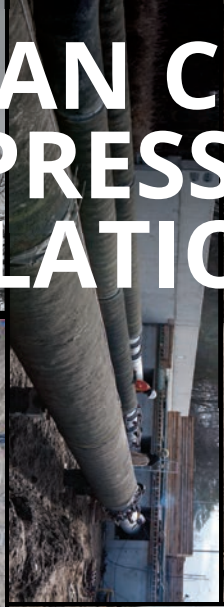
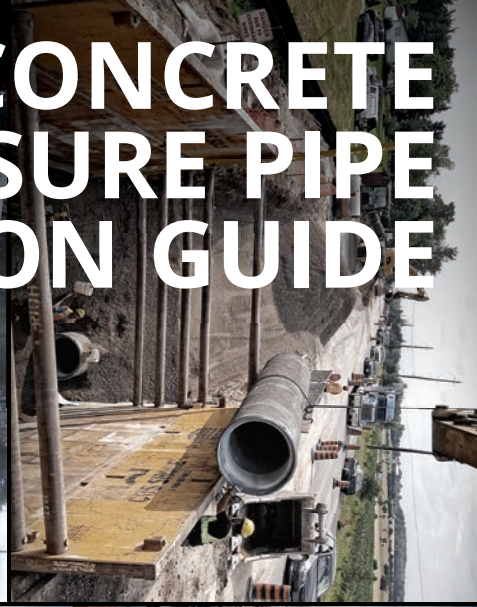
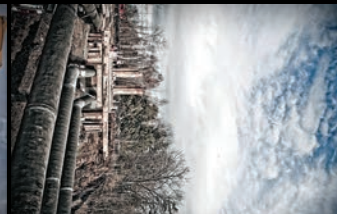
CANADIAN CONCRETE PRESSURE PIPE INSTALLATION GUIDE







CONTACT

The American Concrete Pressure Pipe Association (ACPPA)

714-801-0298

support@acppa.org

www.acppa.org

Canadian Member Companies

DECAST

8807 County Road 56
Utopia, ON, Canada

705-734-2892

info@decastltd.com

www.decastltd.com

Forterra

699 Boulevard Industriel
Saint-Eustache, QC, Canada

888-497-7371

info@forterrabp.com

www.forterrabp.com

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ABOUT THIS GUIDE

This installation guide contains suggestions and recommendations about handling and installing Concrete Pressure Pipe (CPP).

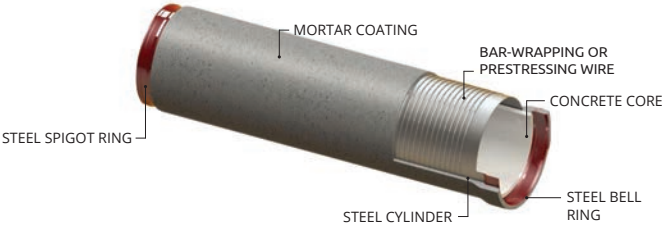
Contract specifications take precedence over this guide. The manufacturer assumes no responsibility or liability for CPP installation by reason of supplying this guide.

GENERAL NOTES

Please consult with the manufacturer for weights and dimensions.

Refer to project shop drawings for more specific information.

Bar-Wrapped C303 / Prestressed C301 Lined CPP



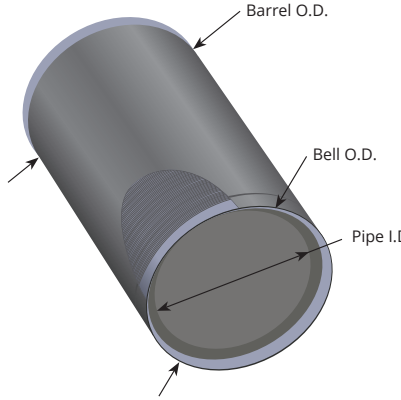
Prestressed C301 Embedded CPP

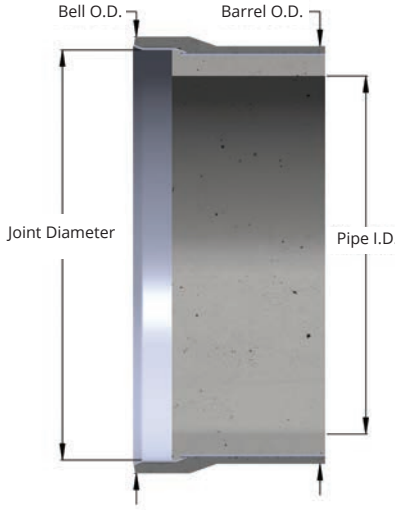
CPP DIMENSIONS

CPP is manufactured to an American standard in inches. The "nominal" pipe diameter is the closest millimeter diameter after unit conversion.

	Nominal Pipe Diameter mm	Actual Pipe Diameter mm	Joint Diameter mm	Pipe Barrel OD mm	Pipe Bell OD	Pipe Weight kg/m
C303	350	356	400	440	465	145
	400	406	454	495	515	169
	450	457	514	555	575	209
	500	508	565	605	625	236
C301L	600	610	699	737	800	375
	750	762	870	908	972	560
	900	914	1041	1080	1143	710
	1050	1067	1200	1251	1302	970
	1200	1219	1372	1422	1473	1225
	1350	1372	1543	1594	1645	1450
	1350	1372	1565	1594	1667	1450
	1500	1524	1738	1765	1838	1640
C301E	1650	1676	1781	1981	1981	2225
	1800	1829	1940	2159	2159	2650
	1950	1981	2096	2337	2337	3075
	2100	2134	2254	2518	2518	3550
	2250	2286	2410	2670	2670	3775
	2400	2438	2569	2822	2822	4025
	2550	2591	2715	2975	2975	4325
	2700	2743	2873	3140	3140	4700
	3000	3048	3216	3483	3483	6025
	3300	3353	3521	3826	3826	6775
	3600	3658	3826	4197	4197	7350

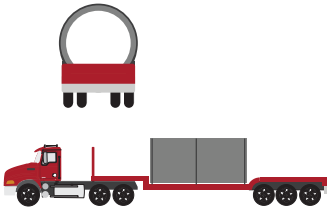
The values listed above are for a standard gauge 16 cylinder pipe. Weight per meter is provided as a guide only on this table. Weight per meter can vary based on pipe design. Please consult with the manufacturer.


