

Best Practice Guide

Updated
18/07/2025

This guide covers the design to delivery guidelines for pipes through to manholes.





"We supply site specific underground infrastructure systems to store and move water, stormwater and wastewater. Our product ends up being a significant asset for councils to monitor and provide services to people for the next 100 years.

Our quality and certification of standards will be led by our people, systems and management through accountability, personal ownership and continuous improvement initiatives."

Andrew Howell

Business Manager
PKS Civil and PKS Fabrication

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1. INTRODUCTION

This quality document outlines what PKS Civil's commitment is to you – our customer when selling and distributing its unique HDPE pipe and structures to projects around New Zealand and the Pacific. PKS Civil aims to provide a service, as well as a reliable product in all stages of dealing with PKS Civil staff and product. The main aspects that will be covered are:

This document should be referenced in all contractual obligations around quality and for design engineers sign off with the contractor / sub-contractor.



2. PRODUCTS AND ADVANTAGES

2.1 Gravity pipe system / low pressure applications

Spiral pipe technology has been manufactured and used successfully throughout Europe since the 1960's. PKS Civil manufacture PE100 spiral wound pipe, in New Zealand for drainage, stormwater and wastewater applications ranging from 300mm (ID) to 2500mm (ID), with possible machine capability to 4200mm (ID) encompassing.

- Pipes
- Manholes
- Wet wells
- Tanks for retention and attenuation
- Reducers
- Bends
- T and Y junction

The ease of constructability allows for structures of a complex nature to be fabricated in the factory and delivered to site for installation therefore reducing construction time onsite.

2.2 Product Advantages

PKS Civil product has many advantages that make it the product of choice. The main advantages are:

- Design life of 100 years on PE100 material
- Efficient hydraulic performance due to low surface friction
- High abrasion resistance
- Reduced installation costs due to its light weight and long lengths (up to 18m lengths through in-house welding)
- Minimum economic order quantity can be as little as 50m depending on pipe size.
- Inert to many chemicals including Hydrogen sulphide (HS₂) attack
- Constructability to achieve required structures such as manholes and fittings
- No pipe chainage wastage due to pipelines being made to exact chainage

The manufacturing process enables us to produce the length of pipe you need in up to 6m standard lengths. Should 96.7m of pipe between manholes be required then this is what is manufactured and delivered. No waste.

If the actual length is unknown, it is feasible to provide a spool section that can adjust the required chainage distance to within a range of +/- 50mm, or we can provide a transition pipe with solid wall section that can be cut onsite and planed to suite.

Wall profile determinations are based on the Static Load Questionnaire ensuring that you are getting the product that you need for the project in accordance with the requirements of AS/NZS2566:1 and the German DVWK ATV 127E Standard which the AS/NZ Standard is referenced from. Installation is carried out to AS/NZS 2566:2 for Flexible pipes which all contractors are well versed in.

2.3 Jointing Methods

Jointing methods offered are designed to suit the individual project requirements.

These can include the following:

