



# Concrete Pipe

## Technical Guide

| October 2024 Version |

**CIVILMART**



# INTRODUCTION

## Overview

Civilmart is a leading supplier of steel reinforced concrete pipes and associated precast concrete products to the Australian stormwater and civil infrastructure market. All Civilmart pipes are designed and manufactured in accordance with AS/NZS 4058 in standard nominal diameters from DN300 to DN2100 in strength load classes 2, 3 and 4. Higher load classes and marine class pipes are available on request.

## DISCLAIMER

Information contained in this document is based on pipes manufactured at our Geelong and Shepparton factories and supplied throughout Australia. Pipes supplied from our Cairns factory are rolling rubber ring pipes and are different to the pipes referred in this document. Contact your Civilmart Representative for more information.

## CPAA

Civilmart is a proud member of the Concrete Pipe Association of Australasia (CPAA) who provide an abundance of technical information and resources for concrete pipe in Australia. Flowrates and sizing of pipes are typically undertaken using specialist software. The CPAA publication [“Hydraulics of Precast Concrete Conduits”](#) is a useful reference for stormwater hydraulic designs.

The CPAA software [“PipeClass”](#) is the industry standard software package for assessing loads on concrete pipes and determining the correct load class and pipe bedding support. This software is also useful for contractors and installers to assess construction loads and other non-standard traffic loads to ensure that these loads do not impact the installed pipeline.

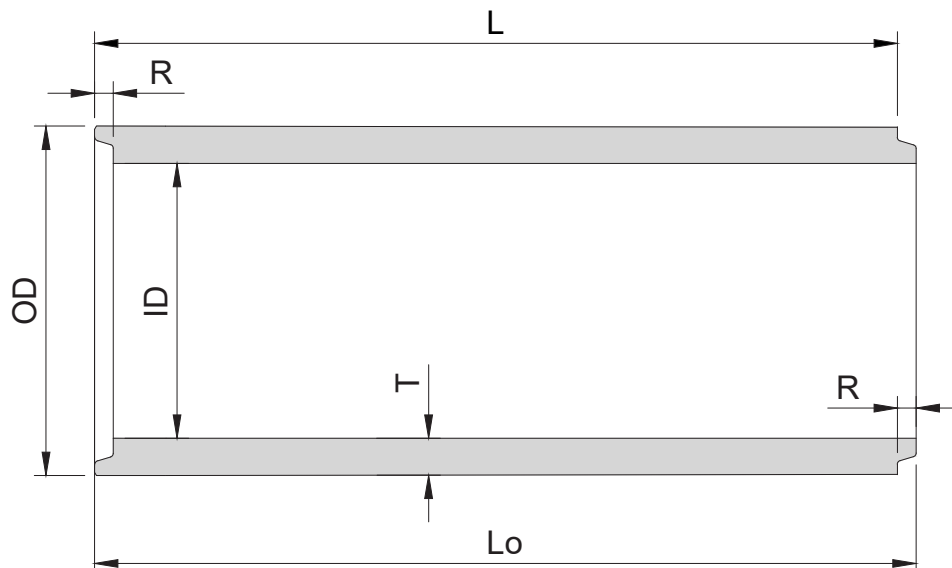
## Product Details - Flush Joint Drainage Pipe

Flush joint (interlocking) concrete pipes are ideal for installations where some infiltration or exfiltration of groundwater is of no concern. They are best suited to installations where excessive ground movement is not expected. Rubber sand bands can be supplied by Civilmart to provide a flush joint pipeline that is more resistant to infiltration of backfill material.

Flush joint drainage pipes are an economical option, particularly in installations that require a high level of compaction or the use of self-compacting embedment and trench material. The resulting soil pipe envelope is extremely stable, preventing pipe movement and surface subsidence.

