



**WATER DISTRIBUTION
SYSTEMS**

PURITON

Pipeline solution for the safe conveyance of drinking water through contaminated land

Radius Systems - The smart choice for plastic pipe solutions

Strategic pipelines tend to be some of the most challenging in terms of the engineering, the most demanding in terms of reliability and usually represent significant investment for the new owner. To get the most from your new investment we understand that it is vitally important the design is optimised, that a full system easily installed is available and, should the need arise, that the means to adapt or repair it in the future are available. Here at Radius Systems, we have the experience, the skills and the resources to work alongside you at each stage of the process to ensure that you get the best value from your investment and that the journey from design to commissioning is straightforward and above all, predictable.

Our heritage and our experience in the manufacture of plastic pipe systems goes back over 40 years from our time as pioneers, introducing the first polyethylene pipes for natural gas distribution. This pioneering spirit has stayed with us ever since, as we have evolved the technology, expanding the use of plastic pipe systems to the water and wastewater industry, bringing state of the art products for trouble free and reliable performance.

If you are looking for an experienced partner who can help you deliver, then look no further.



Puriton pipe systems for potable water

Protection through contaminated ground

Developed by Radius Systems for the safe transportation of potable water through contaminated land, Puriton is a unique pipe and fittings system which combines the barrier properties of aluminium with the benefits of polyethylene. The result is a system which is contamination resistant, flexible, lightweight and easy to joint.

The heart of the system is a multi-layer polyethylene pipe which has a longitudinally lap welded aluminium core, positioned at the centre of the pipe wall providing a full metallic barrier to the ingress of contaminants and protected by the inner and outer layers of polyethylene.



Puriton pipe has a longitudinally lap welded aluminium core positioned between two layers of polyethylene



Benefits of the system

Installation cost savings

- Up to 55% faster to install compared with ductile iron
- Fewer joints, fewer fittings
- No thrust blocks

Easier handling

- 80% lighter than cement lined ductile iron
- Flexibility of plastic, contamination resistance of aluminium
- Supplied in 50m coils as standard

Full barrier system

- Fully welded substantial barrier
- Minimal and simple installation tooling
- No additional wrapping necessary to maintain the system's barrier performance

Security & confidence

- Fully end load bearing with regard to the fittings resistance to pull out forces
- Full barrier fittings system including tapping tees
- Barrier in centre of pipe wall for protection from damage.

Approvals

- Puriton is approved for use in public water supplies
- Puriton is manufactured under strict quality control procedures in an ISO 9001 factory
- WIS 4-32-19 (October 2007)
- Pipe dimensions coincide with BSEN 12201 standard
- WRAS approved



Contamination resistance

Testing of the Puriton pipe system

Chemical permeation performance of Puriton

As an integral part of Radius Systems's Research & Development program all product ranges introduced into the market are subject to exhaustive product performance evaluations to gain third party accreditations and to prove the long-term functionality and integrity of our systems. Barrier pipe systems for drinking water distribution are in addition, required to undergo extensive further testing to prove that the system prevents the ingress of potentially harmful pollutants, which can contaminate the water being transported. The complexity and range of differing contaminants to which the system could potentially be subjected to over its installed lifetime have prompted Radius Systems to pioneer a barrier resistance test which evaluates not just the pipe, but all the fittings and components used to build a barrier pipe system. The tests are carried out with the collaboration of a reputable third party testing

establishment and involve pipe and fitting assemblies filled with water, capped and immersed in a tank filled with unleaded petrol for a period of sixty days. At the end of the sixty-day period, the water is extracted from these assemblies and levels of contaminants are measured through GCMS gas chromatography – mass spectrometry. GCMS is an extremely accurate method of measuring the amounts of foreign substances in water samples, as measurements to levels as low as a single micro gram per litre or part per billion (PPB) can be achieved (for those unfamiliar with quantitative concentrations, 1 part per billion (PPB) is roughly equivalent to a single drop of petrol in a fuel tanker, which we see on the roads every day).