- ▣ Double rubber ring
- ▣ Flange joint
- ▣ Extrusion welded
- ▣ EF joint



FIG. 1: EF Joint

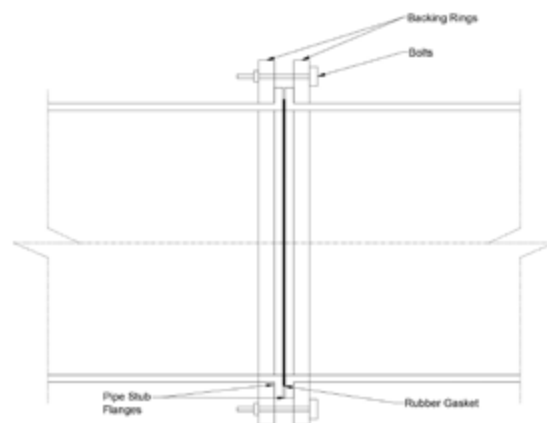


FIG. 2: Stub Flange connection type



FIG. 3: Double rubber ring

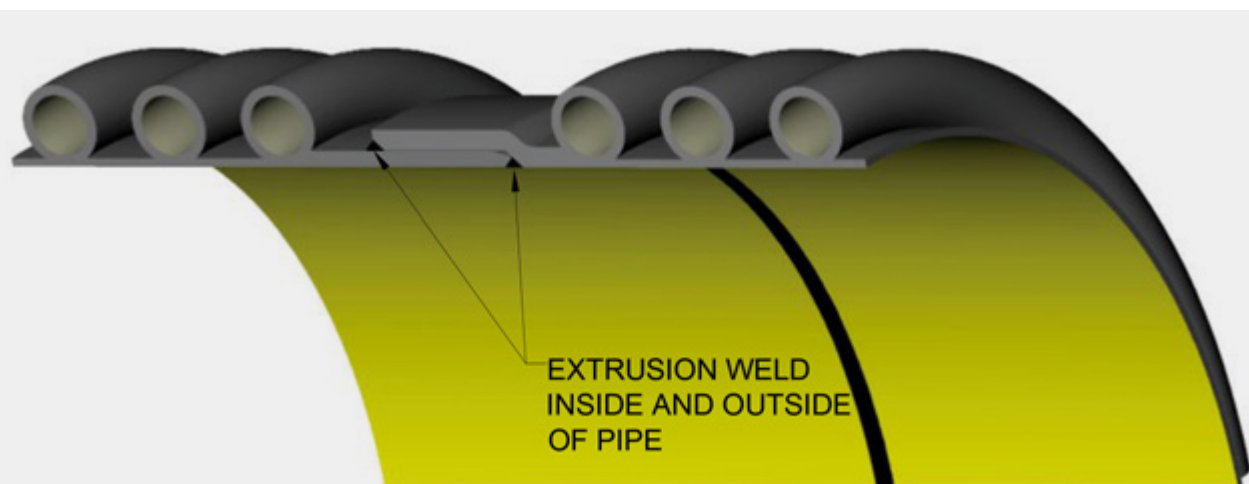


FIG. 4: Extrusion welded

3. PRODUCT DESIGN AND STANDARDS

This section will outline the required standards for the PKS Civil product to meet and how PKS Civil product demonstrates compliance.

The main areas covered in this section are:

- Design Compliance
- Pipe Checks
- Manhole Checks
- Resin Compliance
- Ring Stiffness Testing Compliance
- Manufacturing and Quality Management

3.1 Design Compliance for cost saving or design resilience – for engineers

When a designer fills out the PKS Civil Static Load Questionnaire for either pipe or manholes, it is important that the right information is gathered to provide a solution in PKS Civil product. There are different checks that need to be made for pipes as opposed to manholes.

3.2 Pipe Checks

To provide an adequate product PKS Civil need to ensure the correct pipe profile is determined to suit the onsite conditions. In order to achieve this, PKS Civil require that the Static Load Questionnaire is completed and returned to us to the best of the interested party's ability. This information is then correctly entered into a computer programme (Easypipe) and calculations according to the German ATV DVWK 127E Standard are performed. It is important that the appropriate checks/changes are implemented at this stage to ensure the calculation is done to meet the appropriate AS/NZS Standards. The changes are:

- Check the short-term deformation is less than 5%
- Check the long-term deformation is less than 7.5%
- Implement a buckling factor of safety of no less than 2.50
- Enter the correct trench width at the pipe crown to meet AS/NZS2566.2 Installation

3.3 Ring and Joint Testing

All SBR / EPDM rings meet AS / NZS1462.8 1462.16 standards. Pipes are joint tested with test records available to be provided as part of our QA records for project sign off. We are also happy to provide proof of type testing from third party tester.

3.4 Ring Stiffness Testing Compliance

PKS Civil ensure that before manufacturing any pipe ring stiffness testing has been performed for the specific profile and pipe diameter ordered.

All previous tests are valid for up to 5 years. Ring Stiffness Tests are performed in accordance with AS / NZS 1462.22 – Thermoplastics – Determination of Ring Stiffness.

The ring stiffness testing is carried out inhouse with a SAI Global certified hydraulic testing rig and test certificates can be supplied to all customers upon request (Appendix B).

3.5 Resin Compliance

As a requirement of AS/NZS 5065:2005 – Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications, PE 100 resin must meet the requirements of AS/NZS 4131:2010 – Polyethylene (PE) compounds for pressure pipes and fittings, which discusses the chemical make-up of polyethylene.

The PE 100 raw material used for our products contains the correct percentages and quantities of additives required for it to satisfy the requirements of AS/NZS 5065:2005. A Certificate of Analysis (COA) from the raw material supplier, which contains the PE 100 raw material make-up, can be supplied to the customer upon the delivery of all the product.

PKS Civil ensure that inhouse testing on the resin is done to check the COA lines up accurately with the results gained by testing. The main test is the Melt Mass-Flow Rate (MFR), tested in accordance with ISO 1133-1:2022 Plastics - Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics - Part 1: Standard method. Moisture content testing is carried out on every batch of raw material to ensure that it meets specified requirements.

3.6 Manhole Checks

For manholes, PKS Civil use a programme called Easyschaft designed by Ing software for the German ATV standard. The German ATV DVWK 127E Standard is a reference document for AS/NZS 2566:1 Supplement 1. Checks are made to ensure that flotation resistance is higher than that specified by the customer.

It is also important to ensure that bottom reinforcement reaches its desired factor of safety of 2.5, as this allows for thrust reinforcement and flotation resistance. When calculating manholes, it is important to ensure that all inlets and outlets are accounted for as this is factored into the structural equation.



