

The Patented Fusion Process

Fusion is performed by licenced and trained fusion technicians.

- 1 Pipe ends are precisely and securely aligned
- 2 The fusion machine's dual rotary cutting head faces and accurately squares both PVC pipe ends, simultaneously.
- 3 An electronically controlled heating element in the heater plate, heats the pipe ends in preparation for fusion bonding, forming a melted bead of fusible material.
- 4 Following heating ("heat soak") of the pipe ends, and developing the proper bead, the heater plate is removed, and the pipe ends are brought together and securely held under controlled pressure until the newly-formed joint cools.
- 5 When the joint has cooled to the required conditions, it can be moved or installed immediately.

Fusion times are comparable to other thermoplastic materials. The fusion conditions, including temperature & pressure, are unique to Fusible PVC™. Testing in accordance with F1674 and ASTM D-638 methods demonstrates that the tensile strength of the fused joint is equivalent to the tensile strength of the parent pipe.

Customer Service support

- Engineering and technical support
- Budget preparation
- Project planning
- Fusion services
- Construction training



Test categories	Iplex Pipelines compliance	Iplex Pipelines testing	Fusion QC data collection and retention
AS/NZS 1477	•	•	
Extrusion quality	•	•	
Mechanical properties	•	•	
Pressure testing	•	•	
Process control	•	•	•
Trained and Licensed Operators			•



North Shore City, Auckland NZ



Central America



Worcester, Massachusetts, USA

HORIZONTAL DIRECTIONAL DRILLING



Jacksonville, Florida, USA



Stono River, South Carolina, USA

PIPE BURSTING



City of South San Francisco, USA



Boise, Idaho, USA



Howard Lake, Minnesota, USA



Hampton Roads, Norfolk, Vermont, USA

DIRECT OPEN CUT INSTALLATION



Danville, California, USA



Delano, California, USA



NOVAFUSE™
FUSIBLE PVC™

Novafuse™ Fusible PVC™ Pipe Systems

Iplex Pipelines NZ Ltd is a manufacturer of proprietary infrastructure PVC pipes and Trenchless Technology solutions. Iplex is the New Zealand Licenced manufacturer and supplier of Fusible PVC™ Pipe Systems, patented and developed by Underground Solutions Inc (UGSI) of the USA. UGSI is an infrastructure technology and pipeline rehabilitation company. UGSI has developed and continues to develop unique and proprietary technologies focused on the underground Infrastructure industry, including Fusible PVC™ Pipe products. FPVC™ provides the only available method of installing a continuous, monolithic, seal ring-free PVC pipe, capable of use in numerous trenchless or conventional "open cut" installation. Applications include pressure and non pressure pipelines for drinking water, wastewater, electrical, industrial and telecommunications industries. Fusible PVC™ has been fused and installed throughout the United States, Canada, Central America, Hawaii, and in New Zealand.



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Installation Methods

- Horizontal Directional Drilling (HDD)
- Sliplining
- Static Pipe bursting
- Conventional “open cut”

Applications

Drinking water mains
Raw water and industrial process water
Pressure Sewer rising mains
Gravity Sewer mains
Seismically active locations/unstable/moving ground
Hydrocarbon contaminated ground
Industrial wastewater/dairy/fishing/meat processing/food processing wastewater
Recycled water
Stormwater
Electrical/telecommunications conduit

Standards:

Novafuse Fusible PVC™ Pipe Systems manufactured in New Zealand meet AS/NZS 1477, and external dimensions are fully compatible with conventional socketed PVC-U pipe made to AS/NZS 1477.

Novafuse™ Fusible PVC™ Pipe Systems

- The only fusible polyvinyl chloride pipe system made in New Zealand
- 100 year expected design life technology, and propriory PVC formulation
- Sizes range from DN 100 to DN 600

Features and Benefits

- Monolithic, fully restrained pipe system uses readily available standard ductile iron waterworks fittings to AS/NZS 2280, AS/NZS 4998, and AS/NZS 4793
- PVC is one of the most widely accepted pipe systems used in modern water systems
- Recommended safe pulling allowance greater than PE for similar pipe ID and pressure class
- Recommended safe pulling force greater than conventional seal ring jointed PVC pipe systems
- Reduced installation cost owing to lighter weight and reduced pipe dimensions
- Excellent abrasion and scratch-resistant properties
- Superior resistance to hydrocarbon permeation
- Superiour resistance to chlorine based pipe disinfectants
- Continuous pull-in lengths exceeding 1 kilometre.



