

T-Systems
A World Leader!



ΔT-Tape®

*Delivering Drip Irrigation
Solutions for Agriculture*

A World Leader

T-Systems is the largest manufacturer of drip tape with major production facilities in Brisbane Australia, San Diego USA and Toulouse France.

T-Systems is totally focused on providing drip irrigation solutions to the tens of thousands of farmers worldwide who enjoy the benefits drip irrigation can provide.

T-Systems has a global team of agriculturalists who are in place to ensure that when a T-Tape system is installed it delivers the results our customers have come to expect.

T-Systems global position not only provides us with the best knowledge of drip irrigation production systems, it also provides growers with the security and peace of mind that only comes from dealing with the largest manufacturer of drip tape in the world.

An Australian Professional

In Australia and New Zealand, T-Systems has been extremely proactive in developing the use of T-Tape drip irrigation systems in a broad range of annual and perennial crops. Working in conjunction with growers, industry peak bodies and government agencies, T-Systems has invested substantially to ensure the products and systems developed are effective within the environmental and market conditions of the region.

T-Systems Australia staff are highly motivated, experienced and totally focused on the production, design, installation and management of T-Tape drip irrigation systems. The success of T-Systems in Australia now spans over 20 years.



"We are always informed about new developments in products. The District Sales Manager is a good communication link between the grower and the factory producing the product. Our District Sales Manager is always available to help with any product enquiry. The communication is excellent."

Steve DePaoli, Austchilli, Bundaberg Australia

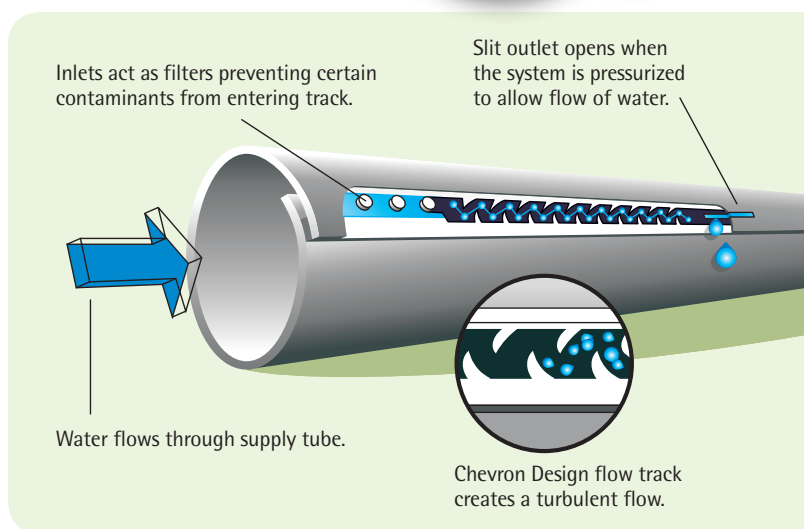
T-SYSTEMS... growing with farmers worldwide



T-TAPE The Product

T-Tape is manufactured within precise specifications to ensure maximum performance. The T-Systems quality assurance program is of the highest standard, with rigorous materials and product testing for every roll of T-Tape.

T-Tape has an advanced turbulent flow track that provides maximum emission uniformity and resistance against plugging, while its wall construction ensures the most reliable performance under the adverse conditions of Australian agriculture.



T-TAPE Higher Yields Than Other Irrigation Methods

Yield and quality gains are major reasons why growers use T-Tape over other forms of irrigation. These yield and quality improvements are related to two main areas:

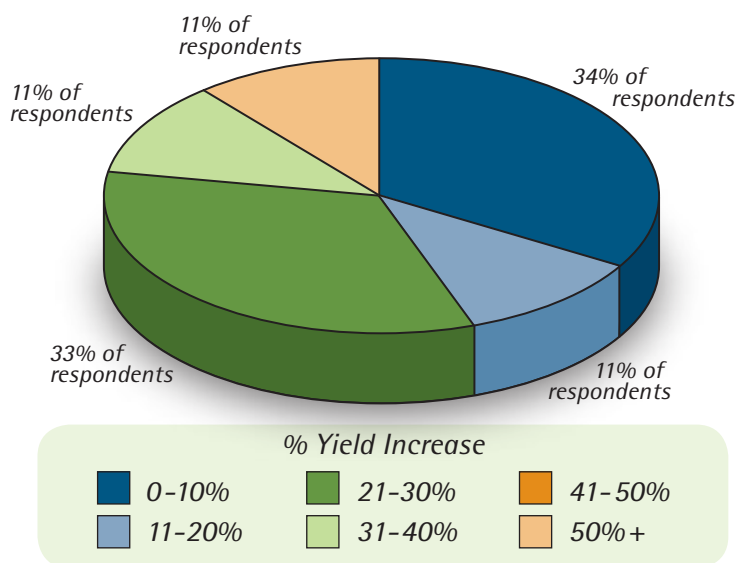
Irrigation Application: T-Tape allows the most precise application of water and management of soil moisture.

Fertiliser Application: T-Tape allows growers to accurately apply water-soluble nutrients to their crops, as and when required.

