



HydroClass®

AS / NZS DN 100 to DN 750

EN545/ISO2531 DN100-DN1200 Anchored joint solution

Ductile Iron Solution for Water Sewage and Mining Pipelines

A SAFE PATH FOR WATER

PAM HYDROCLASS catalogue 2022 Edition

PAM
SAINT-GOBAIN

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THE REFERENCE

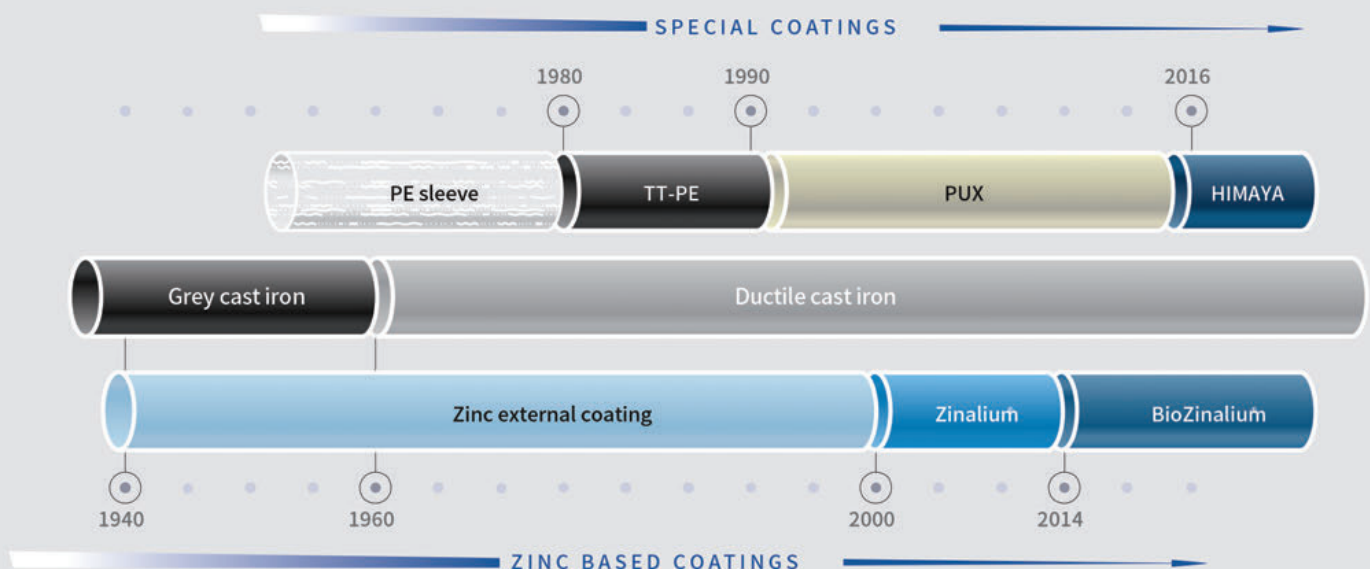
WORLDWIDE RECOGNISED EXPERTISE



Since 1856, PAM has been designing, producing and marketing a complete set of solutions dedicated to drinking water supply, sanitation and sewage disposal, and mining application.

Its reputation in the pipeline profession is based on its know-how, the reliability of its products, as well as on the performance of services rendered to customers.

SUPPLIED IN OVER 100 CAPITALS AND 10,000 CITIES OVER 140 COUNTRIES



PAM is continually improving the performance of materials, coatings and junctions. Its engineers and researchers have developed more than 150 inventions that have resulted in 1500 patents to date. Currently, 30% of the total business of the company is achieved with products launched less than five years ago.

THE PARTNERSHIP

THE EFFECTIVENESS OF A WORLDWIDE NETWORK

PAM has a global network organised for a local service to communities, public and private operators, design offices, installation companies.

PAM is continually striving to share with its customers and its commercial partners the rich experience it draws from its numerous contacts worldwide.

PAM has its plants in many parts of the world. The factories have the complete process from iron making up to the finished products, in order to ensure the quality and satisfaction to clients. These are all under the umbrella of the COFRAC accredited PAM laboratory and research centre based in Pont-a-Mousson, France.

EVERY STAGE OF THE PROJECT WITH CONFIDENCE

Local PAM teams, backed by their experts in soil and water analysis, hydraulic and civil engineering calculations, are present throughout the project development phase until its final completion.



PAM IN OCEANIA



PAM has supplied ductile iron pipes in Australia and the Oceania market since 1920's. In 2008 the company has entered into an exciting chapter by opening an office in Melbourne. Over a decade, PAM has established its market reputation in the region by:

- Partnering with market leaders to ensure seamless supply and customer care
- Supplying over 1,000 km of DICT pipes up to DN1000 for all types of applications in Australia including Bulk Water, Sewerage, Irrigation, Industrial and Mining
- Introducing new coating and anchorage systems contributing to significant cost savings for installation and life cycle asset management.



