

CONCRETE PIPE

MANITOBA

2020



Precast Stormwater & Wastewater Solutions

LAFARGE
Building better cities™



Stormceptor®



CPCQA CERTIFICATION... SUPERIOR QUALITY ASSURANCE!



THE (CPCQA) CERTIFICATION PROGRAM

The Canadian Precast Concrete Quality Assurance (CPCQA) Certification Program qualifies precast concrete manufacturers who fabricate structural, architectural and specialty precast concrete products, including concrete pipe and underground utility and drainage products. Manufacturers adhere to the CPCQA certification program requirements, and the more stringent requirements of CSA, ASTM, PCI MNL and provincial standards where applicable.

***(CPCQA) CERTIFICATION PROGRAM BY PROCESS OFFERS KEY BENEFITS TO ARCHITECTS, CONTRACTORS, ENGINEERS, GOVERNMENT AUTHORITIES AND OWNERS.**

***Endorsed by the Canadian Concrete Pipe and Precast Association (CCPPA) www.ccpa.ca and the Canadian Precast/Prestressed Concrete Institute (CPCI) www.cpci.ca**

If you have any questions on the New CPCQA Certification contact the Quality Assurance Council Administrator at: QACAdministrator@precastcertification.ca



**(CPCQA) CANADIAN
PRECAST CONCRETE
QUALITY ASSURANCE
CERTIFICATION PROGRAM**

For more information on CPCQA Certification, please visit: www.precastcertification.ca

Index

PIPE

Bell and Spigot Pipe	7
1.22/1.83m Straight Wall Pipe	8
2.44m Straight Wall Pipe	9
Jacking Pipe C/W Metal Bands	10
Flared Ends	11
Pipe Gaskets	12
Gasket Installation	13
Recommended Procedures for Concrete Pipe	14
Lift Systems	15
Microtunnel Pipe	16

MANHOLES

Manhole Bases	18
Manhole Reducers	18
Adjusting Rings/Modulocs	18
Manhole Barrels	19
Prebenched Manholes	20
Connector Boots and Cored Holes	20
Large Diameter Manholes	21

CATCH BASINS

Catch Basins and Sumps	22
Manhole and Catch Basin Gaskets	23

BOX SECTIONS

Concrete Box Sections	25
-----------------------	----

STORMWATER TREATMENT SOLUTIONS

Stormceptor EF	28
Jellyfish	30
Stormtrap	31
Performance Monitoring Plan	36
@Source Energy Pipe	37

MISCELLANEOUS

Lifting Clutches - Pipe and Manholes	38
Cement	38
Frames and Covers	38
Plug/Caps	38
Estimating Guide	39
Terms and Conditions	40



Advantages of Concrete Pipe



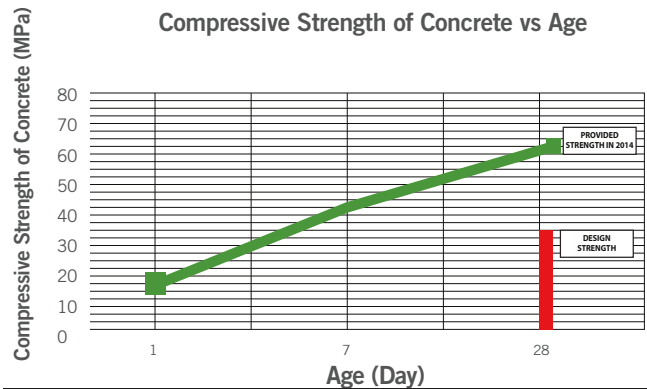
ASTM

CSA

DESIGNED IN ACCORDANCE



Certified through the Canadian Precast Concrete Quality Assurance Certification Program



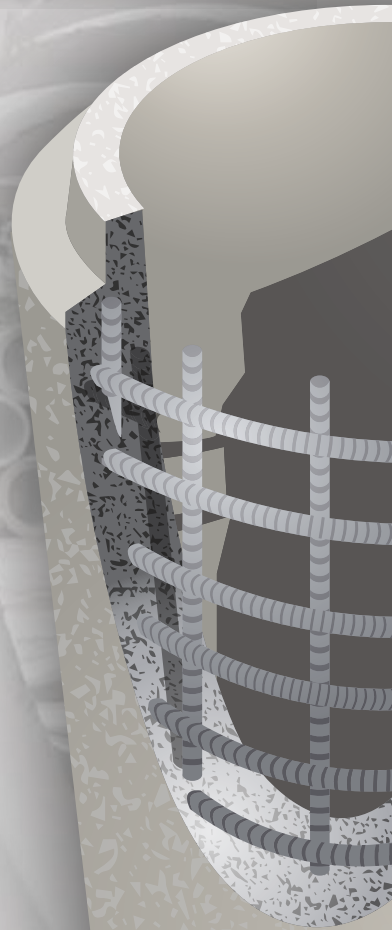
Typically designed for compressive strength of 35MPa, however it normally achieves 50-70 MPa at 28 days



Perfectly connected to other concrete structures like manholes, vaults, boxes, etc.



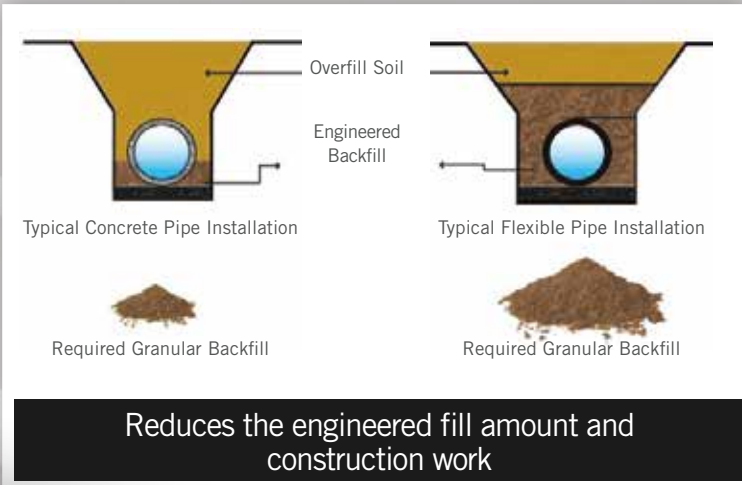
Engineered for a variety of sizes & applications



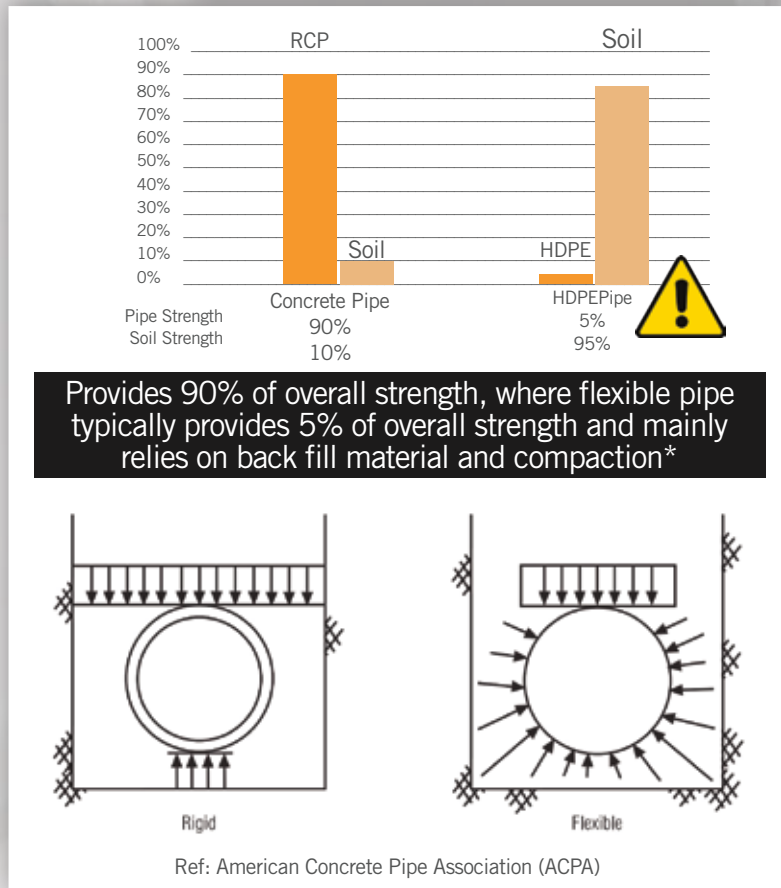
ASCE



WITH STANDARDS AND GUIDELINES



Concrete Pipe



Ref: American Concrete Pipe Association (ACPA)