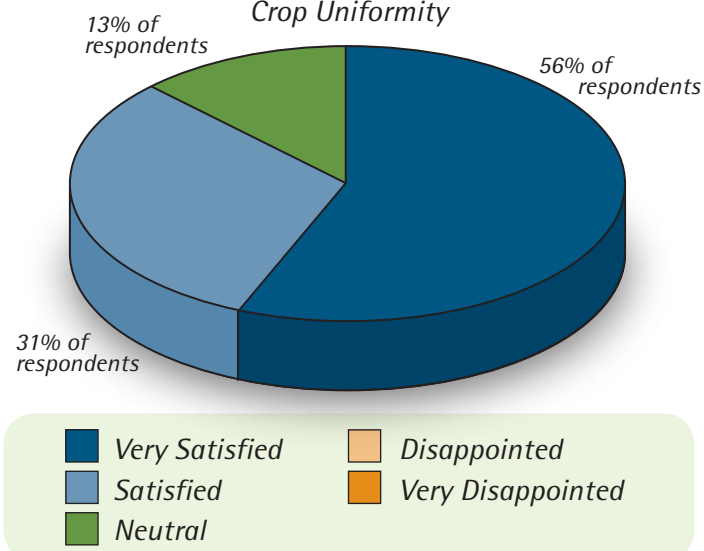
New T-Tape users were surveyed to compare T-Tape irrigation systems against their conventional irrigation systems during 2004/05. Results are illustrated in the charts to the right.

RIGHT: Even though the range of environments, crops and production systems vary substantially, 84% of first time users surveyed received an increase in yield in the first year of use and no grower received a yield decrease. Crop uniformity results in more even yield and more marketable product. The survey revealed that 56% of the respondents were very satisfied with the crop uniformity, 31% were satisfied and 13% were unsure.

Yield Increases Achieved Using T-Tape



Crop Uniformity



"Uniformity is the biggest thing. With the overhead system we had whole sections that were waterlogged, but with trickle we've overcome that problem. The advantage of T-Tape is that you're watering every part of every row at the same time with the same amount."

David Fisher, sweet potato grower, Bundaberg Australia



T-TAPE... makes water go further

T-TAPE Increased Irrigation Efficiency

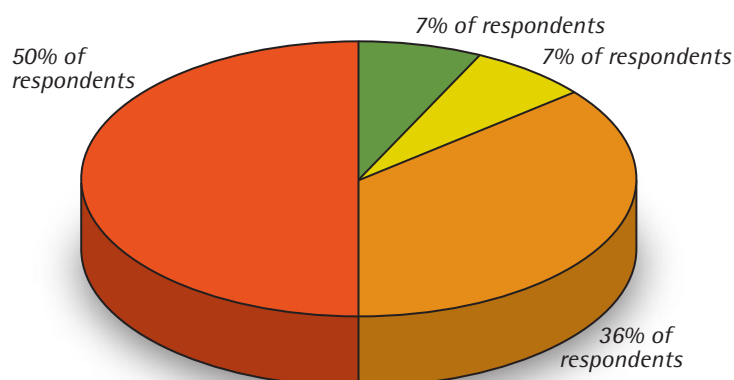
A T-Tape drip irrigation system can provide significant water savings.

Substantial increases in production per unit of water are commonly observed with T-Tape drip irrigation systems.

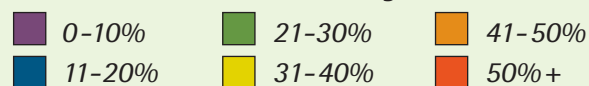
No other irrigation method is able to match water application with crop water use as effectively as drip irrigation.

New T-Tape users were surveyed to compare T-Tape irrigation systems against their conventional irrigation systems during 2004/05. Results are illustrated in the chart to the right.

Water Saving Achieved Using T-Tape



% Water Saving



Because the inter-rows of the field are not irrigated, the total irrigated area of a T-Tape system can be less than 60% of the area irrigated with flood or sprinkler systems.

ABOVE: 100% of growers surveyed said they had achieved significant water savings since using T-Tape. 93% of respondents achieved > 30% water saving. This level of water saving is typically observed across a range of cropping systems throughout Australia.

If water is a limiting factor this significant water saving enables growers to maximize production per megalitre of irrigation water applied.



T-TAPE Performance and Reliability

The exceptional infield performance of T-Tape over 28 years has allowed T-Systems to become a world leader within the drip tape irrigation market.

T-Systems has set the industry benchmark in terms of quality standards, research and development as well as before and after sales service.

A well designed, installed and maintained system will keep performing, as illustrated in the case studies below.

A well designed and managed drip irrigation system can provide significant water savings by only applying water where and when it is needed. Since the inter-rows are not irrigated, rainfall is more effectively utilised and deep drainage and run-off are reduced.

"We keep using T-Tape for the service we receive and because we haven't had any problems with the product"

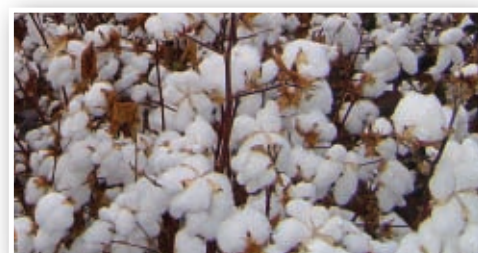
Rob Barbera, vegetable grower, Bundaberg Australia



T-SYSTEMS... supports its product like no other

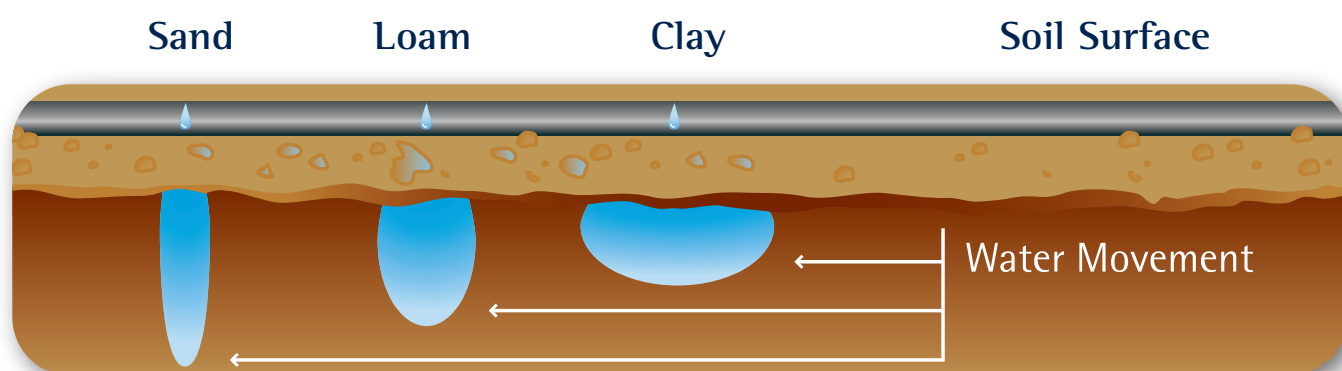
T-TAPE Keeps Performing in Permanent Installations