In 2020, with the requirements of its clients always in mind, PAM draws a new horizon on its Australian extensive commercial and technical network to assure a comprehensive pre and post project service of proximity to urban authorities, engineering and design departments, pipe laying companies and end users.

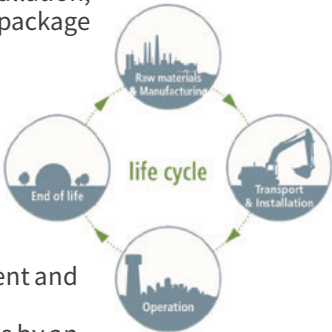
Note: PAM plants are accredited ISO9001; ISO 14001 and Certified Product ISO 2531; EN545; AS/NZS 2280; AS/NZS 2638; complying with WSAA requirements.

THE ENVIRONMENTAL VALUES

THE ECOLOGICAL FOOTPRINT IN A COMPLETELY TRANSPARENT MANNER

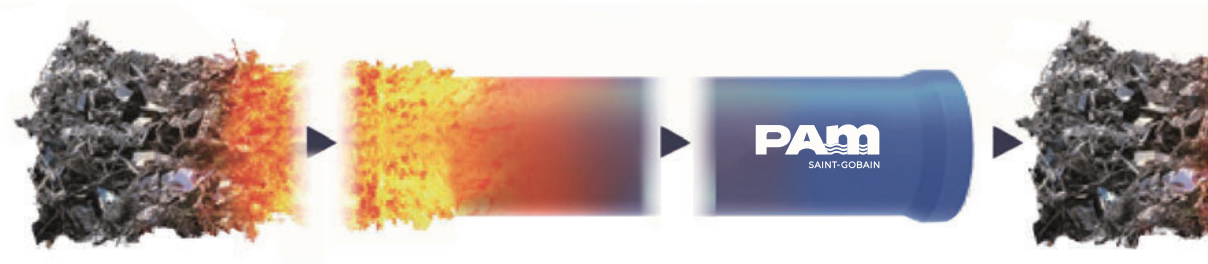
The PAM LCA calculator software package is designed to assess the environmental footprint. It analyses the life cycle(LCA) from the manufacturing, transport, installation, operation until recycling. Complying with the EN 14044 standard, this software package enables to assess on a defined project:

- Emissions of greenhouse gases (CO₂ equivalent)
- Consumption of fossil fuel (M joule)
- The volume of water taken from nature (m³)



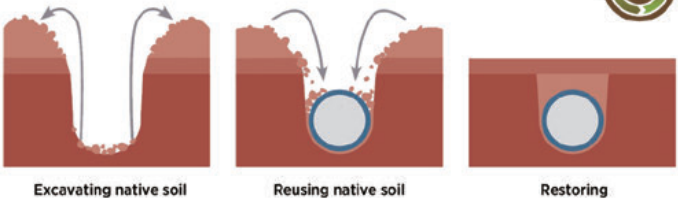
ALL PAM factories produce under ISO 14001 control, in order to minimise the ecological impacts, to prevent pollution incidents, to control waste management and water consumption. Thanks to new industrial processes, PAM has reduced its energy requirements by an average of 30% to manufacture a pipe of the same diameter.

100% RECYCLABLE AND INDEFINITELY



The re-use of recycled scrap recovered from iron and steel manufacture is considered inexhaustible. Ductile cast Iron, derived largely from scrap, is 100% recyclable and easily, due to the proximity of metal recycles.

PRESERVED NATURAL SOIL



Ductile iron pipelines are Semi-rigid and robust and do not require excessive compaction rates when they are laid in trenches. They enable to reuse native backfills rather than materials imported from distant quarries.

This good practice participates in the preservation of soil in its natural state while reducing costs and the site's ecological footprint.