CUSTOM SOLUTIONS

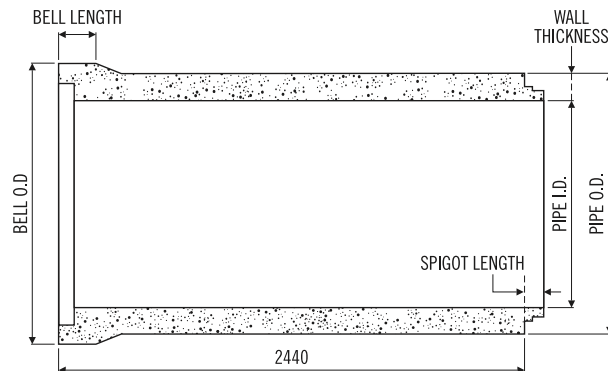
At Lafarge we pride ourselves on being a solutions provider. If your project requires a custom product, please get in touch with us as we are always looking to be able to provide a solution and expand our portfolio of custom products. Below are some custom products we have produced over the years to meet our customers' project requirements.



CONCRETE PIPE - BELL & SPIGOT

Diameter (mm)	Length (m)	Wall Type	Mass (kg/m)	Lifting Pins	Dimensions (mm)					CSA A257.2			
										50-D	65-D	100-D	140D
										ASTM C76M			
										C76-2	C76-3	C76-4	C76-5
										Price per metre			
					Pipe I.D.	Pipe O.D.	Bell O.D.	Wall Thickness	Spigot Length				
300	2.44	C	207	None	305	445	508	70	92	-	-	-	-
375	2.44	C	275	None	381	533	610	76	92	-	-	-	-
450	2.44	B	303	None	457	585	711	64	92	-	-	-	-
525	2.44	C	441	None	533	711	806	89	98	-	-	-	-
600	2.44	C	539	None	610	800	902	95	98	-	-	-	-
750	2.44	C	767	4T	762	978	1099	108	102	-	-	-	-
900	2.44	C	1031	4T	914	1156	1302	121	102	-	-	-	-

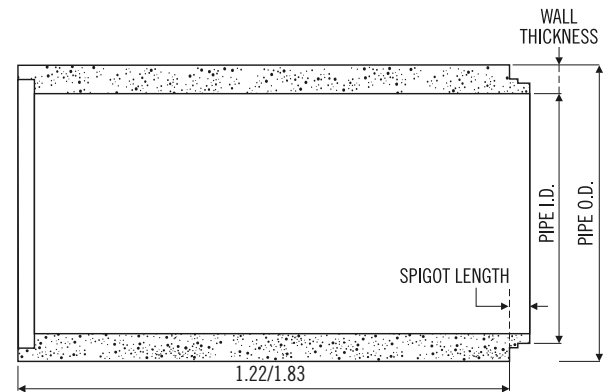
1. Pricing for bends and tees are available upon request.
2. Concrete pipe prices do not include gasket.



CONCRETE PIPE - 1.22 & 1.83m Straight Wall Pipe

Diameter (mm)	Length (m)	Wall Type	Mass (kg/m)	Lifting Pins	Dimensions (mm)				CSA A257.2			
									50-D	65-D	100-D	140D
									ASTM C76M			
									C76-2	C76-3	C76-4	C76-5
					Pipe I.D.	Pipe O.D.	Wall Thickness	Spigot Length	Price per metre			
300	1.22	C	199	None	305	445	70	76	-	-	-	-
375	1.22	C	263	None	381	533	76	76	-	-	-	-
450	1.22	C	339	None	457	623	83	76	-	-	-	-
525	1.22	C	417	None	533	711	89	83	-	-	-	-
600	1.22	C	506	None	610	800	95	89	-	-	-	-
750	1.22/1.83	C	718	4T	762	978	108	89	-	-	-	-
900	1.22/1.83	C	953	4T	914	1156	121	89	-	-	-	-
1050	1.22	C	1239	4T	1067	1333	133	102	-	-	-	-
1200	1.22/1.83	B	1327	4T	1219	1473	127	102	-	-	-	-
1350	1.22/1.83	C	1901	4T	1372	1690	159	127	-	-	-	-
2100	1.22/1.83	C	4078	8T	2134	2578	222	127	-	-	x	x
2400	1.22/1.83	C	4610	8T	2438	2934	248	127	-	-	x	x
2700	1.22/1.83	C	6385	8T	2743	3289	273	127	-	-	x	x

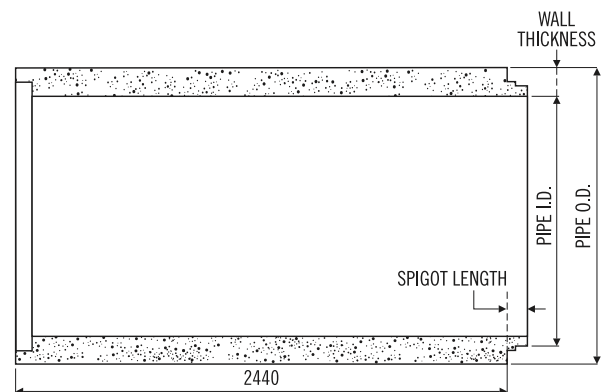
1. Pricing for bends and tees are available upon request.
2. Concrete pipe prices do not include gasket.
3. 2100 - 2700mm diameter pipe prices available up to C76-3. Call for pricing on higher strength pipe.
4. 750mm x 1.22 and 900mm x 1.22m pipe c/w no swift lift.



CONCRETE PIPE - 2.44m Straight Wall Pipe

Diameter (mm)	Length (m)	Wall Type	Mass (kg/m)	Lifting Pins	Dimensions (mm)				CSA A257.2			
									50-D	65-D	100-D	140D
					ASTM C76M				Price per metre			
					C76-2	C76-3	C76-4	C76-5				
					Pipe I.D.	Pipe O.D.	Wall Thickness	Spigot Length				
1050	2.44	C	1239	4T	1067	1333	133	102	-	-	-	-
1200	2.44	C	1476	4T	1219	1511	146	102	-	-	-	-
1350	2.44	C	1901	4T	1372	1690	159	127	-	-	-	-
1500	2.44	C	2362	4T	1524	1866	171	127	-	-	-	-
1650	2.44	C	2695	4T	1676	2048	186	127	-	-	-	-
1800	2.44	C	3153	8T	1829	2223	197	127	-	-	-	-
2100	2.44	C	4078	8T	2134	2578	222	127	-	-	x	x
2400	2.44	C	4610	8T	2438	2934	248	127	-	-	x	x
2700	2.44	C	6385	8T	2743	3289	273	127	-	-	x	x
3000	2.44	B	7134	20T	3048	3607	279	152	x	x	x	x

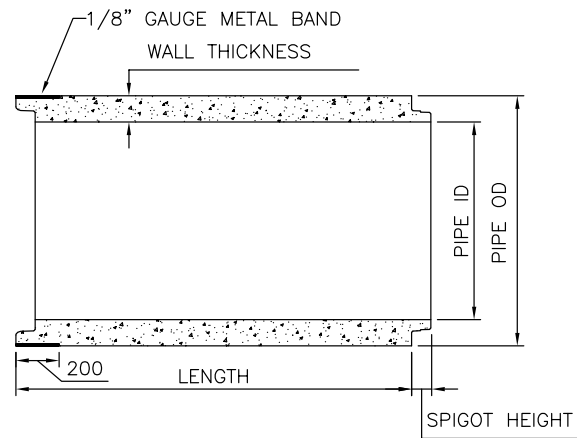
1. Pricing for bends and tees are available upon request.
2. Concrete pipe prices do not include gasket.
3. 2100 - 2700mm diameter pipe prices available up to C76-3. Call for pricing on higher strength pipe.



