



SPECIFYING & INSTALLING AN HDPE **INFRATANK** 10-1000M3





SPECIFYING & INSTALLING AN HDPE INFRATANK 10-1000M³

Purpose

The Purpose of this document is to provide asset managers, consulting engineers and contractors with all the information they require to work with HDPE spiral-wound tanks from Infrapipe from start to finish. It is a 5-minute read and is split into 4 parts for easy reference:

- Part One lists what is (and is not) in the scope of the tank supply
- Part Two explains the unique design flexibility that helical HDPE offers
- Part Three lists information and design at each stage
- Part Four addresses FAQs

Volumes

Infrapipe can offer the following volumes for example but it is important to note that as tanks can be seamlessly joined on site – in any dimension, orientation or angle – then any volume can be created. Here are some typical configurations:

Diameter	6m	12m	18m	30m	50m
2000mm	19m ³	38m ³	57m ³	94m ³	157m ³
2500mm	29m ³	59m ³	88m ³	147m ³	245m ³
3200mm	48m ³	96m ³	145m ³	241m ³	402m ³

Benefits

HDPE tanks have a 100 year life and the following benefits:

- Lighter (typically kg per m³)
- No maintenance
- Completely recyclable
- Very flexible Design
- Short lead time
- Better value (typically \$1k/m³)
- Safer to work with
- Easy to modify
- Easy to install
- Made in New Zealand



Part One: The scope of tank supply

From the perspective of the designer, the contractor or the asset manager, the tank is a subsystem which is supplied by Infrapipe. If the tank subsystem is effectively a black box in the drawings (where the designer is responsible for designing everything up to and around the box but relying on the supplier for the box itself), the lists below explain what is in the box, what connects to the box and what is not in the box but is affected by it. Infrapipe therefore defines:

Standard Items supplied by Infrapipe

Item	Details
Inlets	As required to the bare flange, typical stub is 500mm
Outlets	As required to the bare flange, typical stub is 500mm
Sumps	Any depth as required to a diameter not more than 500mm greater than the tank diameter
Risers	Any height as required to a diameter not more than 500mm greater than the tank diameter
Ladder steps	PE/PP steps every 300mm for access
Lid	Concrete manhole lid as per design on load distribution ring
Cover	As specified by client or determined by INF structural calculations
Hydrophilic seal	Placed around the neck of riser fully covered in copolymer foam
Loadring	As per structural design
Low flow chambers	Flow management and sediment control as per client specification
Baffles	HDPE baffles installed by INF fabricators as per client specification
Buoyancy anchors	Either Infrapipe's standard anchors or if the contractor prefers, a design so they can pour their own
Anchor straps	Straps as required for the anchor system



As an option, tank inners can be supplied in alternative colours such as yellow for ease of inspection.

Subsystems supplied by Infrapipe

Washdown system

Infrapipe works with third party suppliers to provide a washdown system fitted and connected to the exterior inlet and outlet. The scope concludes at the bare flange 500mm from the tank but the design will include the required water volume to operate the system. Systems can be either HDPE or stainless steel.

Pump system

Infrapipe works with third party suppliers to integrate pump systems into the tank. Initial quotes use nationwide options but if end-users have preferred pump models the design can be modified in later stages to accommodate them. The scope concludes at the power supply to the pump.

Items not supplied by Infrapipe but for which data can be provided

To assist the designer, the quantity surveyor and contractors, Infrapipe details the following products and services required to install or support the tank

Item	Details
Water supply to the washdown	Number and size of inlets and outlets and required litres/second is specified by Infrapipe
Power supply for pump	Power supply specified by pump supplier as per washdown system needs
Excavation m3	For standard soils & cover until geotechnical info provided
Backfill m3	For standard soils & cover until geotechnical info provided
Sheet pile/shields	Based on trench size
Craneage weights at distance	Lift plan to be supplied by crane operator according to site access and tank weight
Craneage hours	A prediction of crane hours on site for both time management and costing of installation



Scaffolding for testing	Specification from INF staff on what scaffolding is needed to ensure safe entry into tank for on site works.
Installation timeline	A prediction for the calculation of related costs.