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Iplex NOVAFUSE™ – Metric Series 1 – Pressure Pipe Ratings Weight, Dimensions and safe pull force

PN9						PN12				PN15				PN18			
Nom dia	Mean OD (mm)	Mean ID (mm)	Mean WT (mm)	Weight (Kg/m)	Safe Pull Force (Tonnes)	Mean ID (mm)	Mean WT (mm)	Weight (Kg/m)	Safe Pull Force (Tonnes)	Mean ID (mm)	Mean WT (mm)	Weight (Kg/m)	Safe Pull Force (Tonnes)	Mean ID (mm)	Mean WT (mm)	Weight (Kg/m)	Safe Pull Force (Tonnes)
100.0	114.3	104.5	4.9	2.4	3.26	101.7	6.3	3.1	4.14	98.7	7.8	3.8	5.06	-	-	-	-
150.0	160.2	146.8	6.7	4.7	6.26	142.6	8.8	6.3	8.11	138.6	10.8	7.5	9.82	-	-	-	-
200.0	225.3	208.5	8.4	8.7	11.09	203.1	11.1	11	14.47	197.9	13.7	13.4	17.64	-	-	-	-
225.0	250.3	231.7	9.3	10.8	13.64	225.7	12.3	13.7	17.81	-	-	-	-	-	-	-	-
300.0	315.4	292.0	11.7	17	21.63	284.4	15.5	21.5	28.30	-	-	-	-	-	-	-	-
375.0	400.5	370.7	14.9	27.4	34.97	361.3	19.6	34.7	45.44	352.1	24.2	43.7	55.43	343.1	28.7	49.3	64.95
450.0	500.5	463.3	18.6	43	54.55	451.5	24.5	54.2	70.98	-	-	-	-	-	-	-	-
500.0	560.5	518.9	20.8	50.47	68.33	505.7	27.4	66	88.91	-	-	-	-	-	-	-	-
575.0	630.5	583.5	23.5	65	86.83	-	-	-	-	-	-	-	-	-	-	-	-

Minimum order quantities apply

Iplex NOVAFUSE™ CIOD Series 2 – Pressure Pipe Ratings, Weight, Dimensions and safe pull force

PN9						PN12				PN16				PN18			
Nom dia	Mean OD (mm)	Mean ID (mm)	Mean WT (mm)	Weight (Kg/m)	Safe Pull Force (Tonnes)	Mean ID (mm)	Mean WT (mm)	Weight (Kg/m)	Safe Pull Force (Tonnes)	Mean ID (mm)	Mean WT (mm)	Weight (Kg/m)	Safe Pull Force (Tonnes)	Mean ID (mm)	Mean WT (mm)	Weight (Kg/m)	Safe Pull Force (Tonnes)
100.0	121.9	-	-	-	-	108.5	6.7	3.5	4.70	-	-	-	-	102.3	9.8	5.04	6.69
150.0	177.3	-	-	-	-	157.7	9.8	7.7	9.99	-	-	-	-	148.9	14.2	10.8	14.09
200.0	232.2	-	-	-	-	209.2	11.5	11.6	15.45	202.2	15.0	14.9	19.83	-	-	-	-
250.0	286.3	264.9	10.7	14	17.95	258.1	14.1	17.6	23.35	249.3	18.5	22.8	30.15	-	-	-	-
300.0	345.4	319.6	12.9	20.3	26.10	311.4	17.0	26.4	33.98	-	-	-	-	-	-	-	-
375.0	426.2	394.4	15.9	30.1	39.71	384.4	20.9	38.0	51.56	371.2	27.5	52	66.74	-	-	-	-
450.0	507.0	469.2	18.9	45.3	56.15	-	-	-	-	-	-	-	-	-	-	-	-
525.0	560.3	518.5	20.9	55.8	68.62	-	-	-	-	-	-	-	-	-	-	-	-

Minimum order quantities apply

Iplex NOVAFUSE™ Gravity Sewer Pipe Ratings, Weight, Dimensions and safe pull force				
Stiffness Class (SN16)				
Nominal Size DN	Mean OD mm	Mean ID min (mm)	Weight (Kg/m)	Safe Pull Force (Tonnes)
100	110.2	101.6	2.1	2.77
150	160.3	147.9	4.6	5.81
175	200.3	184.9	7.1	9.02
225	250.4	231.3	11.1	14.00
300	315.4	290.8	18.1	22.69
375	400.5	370.1	28.6	35.65
475	500.5	462.3	45.1	55.96

Minimum order quantities apply

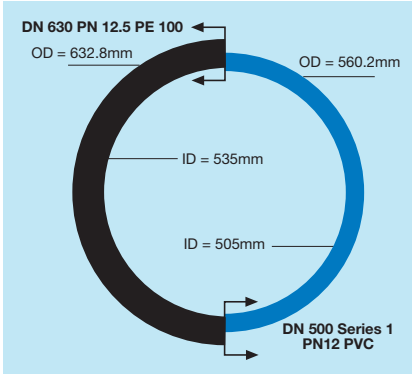
NOVAFUSE Fusible PVC™ pipes can be made in a variety of colours, including

- White – Series 1, Potable Water
- Light Blue – Series 2, Potable Water
- Light Cream – Pressure Sewer
- Light Grey – Gravity Sewer
- Purple – recycle, reclaim or reuse water
- Orange – Electrical conduit