Sub-surface	Cotton, Phoenix, USA	17 years of operation
Sub-surface	Asparagus, Gernsheim, Germany	12 years of operation
Sub-surface	Asparagus, Ain Aouda, Morocco	10 years of operation
Sub-surface	Sugarcane, Mareeba, Australia	12 years of operation
Surface	Grapes, Swan Hill, Australia	11 years of operation

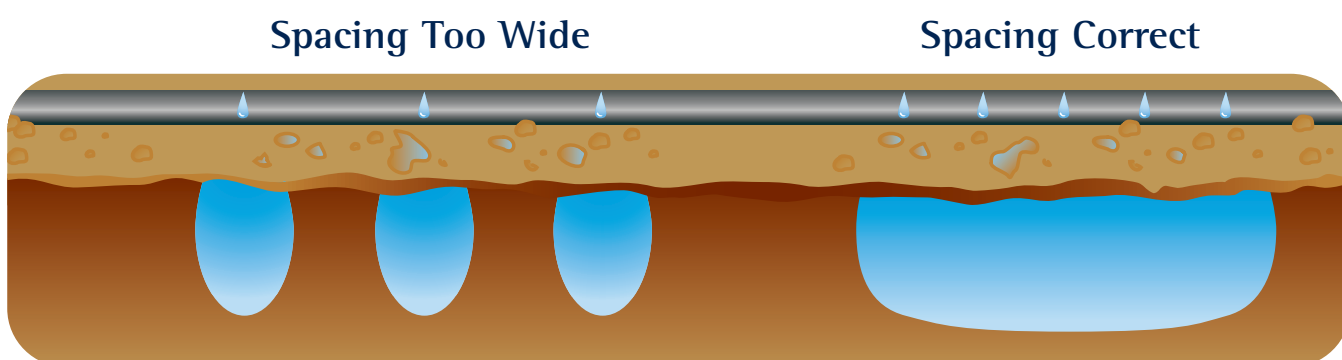


T-TAPE The Right Product for the Job

Selecting the right T-Tape product for a particular soil type and crop is crucial to the performance of any drip irrigation system. To get the maximum benefit from the system, consideration of wall thickness, emitter spacing and flow rate is imperative.



Typically, the more free draining the soil type the closer the emitter spacing needs to be. In heavier soils, the lateral movement of water should be greater, allowing emitters to be spaced further apart.



When the correct emitter spacing is used, the wetting pattern from each emitter should meet the next to form a wetted band. When emitters are too far apart in lighter soils, water and fertiliser can be lost to depths below the effective root zone of the crop. In heavier soils the result can be over-irrigation and waterlogging, as an attempt is made to get the wetting pattern from each emitter to meet.





T-TAPE The System

T-Tape drip irrigation is used in a wide range of cropping systems. There are three principal system types:

- Non-Permanent
- Semi-Permanent
- Permanent

All three systems utilise similar irrigation components. The major components include:

1. T-Tape
2. Pump
3. Filter
4. Mainline
5. Sub-mainline
6. Valves
7. Fertigation system
8. Miscellaneous fittings

The volume, type and size of components selected for a particular installation is determined during the design process.

"We like low flow because of the sand; it spreads the water better and disperses the water even further."

Paul Dydula, strawberry grower, QLD Australia.



**Selecting the right product for the job...
T-SYSTEMS has the know how**

T-TAPE Non-Permanent Systems

This is a simple, quick to install, low cost system. It is generally used in the production of annual medium/high value crops, and is ideally suited to regular field rotation. This is the most common T-Tape system used in Australia.

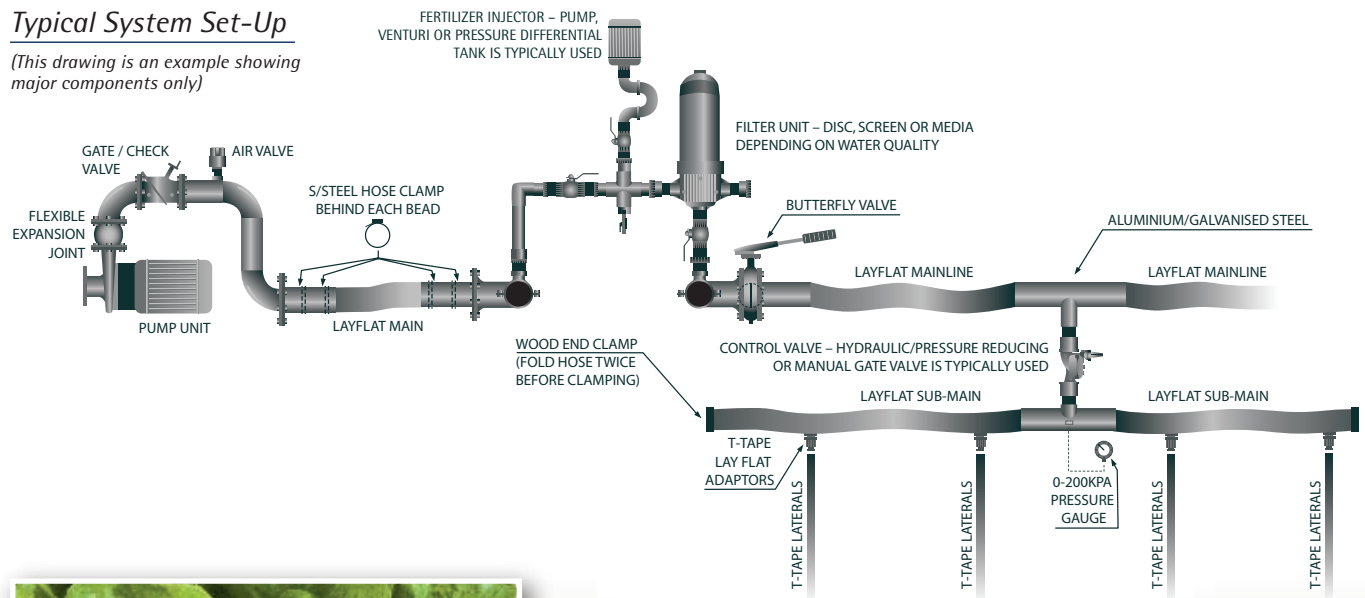
Typical crops include tomato, capsicum, melon, green bean, brassica, lettuce, onion and sweet corn.