Items not supplied but which are relevant to the tank supply

Item	Details
Sensors	level sensors to ensure safe & efficient operation of the tank
Controls for washdown water supply and housing	Backflow preventors, flow control valves, pressure regulators and other controls to ensure efficiency of washdown as well as safety of the water supply
Housing for pump control	Protective enclosure to ensure safety of both equipment and personnel
Gaskets for flanges	Typically EPDM Gaskets for watertightness between flanges
Connection to the inlet and outlet	Flanged, coupled or welded connection between tank stubs and external inlet/outlets

Installation and test plan

Infrapipe will supply an Installation and Test Plan which details contractor requirements at each stage:

- Receiving the pipes
- Laying the pipes
- Joining the pipes
- Testing the tank
- Joining connections
- Completing the tank

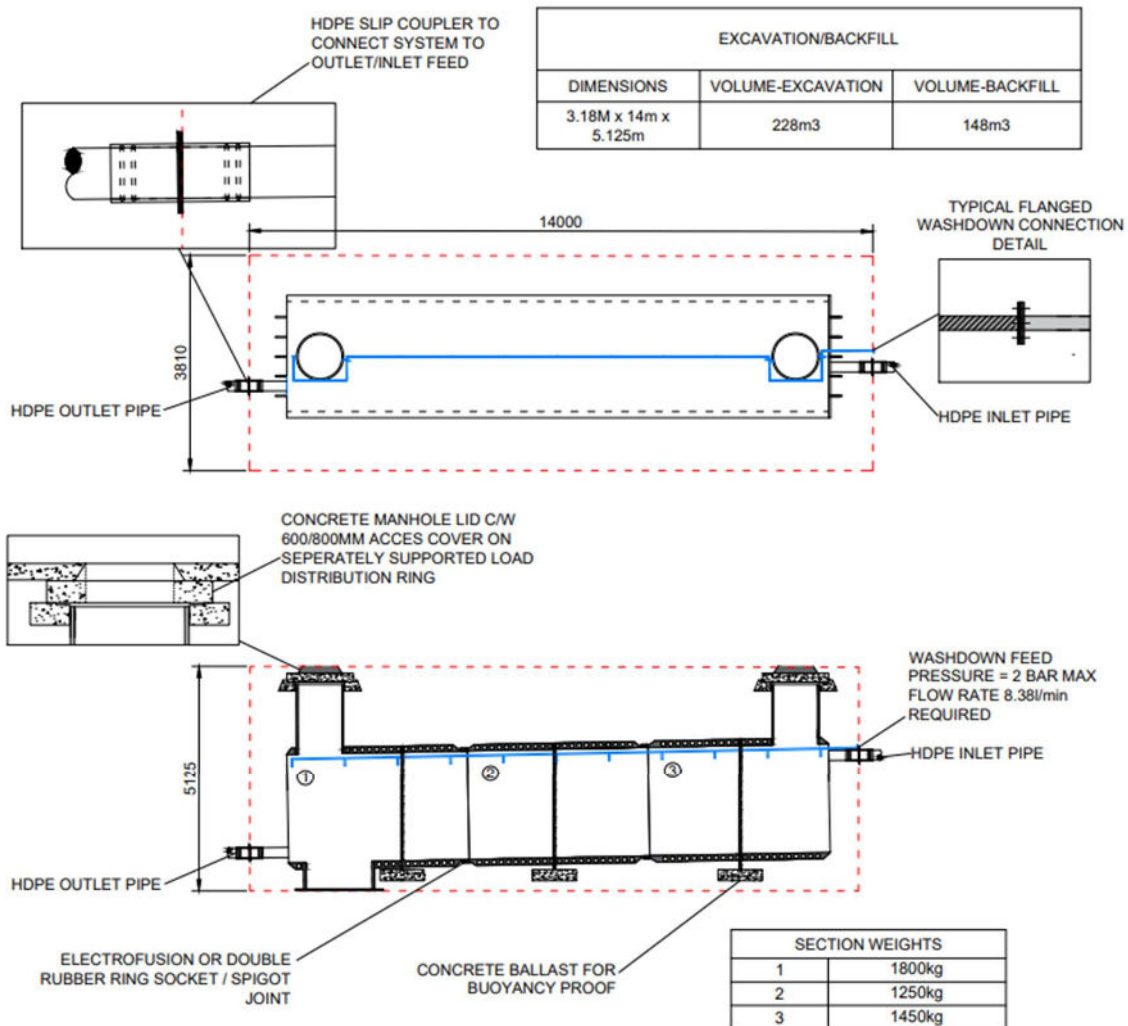


Trench specifications

Infrapipe will specify the trench dimensions and materials for each of the following stages:

- Laying and joining
- Testing
- Completion

Drawing of tank in plan and profile showing extent of scope (red border)





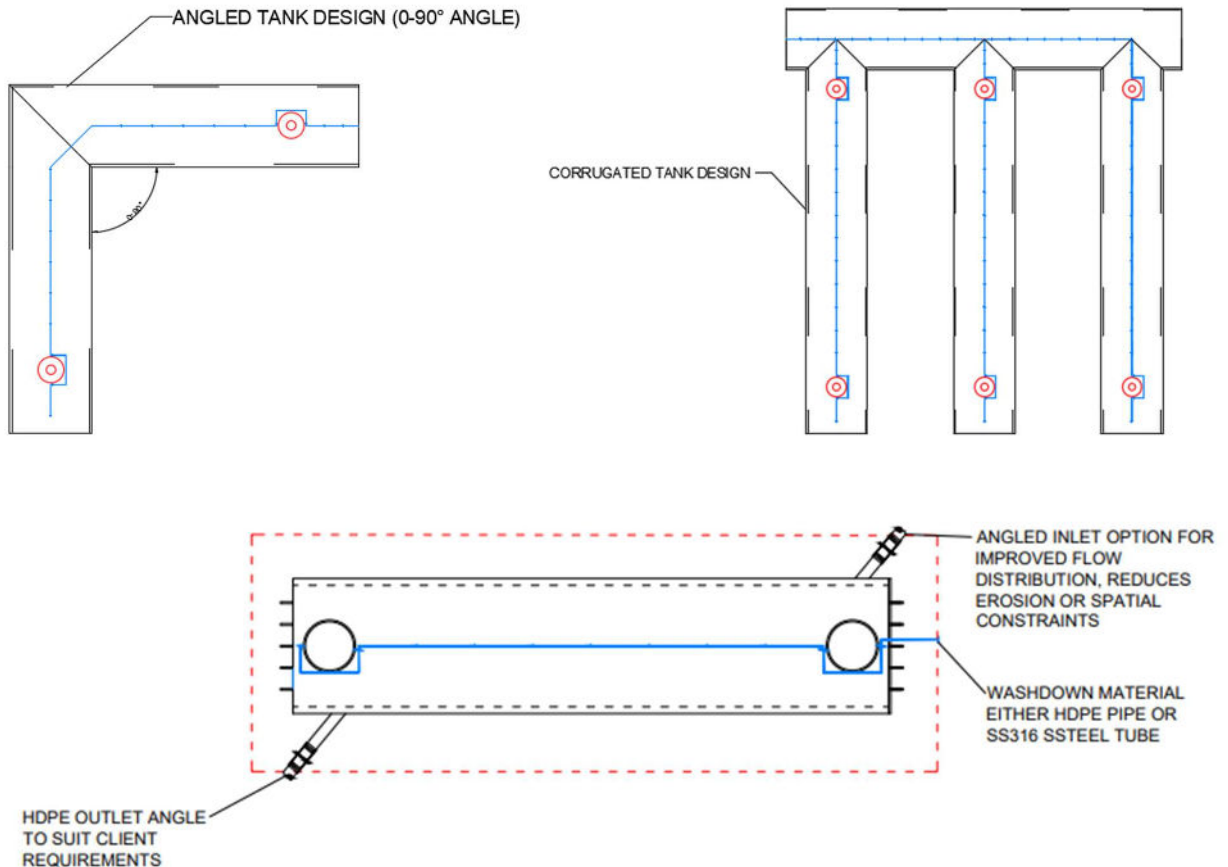
What standards does Infratank comply with?