4. MANUFACTURING PROCESS AND QUALITY MANAGEMENT SYSTEM

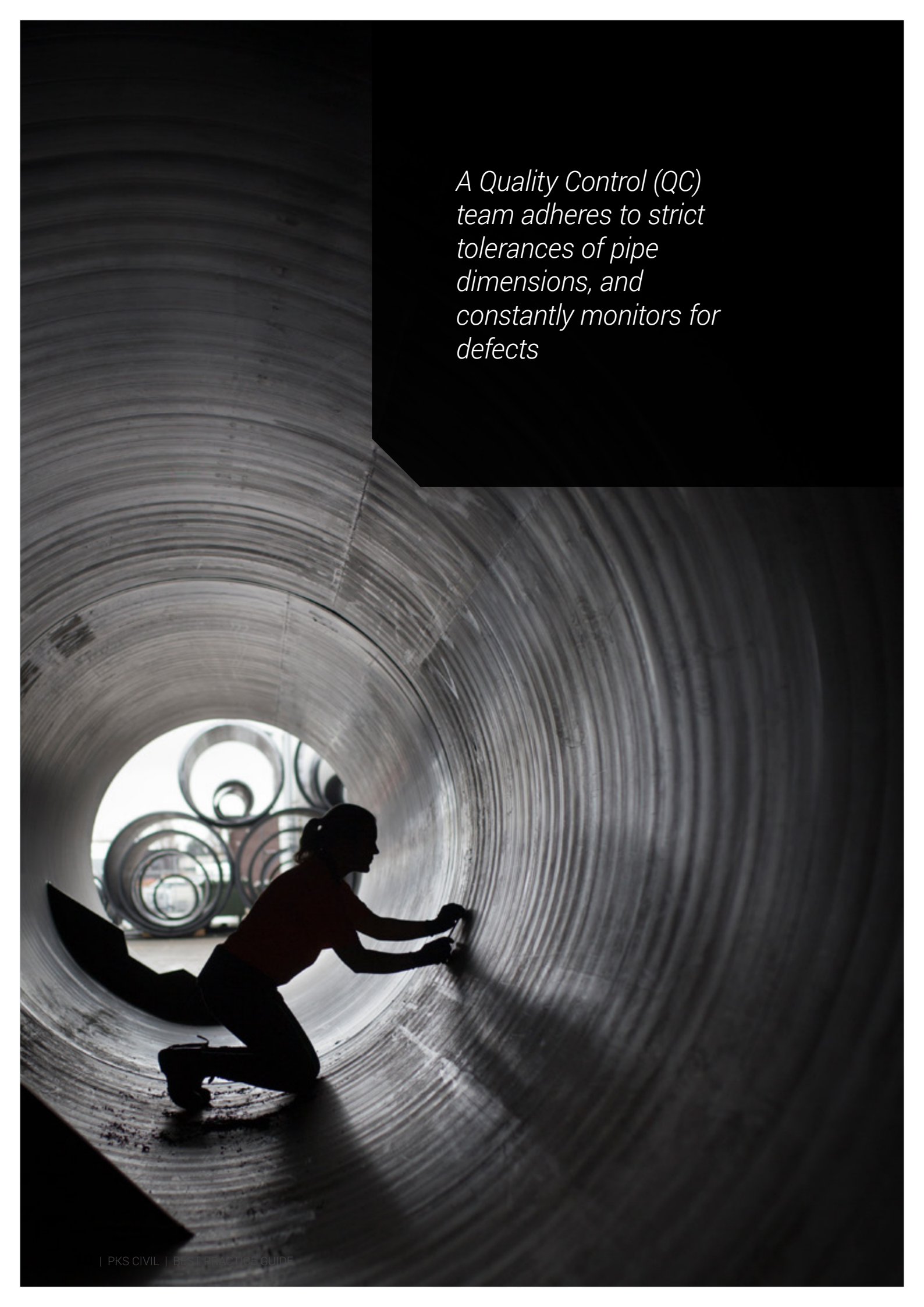
PKS Civil's product is manufactured in Christchurch, New Zealand by skilled machine operators and fabricators.

The product is manufactured in accordance with a Quality Management System (QMS) certified by SAI Global to comply with the requirements of ISO 9001:2015 – Quality Management Systems – and AS / NZS5065. Copies of our current certificates are available on request.

A Quality Control (QC) team adheres to strict tolerances of pipe dimensions, and constantly monitors for defects. The QC team ensures every pipe released meets the specific requirements of AS/NZS 5065: 2005 – Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications.

On request, PKS Civil also supplies pipe stamped and licensed as WaterMark and/or StandardsMark for diameter ranging from 300-1200mm ID (DN300-DN1200).