TCO-LCA ASSESSMENT

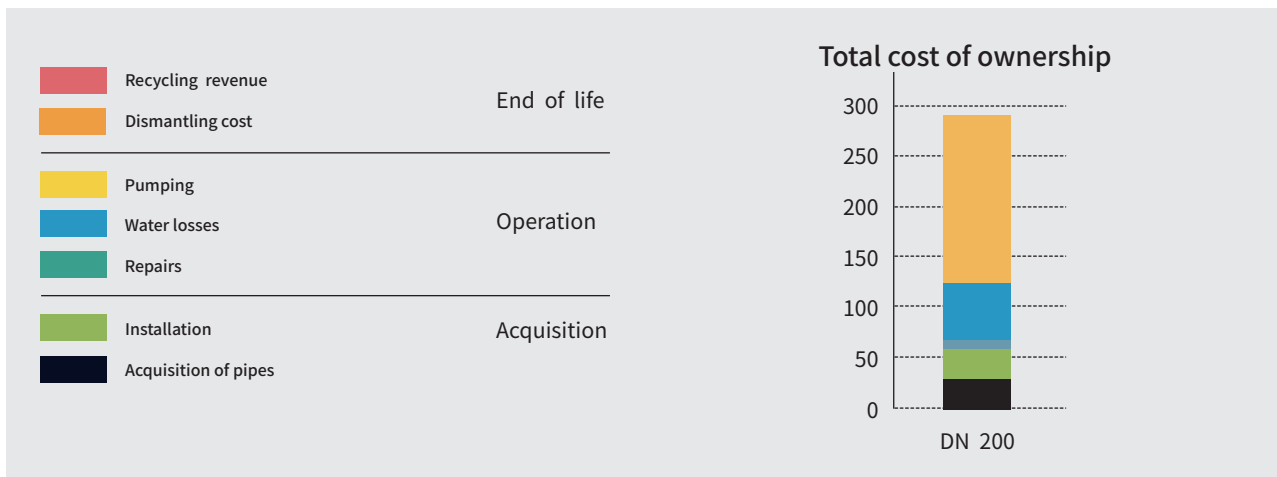
Hypotheses of calculations performed with LCA-TCO PAM calculator:

- For HYDROCLASS® pipes DN 200
- Laid in trenches under standard conditions
- Transported over 13000 km by ship
- Technico-economic data of the year 2014 for Asia/Middle East areas
- Service life 100 years

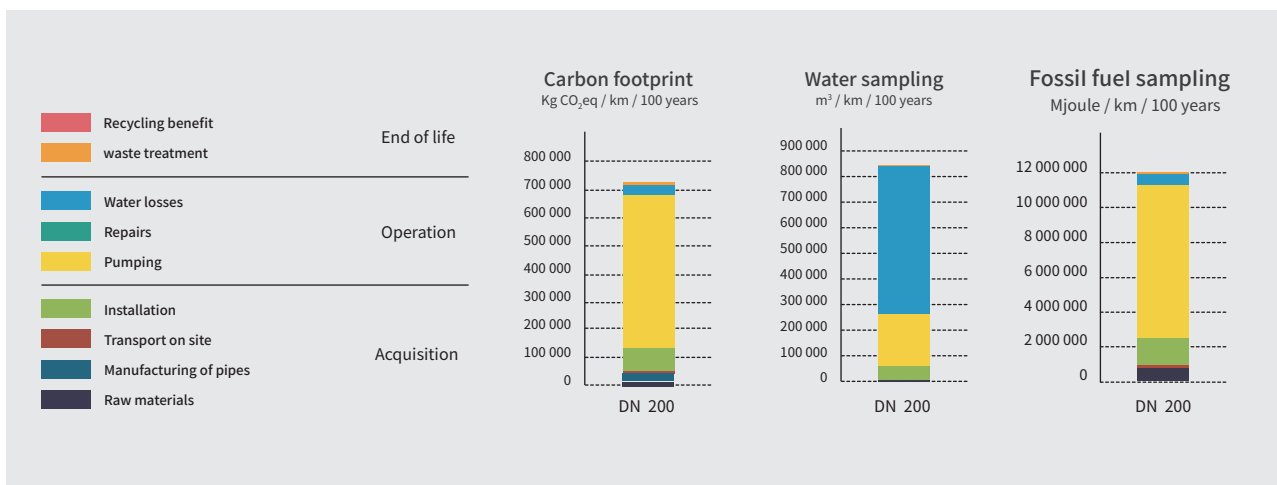


The values below, based on hypothetical cases and average date, are proposed for information. They are not contractual in nature.

TCO ANALYSIS (TOTAL COST OF OWNERSHIP)



LCA ANALYSIS (LIFF CYCLE)



ZINALIUM[®] 85/15

The External Coating solution patented by PAM that convinced the world and Australia

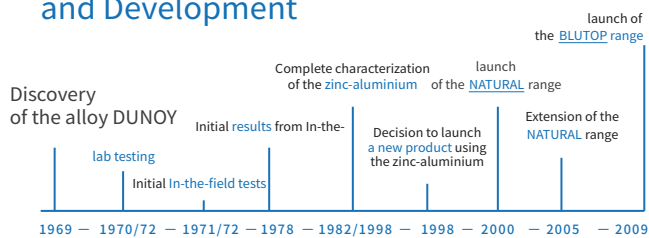
ZINALIUM[®] 85/15 coating prolongs PAM pipe service life time, resulting in enhanced Total Cost Analysis (TCO) and life cycle analysis (LCA).