CONCRETE PIPE - Jacking Pipe C/W Metal Bands

Diameter (mm)	Length (m)	Wall Type	Mass (kg/m)	Lifting Pins	Dimensions (mm)				CSA A257.2			
									50-D	65-D	100-D	140D
									ASTM C76M			
									C76-2	C76-3	C76-4	C76-5
					Pipe I.D.	Pipe O.D.	Wall Thickness	Spigot Length	Price per metre			
750	1.83	C	718	4T	762	978	108	89	-	-	-	-
900	1.83	C	953	4T	914	1156	121	89	-	-	-	-
1050	2.44	C	1239	4T	1067	1333	133	102	-	-	-	-
1200	2.44	C	1476	4T	1219	1511	146	102	-	-	-	-
1350	2.44	C	1901	4T	1372	1690	159	127	-	-	-	-
1500	2.44	C	2362	4T	1524	1866	171	127	-	-	-	-
1650	2.44	C	2695	4T	1676	2048	186	127	-	-	-	-
1800	2.44	C	3153	8T	1829	2223	197	127	-	-	-	-

1. Pricing for bends and tees are available upon request.
2. Concrete pipe prices do not include gasket.
3. Price for metal bands is included.



FLARED END SECTIONS

Diameter (mm)	Length (m)	Weight (kgs)	Price Each (\$)
300	1.85	633	-
450	1.25	424	-
600	1.85	629	-
750	1.85	1182	-
900	2.45	2810	-
1050	2.45	3014	-
1200	2.45	3125	-
1350	2.45	3906	-
1500	2.45	5179	-



FLARED END



SLOPED END

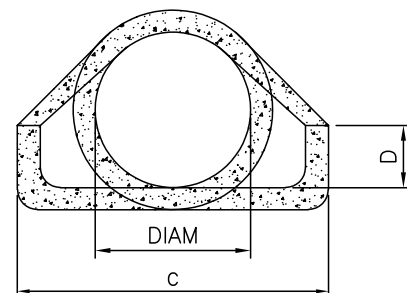
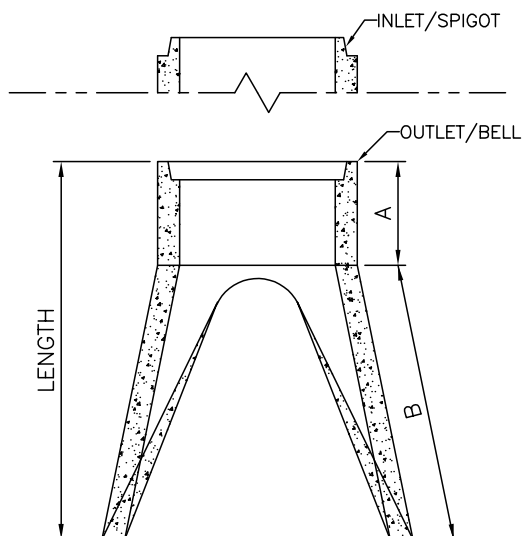
300 and 450 flared ends come with a lifting hole. 600 flared ends come with three lifting holes and 750 - 1500 flared ends come with 4 - 4T swift lift.



SLOPED END

Diameter (mm)	ACTUAL DIMENSIONS (mm)			
	A	B	C	D
300	1241	600	600	150
450	572	724	914	229
600	749	1168	1207	254
750	508	1435	1524	305
900	864	1600	1829	381
1050	889	1650	1981	533
1200	610	1829	2134	610
1350	895	1651	2546	685
1500	819	1525	2740	762

For larger sizes not listed, Lafarge can cut pipe into a sloped end. Please call for pricing.



PIPE GASKETS

Pipe Gaskets

Diameter (mm)	Each (\$)
300	-
375	-
450	-
525	-
600	-
750	-
900	-
1050	-
1200	-
1350	-
1500	-
1650	-
1800	-
2100	-
2400	-
2700	-
3000	-

1. All gaskets designed to meet ASTM C443, C361, C1919 and CSA A257.



Prelube Gasket



Wedge Gasket

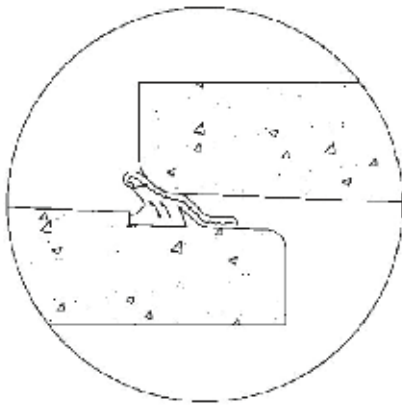
Gasket Lubricant

Size (kg)	Price (\$/Pail)
3.6	-
9.0	-

1. For use with wedge gaskets.

Gasket Installation Instructions

Prelube Gaskets

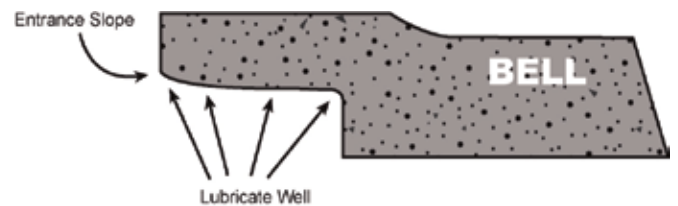
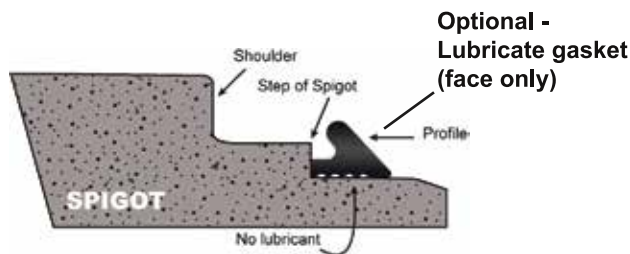


No Lubricant Needed

The prelubricated gasket has all the lubricant it needs inside the sealed mantle. Joints slide together quickly and easily.

1. Stretch prelubricated gasket onto spigot of pipe, making sure that the mantle is laying smoothly towards the end and that the gasket body is firmly against shoulder of spigot.
2. Center pipe spigot and bell, and then evenly and smoothly press the spigot into bell. The gasket mantle will help center the pipe joint as the mantle moves into the clearance space. No equalization is required.
3. Complete assembly until the pipe joint is home. The mantle will move into the recess behind the gasket, cushioning the joint while allowing the joint to deflect. Complete installation by following pipe manufacturer's recommended bedding and backfilling practices.

Wedge Gaskets



1. Check for and remove any loose dirt, debris or foreign material from the inside surface of the bell, spigot and gasket
2. Stretch the gasket over the spigot end of the pipe and move it back until it is seated against the step of the spigot. Always place squared area of gasket against pipe and step.
3. The gasket should be equalized by inserting a clean round metal object between the gasket and pipe and making at least 1 -1/2 revolutions around the pipe. The gasket can also be equalized by slightly tugging/pinching the gasket at different points around the pipe.
4. After equalization, ensure the rear of the gasket is seated firmly against the spigot step around the full circumference of the spigot.
5. Remove all dirt and other foreign matter from the inside surface of the bell. Lubricate the entire bell area of the joint. Be sure to coat the entrance slope of the bell thoroughly with lubricant. It is important that the gasket grips the spigot during installation, so that it is not displaced from the step.
6. Carefully align pipe sections squarely and bring home slowly, so that the gasket makes contact with the bell entrance slope evenly around the entire pipe joint.
7. Complete installation by following pipe manufacturer's recommended bedding and backfilling practices.

RECOMMENDED PROCEDURES FOR CONCRETE PIPE

> HANDLING, INSTALLING & JOINING CONCRETE PIPE

Pipe delivered to a site has been plant tested to ensure that the pipe meets or exceeds the requirements established for your project.

Each shipment of pipe is loaded, blocked and tied down at the plant to avoid damage during transit. However, an overall inspection of each pipe shipment should be made on arrival, as well as quantities checked, before the pipe is unloaded.

