

# TYTON® Z+ DUCTILE IRON PIPE SYSTEMS

## PN35 RUBBER RING JOINT DN100-750

For Potable Water, Raw Water,  
Sewer and Aggressive Fluids



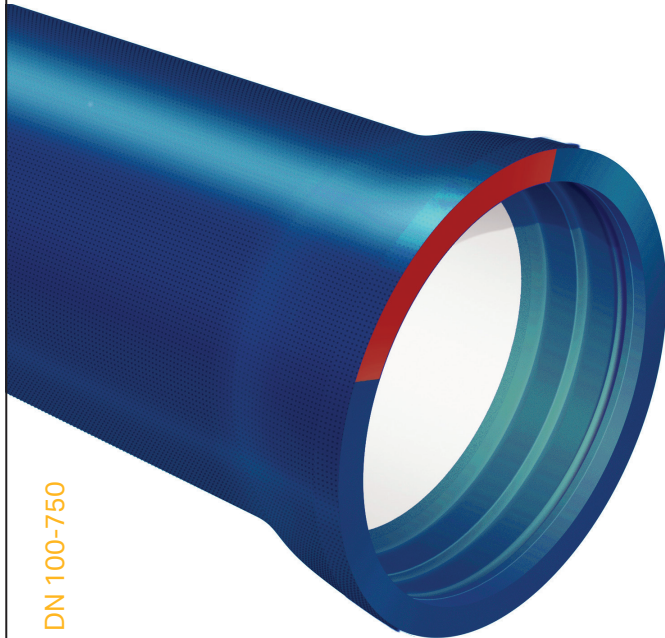
### THE BENEFITS OF DUCTILE IRON

Pressure Class PN 35 matches the maximum flange table rating of the most common water industry applications.

Peace of mind considering water hammer, rogue surges, cyclic stresses, varying soil loads, unpredictable traffic loads, and all unforeseen rigours of a pipe system in construction, operation and maintenance.

Beam strength, heavy duty ring stiffness and critical buckling resistance across the entire size range.

Operational savings and benefits via larger bores with reduced headlosses, reduced pumping costs and increased flows.



DN 100-750

### TYTON XCEL Z+

TYTON XCEL is synonymous with the introduction of pressure class DI Pipe into Australia. Efficiency gains and cost savings are achieved without sacrificing the time proven superior performance capabilities associated with ductile iron.

#### Lining Options

The standard lining is a centrifugally spun cement mortar lining made up of Type SR (Sulphate Resisting) cement.

An additional Seal Coat applied to the cement lining surface is available as an option to inhibit the leaching of lime where very aggressive, soft waters of low hardness (total alkalinity <30mg/L) or high dissolved CO<sub>2</sub> are being conveyed.

**For the conveyance of potable water,  
recycled water & raw water**

### TYTON XTREME Z+

TYTON XTREME incorporates a highly wear resistant Calcium Aluminate Cement (CAC) mortar lining.

This lining protects the internal surface from corrosion, tuberculation and bacteriogenic acid attack when conveying aggressive fluids common in sewage and wastewater pipelines. Perfectly watertight & prevents root ingress.

#### For the conveyance of wastewater including:

- Gravity & Pressure Sewer effluent
- Domestic waste waters
- Mining slurries & process water
- Fluids between pH4 and pH12

### Z+ ZINC/ALUMINIUM/RARE EARTH ALLOY & EPOXY COATING

Z+ is a modern, highly effective Active Corrosion protection layer made up of Zinc, Aluminium and Rare Earths. Applied at 400g/m<sup>2</sup>, Z+ is twice the density required by AS2280 for Zinc and is finished with 100µm Epoxy layer.

Active protection means the pipe continues to be protected in the case of superficial damage to the external coating.

Z+ gives you the opportunity to take advantage of a factory applied corrosion protection system which will extend the life of your pipeline and reduce on site handling by eliminating the requirement for polyethylene sleeving.

### THE Z+ ADVANTAGE

Z+ Provides for exceptional pipeline performance and durability.

Pipe life increased to 3 times that of standard zinc coated pipe.

Suitable for more than 95% of the most frequently encountered ground types.

Eliminates the need for polyethylene sleeving.

Speak to us about soil assessment options where required.

### TYTON XCEED Z+

When it comes to highly aggressive fluids Polyurethane (PU) is the lining which simply exceeds all expectation.

TYTON XCEED's PU lining is applied in accordance with EN15655 and has an average thickness of 1500µm.