A person is kneeling inside a large, dark, corrugated metal pipe, inspecting the interior wall. The person is silhouetted against the bright light coming from the other end of the pipe. The pipe's interior is filled with the repeating circular patterns of the corrugations. In the background, several other similar pipes are stacked, creating a series of concentric circles that lead the eye towards the light source. The overall atmosphere is industrial and focused on quality control.

*A Quality Control (QC)
team adheres to strict
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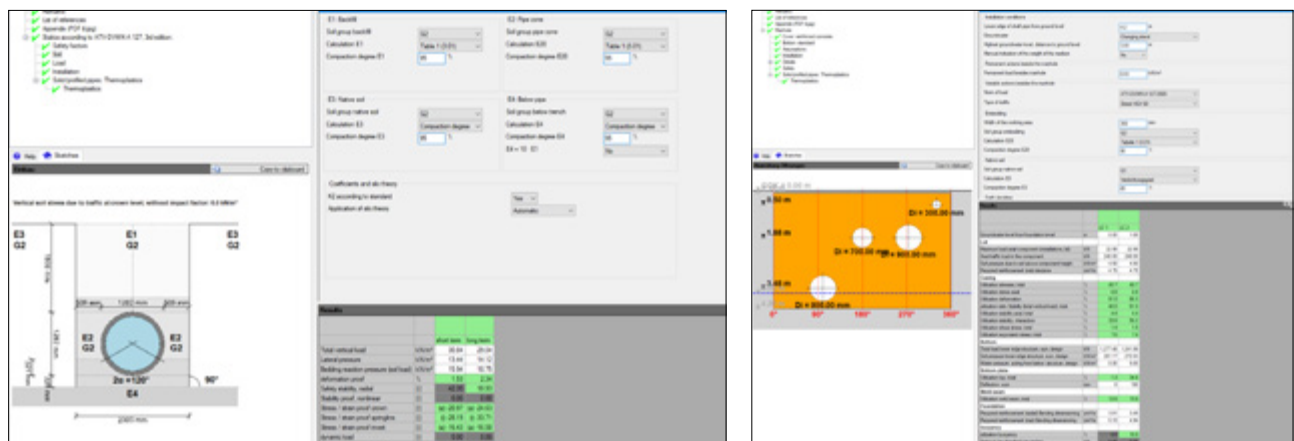
5. DESIGN PACKAGES

Due to the problem-solving nature of PKS Civil's product, there have been requests for various design requirements and packages.

The packages, which are based around design parameters selected by the customer, can include detailed construction drawings, static calculation sheets and even Finite Elemental Modelling (FEM) analysis.

5.1 Basic Package

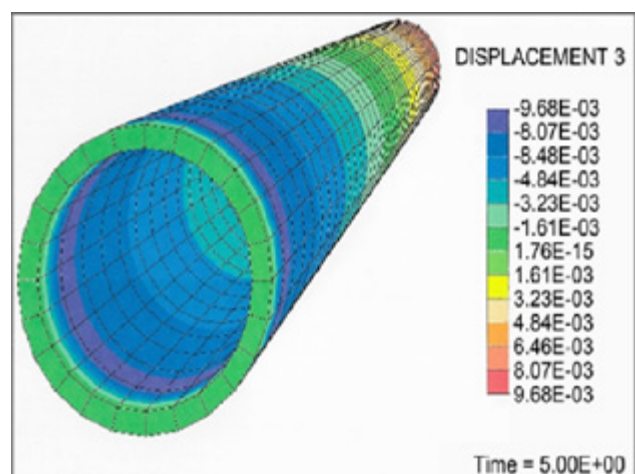
As a basic package for any job will start with the customer filling out a Static Load Questionnaire (Appendix) to provide PKS Civil with the appropriate parameters to perform a static calculation, which will determine which profile is adequate for the job. All provided / or assumed parameters will be used in the static loading calculation.



5.2 FEA Package

A FEA package can include the following depending on client needs

- Static calculation
- Standardised drawing
- PS1
- FEA (Rudimentary soil mechanics analysis tools, offering compression only support - Engineering Certification and Engineers report)
- PS2
- FEA (Advanced soil mechanics analysis tools that include Non Linear soil behaviour - Engineering Certification and Engineers report) - for Seismic resilience.



6. DELIVERY, HANDLING AND STORAGE

This section is about the handling and storage of pipes onsite prior to installation. The handling & storage is written in accordance with Section 2 of AS/NZS 2566.2.

6.1 TRANSPORTATION

During transportation, all pipes shall be supported in a manner to prevent excessive distortion of the pipe cross-section, bowing or twisting of the pipe. When pipes are loaded at the PKS Civil manufacturing facility they are supported with wooden dunnage/chocks and restrained/tied down in a manner that prevents point loading, chafing, scoring, shock and any other damage during transportation.

Where practical and ensuring a safe unload can be achieved pipes of varying sizes can be nested and stacked in a manner to minimise deformation during transport.