If a pipe is damaged during delivery or unloading, it should be set aside. Damaged ends, chips or cracks that do not pass through the wall can usually be repaired before the pipe is used. Supplier must be notified so that Quality Control can go to the site and assess the situation with the site inspector.

When mechanical devices are used for off loading, the lifting device could chip or damage the pipe. Padding should be provided between the pipe and lifting device.

Pipe should always be picked up from the bell end if using a mechanical device to transport.

Stockpiles of pipe should be as near as possible to where the pipe will be installed. Each layer of bell and spigot pipe should be arranged so that male ends are free from pressure of the upper row (i.e. alternate bells and spigots from layer to layer).

All flexible gasket materials should be stored in a cool dry place to be distributed as needed. Rubber gaskets and preformed bulk mastics should be kept clean, away from oil, grease, excessive heat and out of the direct rays of the sun.

> TRENCH CONDITIONS

Conditions in a sewer trench should be such that pipe installation can be accomplished without mud, silt, gravel or other foreign materials entering the joint or the pipe. In general, this means that the trench should be adequately dewatered with a firm bottom, free of mud.

Pipe should be handled to avoid damage. After the gasket has been put on the pipe, the pipe should be carefully handled to avoid bumping the gasket and knocking it out of position or loading it with dirt and foreign material. Any gasket, so disturbed, should be removed, cleaned and replaced before joining is attempted.

Once gaskets are placed on the spigot, a smooth round object, such as a screwdriver shaft, should be inserted under the gasket and run around the spigot twice to equalize gasket stretch. Care must be taken not to damage the gasket.

Gaskets are made so that a precise and constant volume of rubber made to C.S.A./A.S.T.M. standards is used for each joint, thus giving a long-lasting, tight and flexible joint. Some gaskets require a lubricant for proper installation, while others do not.

Before the pipe is installed, a bell hole must be dug in the sub-base to accommodate the bell. Failure to do this can cause beam breaks or cracks in the barrel of the pipe.

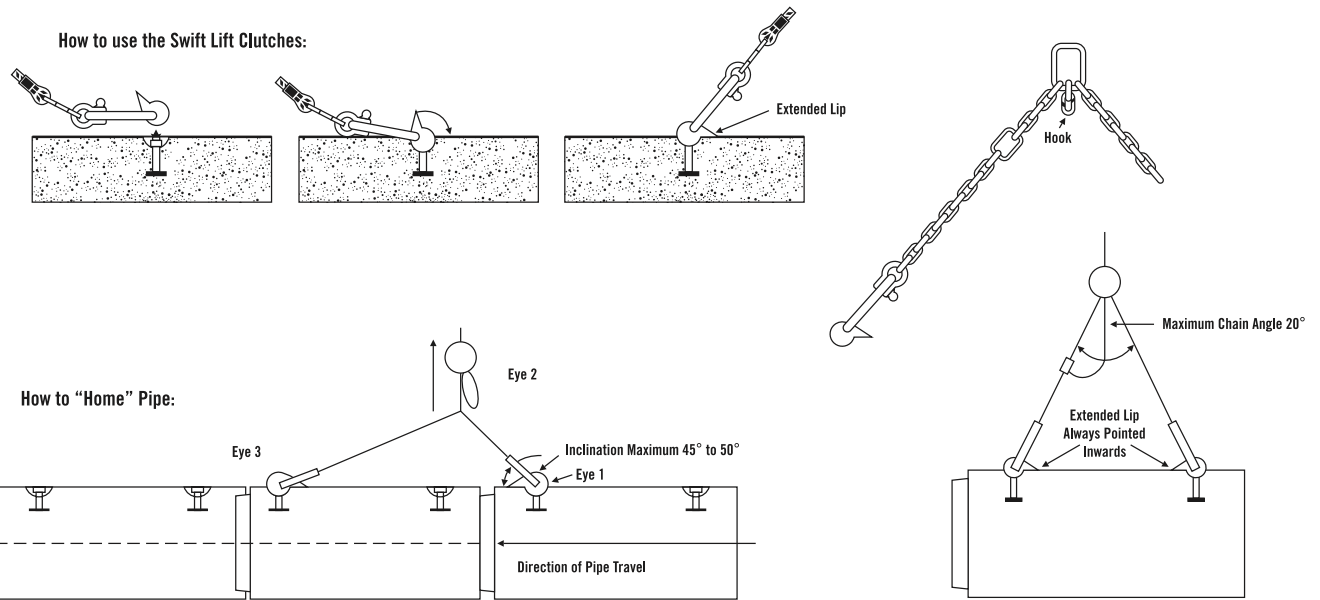
Proper alignment is imperative during the homing process. Joint separation must NOT be used as an alignment guide as the allowable variation in pipe length from one side to the other side is 1/8" per foot of diameter to a maximum of 5/8". For example, a 36" wide pipe with an allowable tolerance of 3/8" could, if joint spacing were used as an alignment guide, put the alignment of line or grade out by 1" per length of pipe.

During installation of the spigot into the bell, before the pipe is homed, the pipe should be partially supported by a sling to minimize lateral pressure on the gasket and to maintain concentricity until the gasket is properly positioned. Once the bell and spigot have been carefully aligned, the pipe must be homed with a direct thrust and not moved from side to side as it enters the bell. Proper homing can be achieved with blocks and lever bars or mechanical "come alongs" suitably braced to ensure even entry into the bell. Back hoes and tractors are NOT recommended for this purpose.

If the bell and spigot are not carefully aligned, the gasket will be displaced causing a leak or splitting of the bell.

LIFT SYSTEMS

> "SWIFT LIFT" PROCEDURES:



> SAFE WORKING PROCEDURES GUIDELINES:

Do not transport pipe over uneven ground using swift lift anchors. This dynamic loading may cause damage to the lift anchor and concrete.

Care must be taken not to tamper with lift pins. Tampering includes heating, hammering, welding, side loading (dragging material) or any other act that could damage the pin or concrete. All these actions deform the steel making the swift lift pin unsafe to work with.

Load must be applied simultaneously to all Swift Lift Anchors in order to safely lift product.



MICROTUNNELING PIPE

Trenchless Technology

What is Microtunneling?

Microtunneling (MT) is a trenchless technology method for installing pipe from a drive shaft to a receiving shaft employing hydraulic jacks to force pipe through the ground via pipe-to-pipe interaction as the jacking face is excavated mechanically with a microtunnel boring machine (MTBM). The MTBM is a remotely-controlled steerable rotating cutting head that excavates material at the face of the pipe jack. The spoil is removed at the face of excavation via the slurry method, which is mixed in the slurry chamber behind the head and pumped to the surface into a separation system and then recycled to be used again.

A laser is used to determine a fixed point of reference for line and grade and transmitted to a monitor. All operator controls are located at the surface in a control box with visible access to the drive shaft for contact with all workers. Using this method, utilities can be installed with very high accuracy or long distances and in challenging soil conditions where other systems would have difficulty performing.



Typical Areas of Installation

Deep installations, unsuitable soil conditions, installations where space is limited. Trenchless installation of pipe is often used to minimize surface disruption, often under existing infrastructure such as railways and roadways.

Did you know? Based on the pipe size and wall design, Lafarge can calculate the maximum jacking force permissible for a given project upon request. This is accomplished following ASCE 27-00 "Standard Practice for Direct Design of Precast Concrete Pipe for Jacking in Trenchless Construction." Here, a concentrically loaded condition is compared against an eccentrically loaded condition, with the more conservative force governing.





Installation Method

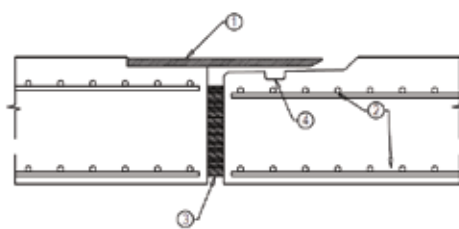
The usual construction sequence for tunneling and jacking concrete pipe is:

- Excavate jacking pits or shafts, construct jacking abutments or thrust blocks, and install jacks, jacking frame and guide rails.
- Begin tunnel excavation by machine, or hand, depending on conditions.
- Lower first section of pipe, position jacks and jacking frame, and jack pipe forward.
- Continue excavation, remove soil through pipe, insert succeeding sections of pipe between the lead pipe and jacks and jack forward.
- Repeat sequence, excavation, soil removal, pipe insertion and jacking, until the operation is complete.
- Consistency of material facilitates easier grading and even compaction.