Flush Joint Pipe Details - Class 2					
Internal Diameter ID	External Diameter OD	Wall Thickness T	Effective Length L	Overall Length Lo	Rebate Width R
mm	mm	mm	mm	mm	mm
300	370	35	2475	2500	25
375	453	39	2475	2500	25
450	538	44	2475	2500	25
525	623	49	2475	2500	25
600	698	49	2470	2500	30
675	785	55	2470	2500	30
750	870	60	2470	2500	30
825	961	68	2470	2500	30
900	1046	73	2470	2500	30
1050	1200	75	2460	2500	40
1200	1356	78	2460	2500	40
1350	1520	85	2460	2500	40
1500	1680	90	2460	2500	40
1650	1830	90	2460	2500	40
1800	1990	95	2460	2500	40
1950	2150	100	2460	2500	40
2100	2300	100	2460	2500	40

Pipes in the 300mm, 375mm, 450mm, 525mm and 600mm range are available upon request

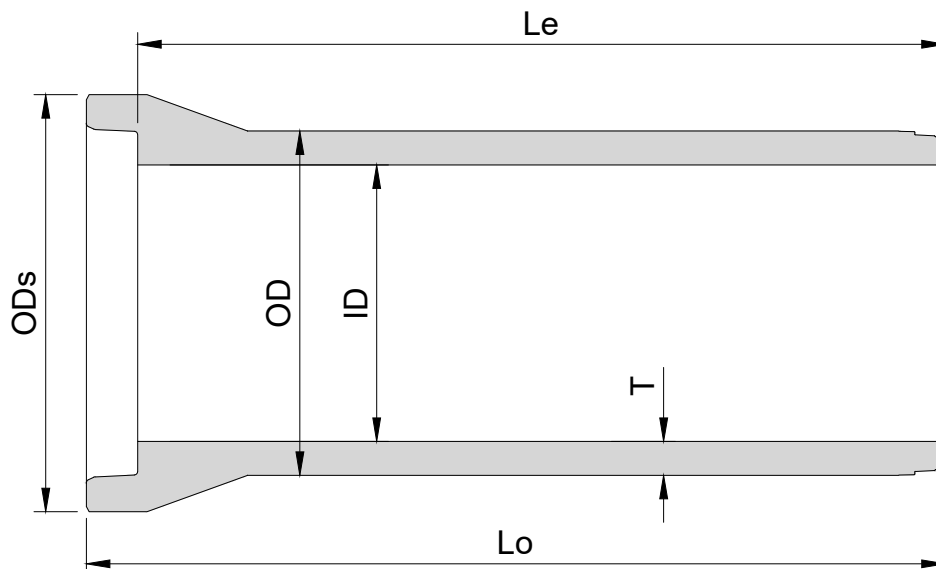


## Product Details - Rubber Ring Joint Drainage Pipe

Rubber Ring Joint (RRJ) pipes provide a flexible and watertight seal that allows for ground movement after installation. They are capable of withstanding ground settlement and can be deflected around large radius

curves while still maintaining a watertight seal. Internally lubricated sliding rubber rings ensure that pipes are easy to install and join.

Rubber Ring Joint Pipe Details - Class 2					
Internal Diameter ID	External Diameter OD	Wall Thickness T	Effective Length $L_e$	Overall Length $L_o$	Socket OD <sub>S</sub>
mm	mm	mm	mm	mm	mm
300	370	35	2410	2500	460
375	453	39	2400	2500	540
450	538	44	2400	2500	640
525	623	49	2400	2500	730
600	698	49	2400	2500	820
675	785	55	2390	2500	910
750	870	60	2390	2500	1000
825	961	68	2390	2500	1085
900	1046	73	2390	2500	1200
1050	1200	75	2390	2500	1390
1200	1356	78	2390	2500	1540
1350	1520	85	2380	2500	1700
1500	1680	90	2380	2500	1880
1650	1830	90	2380	2500	2050
1800	1990	95	2370	2500	2240
1950	2150	100	2370	2500	2400
2100	2300	100	2370	2500	2550

