



TYTON DUCTILE IRON PIPE SYSTEMS

PN 20 RUBBER RING JOINT DN 225 - DN 750

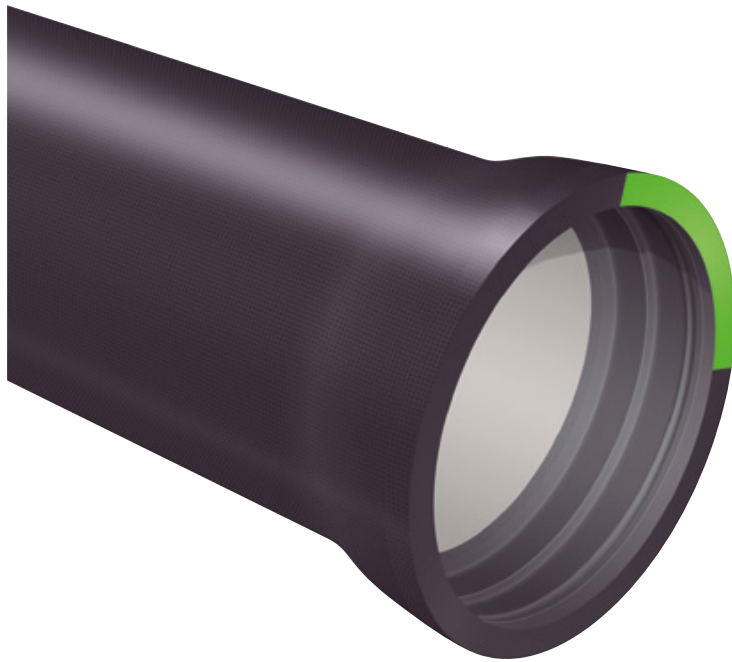
FOR POTABLE WATER, RAW WATER AND SEWERAGE RISING MAINS APPLICATIONS

PN 20 is the minimum pressure class, satisfying a wide range of distribution systems

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



EXTERNAL ZINC & SYNTHETIC RESIN COATING

The external barrel is protected with a 200g/m² metallic zinc layer and finished with a Synthetic Resin pore sealer providing active corrosion protection

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

HYDROLINE-C, CSC & CA LININGS

Our HYDROLINE linings are centrifugally spun cement mortar linings. Pipes are spun with high radial acceleration, around 100g and are simultaneously vibrated, producing a very dense smooth lining of extremely low permeability

From years of proven in service experience, HYDROLINE is hydraulically smooth with Colebrook-White k factors for all new pipes commonly in the order of 0.01-0.03mm

HYDROLINE protects the ductile iron actively due to the chemistry at the iron and cement interface. The cement mortar forms a passive film that inhibits oxidation of the pipe surface and stifles bacteriological action

TYTONXCEL

TYTONXCEL reflects state-of-the-art manufacturing and evolving water industry demands. Efficiency gains and cost savings are achieved without sacrificing the time proven superior performance capabilities associated with ductile iron

LINING OPTIONS

HYDROLINE-C is a centrifugally spun cement mortar lining made up of Type SR (Sulphate Resisting) Blast Furnace Slag cement standard internal lining

HYDROLINE-CSC is HYDROLINE-C with an added Seal Coat to inhibit the leaching of lime where very aggressive, soft waters of low hardness (total alkalinity <30mg/L) or high dissolved CO₂ are being conveyed

TYTONXTREME

TYTONXTREME incorporates our HYDROLINE-CA calcium aluminate cement 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

For the transportation of wastewater of the following types:

- Gravity sewage and under pressure networks
- Domestic wastewaters
- Perfectly watertight
- For effluents between pH4 and pH12

TYTONXTEND

When it comes to mine subsidence, embankment slippage, soil settlement or ground movements, **TYTONXTEND** is without comparison

Based on the robust TYTON pipe joint, **TYTONXTEND** incorporates an extended socket throat which accommodates erratic and unpredictable ground strain in both axial and rotational movement. The pipelines integrity is preserved and vital water or sewer lines remain uncompromised