#### 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 CO<sub>2</sub>, chlorides, sulphates & brine
- Resistivity range of pH1-13

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Sewer and Aggressive Fluids



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	$\varnothing_y$	mm	122	177	232	259	286	345	426	507	560	667	826
	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	2.5	1
UNLINED PIPE	Mean internal diameter	DI	mm	112	167	222	249	276	333	412	491	542	647	801
	Pipe barrel mass per metre	$m_u$	kg/m	12.7	19.0	25.1	28.1	32.3	44.3	65.0	89.5	107.4	148.4	221.7
	Pipe mass including socket	$M_u$	kg	77	115	155	173	199	271	403	548	655	897	1,332
SOCKET	Socket mass	S	kg	4.9	6.7	12.0	13.0	15.0	18.8	32.7	37.8	42.6	51.2	68.5
DI WALL THICKNESS	Nominal	t	mm	4.9	5.0	5.0	5.0	5.2	5.9	7.0	8.1	8.8	10.2	12.3
	Minimum	a	mm	3.5	3.5	3.5	3.5	3.6	4.3	5.3	6.3	7.0	8.3	10.2
CEMENT MORTAR LINED PIPE	Mean internal diameter	$D_c$	mm	103	158	213	240	267	324	403	482	533	638	790
	Nominal CML thickness	$t_{c\ nom}$	mm	5	5	5	5	5	5	5	5	5	5	6
	Minimum CML thickness	$t_{c\ min}$	mm	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.5
	Pipe barrel mass per metre	$m_L$	kg/m	16.4	24.6	32.5	36.4	41.5	55.5	78.8	106.0	125.7	170.2	254.7
THEORETICALLY RATED PRESSURES	Pipe mass including socket and CML	$M_L$	kg	98	147	197	221	252	335	482	642	759	1,021	1,520
	Allowable operating pressure	AOP	MPa	8.27	5.65	4.29	3.84	3.57	3.53	3.53	3.52	3.54	3.53	3.50
	Maximum allowable operating pressure	MAOP	MPa	9.92	6.78	5.15	4.60	4.28	4.24	4.23	4.23	4.25	4.23	4.20
	Allowable site test pressure	ASTP	MPa	10.34	7.06	5.36	4.79	4.46	4.42	4.41	4.40	4.43	4.41	4.38
STRUCTURAL & HYDRAULIC PROPERTIES	Burst pressure	BURST	MPa	25	17	13	12	11	11	11	11	11	11	11
	Transform wall thickness	$t_t$	mm	4.55	4.60	4.60	4.60	4.75	5.45	6.50	7.55	8.25	9.60	11.70
	Celerity of mean CML bore	c	m/s	1,265	1,199	1,141	1,115	1,099	1,086	1,076	1,069	1,066	1,060	1,056
	Barrel ring stiffness	$S_D$	kN/m/m	816	267	117	83	68	58	53	49	47	44	42
FREIGHT	Buckling pressure	P	kPa	8,612	2,822	1,231	880	717	616	555	515	499	465	443
	Pipes (lined) per truck	P/T	n	190	130	90	72	70	56	40	24	24	12	8
WATER MASS	Kilos per truck	$n \times M_L$	kg	18,646	19,077	17,764	15,883	17,623	18,757	19,272	15,409	18,217	12,254	12,161
	Mass of water contained in pipe	$m_w$	kg/m	8	20	36	45	56	83	128	182	223	319	491
BENDING MOMENT AND FOS AGAINST FLEXURAL YIELD	Mass of pipe full of water	$M_T$	kg/m	26	45	70	84	100	141	212	295	357	498	757
	Moment = $wL^2/8$ for simply supported beam over ELL	$M_B$	kNm	1.02	1.81	2.80	3.34	3.98	5.63	8.45	11.75	14.21	19.86	30.17
	$y = DE/2$	y	mm	61	89	116	130	143	173	213	254	280	334	413
	$I = n/64 (D_o^4 - D_i^4)$	I	mm <sup>4</sup>	2.29E+06	7.18E+06	1.64E+07	2.29E+07	3.18E+07	6.68E+07	1.55E+08	3.11E+08	4.65E+08	9.32E+08	2.18E+09
	$\sigma = My/I$ Note max $M = 3wl^2/8$	$\sigma_y$	MPa	81	67	59	57	54	44	35	29	26	21	17
FOS = Yield stress / Working stress	FOS	$\eta$	3.7	4.5	5.1	5.3	5.6	6.9	8.6	10.4	11.7	14.1	17.5	

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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



Certified Product