It is important to ensure that a material strop/tie down is used and that chains should not come into direct contact with the pipes and fabricated items unless on certified HDPE lifting lugs.

6.2 HANDLING

Pipes and fabricated items should be handled in a safe and responsible manner to avoid damage. It is important that pipes and fabricated items are not pushed, rolled or dragged and if they are dropped or knocked to notify the manufacturer to ensure they are still fit for purpose.



FIG. 5: Pipe has been stropped to the lifting equipment to ensure it cannot be dropped or damaged

6.3 UNLOADING

When unloading the pipes and fabricated items it is to be ensured that all lifting techniques are to be carried out in accordance with the industry best practice. This can be done by doing the following:

- Ensure the transport vehicle is level prior to releasing restraints;
- Ensure the equipment being used to unload is on stable ground (excavator, crane or hi- ab);
- All precautions are taken to ensure the pipes and fabricated items are going to be undamaged; and
- Ensure all lifting equipment is tagged, tested and able to handle the intended load

It is important that pipes and fabricated items are not to be dragged on the truck deck or sharp edges and they should never be pushed off or allowed to fall from truck decks.

***come along /strops maximum allowable tension is 2T.*

For further handling and transportation of PKS Civil pipes please refer to our handling, loading and transportation SOP document which is available on request.

6.4 USE OF LIFTING LUGS – Manholes and steep grade pipe access only

At the customer request, PKS Civil can supply HDPE lifting lugs.

PKS Civil acknowledge that these HDPE lifting lugs are for loading, unloading and for lowering pipes into the trench. It is important to ensure the points of best practice for the safe use of the lifting lugs is acknowledged. The points are:

- No lifting lug is to be side or shock loaded;
- No lifting lug is to be used for pulling or dragging the pipe;
- Lifting lugs should not be used when the lifting equipment is moving e.g. excavator tracking with a pipe (choke stropping is preferred);
- No lifting lug is to be used for lifting at angle that is less than 45 degrees.
- Lifting lugs should not be used to push the pipes on an angle into the trench
- Spreader bars should be used where practicable