Barrel O.D.
Bell O.D.
Pipe I.D.

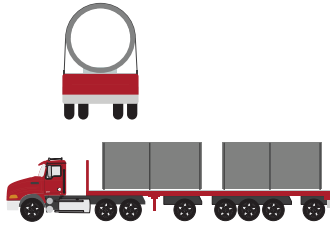

Bell O.D.
Barrel O.D.
Joint Diameter
Pipe I.D.

SHIPPING TO THE JOB SITE

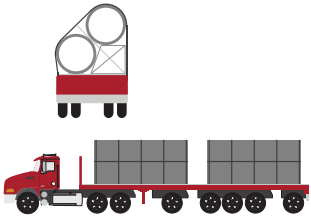
CPP is shipped to the job site on trucks. When the truck arrives at the job site, the CPP will be on the truck stacked in the configurations shown.



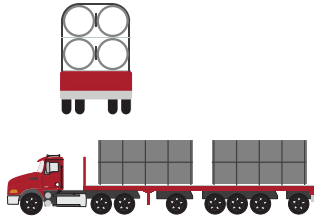
One pipe configuration



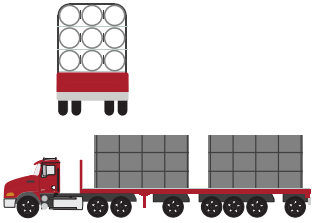
Two pipe configuration



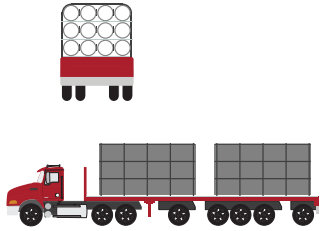
Four pipe configuration



Eight pipe configuration



Eighteen pipe configuration



Twenty four pipe configuration

Your shipment may include the following materials:
Which remain the manufacturer's property

- Pipe spacer
- Wedge 4”x4” heel
- Wedge 6”x6” heel
- Wedge 8”x8” heel
- Straps
- Steel bunk
- 4”x4” sleeper
- 6”x6” sleeper

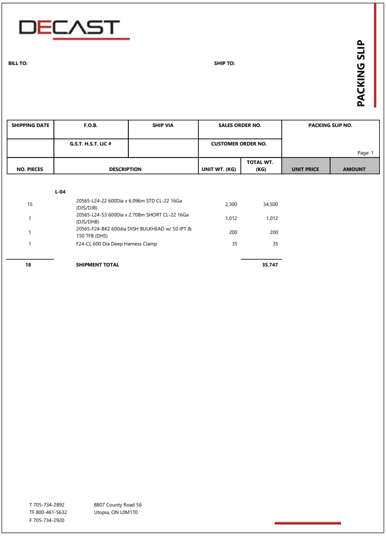
Nominal Pipe Diameter (mm)	Weight of Pipe (kg)	Standard Truckload
400		
450		
500		
600		
750		
900		
1050	**Consult the manufacturer for details on load limits for your jurisdiction**	
1200		
1350		
1500		
1650		
1800		
1950		
2100		
2250		
2400		

Notes:

- Quantities are for standard pipes only. Quantities may vary depending on pieces being loaded
- Unload rear pipes first

INSPECTION (BEFORE UNLOADING) & ACCEPTANCE OF DELIVERY

Each delivery will have a packing slip / bill of lading itemizing the products on the delivery truck.



DECAST

PACKING SLIP

BILL TO:

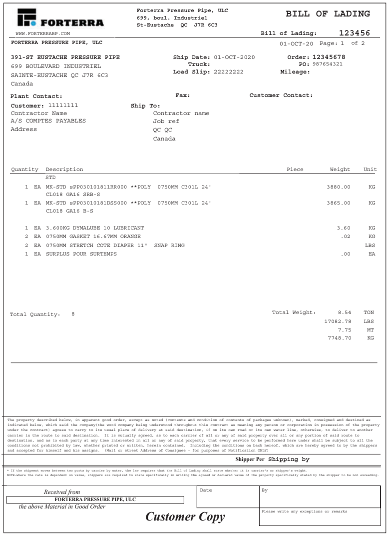
SHIP TO:

SHIPPING DATE	F.O.B.	SHIP VIA	SALES ORDER NO.	PACKING SLIP NO.
	G.S.T. H.S.T. LIC #		CUSTOMER ORDER NO.	Page: 1

NO. PIECES	DESCRIPTION	UNIT WT. (KG)	TOTAL WT. (KG)	UNIT PRICE	AMOUNT
	L-04				
15	20565-L24-22 600Dia x 6.096m STD CL-22 16Ga (DJS/DJB)	2,300	34,500		
1	20565-L24-S3 600Dia x 2.708m SHORT CL-22 16Ga (DJS/DHB)	1,012	1,012		
1	20565-F24-BK2 600dia DISH BULKHEAD w/ 50 IPT & 150 TFB (DHS)	200	200		
1	F24-CL 600 Dia Deep Harness Clamp	35	35		
18	SHIPMENT TOTAL		35,747		

T 705-734-2892
TF 800-461-5632
F 705-734-2920

8807 County Road 56
Utopia, ON L0M1T0



FORTERRA
WWW.FORTERRABP.COM

Forterra Pressure Pipe, ULC
699, boul. Industriel
St-Eustache QC J7R 6C3

BILL OF LADING

Bill of Lading: 123456

FORTERRA PRESSURE PIPE, ULC

01-OCT-20 Page: 1 of 2

391-ST EUSTACHE PRESSURE PIPE
699 BOULEVARD INDUSTRIEL
SAINTE-EUSTACHE QC J7R 6C3
Canada

Ship Date: 01-OCT-2020
Truck:
Load Slip: 22222222

Order: 12345678
PO: 987654321
Mileage:

Plant Contact: Fax: Customer Contact:

Customer: 11111111
Contractor Name
A/S COMPTES PAYABLES
Address

Ship To:
Contractor name
Job ref
QC QC
Canada

Quantity		Description	Piece	Weight	Unit
		STD			
1	EA	MK-STD sPP030101811RR000 **POLY 0750MM C301L 24' CL018 GA16 SRB-S		3880.00	KG
1	EA	MK-STD sPP03010181DSS000 **POLY 0750MM C301L 24' CL018 GA16 B-S		3865.00	KG
1	EA	3.600KG DYMALUBE 10 LUBRICANT		3.60	KG
2	EA	0750MM GASKET 16.67MM ORANGE		.02	KG
2	EA	0750MM STRETCH COTE DIAPER 11" SNAP RING			LBS
1	EA	SURPLUS POUR SURTEMPS		.00	EA

Total Quantity: 8

Total Weight: 8.54 TON
17082.78 LBS
7.75 MT
7748.70 KG

The property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated below, which said the company(the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own road or its own water line, otherwise, to deliver to another carrier in the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed here under shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained. Including the conditions on back hereof, which are hereby agreed to by the shippers and accepted for himself and his assigns. (Mail or street Address of Consignee - for purposes of Notification ONLY)

Shipper Per Shipping by

* If the shipment moves between two ports by carrier by water, the law requires that the Bill of Lading shall state whether it is carrier's or shipper's weight.
NOTE-where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property specifically stated by the shipper to be not exceeding.

Received from
FORTERRA PRESSURE PIPE, ULC
the above Material in Good Order

Date

By

Please write any exceptions or remarks

Customer Copy

Please check your shipment for the following:

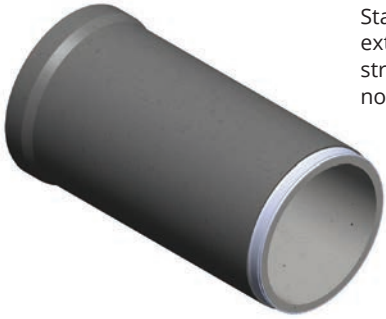
1. Check your packing slip against your order. Notify the manufacturer's shipping department if there are any discrepancies between the order and the packing slip

2. Check for damage during transit

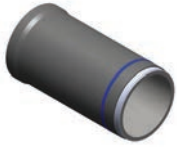
3. Note any damage on packing slip or missing product before accepting the shipment

Once the shipment has been verified, the packing slip must be signed and returned to the truck driver

CPP MARKINGS (OUTSIDE)

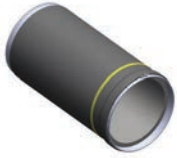


Standard pipes have no exterior markings. A coloured stripe is used to identify a nonstandard pipe.



Blue stripe

A blue stripe identifies a pipe with a bevel end



Yellow stripe

A yellow stripe on the bell end identifies a restrained bell end

Pink stripe

A pink stripe at an outlet identifies a pipe with an outlet

Steel Cylinders

The steel cylinder inside the pipe is standard 16 gauge. If the gauge is thicker than 16 gauge the pipe is marked on the outside mortar coating with paint patches on the spigot end.

U.S. Gauge # / Thickness (in)	Steel Sheet Thickness		Marking Colour Code
	mm	in.	
16	**1.52**	**0.0598**	**None**
15	**1.71**	**0.0673**	**Grey**
14	**1.90**	**0.0747**	**Yellow**
12	**2.66**	**0.1046**	**Red**
10	**3.42**	**0.1345**	**Orange**
8	**4.18**	**0.1644**	**Brown**
3/16"	**4.76**	**0.1875**	**White**
1/4"	**6.35**	**0.2500**	**Green**
5/16"	**7.94**	**0.3125**	**Pink**
3/8"	**9.52**	**0.3750**	**Blue**
1/2"	**12.70**	**0.5000**	**Purple**

CPP PIPE MARKINGS (INSIDE)

The bell end inner concrete lining of the pipe is stenciled with:

- NSF/ANSI 61 Drinking Water System Components - Health Effects Standard
- Manufacturing Facility (M/F)
- Project Number (P/N) / Job Number (J/N)
- Mark Number (M/N)
- Cast Date (C/D)
- Serial Number (S/N)
- AWWA designation for CPP type
- Inspector's stamp

MARKINGS ON FITTINGS

Markings on Fittings Outside and Inside on 1500mm and larger

Fittings are marked to help identify the piece and aid in its installation. Fittings may contain the following markings:

- "L" (long side) and "S" (short side) are marked on the inside core and outside coating at the long and short location of the spigot end of elbows and bevels
- "TOP" is marked at the top location of the inside core and outside coating
- When installing a fitting with a top mark; the marking must be in the 12 o'clock position for proper horizontal and vertical alignment
- Branches or outlet pipe are marked with a pink stripe on the exterior mortar coating at the location of the branch or outlet

UNLOADING CPP

Contractors are responsible for obtaining proper equipment and to ensure all health and safety laws are obeyed while unloading materials. Care must be taken to not damage the pipe in anyway. Contact the manufacturer's shipping department immediately if the pipe is damaged.

Unloading Methods

Crane: Use steel cables or slings of suffi cient lifting capacity.

Forklift: Forks must be cushioned with rubber or wood to prevent damage to the mortar coating.

DO NOT USE CHAINS

Multi-Tiered Shipments

When unloading; **cross timbers must be secured to the trailer** side rail on the unloading side. This is necessary to prevent timbers from kicking upwards and dropping the rear pipe off the back side of the trailer.