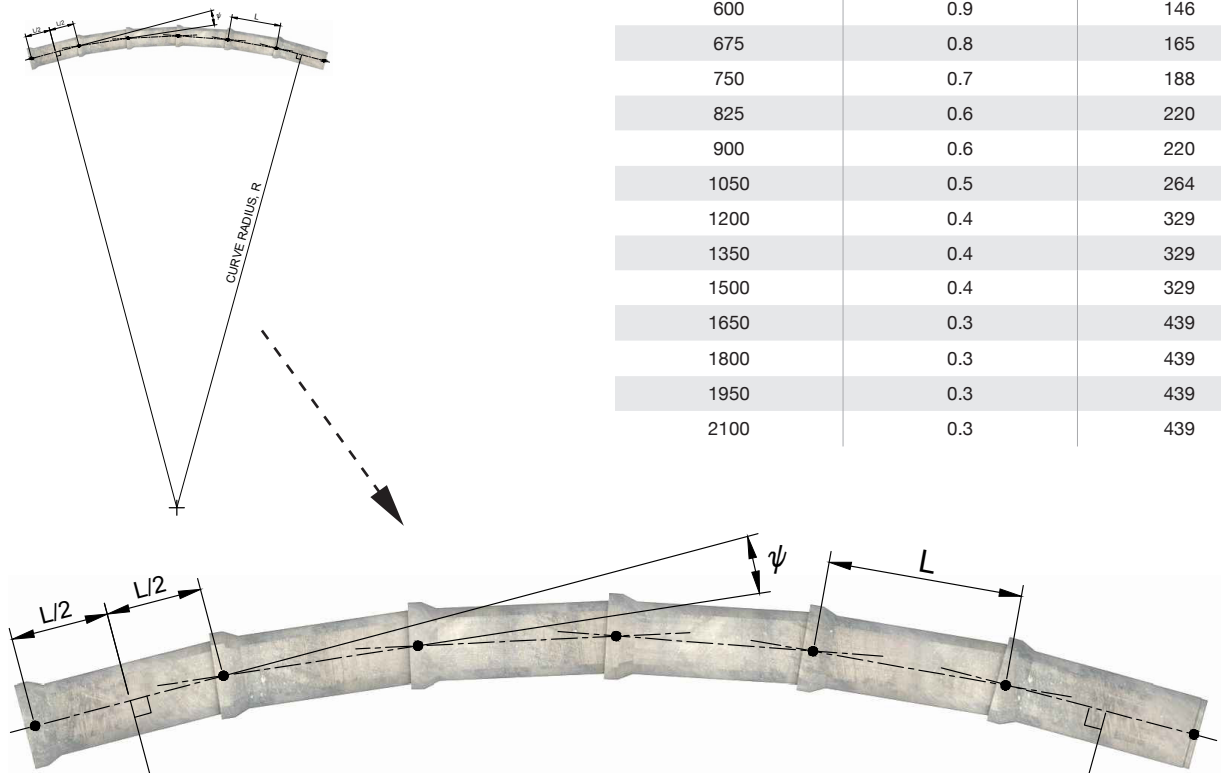


Rubber Ring Joint Pipe Details - Class 3 & 4					
Internal Diameter ID	External Diameter OD	Wall Thickness T	Effective Length $L_e$	Overall Length $L_o$	Socket OD <sub>S</sub>
mm	mm	mm	mm	mm	mm
300	370	35	2410	2500	460
375	453	39	2400	2500	540
450	538	44	2400	2500	640
525	623	49	2400	2500	730
600	698	49	2400	2500	820
675	815	70	2390	2500	910
750	910	80	2390	2500	1000
825	1005	90	2390	2500	1085
900	1080	90	2390	2500	1200
1050	1240	95	2390	2500	1390
1200	1400	100	2390	2500	1540
1350	1580	115	2380	2500	1700
1500	1730	115	2380	2500	1880
1650	1910	130	2380	2500	2050
1800	2070	135	2370	2500	2240
1950	2220	135	2370	2500	2400
2100	2370	135	2370	2500	2550

## Large Radius Curves

It is possible to achieve large radius curves with Civilmart rubber ring jointed pipes by deflecting pipes at each joint. The table below provides advice on the maximum deflection possible at each joint and the minimum achievable curve radius.

Nominal Internal Diameter ID	Maximum Deflection Angle per Joint, $\psi$	Minimum Curve Radius R
mm	(deg)	m
300	1.7	78
375	1.4	94
450	1.1	120
525	1.0	132
600	0.9	146
675	0.8	165
750	0.7	188
825	0.6	220
900	0.6	220
1050	0.5	264
1200	0.4	329
1350	0.4	329
1500	0.4	329
1650	0.3	439
1800	0.3	439
1950	0.3	439
2100	0.3	439



## Lifting and Handling

Civilmart pipes have single lifting holes with a plastic hole cap installed into every pipe. Lifting holes are placed at the top of the pipe at the centre of gravity to ensure a stable and even lift. To lift a pipe a suitably sized chain or sling must be used based on the mass branded on the pipe. All lifting equipment must be appropriately rated and certified for the nominated lift.