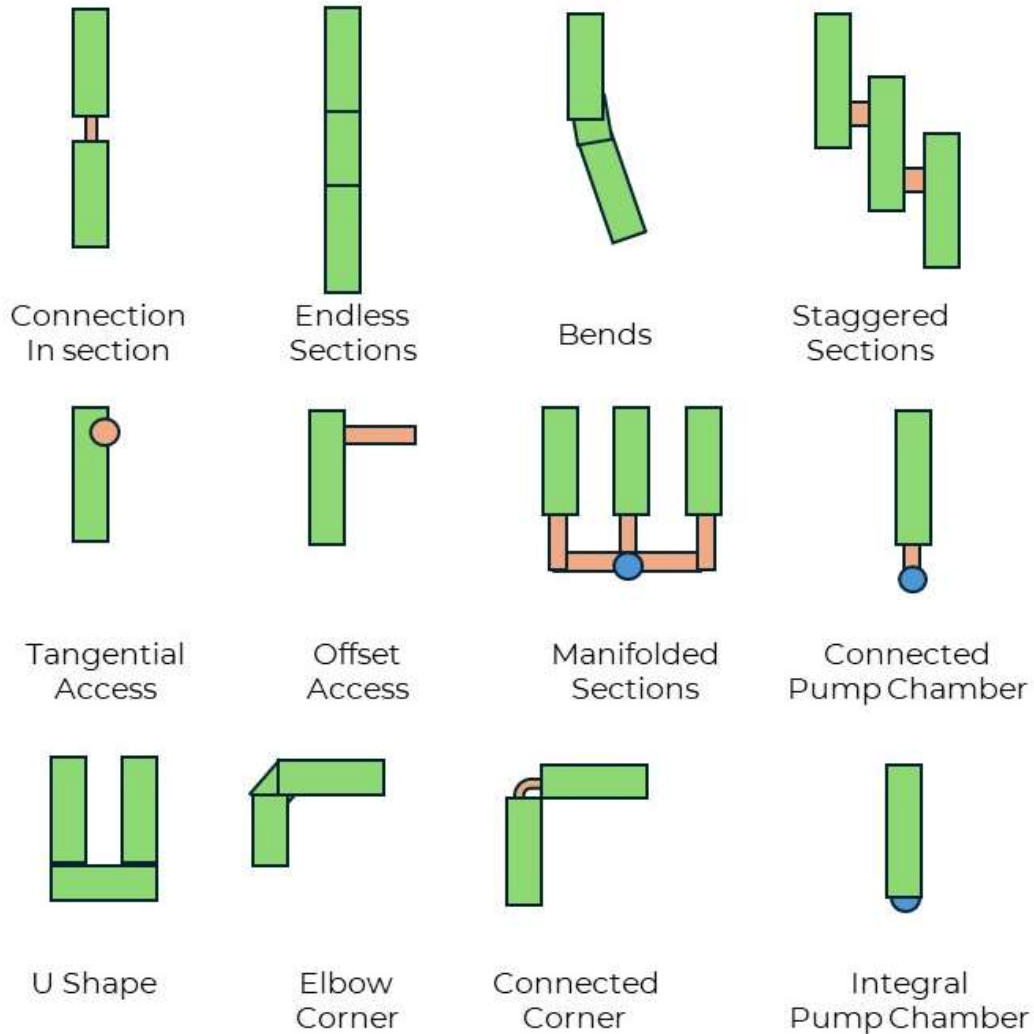
Infrapipe has AS/NZS 5065:2005 certification and ISO 9001:2015. Calculations are in accordance with AS/NZS 2566.1:1998 – *Buried Flexible pipelines: Structural Design* and installation parameters used are in accordance with AS/NZS 2566.2:2002 – *Buried flexible pipelines - Installation*

Design Options – main vessel

The base module of the Infratank, an HDPE pipe 6m long, can be cut and welded in any way possible to form any shape. This allows the designer to optimize the solution for the site, for economic installation, for economic operation thereafter and for future modification.

Some options shown below show how this flexible system can be used, but we stress the importance of early discussions with Infrapipe to realise the potential of the product and the site:





Some more imaginative solutions above show how the tank can be shaped around the other requirements for the site. Inlets, outlets, access, joins and pump locations can be configured in any way that is necessary.