System Features

- T-Tape placement - buried 1-5cm under the soil surface (soil type dependant)
- High flexibility
- Quick installation
- Easy operation
- Easy to automate

Typical System Set-Up

(This drawing is an example showing major components only)



All you need is a pressurised water source in the field you wish to irrigate and you can have the system installed and operational in days – T-Systems staff can help.



T-TAPE Semi-Permanent Systems

This system is designed for multiple cropping situations. The T-Tape is typically buried deeper than in non-permanent systems to allow ground preparation to be performed between crops. It is most commonly applied to annual/perennial, low/medium value crops where various crop types are rotated within the same field.

Typical crops include processing tomatoes, cotton and sugarcane.

System Set-Up

This system utilises features from permanent and non-permanent systems. For example layflat sub-mains are often used instead of buried PVC sub-mains.

System Features

- T-Tape selection - thicker walled product for multiple use (2-3 years)
- T-Tape placement - buried 10-20 cm below the soil surface (soil type dependant)
- Installation - relatively quick, however close attention needs to be given to T-Tape placement to ensure adequate wetting patterns are achieved over multiple cropping cycles
- High flexibility
- Easy to automate

Maximises the use of limited water supplies over several seasons without the high capital costs associated with permanent systems – simple to install and operate!



T-TAPE Permanent Systems

This system is typically used in broadacre cropping. It is maintained in the ground for many years of use. T-Tape is buried deeper than in semi-permanent systems to allow ground preparation to be performed between plantings.

This system is most commonly used where the field is permanently utilised (winter/summer cropping or permanent cropping).

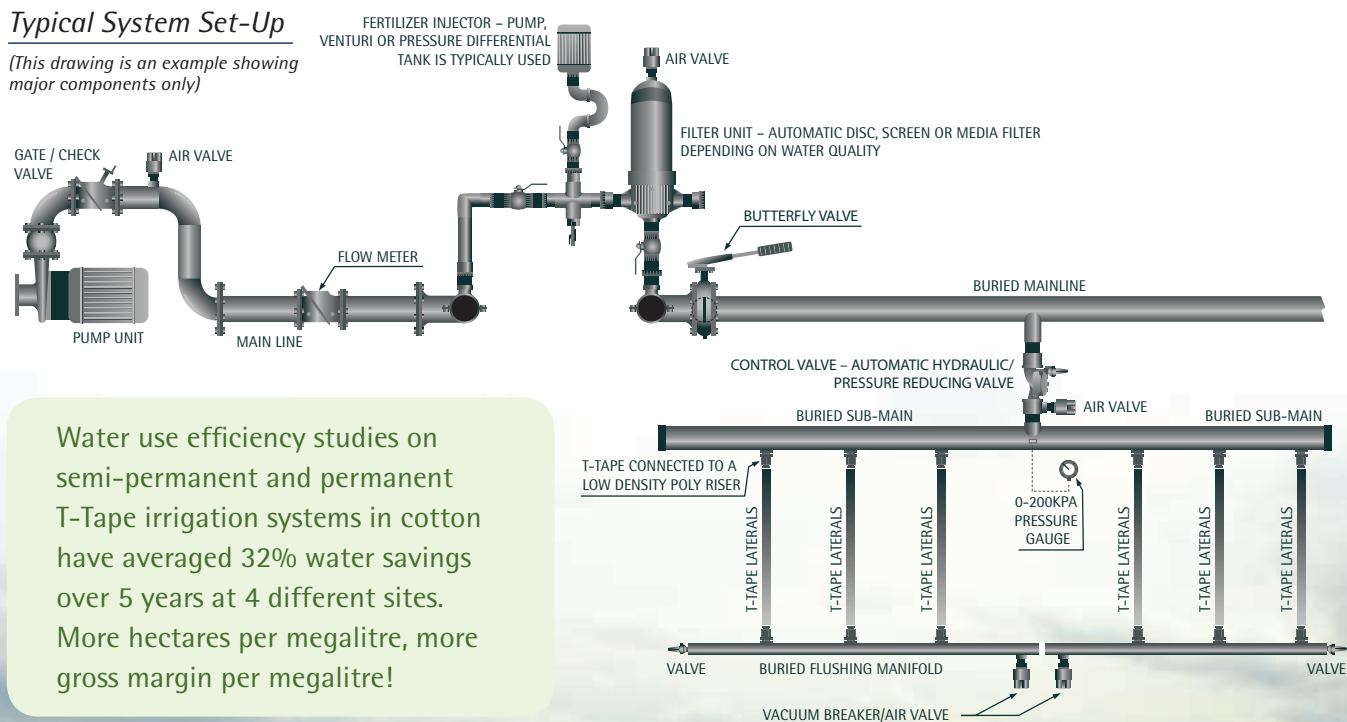
Typical crops include cotton, sugarcane, lucerne and maize. Winter cereals or legumes can be used in rotation with summer annual crops such as cotton.

