apply water at a much lower effective discharge rate than any other system because the water moves into the soil from the surface of the geotextile. This means the discharge from an emitter is dispersed along the entire length and width of the line instead of at discrete points.

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KISSS SUB-SURFACE TEXTILE IRRIGATION

- **Soil surface remains dry**. No tunnelling means no puddles or surface runoff. Water moves to the surface by capillary action and so the soil is never saturated. Moisture is held tightly within the soil matrix preventing contamination of turf with free water.

- **Quality of irrigation water is improved**. As water moves by capillary action from the drip line to the surface, solids are removed by filtration and gravity; and pathogens are inhibited by biological suppression (Oron *et al* 1992, Enriquez *et al* 2003, Song *et al* 2005).

- **More uniform distribution of water in the soil increases the Phosphorus sorption life of the disposal area**. Where the distribution is not uniform (as in surface and sub-surface drip), the soil in those regions receiving the highest volume of water will become saturated with Phosphorus first. In other words, the area will become leaky well before the full sorption capacity of the site has been exploited. This phenomenon could be called "point source leakage".

- **Wider and more uniform soil wetting pattern ensures the surface conditions are more stable under foot.** Conventional drip pipe systems discharge water at rates that are much higher than the soil can accept producing soggy areas. These increase the risk of injury to users.

  Sub-surface textile irrigation discharges water at a rate that more closely matches the capillary action of the soil.

References

1. Anon. Managing urban stormwater. Harvesting and reuse. Department of Environment and Conservation NSW April 2006.

2. Enriquez, C; Alum, A; Suarez-Rey, E; Choi, C; Oron, G and Gerba, C. 2003 Bacteriophages MS2 and PRD1 in turfgrass by subsurface drip irrigation. Journal of Environmental Engineering. 129(9): 852-857.

3. Oron, G; DeMalach, Y; Hoffman, Z and Manor, Y 1992 Effect of effluent quality and application method on agricultural productivity and environmental control. Water Science and Technology 26(7-8): 1593-1602.

4. Song, I; Stine, S; Choi, C and Gerba 2005 Comparison of crop contamination by microorganisms during subsurface drip and furrow irrigation. ASCE Journal of Environmental Engineering.