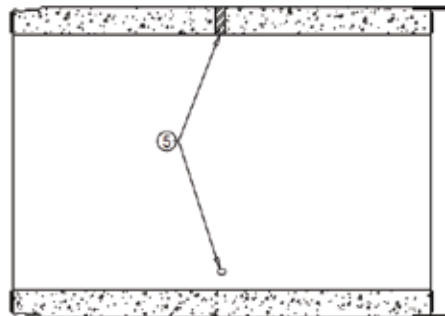
Occasionally a lubricant, such as bentonite slurry, is pumped into the space between the tunnel bore and the outside of the pipe to reduce frictional resistance. After the jacked pipe have reached their final position, grout is frequently pumped into this same space to insure continuous bearing with the surrounding soil.

When increased resistance develops due to soil conditions or length of run, intermediate jacking stations may be inserted at periodic intervals. The intermediate jacking station pushes only the several lengths ahead while bearing on the pipe behind. The use of intermediate jacking stations reduces axial loads on the pipe and required jacking capacity.

The number and capacity of the jacks primarily depends upon the size and length of the pipe to be jacked and the type of soil encountered. Abutments for the jacks must be strong enough and large enough to distribute the maximum capacity of the jacks to the soil behind the backstops.



1. Steel Bell
2. Reinforcing
3. Jacking Cushion
4. Confined Groove Joint
5. Lube or Grout Port



Lafarge can produce concrete pipe in a variety of sizes for trenchless installation with the jacking or tunneling methods. The pipe sections are designed for the additional axial force encountered in these operations and can be produced with ports for grout or lubrication.

MANHOLES

Manhole Bases

Description	Weight (kgs/pc)	Price (\$ Each)
1200mm x 1.83m Barrel with Mono Base	2784	-
1200mm x 1.22m Barrel with Mono Base	1996	-
1200mm x 0.91m Barrel with Mono Base	1594	-
1200mm x 0.61m Barrel with Mono Base	1207	-
1200mm x 2.44m Tee Riser	4320	-
1200mm x 2.44m Tee Riser c/w 1 Mono End	4760	-
1200mm x 2.44m Tee Riser c/w 2 Mono Ends	5200	-
1500mm x 2.44m Tee Riser	6174	-
1500mm x 2.44m Tee Riser c/w 1 Mono End	6614	-
1500mm x 2.44m Tee Riser c/w 2 Mono Ends	7054	-

1. Product made to ASTM C-478 and CSA A257.4 Specifications.
2. Manhole base prices do not include gaskets.
3. Manholes c/w two 4t swift lift.

Manhole Reducers

Description	Weight (kgs/pc)	Price (\$ Each)
1200mm x 0.23m Reducer c/w 900mm Opening	805	-
1200mm x 0.23m Reducer c/w 750mm Opening	805	-
900mm x 0.30m Reducer c/w 750mm Opening	487	-
900mm x 0.15m Reducer c/w 750mm Opening	274	-
900mm x 0.15m Reducer c/w 600mm Square Opening	317	-
750mm x 0.23m Reducer c/w 600mm Square Opening	289	-

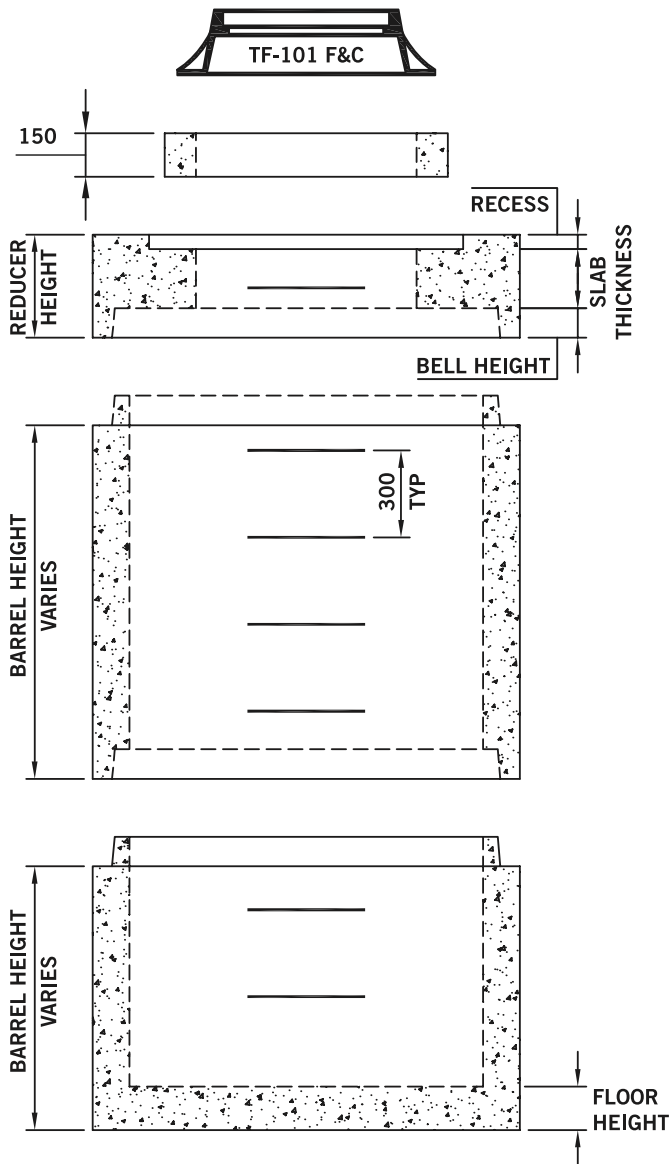
1. Product made to ASTM C-478 and CSA A257.4 Specifications.
2. Manhole base prices do not include gaskets.
3. 1200mm diameter reducers c/w three 4t swift lift.
4. 750 and 900mm diameter reducers c/w two 4t swift lift.

Adjusting Rings / Moduloc

Description	Weight (kgs/pc)	Price (\$ Each)
750mm x 0.15m Adjusting Ring	104	-
750mm x 0.10m Adjusting Ring	70	-
750mm x 0.08m Adjusting Ring	56	-
600mm x 0.08m Square Moduloc	61	-
600mm x 0.05m Square Moduloc	40	-

1. Product made to ASTM C-478 and CSA A257.4 Specifications.

MANHOLES



Manhole Barrels

Product	Weight (kgs/pc)	Price (\$ Each)
1200mm x 1.83m Manhole Barrel	2367	-
1200mm x 1.22m Manhole Barrel	1578	-
1200mm x 0.91m Manhole Barrel	1177	-
1200mm x 0.61m Manhole Barrel	789	-
1200mm x 0.46m Manhole Barrel	595	-
1200mm x 0.30m Manhole Barrel	387	-
900mm x 1.83m Manhole Barrel	1740	-
900mm x 1.22m Manhole Barrel	1160	-
900mm x 0.91m Manhole Barrel	886	-
900mm x 0.61m Manhole Barrel	580	-
900mm x 0.46m Manhole Barrel	437	-
900mm x 0.30m Manhole Barrel	285	-
900mm x 0.15m Manhole Barrel	143	-
750mm x 1.83m Manhole Barrel	1312	-
750mm x 1.22m Manhole Barrel	874	-
750mm x 0.91m Manhole Barrel	652	-
750mm x 0.61m Manhole Barrel	437	-
750mm x 0.46m Manhole Barrel	330	-
750mm x 0.30m Manhole Barrel	215	-
750mm x 0.15m Manhole Barrel	107	-

1. Product made to ASTM C-478 and CSA A257.4 Specifications.
2. Manhole barrel prices do not include gaskets.
3. Manhole barrels c/w two 4t swift lift.