System Features

- T-Tape selection – thicker walled product for multiple use (10 years+)
- T-Tape placement – buried 20-30 cm below the soil surface (soil type dependant)
- Infrastructure requirement – high
- Permanent system
- High longevity
- Easy to automate

Typical System Set-Up

(This drawing is an example showing major components only)



Water use efficiency studies on semi-permanent and permanent T-Tape irrigation systems in cotton have averaged 32% water savings over 5 years at 4 different sites. More hectares per megalitre, more gross margin per megalitre!



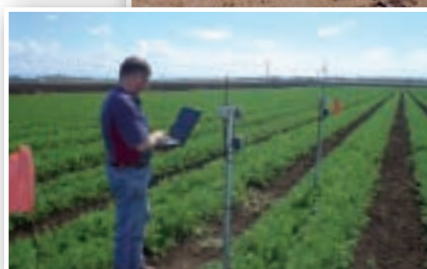
T-SYSTEMS Design and Support

T-Systems exceptional design services and infield support will help provide you with a drip irrigation system that meets your specific needs.

T-Systems highly experienced District Sales Managers can provide support and advice on every aspect of your drip irrigation system including:

- Farm planning
- T-Tape selection
- Irrigation system design (both in-field and in-house)
- Selecting the right components (material list)
- Installation
- Start-up
- System maintenance
- Irrigation management
- Fertigation and nutrient management

Providing the grower with a quick and accurate irrigation design is T-Systems ultimate aim. As a result T-Systems has developed a unique, purpose built drip irrigation design program called ProDesigner. This program, coupled with the use of GPS mapping, provides District Sales Managers with the information they need to get started.



For more complex designs (eg undulating blocks) we highly recommend a contour survey be obtained prior to the design process commencing. Our District Sales Managers will assist you with the information you require.



"T-Systems came out and designed a submain system for us. We had never even used T-Tape before. The design was totally different but it made sense and it worked"

Ivan Rohlf, strawberry grower, QLD Australia

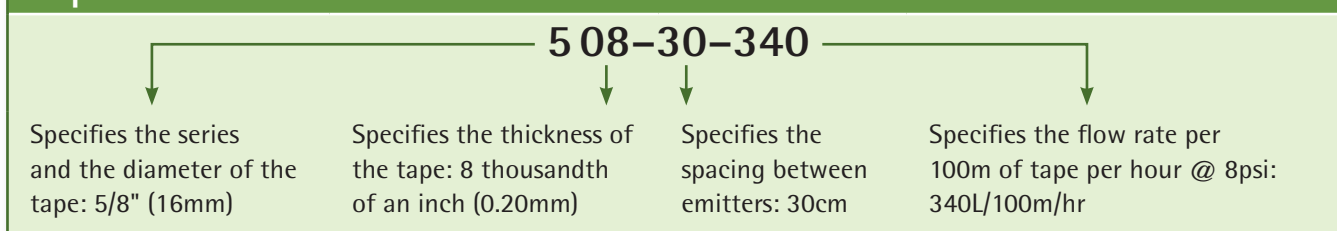
T-SYSTEMS... support and service that is unmatched



T-TAPE Identification - Making it Easy

T-Tape TSX® is identified using a three number product identification code that utilises both imperial and metric measurement. An example of a T-Tape ID code is 508-30-340.

Explanation of Product Code



T-TAPE Exceptional Strength

T-Tape is tough and is manufactured in a variety of wall thicknesses suitable for the wide range of conditions experienced in agriculture.

The environment and/or duration of use will determine the wall thickness of the T-Tape product required. Although thinner walled products can appear more economical, they are not suitable for

all cropping systems. Thicker walled products may be more suited to situations such as:

- permanent and semi-permanent installations
- installations in soils containing rocks and stones
- areas known to contain high populations of chewing soil insects
- cropping systems where there is an increased risk of mechanical damage

Increasing resistance to damage

506, 706 / 508, 708, 908 / 510, 710, 910 / 512, 712, 912 / 515, 715, 915

"We couldn't be happier with the T-Tape and the support we've received from T-Systems"

Troy Qualischefski of QUALIPAC, Gatton QLD



T-SYSTEMS... drip irrigation expertise



PACKAGING Protecting Your Investment

Cardboard packaging is used to minimise transit and installation damage of T-Tape. Each roll of T-Tape is also individually wrapped in recyclable plastic wrap to ensure T-Tape arrives on the farm in the best possible condition.



T-TAPE Product Specification

Series	Wall Thickness (mm)	Tape Diameter (mm)	Quantity Per Reel (m)	Operating Pressure Range (bar)	Operating Pressure Range (psi)	Reel Weight (kg)	Reel Dimensions Diameter x Width (cm)
TSX 506	0.150	16	3050	0.30 – 0.70	4.35 – 10.15	32	51 x 26
TSX 508	0.200	16	2300	0.30 – 1.05	4.35 – 15.23	30	51 x 26
TSX 510	0.250	16	1830	0.30 – 1.05	4.35 – 15.23	30	51 x 26
TSX 512	0.300	16	1550	0.30 – 1.05	4.35 – 15.23	30	51 x 26
TSX 515	0.375	16	1250	0.30 – 1.05	4.35 – 15.23	30	51 x 26
TSX 706	0.150	22	2250	0.30 – 0.70	4.35 – 10.15	30	51 x 26
TSX 708	0.200	22	1695	0.30 – 0.70	4.35 – 10.15	30	51 x 26
TSX 710	0.250	22	1340	0.30 – 1.05	4.35 – 15.23	30	51 x 26
TSX 712	0.300	22	1135	0.30 – 1.05	4.35 – 15.23	30	51 x 26
TSX 715	0.375	22	915	0.30 – 1.05	4.35 – 15.23	30	51 x 26
TSX 908	0.200	29	1700	0.30 – 0.70	4.35 – 10.15	33	51 x 34
TSX 910	0.250	29	1345	0.30 – 1.05	4.35 – 15.23	33	51 x 34
TSX 912	0.300	29	1150	0.30 – 1.05	4.35 – 15.23	33	51 x 34
TSX 915	0.375	29	925	0.30 – 1.05	4.35 – 15.23	33	51 x 34