R&D of ZINALIUM[®]85/15 coating

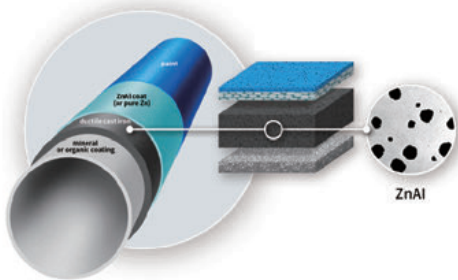
As world's leading manufacturer of ductile iron pipe, PAM started manufacturing since 1970's. Ductile iron pipes are with factory applied metallic Zn-based external coating plus varnishing layer. Over the years, this coating technology is widely recognized and used worldwide.

PAM always continued its research to enhance the ductile iron pipe corrosion protection in order to achieve longer life span. Started in 1960's, and over 40 years of research and testing, PAM invented ZINALIUM[®] 85/15 - Zinc Aluminum alloy (Zn 85%Al 15%) at a density of 400g per m². This enhanced protective coating maintains its galvanic protection and self-healing process, and brings multiple benefits to the market:

40 years of Research and Development



Research Into ZINALIUM started at the end of the 1960's.



ZINALIUM[®]85/15 coating is termed active: As soon as it comes in contact with the soil, the ZINALIUM[®]85/15 coating generates a bonding and stable zinc hydroxide layer that protects the entire surface of the buried pipe. The quality of this overall protective layer increases all the more as the rate of transformation of the zinc into zinc hydroxide is slower.

The combination of aluminium and zinc (85%-15%) considerably reinforces the resistance of this protective layer, and compared with pure zinc, ZINALIUM[®] 85/15 extends the field of use (or service life) in highly corrosive soil.

The protection mechanism

- the 100µm coat of semi-permeable paint limits but does not prevent transfers with the surrounding damp soil;
- the zinc-aluminium alloy - ZINALIUM[®] 85/15 - traps the zinc-rich phase in an aluminium skeleton, which slows down the transformation of zinc into zinc hydroxide and confines the latter in the metal layer.

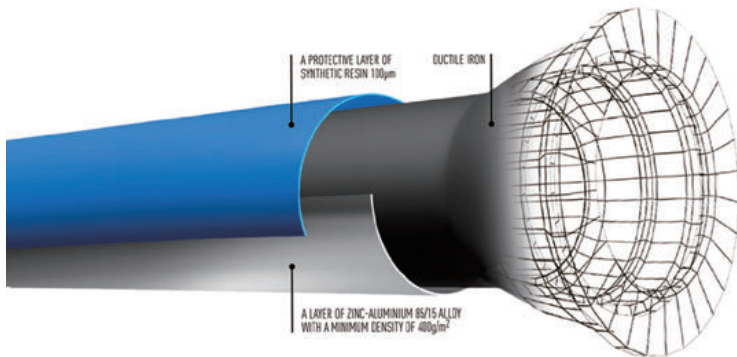


HYDROCLASS®



AS pipes Australian Ductile Iron pipe

PAM ductile iron pipes are made to AS/NZS 2280 standards and compatible with existing installed pipelines.



1. For Australian soils: No PE sleeve and imported soils

Ductile iron pipes with **ZINALIUM®85/15** can be buried in direct contact with most native soil without requiring PE sleeving and/or imported soils* The **HYDROCLASS** pipes are available with **ZINALIUM®85/15** plus a coat of synthetic paint (semi-permeable), at least 100 microns thick. These coatings are compliant with standards EN 545, ISO 8179 and ASNZs 2280.

* For extreme cases of corrosiveness i.e resistivity lower than 500Ω .cm including acid soils and soils containing acidic industrial effluents, ashes or slag, special coatings are available. For More information, contact us or refer to our WSAA appraisal.

2.LONG-LIFE PROTECTION: No cathodic protection

The uses of zinc-Aluminum alloy-based coatings are specified in European EN545 and Australian AS/NZS 2280 standard.Thanks to their socket-spigot jointing with an EPDM gasket, **Hydroclass** pipes are electrically discontinuous. Unlike electrically continuous welded metal pipelines, cathodic protection is not necessary on ductile cast iron pipe systems protected in this manner.

3.SELF HEALING: MADE FOR HEAVY DUTY WORK SITES

A **Zinalium®**-based coating self-restores the continuity of the protective layer at points that have suffered limited damage, by galvanic effect between the exposed cast iron and the zinc near the damaged area (resistant to impacts in transit, handling and scraping during backfilling).

4.Ready to be INSTALLED: No PREPARATION ON SITE

Adhering perfectly to the surface of the cast iron, the **Zinalium®** coating is malleable and deformable, and absorbs impacts in transit or on site without breaking. All PAM pipes are factory-coated, so that after the joints are assembled there is no need to touch up the coating on site.