Shipment Materials

Dunnage and timbers are the property of the manufacturer and must be returned on the delivery truck. Any dunnage or timbers removed from the trailer will be billed back to the contractor.

ON-SITE STORAGE

CPP shipments include gaskets, lubricant and the diapers that are used for field grouting of joints. Grout is not included.

1. Gaskets should be stored in a cool place away from heat, sunlight, gasoline or other materials that can damage rubber

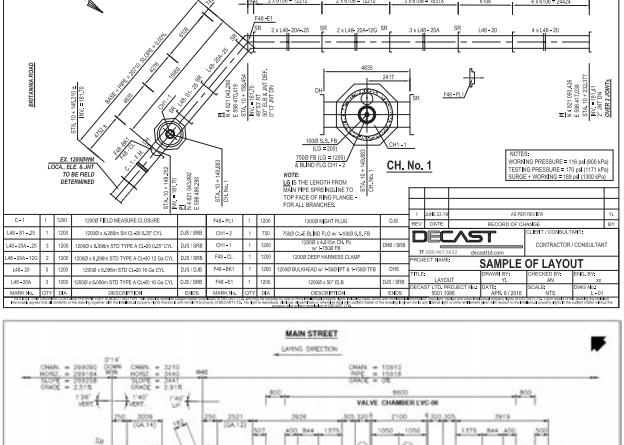
2. Joint lubricants should be stored according to the manufacturer's instructions. If freezing conditions are expected, keep indoors

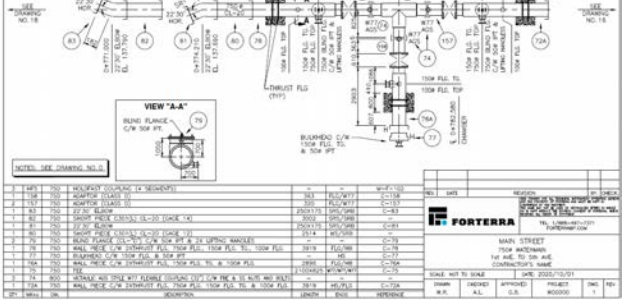
3. If freezing conditions are expected, the CPP must be set on wooden skids off the ground to avoid damaging the mortar coating

SHOP DRAWINGS

The manufacturer provides sealed (stamped) shop drawings for all CPP projects. Installers must ensure they are using the latest revision of the shop drawings obtained from the project manager. Installers must refer to the shop drawings for the following information:

- **Lists of all pipes and fittings**
- **Laying direction, sequence and alignment of pipeline**
- **Any special installation special instructions**





HANDLING AND LAYING

When handling CPP, care must be taken to avoid damaging the outer mortar coating, the ends, or the inner concrete lining.

- Trenches must be excavated to sufficient depths to provide required bedding (see project specifications)
- Trenches must be wide enough for diaper installation and inspection
- Trench bottoms must be prepared as shown in project drawings
- Pipes and fittings have been designed for the installation and operating conditions specified in project contract documents. These conditions should not be modifieded without consulting the manufacturer's engineering department

All pipes, fittings, etc. shall be lowered into the trench using suitable pipe-laying equipment.

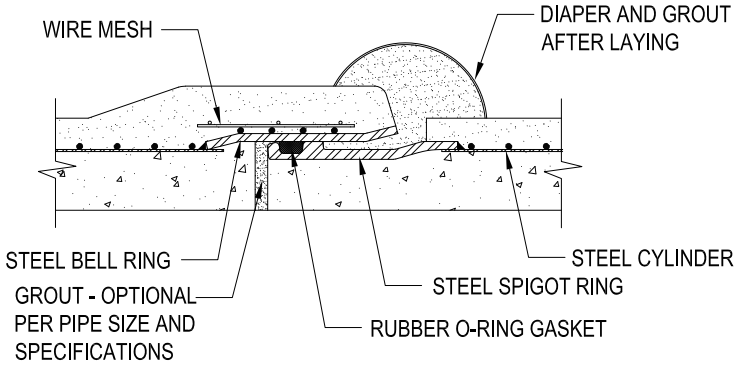
- Pipe must not be rolled, skidded, or dumped into the trench
- Laying equipment must have sufficient lifting capacity and stability

Pipes are to be laid with the bell ends facing the direction in which the pipe laying proceeds.

JOINTS

1) Standard Bell and Spigot Joints

Bell and spigot joints are the standard joint configuration for CPP. The spigot ring is steel and has a rectangular recess that holds a circular rubber O-ring gasket.



2) Restrained Joints

CPP is available with restrained joints to avoid the need to construct thrust blocks. CPP can be restrained to resist the thrust forces caused by changes in direction or dead ends. Restrained joints on CPP are designed by the manufacturer.

ALL JOINTS WITH RESTRAINED JOINTS (SNAP-RING, HARNESS OR WELDED) SHALL BE GROUTED & BACKFILLED TO THE RESTRAINED JOINTS DESIGN COVER PRIOR TO PRESSURE TESTING THE LINE.