T-TAPE... the right product for the job

T-TAPE Makes Water Go Further

The maximum effective run length (90% emission uniformity) that can be achieved with T-Tape is related to the manufactured flow rate (water applied per 100 m/hr) and the internal diameter (ID). On flat ground, the lower the flow rate and the larger the ID, the greater the run length.

All flow rates used in T-Tape identification are determined using a nominal pressure of (0.55 bar or 8 psi). Higher operating pressure provides higher flow rates.

Emitter spacing does not effect run length if overall flow rate per 100 m/hr is the same (see graphs on following pages).

Emitter Flow Rate

The **nominal flow rate** for T-Tape is determined using a pressure of 0.55 bar, however increasing pressure will provide a higher flow rate for each emitter type. For example an emitter that delivers 0.5 L/hr at 0.55 bar will deliver 0.62 L/hr at 0.8 bar and 0.70 L/hr at 1.0 bar.

Nominal Flow Rate L/hr per emitter @ 0.55 bar	0.25 (ULF)	0.33 (VLF)	0.50	0.75	1.00	1.25	2.0
Flow Rate L/hr per emitter @ 0.80 bar	0.32	0.42	0.62	0.89	1.20	1.47	2.31
Flow Rate L/hr per emitter @ 1.00 bar	0.37	0.49	0.70	1.00	1.35	1.65	2.58

Note: Not all emitters are available in all product configurations

Ultra Low Flow (ULF) and Very Low Flow (VLF)

In 2004 T-Systems introduced the ULF and VLF range of T-Tape products. These specialised products are ideally suited for large block sizes with long run lengths and/or where the soil type exhibits slow infiltration and high water holding capacity.

While ULF and VLF allows the grower to irrigate large areas more cost effectively than higher flow products, the ability of the system to apply an adequate volume of water to fulfil the peak irrigation requirement (PIR) of the crop, is the most important consideration. PIR is a crop's maximum water requirement under worst-case conditions and is usually expressed as mm/day. Therefore when designing a ULF or VLF system it is imperative that the maximum flow rate of the system is matched to PIR.

Emitter Spacing

Emitters are available in a range of flow rates and spacings to ensure that T-Tape can cater for most crop types and soil conditions.

10, 15, 20, 25, 30, 40, 50 and 60cm emitter spacings are available for most T-Tape products.

If water is applied at a flow rate that cannot infiltrate the soil, it will tend to rise to the surface and drain away from the crop or tunnel downwards. In these situations a lower flow rate emitter maybe more suitable. Ask your local dealer or a T-Systems District Sales Manager.

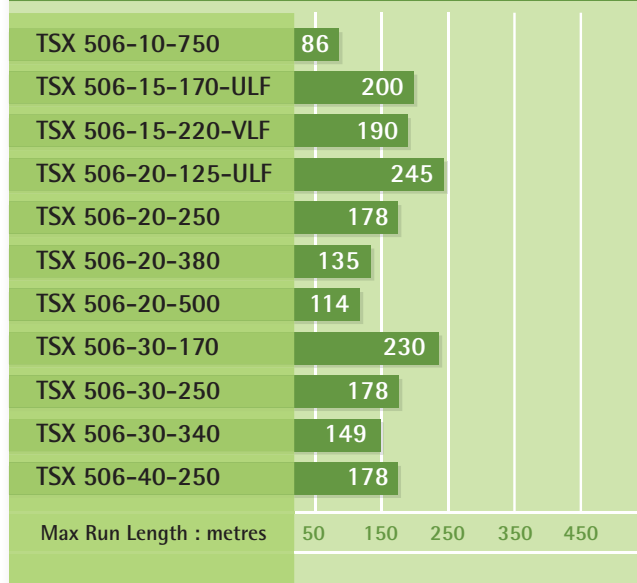
T-SYSTEMS... developing new products for the market



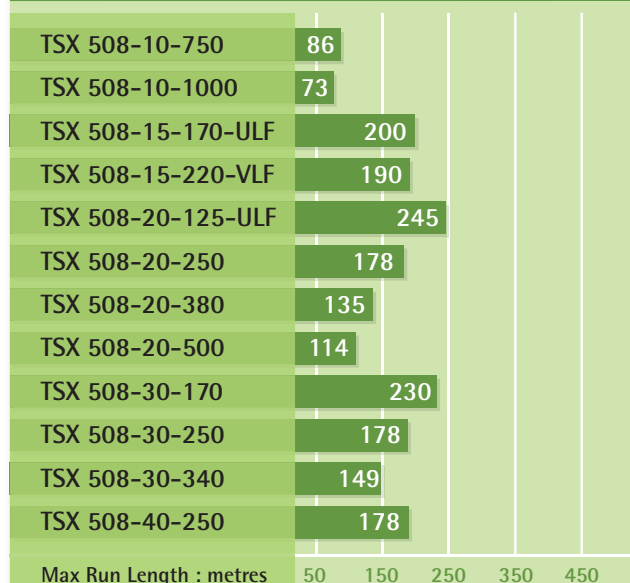
T-TAPE

Run Length at an Operating Pressure of 0.55 Bar on Flat Ground Delivering a 90% Emission Uniformity