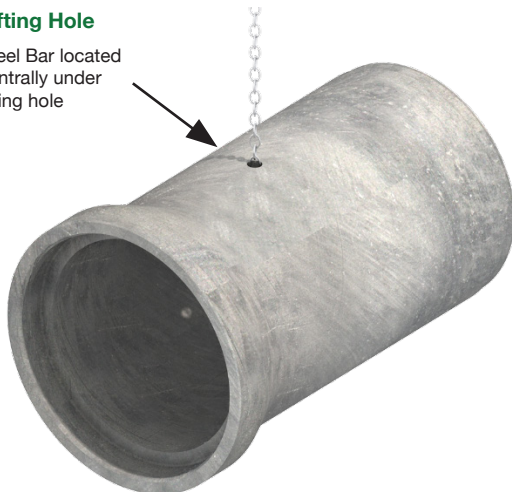
A bar of sufficient diameter and length must be used inside the pipe to support the weight of the pipe during the lift. Refer to the table below for the minimum bar requirements. Steel lifting bars should comply with AS/NZS 4671 and be grade D500N. Other proprietary pipe lifting bars may be used as long as they are certified for the appropriate mass of the pipe being lifted.

Pipe Nominal Diameter	Bar Diameter	Min. Bar Length
mm	mm	mm
525	16	500
600-750	20	500
825-1500	24	800
1650-1800	24	1000
1950-2100	32	1250

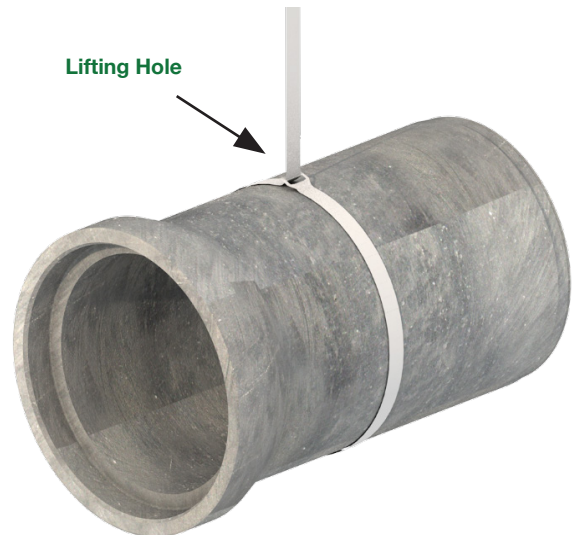
Pipes in the 300mm, 375mm, and 450mm range are not supplied with lifting holes in either the flush or rubber ring joint profile

### Lifting Hole

Steel Bar located centrally under lifting hole



### Lifting Hole



For pipes that do not have a lifting hole or where a sling is preferred, a belly sling can be used to lift and handle the pipes. Larger pipes can use one belly sling while smaller diameter pipes may use two for better handling. Whether one or two slings are used, adjust the position to ensure that the pipe is hanging horizontally.

To avoid excessive dynamic loading on the pipes, drive slowly when moving pipes around the site and do not travel over rough terrain where possible.

# CIVILMART



## Storage of Pipes on Site

Pipes can be stored on site prior to installation for convenience. Pipes should be stored in a safe manner which requires the least amount of double handling as possible. Take care to ensure that pipe ends are not damaged as spigot and socket jointing faces are critical to ensuring a water-tight and durable structure.

Pipes shall be stored on an even surface and adequately chocked to ensure that the pipes do not roll from their stored position. Store pipes so that the lifting hole is at the top of the pipe. Storage and chocking of pipes is the responsibility of the contractor and all measures must be undertaken to ensure that the pipes are stored safely.

Rubber rings can be damaged if left in the sun for too long. Ensure that rings are stored under cover if the pipes are not going to be installed within a few days. Keep rings away from petroleum products and other contaminants that will damage the rings.

# CIVILMART





## Installation of Civilmart Pipes

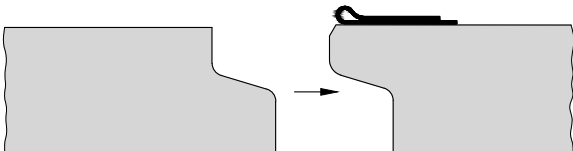
The following sections provide guidance on the jointing of Civilmart pipes. It should be understood that this is a guide and project specifications, site safety requirements, pipe laying procedures, bedding & backfill materials and other site requirements need to be followed.