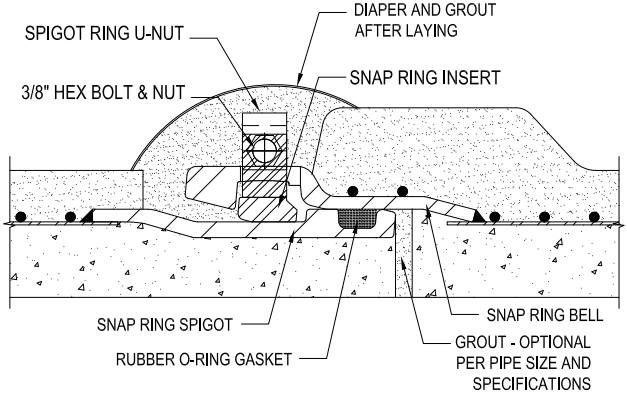
2.1 SNAP RING Joint

2.2 Harness / Holdfast Clamp Joint

2.3 Welded Joint

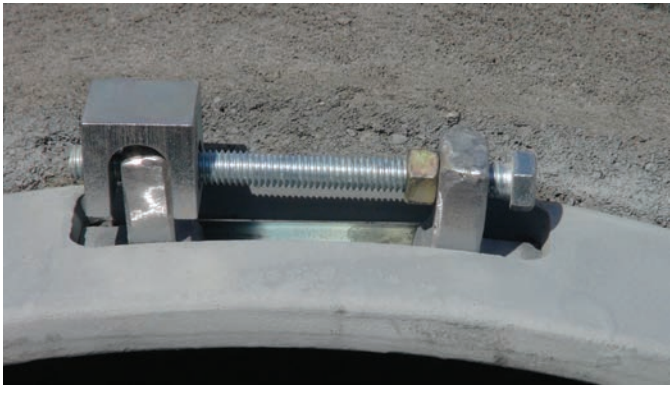
2.1 SNAP RING Joint

The SNAP RING joint is a restrained jointing system. The joint is made by tightening a bolt on the outside to employ a snap-ring to secure the spigot and bell against separation.



The SNAP RING bell requires a full site inspection prior to assembly

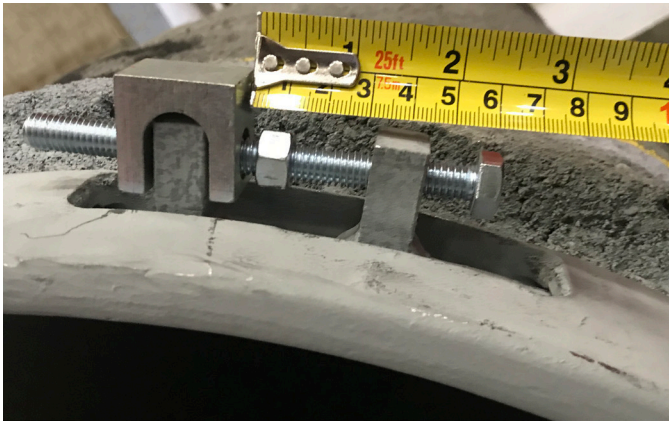
1) The hardware of the SNAP RING must be expanded fully. The bolt must be straight and the u-nut must be in the correct position and undamaged



2) The SNAP RING insert must be seated within the insert groove and be flush or below the surface of the bell as shown below

3) The Snap Ring Clip (also called the steel skid plate) will sit flat as it bridges the gap in the insert. It will take the shape of the Bell as the gasket pushes past it. **ANY DEFORMATION OR DAMAGE TO THE SNAP RING BELL, INSERT OR ITS HARDWARE MUST BE CORRECTED PRIOR TO INSTALLING JOINT**

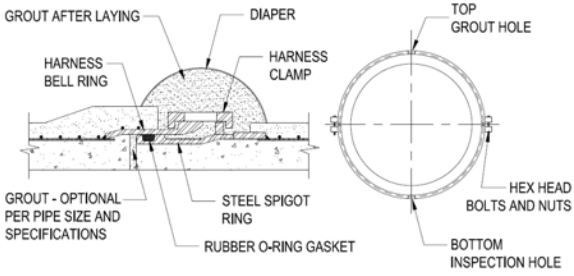
4) Shown below: SNAP RING hardware not closed and joint not homed



5) Shown below: SNAP RING hardware closed and spigot engaged

2.2 Harness Type Clamp Joint

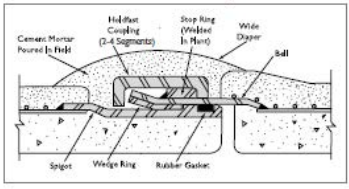
Harness joints are used as a mechanical means of transmitting longitudinal thrust across the joints. Often used at locations where there is the potential for future connection and also where the application dictates a higher pressure, for example at a bulkhead. The two-part harness clamp is positioned around the joint and secured by tightening drawbolts on each side.

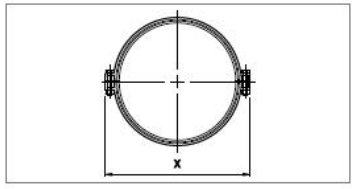


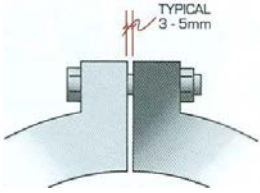
Holdfast Restrained joint

The Holdfast "clamp-type" joint provides restraint utilizing 2 or 4 precision casted segments (2 up to 600mm; 4 from 750 to 1350mm diameter) connected together once the joint is homed/mated. Also, typically used at test bulkheads for 350 to 1350mm diameter. The other noticeable difference from the Harnessed joint described earlier is the Wedge Ring around the spigot behind the gasket groove. Once the segments are installed with bolts tightened and inspected for proper seating (per diagram below), the diaper and grout process is completed utilizing a wider diaper. Grouting process is the same as for a standard joint.