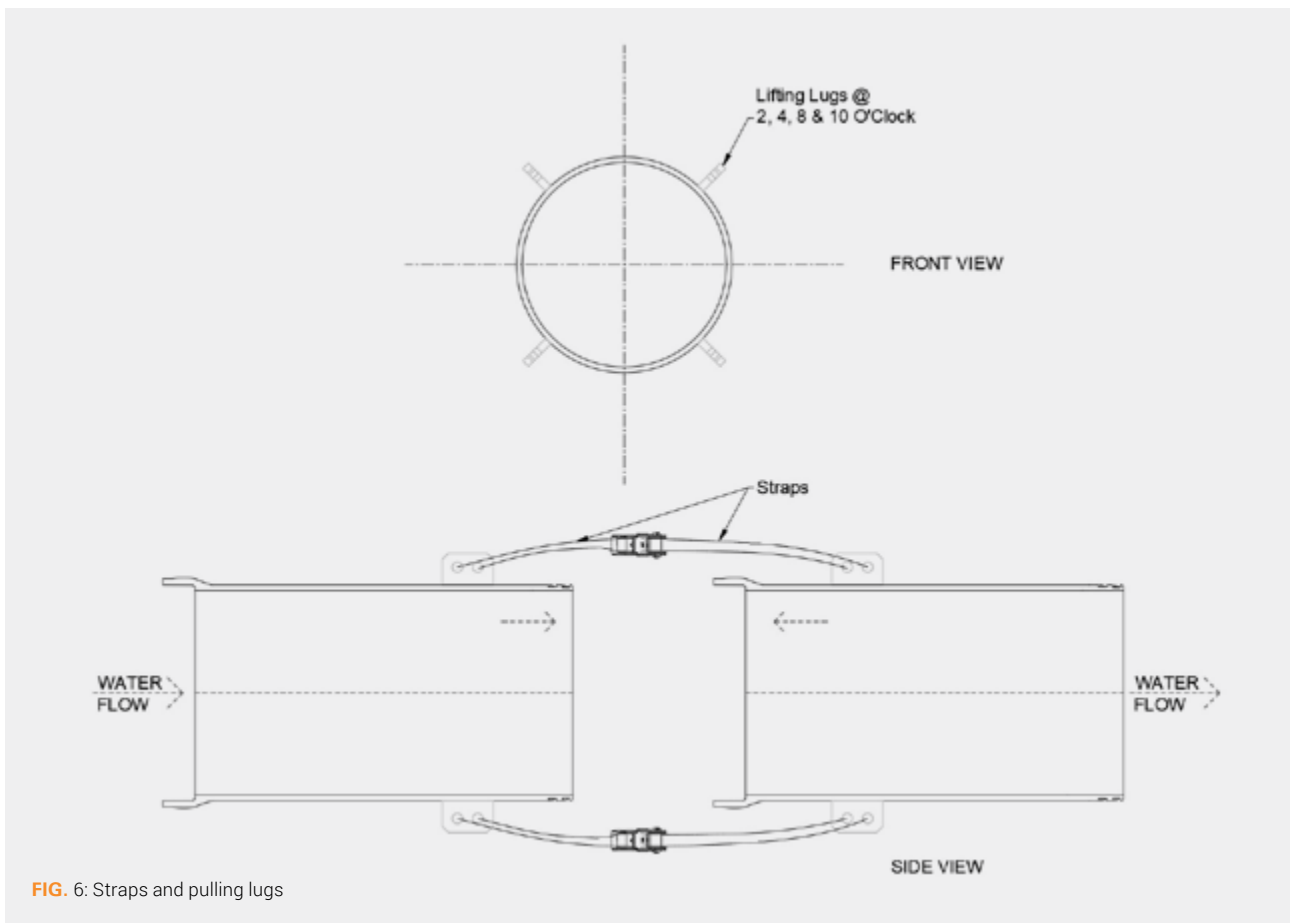


FIG. 6: Straps and pulling lugs

6.5 PULLING LUGS

Where you have tight spaces with shielding or bends and tees to be attached to a mainway pipe line, we can weld pulling lugs onto these fittings or shorter pipe sections so that the existing pipeline is not pulled out of alignment.

Where bends and tees are required to be connected to mainway of pipeline we can add pulling pugs to the fittings so you can use come along or straps to pull them into place without displacing the pipeline angle direction. Lugs and straps suitable for no more than 2T allowable tension.

6.6 STORAGE

It is important that a suitable storage area is selected onsite. An adequate storage area should include:

- No vegetation and/or combustible materials to eliminate the risk of fire damage
- Should not obstruct pedestrian or vehicle routes;
- Easy access for lifting equipment;
- A level surface for the pipe dunnage to be set down for the pipes to be stacked on;
- At least 2,000mm minimum distance from the trench; and
- Man access safe enough to chock all pipes to stop them rolling

There are several things to consider when storing HDPE and PP pipes for extended periods of time. They are:

- Pipes that have been damaged must not be installed
- When pipes are being stored for more than 12 months, it is important that additional protection is found for protection against UV radiation and high temperatures
- Stored pipes may go out of round and will require re rounding
- All pipes shall be stacked so the ends are free of loading and are not resting on anything
- When storing Electrofusion pipes it is important to have the spigot end higher than the socket to allow for any moisture to drain freely from the socket
- Dunnage that arrives with the pipe on the transport should be used in the same manner to store the pipe
- Do not place dunnage underneath socket or spigot – it should be placed under the main way of the pipe

For temporary storage on the construction site, it might be necessary to prepare the storage location, depending on the ground and weather conditions.

PKS Civil can provide a comprehensive Safe loading and unloading document for quality records on request.



6.7 INSPECTION – PRIOR TO LAYING

This section is about inspecting the pipes and managing defects/damages prior to installation and is written in accordance with Section 3 of AS/NZS 2566.2.

6.8 THERMAL EXPANSION AND CONTRACTION CONSIDERATIONS

PE pipe material will alter socket spigot and pipe length characteristics in hot or cold conditions.

All pipes expand and contract with change of temperature. The key is the management of the resultant thermal strain. As with all materials, expansion and contraction must be taken into consideration when designing a HDPE piping system. However, for above ground applications thermal effects must be considered - the unrestrained coefficient of thermal expansion for HDPE pipe is 0,18 mm per meter and degree temperature change (mm/mK).

So long as the pipes you wish to lay on the day are all in the same conditions – ie all of them are in exposed sun or all of them are under cover – then the socket and spigots will still be compatible, but if you have a socket in the trench which is cold and a pipe in direct sun about to be inserted into this pipe then you will have difficulty in joining them, and if the spigot is cold and the socket is hot you will not be able to pressure test this connection successfully until both become the same temperature.

6.9 INSPECTION OF PIPES

Pipeline components (pipes, fittings and accessories) shall be thoroughly inspected, internally and externally, on delivery and immediately prior to installation, for compliance with product specifications and to ensure no damage has occurred. However, rubber rings in sealed packaging shall not be removed for inspection until immediately prior to installation.

Acceptance criteria for pipes, fittings and pipeline accessories on delivery and immediately prior to installation shall be as follows:

- All product materials, diameters, lengths, pressure & stiffness ratings, joint types, fitting types and accessories shall comply with project specifications.
- Seals and gaskets shall have no cuts, weathering damage, deleterious materials or dislodgment that could impair performance in service and be kept in a clean container until required on the pipe.
- Pipeline component jointing surfaces, coatings and wall structures shall have no defects or damage that could impair component performance in service.
- Significant cuts or scratches on pipes or fittings shall be sent to PKS Civil by the contractor so sign off or repair methodology can be advised.