MANHOLES

Prebenched Manholes

Description	Weight (kgs/pc)	Price (\$ Each)
1200mm x 1.22m Prebench	2439	-
1200mm x 0.91m Prebench	2168	-
1200mm x 0.61m Prebench	1679	-

1. Product made to ASTM C-478 and CSA A257.4 Specifications.
2. Connector boots are only for SDR-35 PVC Pipe.

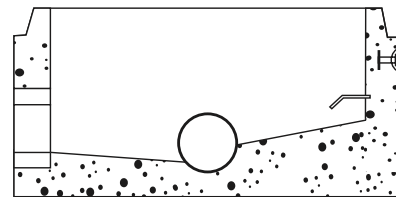
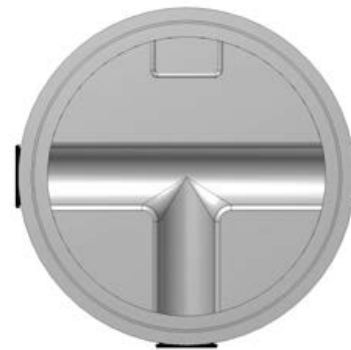
Connector Boots

Boot Size	Price (\$ Each)
100mm	-
150mm	-
200mm	-
250mm	-
300mm	-
375mm	-

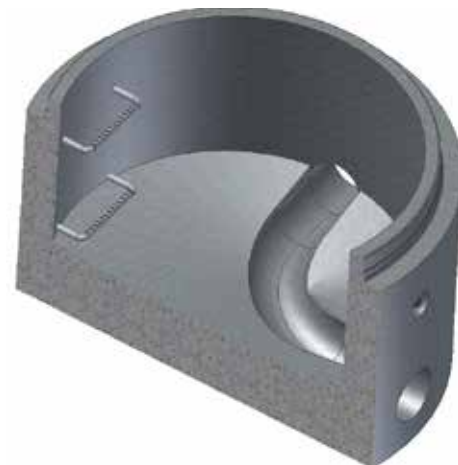
1. Connector boots are only for SDR-35 PVC Pipe.
2. Prices are for supply and installation of connector boots.

Cored Holes

Cored Hole Size	Price (\$ Each)
16" / 406mm	-
18" / 457mm	-
20" / 508mm	-
22" / 559mm	-
24" / 610mm	-
26" / 660mm	-
28" / 711mm	-
30" / 762mm	-
32" / 813mm	-
38" / 965mm	-
40" / 1016mm	-



Pre-Benched Base



LARGE DIAMETER MANHOLES / LIFT STATIONS

Flat Reducers / Precast Floors

Diameter (mm)	Description	Length (m)	Mass (kg)	Price (\$ Each)
1350	Flat Reducer	0.20	1002	-
1350	Precast Floor	0.20	712	-
1500	Flat Reducer	0.20	1275	-
1500	Precast Floor	0.20	880	-
1650	Flat Reducer	0.20	1524	-
1650	Precast Floor	0.20	1064	-
1800	Flat Reducer	0.20	1859	-
1800	Precast Floor	0.23	1268	-
2100	Flat Reducer	0.23	2903	-
2100	Precast Floor	0.23	2154	-
2400	Flat Reducer	0.23	3794	-
2400	Precast Floor	0.25	2810	-
2700	Flat Reducer	0.25	5231	-
2700	Precast Floor	0.25	3560	-
3000	Flat Reducer	0.25	6409	-
3000	Precast Floor	0.25	5269	-

- Product made to ASTM C-478 and CSA A257.4 Specifications.
- Reducers and floor prices do not include gaskets.
- 1350 - 1650mm diameter reducers c/w three 4t swift lift.
- 1800 - 3000mm diameter reducers c/w three 8t swift lift.

Barrels

Diameter (mm)	Barrel Height (m)						
	2.44	1.83	1.22	0.91	0.61	0.46	0.30
1350	-	-	-	-	-	-	-
Mass (kg)	4490	3367	2244	1675	1123	847	552
1500	-	-	-	-	-	-	-
Mass (kg)	5581	4185	2790	2081	1395	1052	686
1650	-	x	x	x	x	x	x
Mass (kg)	6262	x	x	x	x	x	x
1800	-	-	-	-	-	-	x
Mass (kg)	7379	5534	3690	2753	1845	1391	x
2100	-	-	-	-	-	-	x
Mass (kg)	9727	7295	4864	3627	2432	1834	x
2400	-	-	-	-	-	-	x
Mass (kg)	12412	9308	6206	4629	3103	x	x
2700	-	-	-	-	-	x	x
Mass (kg)	15616	11712	7697	5741	3849	x	x
3000	-	-	-	-	x	x	x
Mass (kg)	17407	13875	8727	6509	x	x	x

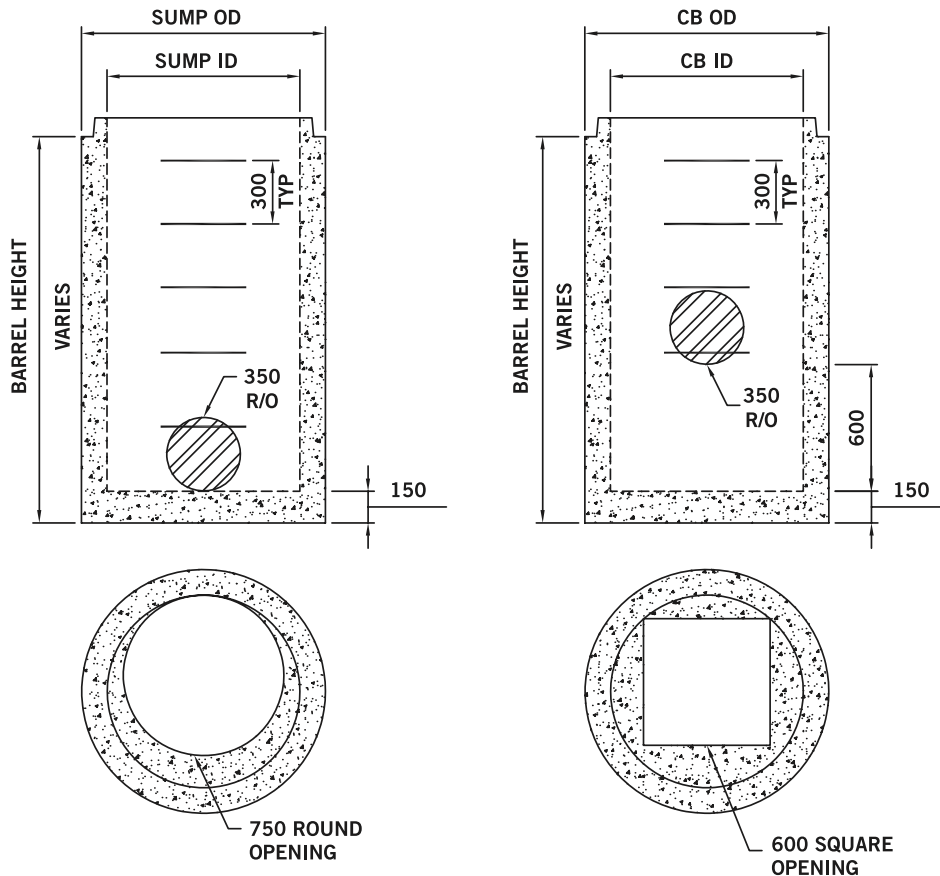
- Product made to ASTM C-478 and CSA A257.4 Specifications.
- Manhole barrel prices do not include gaskets.
- 1350-1650mm diameter barrels c/w two 4t swift lift.
- 1800-2700mm diameter barrels c/w two 8t swift lift.
- 3000mm diameter barrels c/w three 8t swift lift.

CATCH BASINS

Catch Basins and Sumps

Product	Weight (kgs/pc)	Price (\$ Each)
900mm x 1.83m Catch Basin / Sump with Base	1975	-
900mm x 1.22m Catch Basin / Sump with Base	1395	-
900mm x 0.91m Catch Basin / Sump with Base	1100	-
900mm x 0.61m Sump with Mono Base	814	-
900mm x 0.46m Sump with Mono Base	672	-
900mm x 0.30m Sump with Mono Base	520	-
750mm x 1.83m Catch Basin / Sump with Base	1475	-
750mm x 1.22m Catch Basin / Sump with Base	1038	-
750mm x 0.91m Catch Basin / Sump with Base	815	-
750mm x 0.61m Sump with Mono Base	600	-
750mm x 0.46m Sump with Mono Base	493	-
750mm x 0.30m Sump with Mono Base	378	-

1. Product made to ASTM C-478 and CSA A257.4 Specifications.
2. Catch basin and sump prices do not include gaskets.
3. Catch basin and sumps c/w 4t swift lift.