If you can draw it – we can make it

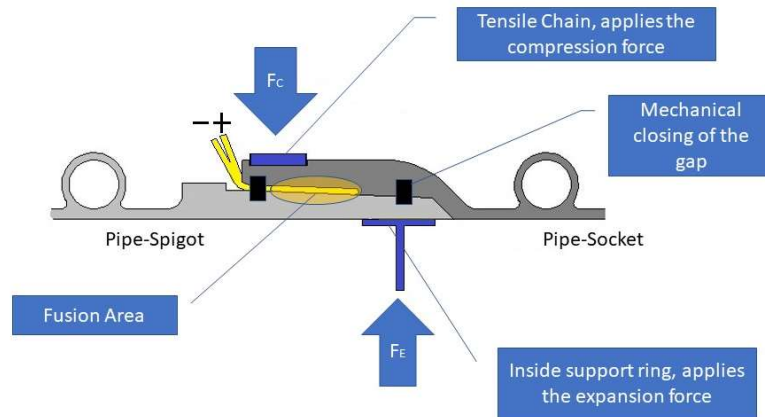
Above ground tanks

The use of helical HDPE for above ground tanks is common overseas and has the same flexibility of design for connections. Contact sales@infrapipe.co.nz for more details.



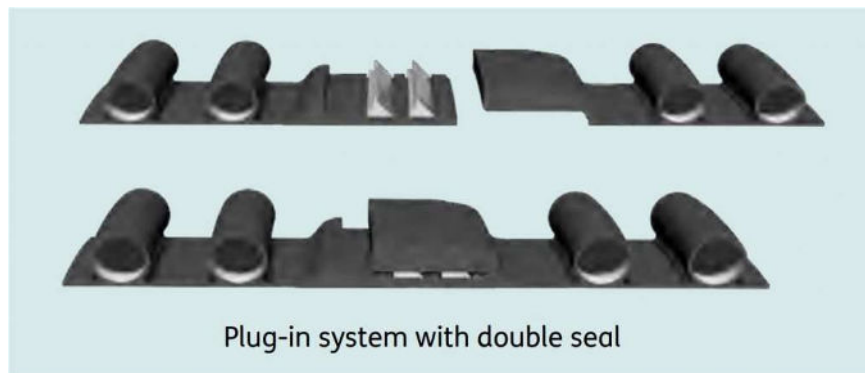
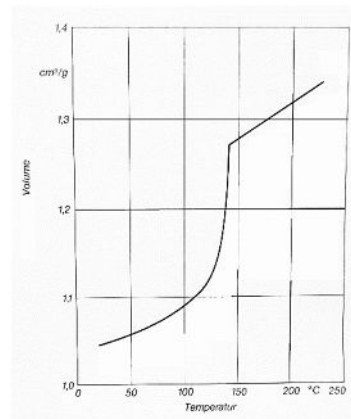
How are sections joined?

Once located and aligned, Infratank sections are joined with one of two methods:



The first, electrofusion, uses the 30% expansion of HDPE 100 when heated to 135 degrees to bond the two surfaces completely in a process that takes two staff (normally Infrapipe staff) approximately 45 minutes.

The other alternative is a double rubber ring joint as shown below.





Design Process

Infrapipe will engage at every stage of the process to ensure that the appropriate professional has all the information required:

Initial Scheme Design

Potential options and provisional costings to optimise use of the site and hydraulic efficiency and minimize manufacture, freight and installation costs.

Engineers Estimate

At this stage Infrapipe can supply an estimate without geotechnical information or invert levels:

1. Basic design including the location of
 - a. Inlets
 - b. Outlets
 - c. Risers
 - d. Accessways
 - e. Sumps
2. Delivered to site system estimate including
 - a. Washdown system
 - b. Pump system
 - c. Freight
3. Installation costs estimate
4. Requirements for other services (washdown and pump)
5. Installation requirements

Contractors quote

At this stage a Geotech report, site design, invert levels, gradients and confirmation of the hydraulic design is essential. Cover to be determined by either Contractor specification or INF structural calculations. Infrapipe will supply:

1. Full tank design
2. Manufactured and delivered cost
3. Requirements for other services (washdown and pump)
4. Installation requirements as per structural calculation



At this stage Infrapipe can confirm with the contractor if they wish to supply buoyancy anchors and straps, loadings, lids and access covers.