TYTONXTEND is available in all HYDROLINE options

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Nominal size		Symbol	Units	100	150	200	225	250	300	375	450	500	600	750
KEY METRICS	Nominal pressure	PN	Nom	20	20	20	20	20	20	20	20	20	20	20
	Mean external diameter	ϕ_y	mm	NA	NA	NA	259	286	345	426	507	560	667	826
	Effective laying length	L_e	m	NA	NA	NA	5.75	5.75	5.75	5.75	5.75	5.75	6.00	6.00
	Joint deflection	°	deg	NA	NA	NA	3.5	3.5	2.5	2.5	2.5	2.5	2.5	1
UNLINED PIPE	Mean internal diameter	DI	mm	NA	NA	NA	249	276	335	416	496	548	653	810
	Pipe barrel mass per metre	m_U	kg/m	NA	NA	NA	28.1	31.1	37.7	47.5	62.2	73.6	99.4	143.1
	Pipe mass including socket	M_U	kg	NA	NA	NA	172	190	230	297	385	454	632	920
SOCKET	Socket mass	S	kg	NA	NA	NA	10.4	11.3	13.4	23.7	27.7	30.3	35.6	60.8
DI WALL THICKNESS	Nominal	t	mm	NA	NA	NA	5.0	5.0	5.0	5.1	5.6	6.0	6.8	7.9
	Minimum	a	mm	NA	NA	NA	3.0	3.0	3.0	3.1	3.6	4.0	4.8	5.9
CEMENT MORTAR LINED PIPE	Mean internal diameter	D_C	mm	NA	NA	NA	239	266	325	406	486	538	643	798
	Nominal CML thickness	$t_{c\ nom}$	mm	NA	NA	NA	5	5	5	5	5	5	5	6
	Minimum CML thickness	$t_{c\ min}$	mm	NA	NA	NA	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	NA	NA	NA	37.3	41.3	50.1	63.0	80.7	94.1	123.9	179.5
	Pipe mass including socket and CML	M_L	kg	NA	NA	NA	225	249	301	386	492	572	779	1,138
THEORETICALLY RATED PRESSURES	Allowable Operating Pressure	AOP	MPa	NA	NA	NA	3.28	2.97	2.46	2.05	2.00	2.01	2.03	2.01
	Maximum Allowable Operating Pressure	MAOP	MPa	NA	NA	NA	3.94	3.56	2.95	2.46	2.40	2.42	2.44	2.42
	Allowable Site Test Pressure	ASTP	MPa	NA	NA	NA	4.10	3.71	3.07	2.57	2.50	2.52	2.54	2.52
	Burst pressure	BURST	MPa	NA	NA	NA	10	9	7	6	6	6	6	6
STRUCTURAL & HYDRAULIC PROPERTIES	Transform wall thickness	t_t	mm	NA	NA	NA	4.35	4.35	4.35	4.45	4.95	5.35	6.15	7.35
	Celerity of mean CML bore	c	m/s	NA	NA	NA	1,104	1,079	1,031	980	961	955	944	934
	Barrel ring stiffness	S_D	N/m/m	NA	NA	NA	68,500	50,700	28,600	16,200	13,200	12,300	11,100	10,000
	Buckling pressure	P	kPa	NA	NA	NA	723	535	302	171	139	130	117	105
FREIGHT	Pipes (lined) per truck	P/T	n	NA	NA	NA	72	70	56	40	24	24	12	8
	kilos per truck	n x M_L	kg	NA	NA	NA	16,202	17,428	16,880	15,445	11,800	13,712	6,231	9,104
WATER MASS	Mass of water contained in pipe	m_w	kg/m	NA	NA	NA	45	56	83	129	185	227	325	500
MASS FULL	Mass of pipe full of water	M_T	kg/m	NA	NA	NA	84	99	135	196	271	327	455	690
BENDING MOMENT AND FOS AGAINST FLEXURAL YIELD	Moment = $wL^2/8$ for simply supported beam over ELL	M_B	kNm	NA	NA	NA	3.41	4.01	5.49	7.97	10.98	13.24	20.08	30.46
	$y = DE/2$	y	mm	NA	NA	NA	130	143	173	213	254	280	334	413
	$I = \pi/64 (D_o^4 - D_i^4)$	I	mm ⁴	NA	NA	NA	1.98E+07	2.67E+07	4.71E+07	9.21E+07	1.80E+08	2.70E+08	5.47E+08	1.28E+09
	$\sigma = My/I$ Note max $M = 3wL^2/8$	σ_y	MPa	NA	NA	NA	67	64	60	55	46	41	37	30
	FOS = Yield stress / Working stress	FOS	η	NA	NA	NA	4.5	4.7	5.0	5.4	6.5	7.3	8.2	10.2
Density of water = 1,000kg/m ³ Yield stress of ductile iron = 300MPa														

VIADUX WATER NETWORK SYSTEMS

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