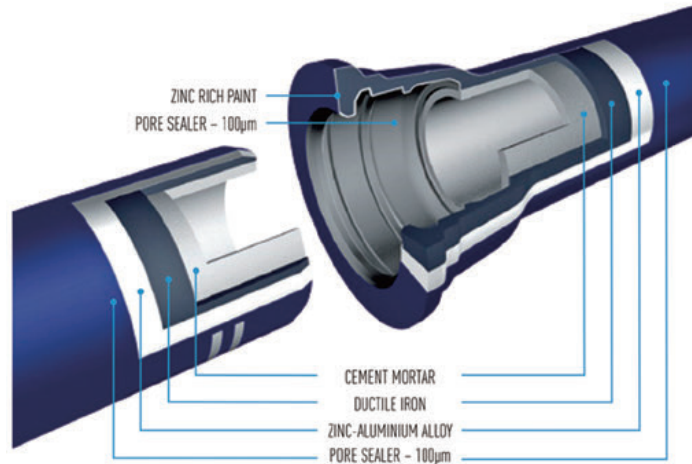


HYDROCLASS®

For potable, raw and recycled water



Designed to meet the requirement of industry Australian water, **HYDROCLASS®** pipes are an integration of the PAM 160' s know-how and experience. Dimensions of pipe are made to comply with AS/NZS 2280 standards and ensure its compatibility with the existing pipelines. The push-on TYT joint provides an easy-installation, secured sealing performance and important angular deflection to adapt to site conditions and soil movement.



Size: DN100 - 750

conformity: AS/NZS 2280 Ductile Iron Pipe and Fittings
AS 4020 testing of products for use in contact with drinking water

Joint: TYT push-on joint to AS/NZS 2280

Pressure rate: PN20,PN35 and Flange Class

External coating: ZINALIUM® 85/15(400g/m²) 100µm blue synthetic coating

Coating option: HIMAYA® for extreme soils

Internal lining: Blast furnace slag cement lining to AS/NZS 2280 and AS4020

Lining options: Seal coat in compliance with ISO16132 and AS/NZS 2280
PH1-12 for soft aggressive water

HIMAYA® : the external coating options for extremely corrosive condition

PAM patented dual active and passive solution, the HDPE coating (>2.2mm thick) is factory hot-applied on top of **ZINALIUM® 85/15** coating. The coating has excellent impact resistance and UV resistance to maintain its quality during storage and transportation. This solution can be used in all kinds of soil corrosivity conditions.



Seal Coat Internal lining options

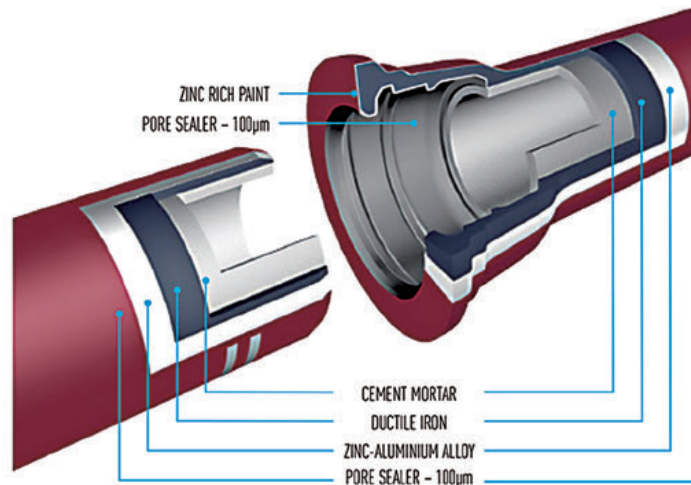
Blast Furnace Slag Cement (BFSC) lining + seal coat. The BFSC is PAM Patented product, made from PAM own slag, produced during the own slag-by product at blast furnace iron making process. Common reduces significantly the carbon footprint of PAM pipe making process. The seal coat allows pipes to convey soft water (total alkalinity < 30mg/L) or high dissolved CO₂.