CATCH BASINS

Manhole Gaskets

Product	Diameter (mm)	Length (m)	Quantity	Price (\$ Each)
ConSeal	25	4.42	8 pieces/carton	-
ConSeal	38	3.81	4 pieces/carton	-
ConSeal	44	3.66	3 pieces/carton	-

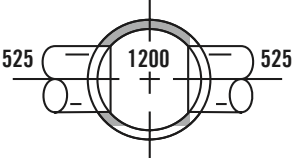
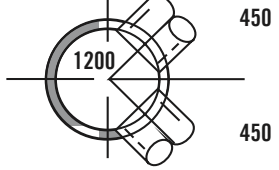
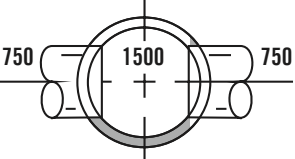
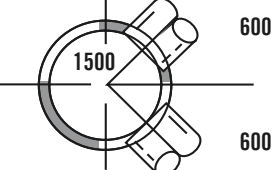
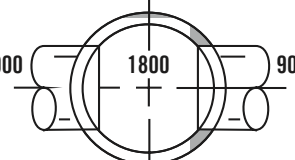
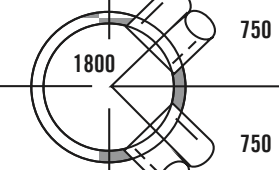
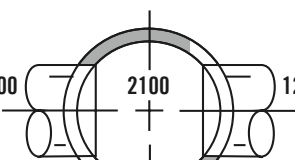
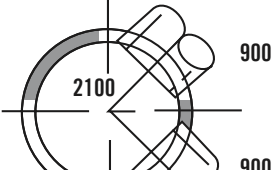
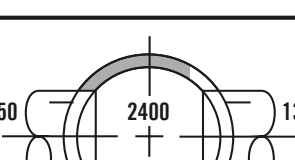
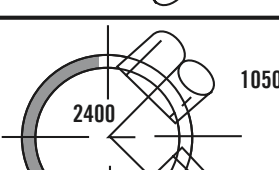
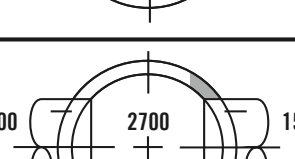
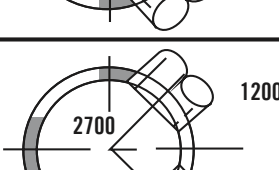
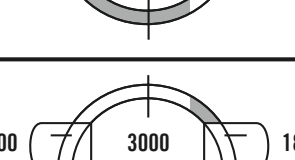
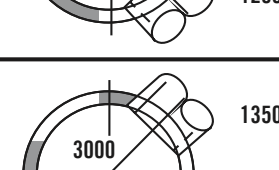
1. All manhole gaskets designed to meet ASTM C990.

Manhole Gasket Estimating Chart

Product	Diameter (mm)	Length (m)	Gasket Pieces/ Joint
25mm ConSeal	750	4.42	0.70
25mm ConSeal	900	4.42	0.85
25mm ConSeal	1050	4.42	0.95
25mm ConSeal	1200	4.42	1.00
38mm ConSeal	1350	3.81	1.50
38mm ConSeal	1500	3.81	1.60
38mm ConSeal	1650	3.81	1.70
38mm ConSeal	1800	3.81	1.90
44mm ConSeal	2100	3.66	2.00
44mm ConSeal	2400	3.66	2.30
44mm ConSeal	2700	3.66	2.80
44mm ConSeal	3000	3.66	3.10



MANHOLE SIZING CHART

Maintenance Hole Inside Diameter (mm)	Max. Pipe Size for Straight Through Installation (mm)	Max. Pipe Size for Right Angle Installation (mm)
1200		
1500		
1800		
2100		
2400		
2700		
3000		

Note: Chart meant only as a guide. Please call for assistance with sizing manholes.

CONCRETE BOX SECTIONS

ASTM C-1433 Box Size		Weight Per Unit (kg)
Span x Rise (mm)	Unit	
1200 x 600	Meter	1714/m
Base	Ea	517
Slab Top	Ea	1100
1200 x 900	Meter	1856/m
Base	Ea	771
Slab Top	Ea	1500
1800 x 1200	Meter	3240/m
Base	Ea	1547
Slab Top	Ea	2700
2400 x 1200	Meter	4554/m
Base	Ea	2020
Slab Top	Ea	3600
2400 x 1800	Meter	5238/m
Base	Ea	3089
Slab Top	Ea	4800
2400 x 2400	Meter	5568/m
Base	Ea	4265
Slab Top	Ea	6200
3000 x 2400	Meter	7733/m
Base	Ea	5134
Slab Top	Ea	7900



1. Please call for pricing on box material.
2. Boxes c/w swift lift.



CONCRETE BOX SECTIONS

Box Size (Span x Rise)	Maximum Length (m)	Top Thickness	Bottom Thickness	Side Wall Thickness	Haunch	Base / Slab Top Thickness	Lift Anchor Required (4 Per Box)
1200 x 600	2.00	190	150	125	125	300	4T
1200 x 900	2.00	190	150	125	125	300	8T
1800 x 1200	2.00	200	175	175	175	300	8T
2400 x 1200	2.00	213	213	223	203	300	8T
2400 x 1800	2.00	217	217	223	203	300	8T
2440 x 2440	2.44	203	203	203	203	300	8T
3000 x 2400	2.00	250	250	250	250	300	8T

Dimensions subject to change. Please call for precise measurements.

> BOX CULVERT HANDLING:

How to Handle and Set Concrete Box Sections:

As with lifting any concrete element, special care should be taken by the driver of the placement vehicle to ensure that the impact or dynamic loads are reduced to a minimum. Impact of dynamic loads can greatly overload the anchors and cause failure.

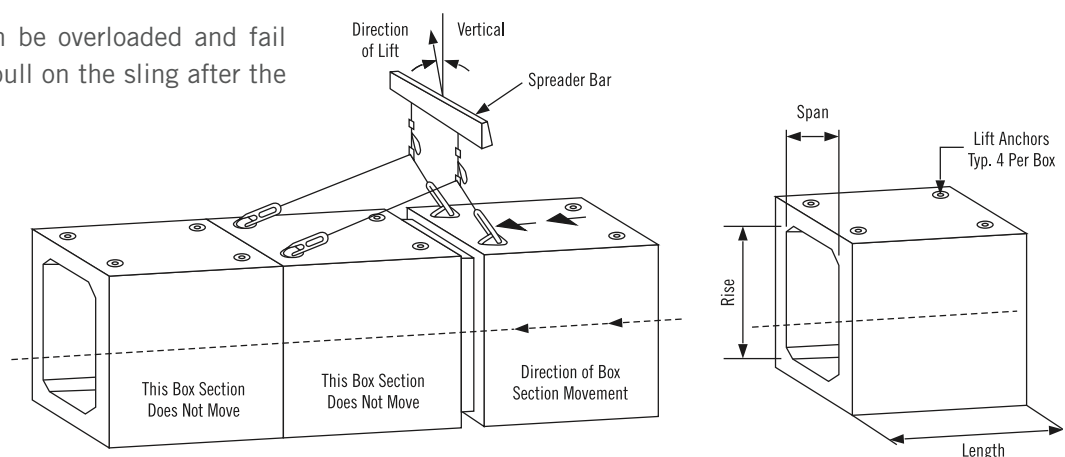
Load must be applied to all anchors simultaneously.

Correct Method for Pulling Box Sections Together:

To pull the box section into position, the long leg of the lift sling is coupled to the previously placed box section. The free short leg is hung into the hook provided for this purpose.

Ensure that the top guide of the crane is over the outer lifting anchor of the previously placed box section so that the direction of pull is slightly inclined towards the placed box section.

Warning: The anchors can be overloaded and fail if the crane continues to pull on the sling after the connection is complete.



