

TYTON® DUCTILE IRON PIPE SYSTEMS INTERNAL LININGS FOR DI PIPE

For Potable Water, Raw Water,
Sewer and Aggressive Fluids



OVERVIEW

Pipeline bores carry a wide variety of fluids in an extreme range of above and below ground conditions, including:

- Potable Water
- Raw Water
- Irrigation Water
- Gravity and Pressure Sewage
- Effluent and Waste
- Bore Water
- Sea Water
- Slurries

Linings must be fit for purpose. They must be hydraulically smooth, operate in a range of temperatures and most importantly provide assurance of a long, trouble free service. Judicious selection of a lining for ductile iron pipeline systems will ensure the safe transportation of all these fluids.

SULPHATE RESISTING CEMENT

Cement mortar is the preferred lining in the protection of ductile iron pipes around the world because of the active nature of its protection mechanism and the proven performance over centuries. The cement mortar forms a passive film at the ductile iron interface that inhibits oxidation of the iron surface and stifles bacteriological action. Cement mortar linings have been used to prevent tuberculation and improve water quality in Australia since the 1920's.

Cement also has a unique self-repair property. When cracks are exposed to the fluid filling the pipeline, a process known as 'autogenous healing' takes place. It helps to close any discontinuities that may exist in the lining. Furthermore, cement is easily repaired in the field and provides a tough durable surface.

TYTON XCEL Cement linings are centrifugally spun and made up of Sulphate Resisting (SR) cement, sand and water. Pipes are spun with high radial acceleration, around 100g and are simultaneously vibrated, producing a very dense smooth lining of extremely low permeability and Colebrook-White k factors for new pipes commonly in the order of 0.01-0.03mm.

SEAL COATED CEMENT

Some very aggressive, soft waters of low hardness (total alkalinity <30mg/L) or high dissolved CO₂ may leach lime from cement mortar linings and result in an increase in pH of the conveyed waters. This is particularly so with low flows or long residence times, say in the order of 1-3 days. This problem can be easily overcome at the design stage with an assessment of water chemistry and operational conditions.

The application of an effective seal coat to the cement mortar lining surface will restrict pH increases in the conveyant.

Dimax seal coat systems, available optionally with our XCEL range of DI pipe have passed all testing to AS/NZS 4020. They have also demonstrated the essential properties for long life and performance including:

- Good Adhesion
- High Abrasion Resistance
- High Permeation Resistance

CALCIUM ALUMINATE CEMENT

Currently used in our XTREME range of DI pipe, this special Calcium Aluminate Cement lining is ideally suited to aggressive applications such as septic gravity sewers and other aggressive industrial effluents.

CA Cement exhibits excellent performance under bacteriogenic acid attack accommodating the extremes of pH 4 to 12. With the additional benefit of resisting abrasion caused by grit and suspended solids, the lining protects the internal ductile iron surface from chemical and gas attack as well as tuberculation when conveying aggressive fluids common in sewage and wastewater pipelines.

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POLYURETHANE

Polyurethane (PU) is the most effective lining when it comes to highly aggressive fluids and has no chemical reaction with chlorine or any other disinfectants.

The elasticity of polyurethane allows deformation (similar to the ductile iron pipe shell). XCEED PU lining is applied in accordance with EN15655 and has an average thickness of 1.3/1.5mm depending on pipe size.

For the conveyance of potable water, wastewater & sewer including:

- Very soft water (hardness less than 1mg/L) combined with extremely long residence times
- Mineral water, i.e. water whose chemical specifications must remain unchanged between the pipeline inlet and outlet
- Aggressive conveyants including septic sewage, high CO₂, chlorides, sulphates & brine

NOMINAL SIZE	Symbol	Units	100	150	200	225	250	300	375	450	500	600	750
KEY METRICS	Nominal pressure	PN	Nom	35	35	35	35	35	35	35	35	35	35
	Mean external diameter	Ø _y	mm	122	177	232	259	286	345	426	507	560	667
	Effective laying length	L _e	m	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70
	Joint defelection	°	deg	3.5	3.5	3.5	3.5	3.5	2.5	2.5	2.5	2.5	1
POLYURETHANE LINED PIPE	Mean internal diameter	DI	mm	110	165	219	246	273	329	408	487	539	643
	Nominal PU thickness	t _{p nom}	mm	1.3	1.3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Pipe mass including socket	M _u	kg	79	115	152	178	210	284	410	552	658	891
CEMENT MORTAR LINED PIPE	Mean internal diameter	D _c	mm	102	157	212	239	266	323	402	481	532	637
	Nominal PU thickness	t _{c nom}	mm	5	5	5	5	5	5	5	5	5	6
	Pipe mass including socket	ML	kg	102	148	198	230	267	353	497.5	656	773	1029
RATED PRESSURES	Allowable operating pressure	AOP	MPa	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
	Maximum allowable operating pressure	MAOP	MPa	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20
	Allowable site test pressure	ASTP	MPa	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38

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Because we are continuously improving our products and services, The Reece Group reserves the right to change specifications without prior notice.

CERTIFICATIONS

AS/NZS2280 – Ductile Iron Pipes & Fittings
AS4020 – Testing for use in contact with drinking water
EN15655.1 - Polyurethane lining of pipes and fittings