INTEGRAL®



For **waste water or industrial** returns with high chemical aggressiveness or abrasion

Combining the key features of Hydroclass® and high aluminate cement lining, **INTEGRAL®** pipes are designed to transport sewage water or industrial waste water, which has high chemical aggressiveness and / or solid contents causing abrasion. Its main features are:



Size: DN100 - 750

Quality conformity: AS/NZS 2280 Ductile iron Pipe and fittings

Joint: TYT push-on joint to AS/NZS 2280

Pressure rate: PN20, PN35, Flange Class

External coating: ZINALIUM® 85/15(400g/m²) 100µm red synthetic coating

Internal lining: High aluminate cement EN598 & AS/NZS 2280

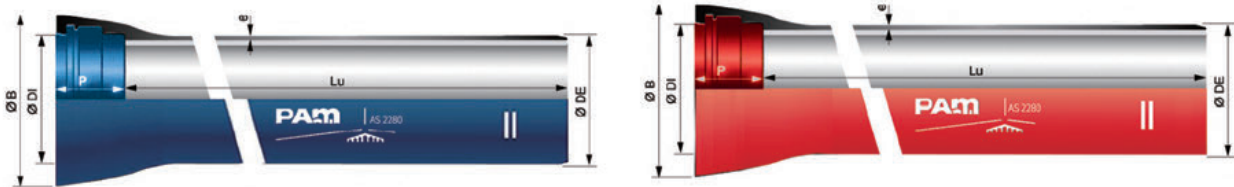
For effluents between pH4 and pH12

Besides complying with AS/NZS 2280 lining of the **INTEGRAL®** pipe is designed and type tested to EN598: Chemical Resistance Test and Abrasion Resistance Test. It can be used to transport effluent between pH4-12.

SPECIFICATION

AS/NZS PAM Pipe with AS TYT Joint

DN100-750



DN	Lu	PN	e	ØDE	ØDI	P	ØB	Mass
mm	m		mm	mm	mm	mm	mm	kg/m
100	5.75	PN35	4.9	122	124.7	89	162.7	17.5
150	5.75	PN35	5.0	177	179.7	89	218.3	26.1
200	5.75	PN35	5.0	232	235.2	102	278.2	34.8
225	5.75	PN35	5.0	259	262.1	102	303.4	39.2
250	5.75	PN35	5.2	286	289.0	102	329.5	44.6
300	5.75	PN35	5.9	345	348.2	102	391.4	59.0
375	5.75	PN35	7.0	426	430.5	127	487.3	84.4
450	5.75	PN35	8.1	507	511.2	127	570.7	112.7
500	5.75	PN35	8.8	560	564.3	127	626.0	133.0
600	5.75	PN35	10.2	667	671.2	135	751.4	178.9
750	5.75	PN35	12.3	826	830.2	157	912.7	268.2

DN	Lu	PN	e	ØDE	ØDI	P	ØB	Mass
mm	m		mm	mm	mm	mm	mm	kg/m
225	5.75	PN20	4.5	259	262.1	102	303.4	36.4
250	5.75	PN20	4.6	286	289.0	102	329.5	40.9
300	5.75	PN20	4.6	345	348.2	102	391.4	49.3
375	5.75	PN20	4.8	426	430.5	127	487.3	64.2
450	5.75	PN20	5.4	507	511.2	127	570.7	83.2
500	5.75	PN20	5.8	560	564.3	127	626.0	96.8
600	5.75	PN20	6.7	667	671.2	135	751.4	128.5
750	5.75	PN20	8.0	826	830.2	157	912.7	191.5

Note: Dimensions and mass are given as nominal value. Higher pressure is available for Flange Class

Legend

DN: nominal diameter

e: nominal thickness to AS/NZS 2280:2020, in mm

Lu : laying length, in m

ØDE : external nominal diameter of the barrel to AS/NZS 2280:2020, in mm

PN : pressure rating to AS/NZS 2280:2020

ØDI : internal nominal diameter of the socket, in mm

P : nominal depth of the socket, in mm

Mass : mean total mass per meter

ØB : nominal external diameter of the socket, in mm

HYDROCLASS® ZINALIUM®

Field of use:

For drinking water networks and other water networks

Main characteristics:

AS TYT joint in EPDM to AS1646

External coating:

- ZINALIUM® alloy Zn85Al15(400 g/m²)
- Blue cobalt synthetic pore sealer minimum 100 microns to AS3750.19


Internal coating:

- Blast Furnace Slag Cement mortar (BFSC) to AS3972 type GB
- Option: seal coated to ISO 16132

In conformance to AS/NZS 2280:2020

Water contact areas tested to AS/NZS 4020

Details:

	HYDROCLASS ZINALIUM®
Available Diameter Range	DN100,150,200,225, 250, 300, 375,450, 500,600, 750
Pressure Rating	PN20 - Green mark on socket face PN35 - Red mark on socket face Flange Class - Blue mark on socket face 
Joints	Automatic push on TYT type rubber ring joint - DN100 to 750
Deflection	DN100-250: 3.5° DN300-600: 2.5° DN750: 1°
External coating	ZINALIUM® 85/15 + 100µm blue synthetic coating
Coating option:	HIMAYA® <ul style="list-style-type: none"> · Soils with a resistivity lower than 500 Ω .cm · Peaty and acid soils · Soils containing acidic industrial effluents, ashes or slag
Internal coating	Blast Furnace Cement Mortar (BFSC)
Length	DN100 to DN750: L=5.75m