Holdfast coupling restrained joint





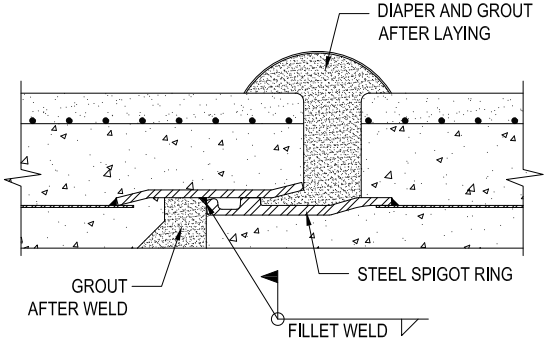


Harness Joints must be grouted prior to pressurizing the pipeline Bolt Torque for harness clamps is 135 N.m (100 lb.ft)

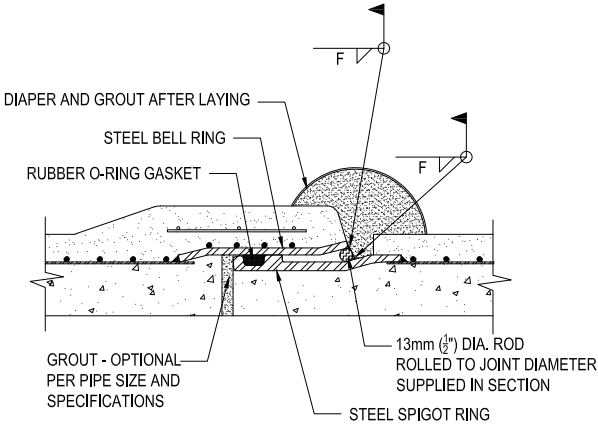
2.3 Welded Joint

There are many different possibilities of welded joints. Depending on the pipe design and diameter, welding can be done from the inside or the outside. Consult manufacturer's engineering department for more information.

Internal Field Weld



External Field Weld



Notes:

- All joints must be protected from corrosion with a grout filled diaper
- Internally welded joints must be internally grouted as well

PREPARING PIPE ENDS FOR BELL AND SPIGOT JOINTING

To ensure a proper, watertight joint, the following steps must be taken prior to jointing.

1. Clean the bell and spigot of the pipe to remove all dirt and foreign materials

2. Apply lubricant to the spigot groove

3. Apply lubricant to the inside of the bell

4. Place the lubricated gasket in the gasket groove of the entire spigot ring. When the gasket is in place, insert a smooth rod or a screwdriver between the gasket and spigot ring and run the screwdriver/ rod around the entire circumference of the spigot ring to ensure that the gasket is stretched evenly around the spigot. This usually takes 2 to 3 rotations to accomplish

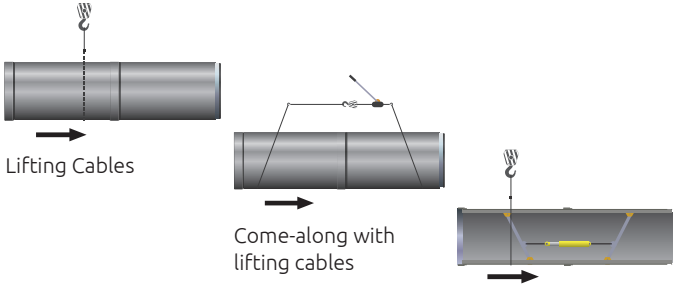
5. Coat the gasket with a 1 mm layer of lubricant

Notes:

- Lubricant is supplied by the manufacturer
- To ensure a water tight joint, install gaskets **immediately before** laying the pipe
- Do not pre-install gaskets on pipes ahead of the installation crew, the lubrication will dry out
- In winter conditions, the bell and spigot must be preheated before lubrication and connection

BRINGING PIPES TOGETHER TO FORM A JOINT

The following diagram shows three possible methods of bringing pipe together to form joints: lifting cables, come-along with lifting cables and hydraulic puller.



The handling method is the responsibility of the installation contractor. Care must be taken to avoid any damage to the pipe, specifically to the joint rings and mortar coating.

Follow these steps to join pipes

1. Ensure that a space approximately 200 mm deep and 400 mm wide is excavated in the ground under the jointing area to facilitate grouting of the joint with the diaper

2. Carefully maneuver the new pipe to be added so that the nose of the spigot end is aligned into the flare of the bell end of the previously installed pipe. This is necessary so that the spigot will enter the bell end squarely. If the new pipe is properly aligned, it will slide into the pipe bell smoothly

3. Pipe must be suspended by cable or sling during jointing

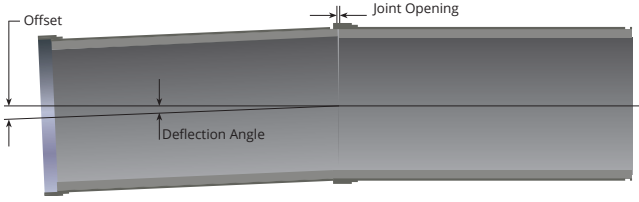
4. If any dirt touches the lubricated spigot and bell before they are assembled, they must be cleaned and re-lubricated

5. It is the contractor's responsibility to ensure the gaskets are correctly placed. Feeler gauges are available from the manufacturer upon request. Contact your manufacturer's service representative for direction on using a feeler gauge to check gaskets after jointing pipes


CAT

JOINT DEFLECTIONS

- If joint deflections are required for slight grade or line changes, they must be made after the pipes have been joined and before grouting
- After the joint is squarely in place, the pipe can be deflected within the limits shown in the following deflection tables
- Restrained joints must be fastened before they are deflected. Deflection limits for restrained joints are shown on the next page



Joint Deflection of CPP with Deep Bell and Spigot Joints

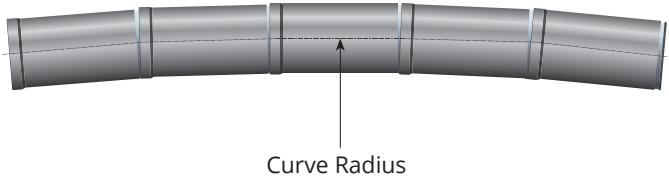
				6.1m LENGTHS		7.3m LENGTHS	
	Nominal Pipe Diameter mm	Max. Joint Opening mm	Max. Deflection Angle Deg	Offset Std. Length mm	Curve Radius Std. Length m	Offset Std. Length mm	Curve Radius Std. Length m
C303	350	13	1° 52'	198	188	238	225
	400	44	5° 32'	590	63	708	76
	450	44	4° 54'	522	72	626	86
	500	44	4° 27'	475	79	570	94
C301L Deep Joint	600	44	3° 38'	387	95	461	117
	750	44	2° 55'	311	119	371	145
	900	44	2° 26'	259	142	310	174
	1050	44	2° 7'	225	164	269	200
	1200	44	1° 51'	197	188	235	229
	1350 (Joint dia. = 1543)	44	1° 38'	174	215	209	257
	1350 (Joint dia. = 1565)	41	1° 30'	160	231		
	1500	44	1° 27'	155	238		
C301E Standard Joint	1650	28	0° 55'	93	403		
	1800	28	0° 50'	88	423		
	1950	27	0° 44'	79	474		
	2100	31	0° 48'	81	459		
	2250	30	0° 43'	76	491		
	2400	30	0° 40'	71	523		
	2550	44	0° 56'	99	378		
	2700	45	0° 54'	96	391		