Unleaded petrol was chosen as the external contaminant as it contains levels of Benzene, Toluene and Ethylbenzene and Xylene (BTEX). These compounds are some of the



Volatile Organic Hydrocarbons (VOHs) found in petroleum derivatives and are considered the most notorious compounds found in contaminated ground. In addition, fuel spills are one of the most common causes of reported poor drinking water quality, which is another reason why Radius Systems chose to use unleaded fuel as the medium to measure the functionality of the system. The amount of 'Total BTEX' is sometimes used to help assess the relative risk or seriousness at contaminated locations and the need of remediation of such sites. Table 1 indicates typical site re-

Government and Local Water Authority guidance exists for the conveyance of potable water through contaminated land. It remains at all times, the responsibility of the customer to ensure that the pipe system selected is suitable for the particular application intended. Radius Systems accepts no liability arising out of the information supplied in this document, which is given in good faith and is correct at the time of publication.

Puriton pipe systems for potable water

Chemical permeation performance of Puriton (cont...)

development locations and expected types of contamination, where it is expected that a drinking water barrier pipe system will be installed. This is the case even after major site clean up operations have been undertaken (WRAS Information Guidance Note

No 9-04-03).

In addition to assessing all the components that make up the Puriton barrier pipe system, comparisons have been carried out with other pipe systems that are used as water mains through

brown field sites. These evaluations were undertaken using the same test procedure and sixty-day exposure period. The comparison of differing systems to sixty-day direct exposure to unleaded petrol can be seen in Graph 1.

Table 1 - Contaminants arising from the previous use of the site

USE	PROBABILITY	CONTAMINATION TYPE
Chemical works	●●●	■ ■ ■
Vehicle repair garages	●●●	■
Petrol filling stations	●●●	■
Gas works	●●●	■ ■ ■
Hazardous waste treatment plant	●●●	■ ■ ■
Landfill sites	●●●	■ ■ ■ ■
Paper manufacturing	●●●	■ ■ ■
Print works	●●●	■
Railway yards	●●●	■ ■ ■
Scrap yards	●●●	■ ■ ■
Tanneries	●●●	■ ■ ■
Timber product producers	●●●	■ ■
Docks	●●	■
Electrical equipment manufacture	●●	■
Paint manufacture	●●	■ ■ ■
Agriculture / allotments	●	■ ■ ■
Beverage distilleries	●	■ ■
Food processing	●	■ ■

●●● High	●● Medium	● Low	
■ Toxic	■ Corrosive	■ Organic	■ Flammable

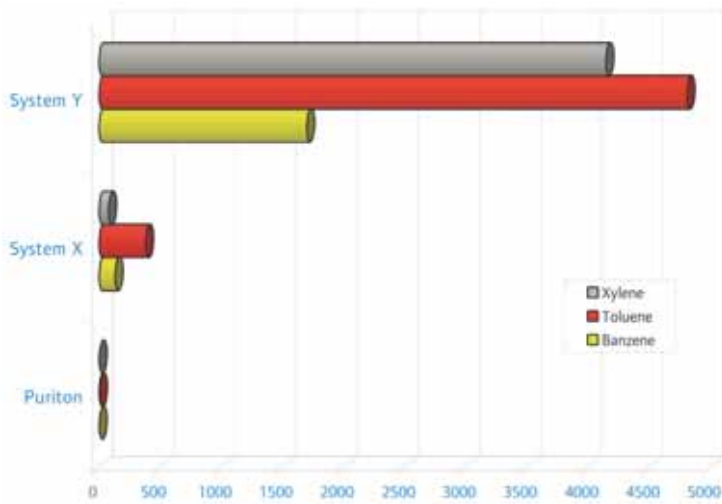
Typical substances found within the contaminant types

- Corrosive
 - Acids
 - Acid soluble sulphate
 - Elemental sulphur
 - Alkalis (lime, sodium hydroxide)
 - Sulphide