INTEGRAL® ZINALIUM®

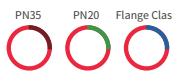
Field of use:

- For gravity sewer and pressure or pumped sewer networks
- Domestic waste water
- Very hard raw water and irrigation
- For effluents between pH4 and pH12

Main characteristics:

- AS TYT type joint in NBR to AS1646
- External coating:
 - ZINALIUM® alloy Zn85Al15(400 g/m²)
 - Red synthetic pore sealer minimum 80 microns to AS3750.19
- Internal coating:
 - High Alumina Cement (HAC) to AS3972 type GB
- In conformance to AS/NZS 2280:2020

Details:

	HYDROCLASS ZINALIUM®
Available Diameter Range	DN100,150,200,225, 250, 300, 375,450, 500,600, 750
Pressure Rating	PN20 - Green mark on socket face PN35 - Red mark on socket face Flange Class - Blue mark on socket face 
Joints	Automatic push in TYT type rubber ring joint - DN100 to 750
Anchoring System	TYT push-on restraint joint available - DN100 to 375
Deflection	DN100-250: 3.5° DN300-600: 2.5° DN750: 1°
External coating	The external & socket area is coated with a 'red' synthetic coating
Internal coating	High Alumina Cement (HAC)
Length	DN100 to DN750: L=5.75m

Anchored joint solutions

Universal PIPE Systems

All pipe systems carrying a fluid under pressure are subjected to significant stresses: thrust forces occur at changes in direction, reductions in diameter and at the ends of pipelines. It is essential to counterbalance these forces to prevent any risk of disjoining either by the use of concrete anchor blocks, or self-anchoring the pipe system.

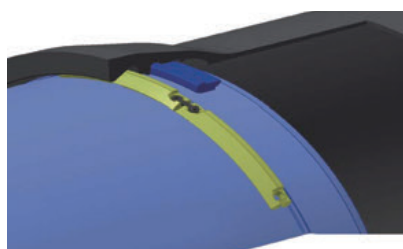
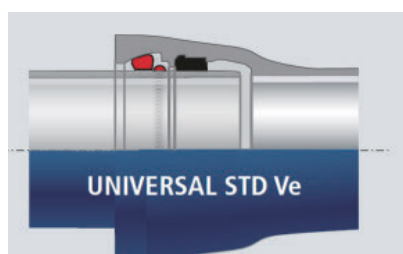
Alternative solutions to concrete anchor blocks have existed many years.

SAINT-GOBAIN PAM offers a range of anchoring system for higher pressure rating, Universal PIPE Systems comply with EN545/ISO2531.

(UNIVERSAL Ve joint) for pipes and fittings, it is available from DN100 to DN1600.

Locking with ring and weld bead housed in chamber, adjoining the sealing chamber.

HIGH PRESSURE, WITHOUT ANY BOLTS!

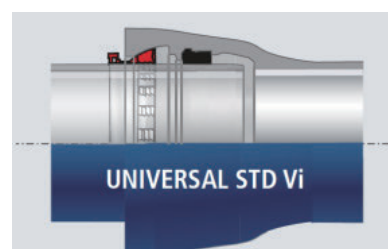


UNIVERSAL Ve					
DN	Pipe Class	AOP	MAOP	ASTP	Deflection
		bar	bar	bar	°
100	C100	85	102	106	3
150	C64	63	75	78	3
200	C64	52	62	65	3
250	C50	46	55	57	3
300	C50	41	49	51	3
350	C40	38	45	47	3
400	C40	35	42	43	3
450	C40	32	38	40	3
500	C40	30	36	37	3
600	C40	30	36	37	2
700	C30	27	32	33	2
800	C30	25	30	31	2
900	C30	25	30	31	1,5
1000	C30	25	30	31	1,2
1200	C30	25	30	31	1,1
1400	C25	16	19	20	1.2
1600	C25	16	19	20	0.9

(UNIVERSAL Vi joint) for pipes and fittings, it is available from DN100 to DN600.

Locking with insert rings housed in a chamber, adjoining the sealing chamber.

WITHOUT WELD BEAD!