Specifications for other sizes available on request, up to 914mm nominal diameter.
Pipe sold in 12m lengths – other lengths available on request
More information available at - www.iplex.co.nz

Safe Pulling Force: Based on the mean cross-sectional area of the pipe and safe axial tensile stress of 19 MPa (19,000Kn/m²) (Axial tensile stress of 48 MPa with a safety factor of 2.5)

PROPERTY	SPECIFICATION	PVC-U	PE 100	DIFFERENCE (%) PVC-U vs PE100
Tensile Strength (MPa)	ASTM D-638 / ISO 527	48	25	+ 92
Safe Pulling Stress (MPa)		19	8	+ 137
Specific Gravity	ASTM D-1505	1.40	0.95	
Minimum Required Strength (MRS) (MPa)		26	10	+ 160
Hydrostatic Design Stress (MPa) < DN 150	AS / NZS 1477 / AS / NZS 4130	11	8	+ 37
Hydrostatic Design Stress (MPa) > DN 150	AS / NZS 1477 / AS / NZS 4130	12.3	8	+ 53
Coefficient of Linear Expansion (m/m/°C)	Plastics Pipes for Water Supply and Sewerage Disposal, 4th Edition, 2003 – Lars-Eric Janson	8 x 10 ⁻⁵	18 x 10 ⁻⁵	- 55
Initial 3 Minute Ring Bending Modulus (Initial 3 Minute Modulus of Elasticity) (E ^b) (MPa)	AS / NZS 2566.1	3200	950	+ 236
Long Term Minute Ring Bending Modulus (Long Term Modulus of Elasticity) (E ^{bl}) (MPa)	AS / NZS 2566.1	1400	260	+ 438



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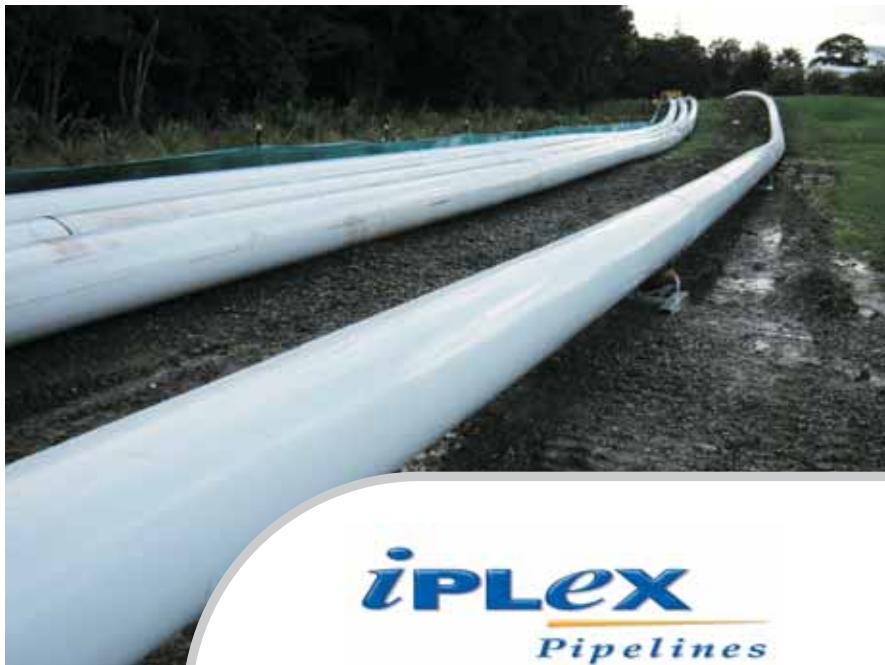
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Iplex NOVAFUSE™ PVC-U vs Iplex PE 100 for Horizontal Directional Drilling (Typical Example)

PROPERTY	PVC-U	PE 100	DIFFERENCE, (%) PVC-U vs PE100
DN	500 Series1	630	
Mean Pipe Outside Diameter (mm)	560.2	632.8	- 11
HDD Bore Volume pipe OD plus 40%, (m³/m)	0.48	0.61	- 21
Mean Pipe Wall Thickness (mm)	27.4	48.7	- 43
Mean Pipe Internal Diameter (mm)	505	535	
Pipe Pressure Class (PN) (Bar)	12	12.5	
Pipe Weight (Kg/m)	66	84	- 21%

Iplex NOVAFUSE™ Minimum Bend Radius

Pipe DN (mm) / Series	Pipe Nominal minimum OD (mm)	Minimum bend radius (m) (270 x OD)
100 Series 1	114	30
100 Series 2	121	32
150 Series 1	160	43
150 Series 2	177	47
200 Series 1	225	60
200 Series 2	232	62
225 Series 1	250	67
250 Series 2	286	77
300 Series 1	315	85
300 Series 2	345	93
375 Series 1	400	108
375 Series 2	426	115
450 Series 1	500	135
450 series 2	506	136
525 Series 1 / Series 2	560	151
575 Series 1	630	170



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