Note:

- Standard pipe length: see manufacturer's details
- Joint deflections may vary based on joint geometry. All joint deflections should be verified with the specified value on the shop drawings

Joint Deflection of CPP with Mechanical Restrained Joints

				6.1m LENGTHS		7.3m LENGTHS	
	Nominal Pipe Diameter mm	Max. Joint Opening mm	Max. Deflection Angle Deg	Offset Std. Length mm	Curve Radius Std. Length m	Offset Std. Length mm	Curve Radius Std. Length m
C303	400	13	1° 36'	171	218	205	262
	450	13	1° 25'	151	247	181	296
	500	13	1° 17'	137	272	165	326
C301L	600	13	1° 2'	110	335	133	403
	750	13	0° 50'	88	417	107	502
	900	13	0° 41'	74	499	89	600
	1050	13	0° 36'	64	576	77	692
	1200	13	0° 31'	56	658	68	791
	1350 (Joint dia. = 1543)	13	0° 28'	50	741	60	890
	1350 (Joint dia. = 1565)	13	0° 27'	49	751		
	1500	13	0° 25'	44	833		
C301E	1650	13	0° 24'	43	854		
	1800	13	0° 22'	39	932		
	1950	13	0° 20'	36	1005		
	2100	13	0° 19'	34	1082		
	2250	13	0° 18'	32	1156		
	2400	13	0° 16'	30	1232		



Note:

- Standard pipe length: see manufacturer's details
- Joint deflections may vary based on joint geometry. All joint deflections should be verified with the specified value on the shop drawings

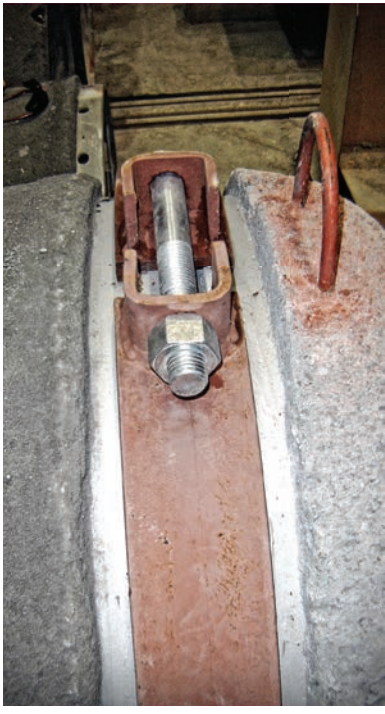
SNAP RING Restrained Joints

1. With the snap ring in its expanded position insert the spigot of the adjoining pipe into the bell as previously described
2. After the pipe is pushed in completely, loosen the interior nut
3. The joint is assembled squarely and the insert is tightened only enough to prevent the pipe from pulling apart during deflection
4. Once the pipe has been deflected the required amount, the insert can be tightened to the extent of the bolt travel. Hand tightening is all that is required, do not force the bolt
5. Make grade/line adjustments as indicated on the shop drawings
6. Grout the joint following the procedure on page 32

Harness Clamp Restrained Joints

Position the bottom half of the harness clamp under the joint prior to placing of the adjoining pipe

1. Assemble the bell and spigot joints as previously described
2. Position the top half of the harness clamp over the joint
3. Assemble joint by tightening the two bolts only enough to prevent the pipe from pulling apart during deflection
4. Once the pipe is deflected to the appropriate angle tighten the bolts and grout as usual
5. Make grade/line adjustments as indicated on the shop drawings
6. Grout the joint following the procedure on the next page



Welded Restrained Joints

Several welded configurations are available. Consult the layout drawings of your project for specific information, or consult the manufacturer's engineering department

PROTECTING THE JOINTS WITH A MORTAR COLLAR

1. Ensure a 200 mm deep and 400 mm wide space exists under the joint to guarantee grout surrounds the full circumference of the joint

2. Place the supplied grout band also known as the "diaper" around the full circumference of the joint so that it straddles the joint recess. Tighten the straps. Fill diapers prior to backfilling

3. Mix 3 parts of sand to 1 part of cement with enough water to make a free-flowing grout. Ensure that the same type of cement that was used in the pipe coating is used in the grout, as per contract specification

4. Pour the grout into the diaper on one side until the mortar circles the pipe and appears on the other side. Continue pouring the grout on the other side until the diaper is full. Ensure the grout is rodded or agitated on both sides of the pipe alternately to settle the grout and fi ll all voids

5. Use stiffer mix at the top and trowel the gap at the top of the diaper, ensuring that the entire joint is covered with 25mm of grout

Diaper is placed around the joint and straps are tightened

Grout is poured into the diaper into one side and then the other until the diaper is completely full

Mortar the Inside of the Joint

At the discretion of the owner, for the inside joint recess of the CPP pipeline, typically 1500mm diameter and larger, use a ratio of 3:1 (sand to cement) and enough water to make a mix that can easily be troweled. **Point the inner joint recess and strike off the surface smooth with the inside of the pipe.**

FITTINGS

Fittings allow for variations and adaptability from the straight course of a pipeline. Grade and line changes are implemented using fittings. Fittings are custom-made to size and configuration based on the pipeline design. Fittings are connected to concrete pressure pipe in the same way as joints for straight pipe.