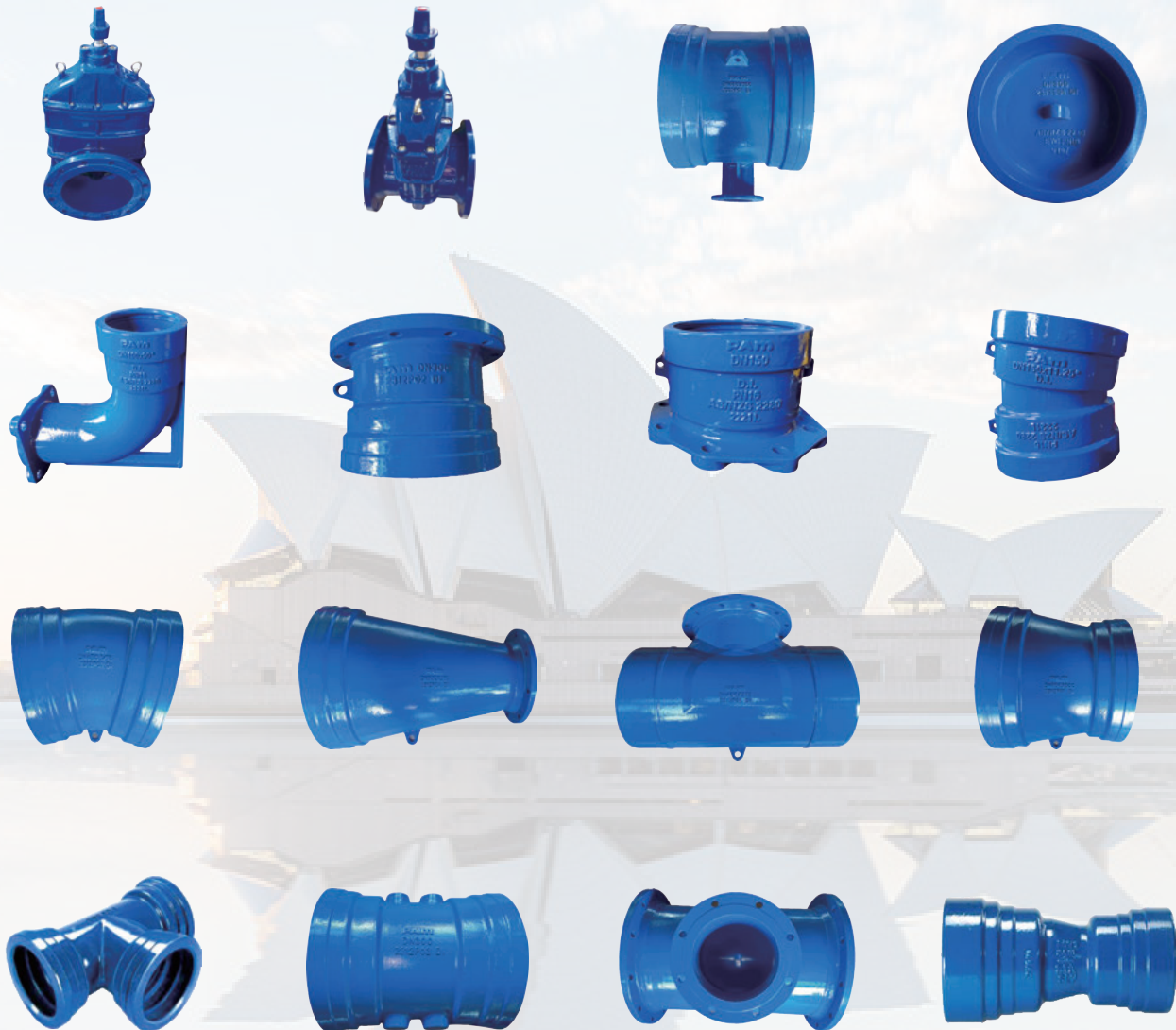
UNIVERSAL VI					
DN	Pipe Class	AOP	MAOP	ASTP	Deflection
		bar	bar	bar	°
100	C100	56	67	70	3
150	C64	48	57	60	3
200	C64	43	51	53	3
250	C50	39	46	48	3
300	C50	34	40	42	3
350	C40	25	30	31	3
400	C40	20	24	25	3
450	C40	16	19	23	3
500	C40	16	19	23	2
600	C40	16	19	23	2

Universal Standard Vi Locked Ring

standard gasket



Fittings, Valves AS/NZS and Universal range



PAM provides many kinds of fittings complying with AS/NZS 2280 standard, including tee, taper, bend and other connector with socket joint or flange joint.

Internal and external epoxy coating which is complying with AS/NZS 4158 standard.

Universal STD fitting is complying with EN545/ISO2531, the internal and external epoxy coating comply with EN14901 standard.



SAINT-GOBAIN

SAINT-GOBAIN PAM CANALISATOIN

21 avenue Camillie Cavallier,
54705 Point-a-Mousson, France

SAINT-GOBAIN PAM APAC

Address: Room 1808, 18th Floor,
Building No.5, Zi Yun Wisdom Plaza,
No. 19 Kazimen Avenue. Qinhuai
District, Nanjing, PRC

**Customer service hotline:
400-8880-198**

**www.saint-gobain.com.cn/en/pam
www.pamline.com**