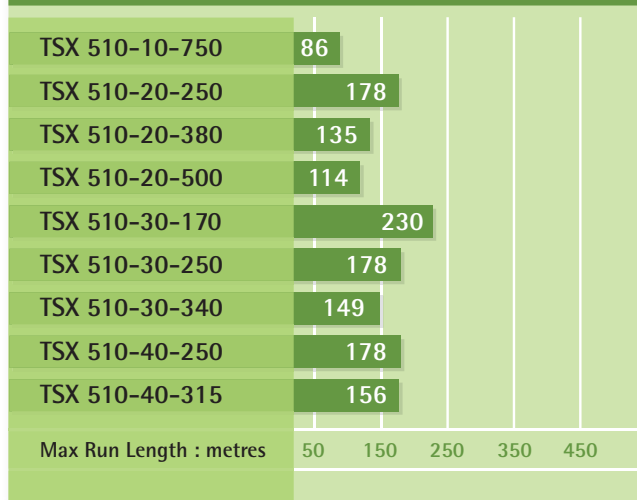
T-Tape TSX 506 Series



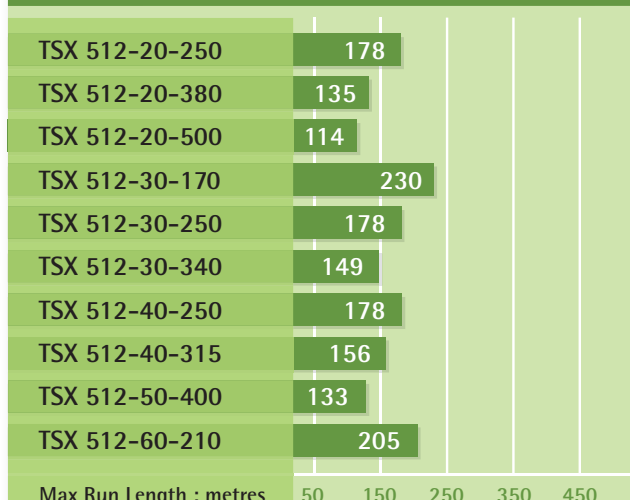
T-Tape TSX 508 Series



T-Tape TSX 510 Series

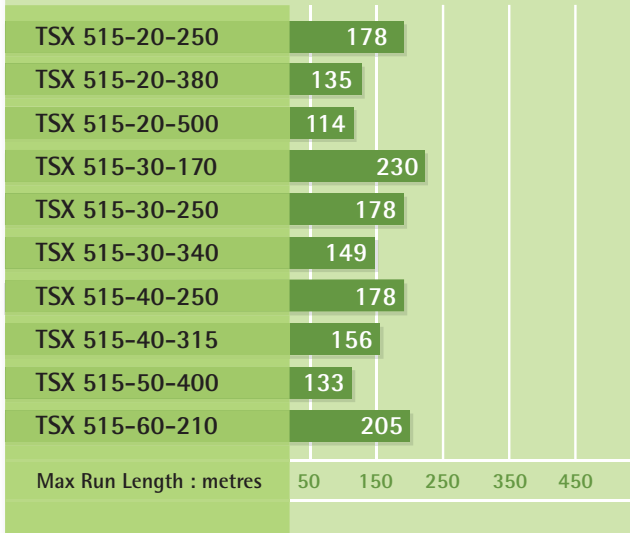


T-Tape TSX 512 Series



The Above Graphs Provide an Indication of Run Length

T-Tape TSX 515 Series



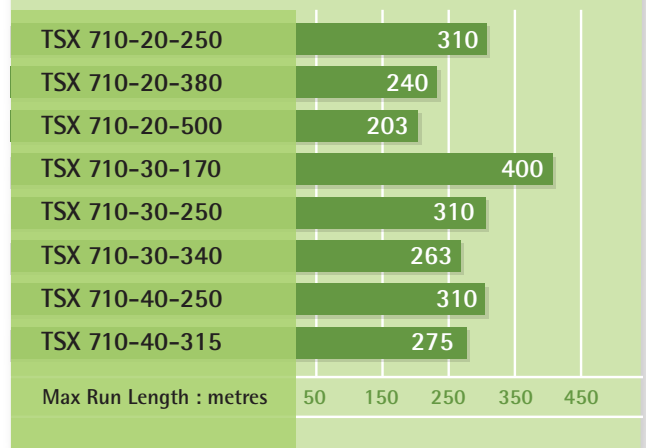
T-Tape TSX 706 Series



T-Tape TSX 708 Series



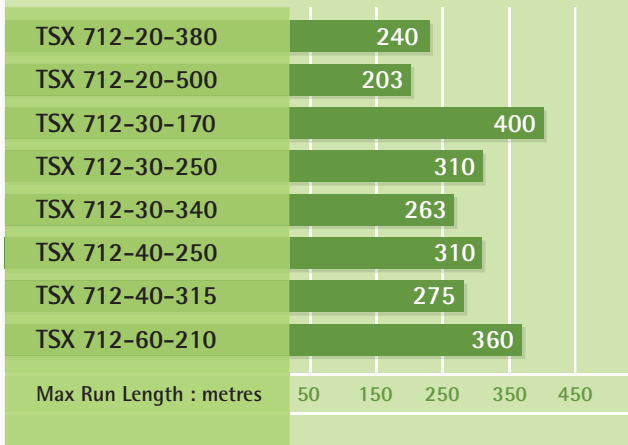
T-Tape TSX 710 Series



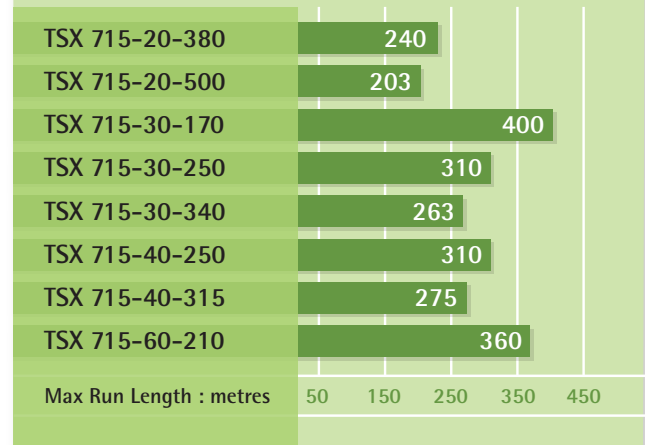
The Above Graphs Provide an Indication of Run Length



