

INFRAPIPE™
SUSTAINABLE SOLUTIONS FOR GENERATIONS TO FOLLOW

MATERIAL PROPERTIES – PE & PP

HDPE pipes, tanks and chambers have a 100 year life and the best hydraulic performance. They are easy to handle, quick to install and don't get damaged on site. They are the best option in an earthquake, are chemically inert and immune to biological attack or infiltration. They use less CO2 per metre of pipe to make and install and all production waste is recycled.

Requirement	HDPE/PP	Concrete	GRP	PVC
Material life	Very good	Average	Can decay	Good
Abrasion resistance	Very good	Very poor	Poor	Good
Hydraulic efficiency	Very good	Average	Very good	Very good
Weight	Light	Very heavy	Heavy	Heavy
Tensile Strength	Very good	Good	Average	Average
Compressive Strength	Good	Very good	Very good	Good
Ductility	Very good	Nil	Nil	Nil
Deformation Recovery	Good	Nil	Nil	Nil
Brittleness	No	Some	Yes	Yes
Homogeneity	Yes	Yes	No	Yes
Risk of infiltration	Very good	Very poor	poor	Poor
Ease of modification	Very good	Average	Poor	Average
Ease of repair	Very good	Average	Poor	Poor
Seismic resilience	Very good	Poor	Poor	Average
Water permeability	Very good	Poor	Very poor	Very good
Biological resistance	Very good	Poor	Very poor	Very good
Chemical resistance	Very good	Very poor	Good	Good
Recycled in NZ	**Very good**	**Rare**	**Nil**	**Rare**
Sustainable manufacture	Average	Poor	Very poor	Very poor
Sustainable installation	**Very good**	Average	Poor	Average

This document is part of the range of INFRAPIPE design manuals, datasheets and technical guides, supported by BIM files, standards information and standard drawings.

INFRAPIPE is an independent tax-paying NZ business that makes the largest pipes in Australasia. It is ISO9001 accredited with products certified to AS/NZS 5065 and AS/NZS 4130 and tested to ISO9969 and pipe solutions designed to meet AS/NZS 2566 Parts 1 & 2. with testing to ISO 9969:2016, resins compliant with AS/NZS 4131:2010 and rubber rings to AS1646:2007.



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Requirement	Notes
Material life	HDPE/PP proven to be 100Yrs+ (see below), concrete pipes often <70. Penetrations/scratches to GRP cause rot and decay.
Abrasion resistance	HDPE Abrasion is less than PVC by a factor of 2, GRP 5 and concrete 10+
Hydraulic efficiency	Mannings number is 0.009-0.011, concrete is 0.012-0.013 (18%+ difference) Colebrook-White is 0.0015, PVC 0.03, GRP 0.06, concrete 0.15
Weight	Concrete is 14 times heavier for pipes, PVC between 2 and 6 times heavier depending on diameter, GRP varies but typically twice as heavy for tanks.
Tensile Strength	INFRAPIPE HDPE yields at 31MPA with 8% strain. This is sufficient for all NZ load cases and seismic shear requirements after ground displacement.
Compressive Strength	The design of INFRAPIPE is bespoke so pipe with any SN rating can be manufactured. Compressive testing onsite in accordance with ISO 9969:2016.
Ductility	HDPE is very ductile; other pipe systems are not.
Deformation Recovery	INFRAPIPE can recover from up to 50% deformation (see videos here or take a factory tour)
Brittleness	HDPE does not become brittle. Standard resin UV resistance is 50yrs+
Homogeneity	HDPE pipes are completely homogenous – there are no weak points or no interface issues between gelcoat and fabric (GRP) or concrete and its reinforcing steel.
Risk of infiltration	CollarFUSION welded HDPE becomes one single structure, there are no infiltration points. The rubber gasket option is a machined solution with a 1-2mm gap.
Ease of modification	Cut, prepare and weld – it is very simple for HDPE. It can be surface-dried instantly prior to welding, and can be used once cool – no extended drying or curing times.
Seismic performance	HDPE elongates, compresses and bends. In seismic events globally in the last few decades (Japan, Christchurch) it has consistently outperformed all other options.
Water permeability	GRP and to a lesser extent concrete are both at risk of water penetration.
Biological resistance	GRP and to a lesser extent concrete are both susceptible to biological attack.
Chemical resistance	Concrete reacts with the environment and waste, GRP if exposed (the gelcoat protective layer is damaged) can also react. HDPE is inert.
Recycled in NZ	INFRAPIPE recycles all production waste and will recycle unwanted HDPE pipe GRP cannot be recycled in NZ and PVC or concrete recycling is rare and ineffective.
Sustainable manufacture	Concrete requires 3.5kg of CO2 per m of pipe, HDPE is 2.2kg. Visit EPDHUB and use the code HUB-0168
Sustainable installation	HDPE weighs 7% or less than that of concrete and comes in 6m lengths. Smaller diggers, less trucks, quicker install and then less inspection, no maintenance and recycling at end of life 100 years later. In 70 years concrete will require disposal and replacement.

The latest meta study by European body TEPPFA confirmed that the expected life of HDPE pipes is well in excess of 100 years. This is in addition to the 2006 research conducted on pipes exhumed after 50 years in the ground which confirmed their service life will exceed 100 years, or the study conducted in 2014 which investigated a wide variety of installed pipes to confirm their service life was 100 years plus.

Fat does not bind to HDPE pipes in NZ Microplastics do not come from pipes HDPE does not achieve self-sustained combustion Buoyancy is only an issue for large pipes in poor soil with high GWL