PKS Civil will be notified of any damaged pipes that are found during the pipe inspections. PKS Civil will give sign off to continue or advise of the methodology to carry out the repairs required.

7. Appendices:

Static load questionnaire use QR code to link to website

The key to the static load questionnaire is to capture the soil / trench / loading scenarios that may be present so that we can design the pipe stiffness to the actual job conditions. This may mean a lower SN rated pipe can be suitable and can reduce costs considerably – and conversely some parts of a pipeline can be engineered up or down to meet the ground and loading conditions to save costs / reduce risk of short -long term deflection.



Static load
questionnaire
QR Code

Quality form Use QR code to link

This form includes considerations around the contractor or sub-contractor sign off and should include but not be limited to checks to have on record and be shared with the Consulting Engineer.

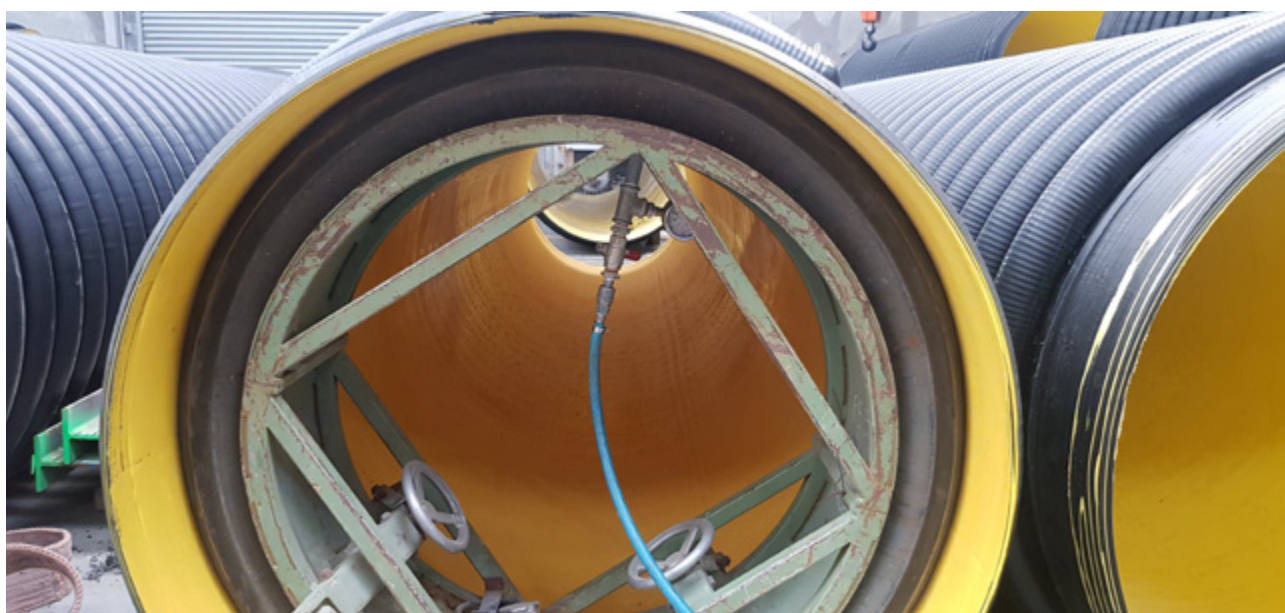


Quality form
QR Code

MANUFACTURING QUALITY RECORDS

The following reports are available and agreed to with the design engineer / client;

- AS / NZS standards certificates for pipes / rings, material QMS certificates



QUALITY ASSURANCE CERTIFICATE

PKS Civil
80 Francella Street, Bromley,
Christchurch, New Zealand

Certificate Number: _____
Job Number: _____
Project Name: _____

ISO9001:2015 – Quality Management System
(Certificate No.: QMS42476)

StandardsMark™ License – AS/NZS
5065:2005 – Polyethylene and polypropylene pipes
and fittings for drainage and sewerage applications
(License No.: SMK26677)



WaterMark™ Certificate of Conformity -
AS/NZS 5065:2005 - Polyethylene and polypropylene
pipes and fittings for drainage and sewerage
applications
(License No.: WMK26677)



This certificate certifies that the job has been :