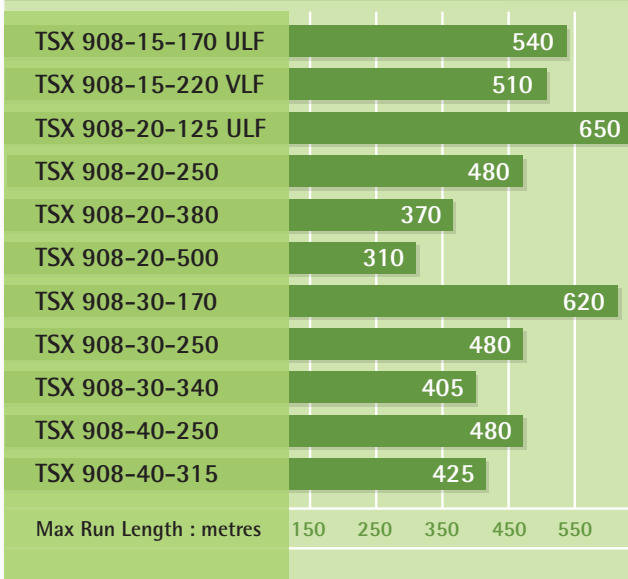
T-Tape TSX 712 Series



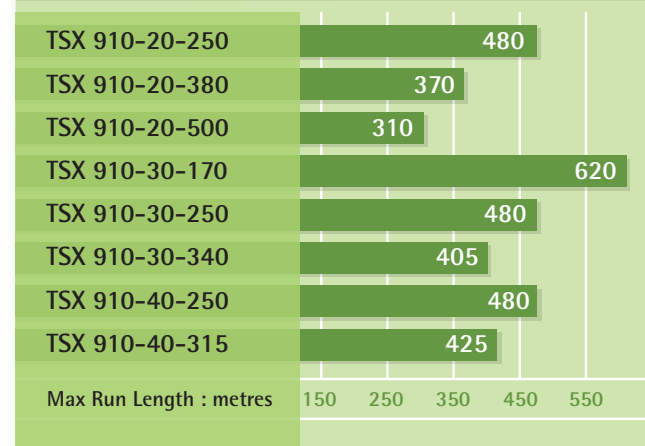
T-Tape TSX 715 Series



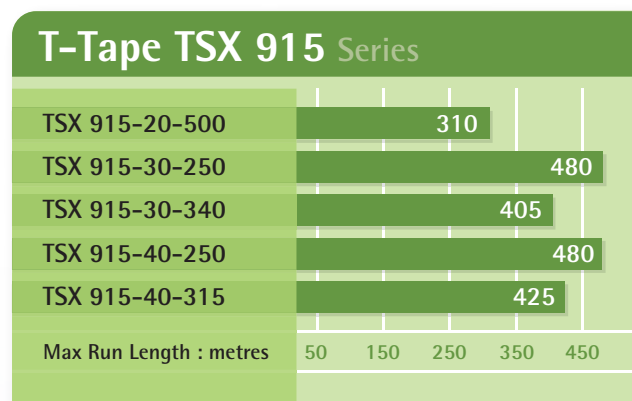
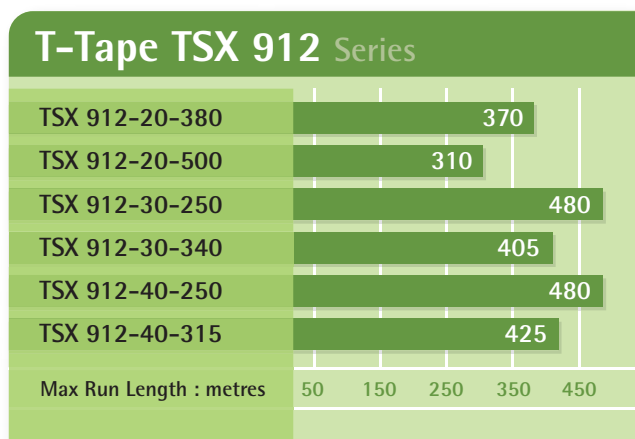
T-Tape TSX 908 Series



T-Tape TSX 910 Series



The Above Graphs Provide an Indication of Run Length

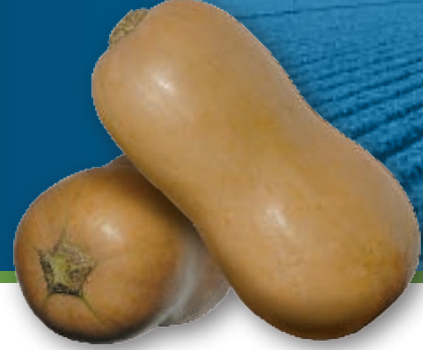


The Above Graphs Provide an Indication of Run Length

For more detailed information on T-TAPE and drip irrigation please contact your T-SYSTEMS dealer or T-SYSTEMS Australia Pty. Ltd.

T-Tape and TSX are registered trademarks of T-Systems International Inc. In the United States and other countries. U.S. Patent No 4,247,051; 5,123,984; 5,003,726; 5,282,578; 5,364,032, 5,522,551; 5,634,585; and other U.S. and foreign patents issued and pending.

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Notes

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