Elbow

Tee

Wye

Reducer

CLOSURES

Closures are used to connect installed pipeline sections. They are designed and manufactured to the exact dimensions required. Contact your manufacturer's representative for assistance on field measurements of closures. Complicated geometry may require surveying equipment.

STANDARD CLOSURE MEASUREMENT

STEP 1: EXCAVATE AND EXPOSE PIPE ENDS SO THAT FOUR COORDINATE POINTS (AT LEAST 2500mm APART) CAN BE TAKEN AS SHOWN
STEP 2: TYPE OF JOINTS (STD, HARNESS, HOLDFAST, SNAP-RING) TO BE DETERMINED INCLUDING ORIENTATION (BELL OR SPIGOT) AFTER CAREFULLY CHIPPING MORTAR
STEP 3: TYPE OF PIPE (C303, C301(L) OR (E), SSP, C300) TO BE DETERMINED
STEP 4: TAKE FOUR SHOTS (NORTHING, EASTING AND ELEVATION) AS PER DETAIL "A", ON PIPE CENTRE LINE AT TOP WITH PROPER SURVEYING EQUIPMENT AND FILL IN TABLE 1.

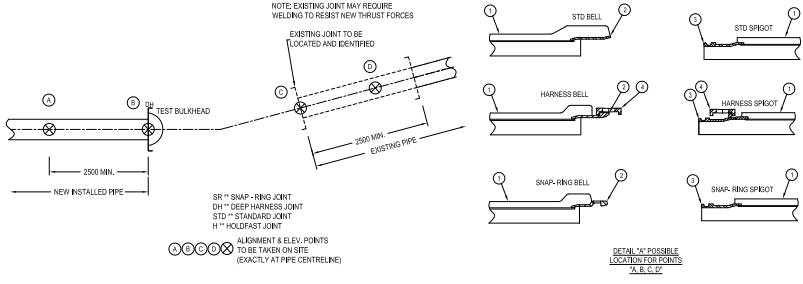


TABLE 1				LAYOUT No.		
POINT	PIECE No.	TYPE OF END	POSITION OF POINT (DETAIL "A")	X	Y	ELEVATION
EXAMPLE	L24-16A	DEEP JOINT SPIGOT	3	506843.154	4965123.254	88.541
A						
B						
C						
D						

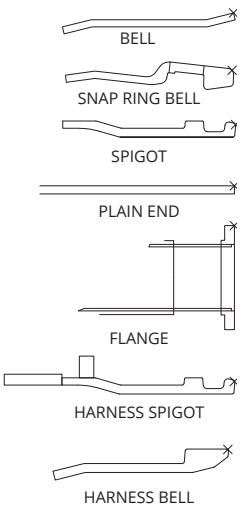
8 POINT MEASUREMENT

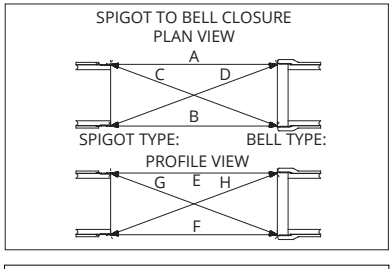
(Simple closure application. Alignment and Joints are accessible)

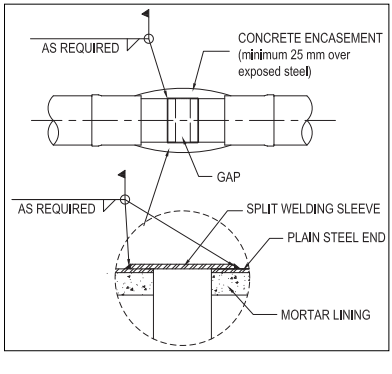
Closure sections are used when a new pipeline is connected to an existing pipeline, or when a connection is required after an isolated pressure test. To manufacture the closure section, the manufacturer requires the exact dimensions of the closure length.

If access to the pipe joints is available, the closure should be measured as per the diagram below. If the bulkheads cannot be removed or if complete excavation is not possible, your manufacturer's Technical Services can instruct the survey crews on how to acquire the necessary dimensions. The manufacturer will manufacture the closure to fit the existing opening. The closure may be installed with a coupling or a split welding sleeve.

Closures can be manufactured for restrained or non-restrained areas of the pipeline.







Note:

For complex geometries, survey equipment provided by the contractor may be required to take specific measurements

BACKFILLING

ALL JOINTS WITH RESTRAINED JOINTS (SNAP-RING, HARNESS OR WELDED) SHALL BE GROUTED & BACKFILLED TO THE RESTRAINED JOINTS DESIGN COVER PRIOR TO PRESSURE TESTING THE LINE.

Bedding materials, and trench details are specified in contract documents and must be followed to ensure the pipe will perform as designed over time. The exterior mortar coating on CPP provides protection for the bar /prestressing wire and steel cylinder in the pipe so it is necessary to ensure that large rocks and debris are removed prior to backfilling to avoid damage to the exterior of the pipe.

FIELD SERVICES

On-Site Welding

Yourmanufacturer provides on-site welding services. Welders are Canadian Welding Bureau (CWB) certified. Personnel and equipment can also be provided for confined space entry.

Live Tapping

Outlets in pipe are needed for various reasons and when the location of outlets cannot be predetermined, it is necessary to tap into existing pressure lines. Your manufacturer provides a full service field solution for pressure tapping for concrete pressure pipe and other pipe materials.

Consultation on Connection to Existing Pipes / Existing Infrastructure Rehabilitation

Determining the appropriate connection methods to existing pipes requires situation assessment, knowledge of pipe materials, engineering analysis and implementation. Your manufacturer provides a complete solution from consultation through to implementation.

Contact your manufacturer for an estimate and quotation.

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