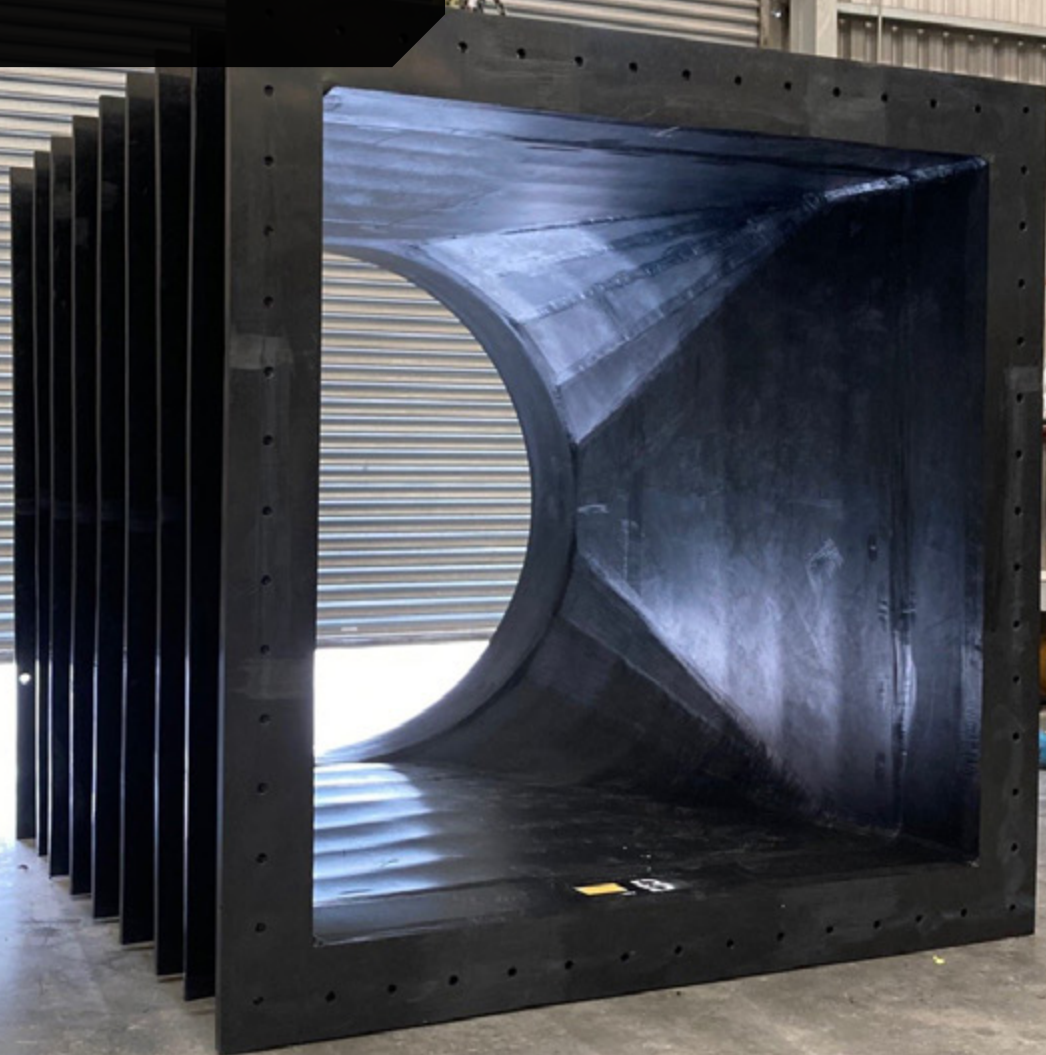
- Designed in accordance with ATV-DVWK-A 127 (Static Calculation of Drains and Sewers)
- Designed in accordance with AS/NZS 2566.1:1998 (Buried flexible pipelines Part1: Structural design)
- Designed in accordance with NZ Bridge Manual v3.4
- Compounds used in accordance with AS/NZS 4131:2010 (Polyethylene compounds for pressure pipes and fittings)
- Manufactured in accordance with AS/NZS 5065:2005 (Polyethylene and Polypropylene pipe and fittings for drainage and sewerage applications)
- Fabricated in accordance DVS 2207-4 (Welding thermoplastic materials extrusion welding of pipes, piping parts, fittings and panels – procedures, requirements)
- Pneumatic test in accordance with AS/NZS 2566.2 Appendix N2 - Low pressure air test
- Hydrostatic test on Manholes / Chambers (tested for 24 hrs full of water)

A handwritten signature in black ink.

Steven Kallai
Quality & Technical Manager

Issue date: 6th June 2023

With even the more difficult of large transitions, our expert fabricators can make precision large fittings to your drawings and specification



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Sales SI & Business Manager - Andrew Howell - ph 022 603 1765

Disclaimer: While every effort has been made to ensure that the information in this document is correct and accurate, users of PKS Civil product or information within this document must make their own assessment of suitability for their particular application. Product dimensions are nominal only, and should be verified if critical to a particular installation. No warranty is either expressed, implied, or statutory made by PKS Civil unless expressly stated in any sale and purchase agreement entered into between PKS Civil and the user.

Technical Questions or Information:
For further information or technical inquiries please visit our downloads page
pkscivil.co.nz/resources or call 03 384 6294

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PIPE & STRUCTURES