Contract accepted

Once the quote is accepted, variations can typically be made without penalty cost up to two weeks before delivery (exact dates to be confirmed during quotation). The following is provided:

- Installation and Test Plan
- Fabricated products installation guide
- Final drawings

Final Documentation

Following completion and successful testing, Infrapipe will supply the following:

- Maintenance instructions for the washdown system
- Pump maintenance instructions
- Quality assurance for tank and fabrication

There are no maintenance requirements for the tank structure

Installation Process

1. Site preparation
2. Excavation
3. Install sheet piles/shields
4. Base preparation
5. Bring in connections
6. Prep ground
7. Lay section, join and weld (repeat as necessary)
8. Backfill to spring line
9. Test
10. Complete connections
11. Backfill
12. Compact
13. Completion of pump, sensors etc.
14. Site restitution



FAQs

These are some of the questions most commonly asked about Infratank:

How do we know it will last one hundred years?

Products of this kind have been in use in Germany since 1956 and continuously tested since then without any degradation:

https://plasticer.de/Plastics_News_2921_Basell_50_years_of_continuous_testing_of_pipes_made_from_Hostalen_HDPE_grades_completed?begriff=hosta&div=n

What is the leadtime?

For tanks up to 200m³, leadtime is 2-4 weeks. For applications over this size, typical leadtime is 4-6 weeks except by arrangement.

Bespoke layouts & configuration may differ from standard lead times.

What is Infrapipe's production capacity?

We can make and weld at least 3 large diameter pipes each working day, so maximum capacity ranges from 108 lineal metres per week of 3.2m pipe to approx. 180 lineal metres per week of 2.3m pipe

How does Infratank address buoyancy

Infrapipe's civil engineers will calculate the buoyancy potential once they have the relevant geotechnical information and water table levels. Infrapipe will then offer to provide and install the required numbers of its anchors, or will provide the requirements for the alternative option of site poured slab(s) underneath.

How do Infratanks handle seismic events?

HDPE pipes have high flexibility allowing them to absorb seismic energy without breaking or cracking. The ductile nature of PE allows the pipe to deform without breaking, allowing them to stretch and elongate rather than fracture. Fusion welding is used to join the pipes together to create a bond as strong as, if not stronger than the pipe itself ensuring the joints do not break or leak during a seismic event.

What happens if the tank is damaged

It is not easy to damage HDPE but should this occur (before, during or after installation), Infrapipe's site services team can repair with welding onsite.



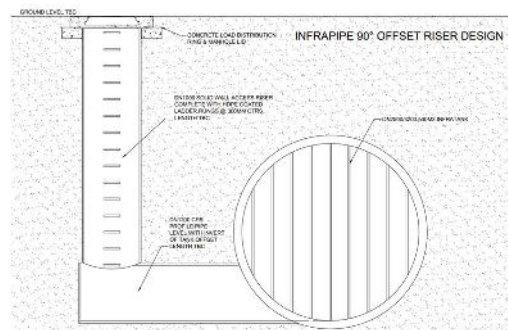
If the tank is damaged in subsequent years, any qualified HDPE welder can repair the tank quickly and easily with welding being dry and usable within 45 minutes of completion. HDPE is homogeneous (ie it has no need of a protective gelcoat or paint) so damage is easy to deal with and has no impact on longevity.

Can the tank be modified

Should there be a future requirement to modify the tank, with additional connections for instance, this can be conducted on site quickly and easily by Infrapipe's team, giving asset managers the flexibility to consider further options

What is an offset access?

The flexible construction of an Infratank allows for an inspection access which is offset from the tank itself, allowing tanks to be placed under roads or in other locations where frequent access to the riser for inspection is expensive, inefficient or unsafe.



What maintenance is required

Infratanks require no maintenance on the body of the tank. Ever. There is no rotting, rusting or corroding. HDPE is completely unaffected by any NZ soil.

Can the tank be recycled?

Infratanks are completely recyclable. All production waste is recycled into culvert.

What is the carbon footprint

Whilst each application varies (due to location and design), HDPE generally has an environmental cost of 1.92 CE/kg and when it is then recycled this drops to 0.23 CE/kg.

About Infrapipe

Infrapipe is an NZ-owned business with factories in Auckland and Palmerston North. It was established to offer New Zealand the latest pipe technologies which are now standard in the Northern hemisphere.