The CPAA have additional information regarding the installation of concrete pipes, including the [“Foremans guide to laying pipes”](#).

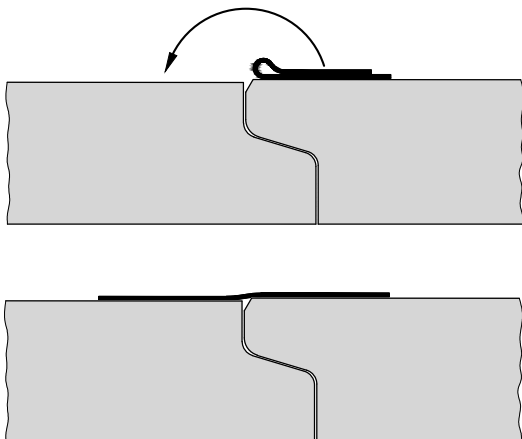
### Jointing of Flush Joint Pipes

Civilmart Flush jointed pipes have an interlocking male / female joint to ensure that pipes stay in alignment and to limit ingress of backfill material. It is recommended when using flush jointed pipes to use a sand band to prevent the ingress of backfill material.

Fit half of the sand band over the end of one of the pipes and then fold the sand band over. Install this pipe into position in the trench. Note that you may first need to dig out a small portion of the bedding under the sand band location.



Install the incoming pipe and push home into the final position. The sand band can now be folded over onto the second pipe.



## Jointing of Rubber Ring Joint Pipes

Prior to attempting to joint RRJ pipes, both the spigot and socket needs to be clean of dirt and debris. Ensure that the rubber ring is the correct size for the pipe. Civilmart rubber rings are a special compression seal with a self-lubricating rolling bladder for ease of jointing. Do not lubricate the socket.

Ensure that the correct lifting bar and chains / sling are used for handing the pipe and that all safety measures have been taken in line with project specifications and site safety procedures. Place the rubber ring on the outer edge of the pipe spigot as shown below.

Ensure that the ring is placed evenly around the pipe and that the ring is aligned with the end of the spigot as shown in the photos. You may need to flick the ring to ensure even tension all the way around the circumference.

Dig the small portion of bedding necessary for the incoming socket to lay into as the pipe is being jointed.

Align the incoming spigot with the socket. Ensure that the incoming spigot is square to the socket face. If the spigot is not square to the socket then the ring may twist and not work properly.

Push the pipe home and confirm alignment in both the vertical and horizontal planes. There is a witness mark built into the shoulder of the spigot that aligns with the end of the socket after jointing. See photo below.

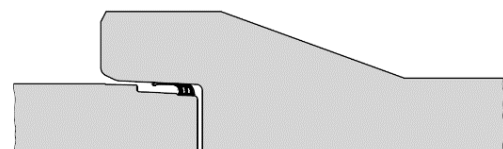
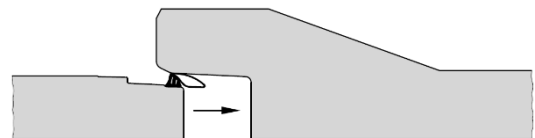
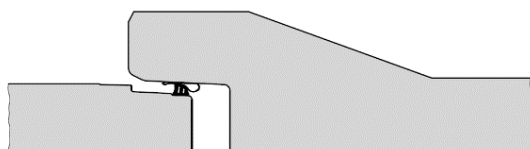
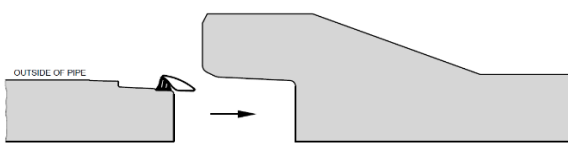
If a pipe is to be deflected around a large radius curve, firstly joint the incoming pipe so that it is square to the face of the socket, then deflect the pipe to the desired angle. Ensure that the maximum deflection is not exceeded



Once the pipes have been laid, the plastic lifting hole cap can be installed back into position.

Backfill the pipeline in accordance with project specifications and AS 3725 requirements.

Ensure that the haunch and side zones are properly compacted to achieve the specified bedding support type.





**CIVILMART**  
civilmart.com.au



**CIVILMART**



Scan here to find a  
location near you:

**[civilmart.com.au](http://civilmart.com.au)**