- Organic
 - Solvents (chlorinated solvents)
 - Phenols
 - Poly-aromatic hydrocarbons
 - Poly-chlorinated byphenyls (PCBs)
 - Cyclohexane and toluene extractable material
 - Petroleum hydrocarbons

- Toxic
 - Antimony
 - Arsenic
 - Cadmium
 - Chromium
 - Mercury
 - Lead
 - Selenium
 - Cyanide

Graph 1



The extensive tests carried out on the entire Puriton product range demonstrate that Radius Systems Puriton is one of the safest systems on the market for the conveyance of potable water through contaminated ground and offers the best combination of barrier resistance to the ingress of contaminants and user-friendly joining system technology.



Puriton pipe systems for potable water

Product range

Straight pipe



Nominal diameter mm	SDR	Pressure rating bar	Wall thickness mm		Outside diameter mm		Approx. weight kg/m	Length m	Product code
			min	max	min	max			
25	11	12.5	2.30	2.70	25	25.3	0.208	6	25PU5
32	11	12.5	2.91	3.30	32	32.3	0.330	6	32PU6
63	11	12.5	5.80	6.50	63	63.4	1.125	6	63PU6
90	11	12.5	8.20	9.20	90	90.6	2.395	6	90PU6
110	11	12.5	10.00	11.10	110	110.6	3.369	6	110PU6

For transport purposes, Puriton 6m length pipes are currently shipped in a polyethylene tube

Coils



Nominal diameter mm	SDR	Pressure rating bar	Coil inner diameter mm	Coil outside diameter mm	Coil width mm	Approx. weight kg/m	Length m	Product code
32	11	12.5	860	1120	190	0.330	50	32PUL
63	11	12.5	1800	2180	190	1.125	50	63PUL
90	11	12.5	1800	2340	270	2.395	50	90PUL
110	11	12.5	2200	2640	440	3.369	50	110PUL

Pack quantities (for straight pipes only)

Nominal diameter mm	Pack quantities
25	11
32	11
63	11
90	11
110	11

Note: only Radius Systems approved fittings should be used with Puriton pipe

Puriton fittings - Jointing and protection

25mm and 32mm compression fittings (MBSP)

The dedicated Puriton barrier fittings range for pipe diameters 25mm and 32mm are manufactured from a dezincification resistant grade of brass to BS EN 12164.

The use of a full metal-bodied fittings with its unique insert design, provides a complete contamination barrier across the joint. This dedicated fitting range completely eliminates the requirement for 'wrapping' the joints to ensure the protection to the system.

The 25mm and 32mm compression fitting joints are made quickly and easily, without the need for any specialist equipment. They are fully end load bearing and are ready for commissioning immediately after installation.

Sealing is provided on both the internal and external surfaces of the pipe thanks to water quality approved EPDM O'ring seals, ensuring leak-tightness and minimising the possibility of contaminants making contact with the drinking water.

The male end connection for the 25mm and 32mm fittings are 1" and 1¼" to British Standard pipe thread, BS21. This applies to all fittings except for the transition coupler: BSP screw thread = ¾" and 1".

All threads are parallel and are male. Where connections to ancillary components such as boundary boxes, stop taps etc. are required, then a suitably **approved sealant should be used, i.e. PTFE thread tape.**

Couplers



Size	Pack Qty	Product code
25mm	1	25PU01
32mm	1	32PU01

Transition couplers



Size	Pack Qty	Product code
25mm	1	25PU06
32mm	1	32PU06

Equal tees



Size	Pack Qty	Product code
25mm	1	25PU24E
32mm	1	32PU24E

Note: only Radius Systems approved fittings should be used with Puriton

All joints within the Puriton system are fully end-load bearing with regard to resistance to pull out forces from the applied hydrostatic and thermal stresses normally associated with the use of this pipe in buried cold water applications

Puriton pipe systems for potable water

Puriton fittings - Jointing and protection

25mm and 32mm compression fittings (MBSP)

Elbows



Size	Pack Qty	Product code
25mm	1	25PU12E
32mm	1	32PU12E

63mm to 110mm Redman fittings

Couplers



Size	Pack Qty	Product code
63mm	1	63PU01
90mm	1	90PU01
110mm	1	110PU01

Note: only Radius Systems approved fittings should be used with Puriton pipe



Flange adaptors



Size	Pack Qty	Product code
63mm x DN50 ¹	1	63PU50A
63mm x DN80 ¹	1	63PU80A
90mm x DN80 ¹	1	90PU80A
110 x DN100 ¹	1	110PU80A

Equal tees



Size	Pack Qty	Product code
63mm	1	63PU24E
90mm	1	90PU24E
110mm	1	110PU24E

Flange branch tees



Size	Pack Qty	Product code
63mm x DN80 ¹	1	63PU25P
90mm x DN80 ¹	1	90PU25P
110mm x DN80 ¹	1	110PU25P

All joints within the Puriton system are fully end-load bearing with regard to resistance to disengagement from the applied hydrostatic and thermal stresses normally associated with the use of this pipe in buried cold water applications

¹ BS4504 NP16. Flanges are supplied with EPDM sealing gasket. Bolt sets are not supplied.

Puriton pipe systems for potable water

Puriton fittings - Jointing and protection

63mm to 110mm Redman fittings

Elbows



Size	Pack Qty	Product code
63mm x 90°	1	63PU12E
63mm x 45°	1	63PU21E
90mm x 90°	1	90PU12E
90mm x 45°	1	90PU21E
110mm x 90°	1	110PU12E
110mm x 45°	1	110PU21E

Reducers



Size	Pack Qty	Product code
90mm x 63mm	1	90PU06
110mm x 90mm	1	110PU06

Universal thread adapters



Size	Pack Qty	Product code
63mm x 1½" FBSP / 2" MBSP	1	63PU06

All joints within the Puriton system are fully end-load bearing with regard to resistance to disengagement from the applied hydrostatic and thermal stresses normally associated with the use of this pipe in buried cold water applications

Repair couplers



Size	Pack Qty	Product code
63mm	1	63PU02
90mm	1	90PU02
110mm	1	110PU02

Hydrant duckfoot bends



Size	Pack Qty	Product code
63mm x DN80 ¹	1	63PU02
90mm x DN80 ¹	1	90PU02
110mm x DN80 ¹	1	110PU02

Tapping tees

Benefits of the Puriton tapping tees:

- Unique design dedicated to the Puriton system
- All metallic barrier from the main through to the service pipe
- Direct connection to 25mm and 32mm Puriton service pipe
- All sealing rings exposed to the contaminants are manufactured from Water Quality Approved nitrile rubber
- One stage drilling / sleeve insertion operation
- No specialist equipment required for installation



Size	Pack Qty	Product code
63mm x 25mm	1	63PU13
90mm x 25mm	1	90PU13
110mm x 25mm	1	110PU13
63mm x 32mm	1	63PU14
90mm x 32mm	1	90PU14
110mm x 32mm	1	110PU14

¹ BS4504 NP16. Flanges are supplied with EPDM sealing gasket. Bolt sets are not supplied.

Puriton pipe systems for potable water

Puriton jointing equipment and ancillaries

	Description	Quantity	Product code
	Hydraulic pump for 90mm to 110mm fittings	1	PU002
	Oil container (for pump)	5 litres	PU001
	$\frac{3}{8}$ A/F hexagonal T key	1	PU003
	Marker tape for buried pipe	365m x 150mm	PU005
	Deburring tool for all pipe sizes	1	PU004
	25mm pipe rerounding and deburring tool	1	PU006
	32mm pipe rerounding and deburring tool	1	PU007

Radius Systems Limited
Hilcote Plant, PO Box 1
Blackwell, Nr Alfreton
Derbyshire, DE55 5JD

T: +44 (0)1773 811112
F: +44 (0)1773 812343
E: sales@radius-systems.co.uk
W: www.radius-systems.com