CONCRETE BOX SECTIONS

> APPLICATIONS

Precast Reinforced Concrete Box Sections are a value-added and cost-effective product that can be used for the following applications to finish the job on time with less worries:

- > Highway Culverts
- > Storm Sewer
- > Pedestrian Under Passes
- > Animal Crossings
- > Retention System
- > Vertical Vaults
- > Lift Stations
- > Control Chambers
- > Overflow relief systems
- > Electrical cable tunnels



> DESIGN AND MANUFACTURING CRITERIA:

Precast Reinforced Concrete Box Sections are designed in accordance with ASTM C-1433 “Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains and Sewer.” Boxes are typically designed to the CL-625 live loading spec under the Canadian Highway Bridge Design Code (CHBDC). Design for other load specifications such as Cooper E-Series for Railway loading and for Box Jacking can be accommodated to meet the specific job requirements. BOXCAR, a computer program for structural design of reinforced concrete box culverts, is used to analyze and design the sections.

Precast Reinforced Concrete Box Sections are manufactured under high quality plant controlled conditions. The boxes are produced with bell and spigot joints/ends. A butyl, rubber-based flexible gasket type sealant is used to help seal the joints/ends.

> SPECIAL TREATMENTS AND END SECTIONS:

Precast Reinforced Concrete Sections can be produced for special end treatments such as Sloped End Sections, Reducers and Plain End Sections and sections with reinforcing steel exposed. Bends (5°-45°), and Manhole Tees can also be produced depending upon job specific requirements.



Stormceptor® EF (Enhanced Flow)

The enhanced flow Stormceptor EF is a high performing oil grit separator that effectively removes and retains pollutants such as sediment (TSS), free oils, gross pollutants, nutrients and metals from stormwater and snowmelt runoff at much higher flow rates than other oil grit separators.

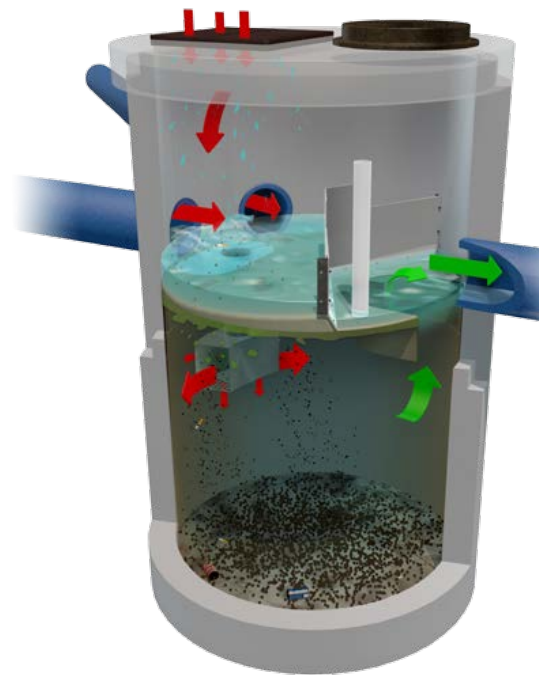
Stormceptor EF also offers design flexibility in one platform, accepting flow from a single inlet pipe, multiple inlet pipes, and from the surface through an inlet grate. Stormceptor EF can also accommodate a 90-degree inlet to outlet bend angle, and tailwater conditions.

Ideal Uses:

- Sediment (TSS) removal
- Spill capture for oil/fuel spill hotspots (Stormceptor EFO)
- Debris and small floatables capture
- Pretreatment for filtration, detention/retention systems, ponds, wetlands, Low Impact Development (LID), green infrastructure, and water-sensitive urban design
- Retrofit and redevelopment projects

Design Flexibility:

- Single Inlet
- Multiple Inlets
- Grated Inlet
- Submerged



FEATURES	BENEFITS
Patent-pending enhanced flow, TSS treatment technology	Superior, verified third-party performance
Scour prevention with an internal bypass	Validated online installation and cost savings
Third-party verified light liquid capture (oil) and retention (Stormceptor EFO)	Proven performance for fuel/oil spill hotspot locations
Functions as bend, junction or inlet structure	Cost savings and design flexibility
Minimal drop between inlet and outlet	Site installation ease
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade

The design flexibility of Stormceptor EF makes this OGS ideal for redevelopment and retrofit projects.



For more information on the Stormceptor system, including pricing, site design, or sizing, or to arrange a lunch and learn session at your office, please contact your local Lafarge Pipe representative.

Stormceptor® EF (Enhanced Flow)

Our standard design for most stormwater treatment applications, the Inline Stormceptor is available in a variety of sizes, as outlined below. Standard drawings are available. Please contact your Lafarge Representative for full size drawings.



STORMCEPTOR EFO – HYDROCARBON SPILL PROTECTION

- The EFO configuration has been third-party performance tested for safe oil capture and retention.
- Creates a non-turbulent treatment environment, allowing free oil to rise and sediment to settle.
- Patent-pending oil and spills retention technology ensures captured oil and sediment remain in unit even during the largest rain events, for secure storage, environmental protection and easy removal.
- The EFO is ideal for gas stations, fuel depots, ports, garages, loading docks, industrial sites, fast food locations, convenience stores, high-collision intersections and other hotspots with spill-prone areas.
- The EFO can accommodate an optional oil alarm and additional storage to increase spill storage capacity.



1. Call for sizing assistance. The drainage area, imperviousness (or runoff coefficient), flow control and required treatment level need to be provided.
2. Call for pricing. In addition to the concrete material, the price will include a Stormceptor frame and cover as well as nitrile gaskets for all joints.
3. More hydrocarbon storage volume is available with the Extended Oil Storage (EFO) units. Please call for more information.
4. Heaviest component may be able to be reduced / adjusted. Please call for assistance.

For more information on the Stormceptor system, including pricing, site design, or sizing, or to arrange a lunch and learn session at your office, please contact your local Lafarge Pipe representative.

Jellyfish® Filter

The Jellyfish filtration system takes total suspended solid capture to the next level - far beyond that of an oil/grit separator. The Jellyfish Filter (patent pending) is an engineered stormwater quality treatment technology featuring unique membrane filtration in a compact stand-alone treatment system. The unit consists of a fiberglass disc that holds a series of sediment filters and is housed by concrete manhole components, similar to the Stormceptor system. Each lightweight Jellyfish Filter cartridge consists of multiple membrane-encased filter elements attached to a cartridge head plate.

Pollutant Removal

- TSS 85%
- Total Metals >50%
- Total Phosphorus 60%
- Turbidity <15 NTU
- Total Nitrogen 50%
- Trash 100%

LEED Credits

- Jellyfish filters can be used to achieve LEED credits
- NJDEP Certified for LEED credits

Pretreatment

- Traps oil, trash and debris outside the filtration zone.
- Coarse particles settle to the sump.
- Separator skirt protects the cartridge from floatables contamination.

Filtration

- Membrane filtration tentacles capture fine particles, as small as 2 microns.
- Removes a high percentage of particulate bound pollutants including nutrients, metals, hydrocarbons and bacteria.
- High surface area membranes ensure long lasting treatment.

Self-Cleaning Filters

- During filtration, vibrational pulses dislodge sediment from the membrane surfaces.
- After every storm peak, filtered water backwashes membrane filtration tentacles.
- Sediment is continuously removed from the tentacles by gravity.



Jellyfish filter installation in St. Albert, AB. A JF8-6-2 was installed to obtain LEED credits and treat up to 32.5 L/s

Features

1. High surface area, high flow rate membrane filtration.
2. Highest treatment flow rate per cartridge (up to 80 gpm (5 L/s)).
3. Low head loss (typically 18 inches or less (457mm)).
4. Removes particles as small as 2 microns.
5. Light weight, self-cleaning cartridges.

Benefits

1. Long lasting and effective stormwater treatment.
2. Fewer cartridges required than other filtration systems, leading to a lower cost & easier maintenance.
3. Design is compatible with all piping systems.
4. Superior pollutant capture.
5. Easy maintenance & low life-cycle cost.

For more information on the Jellyfish filtration system, including pricing, site design, or sizing, or to arrange a lunch and learn session at your office, please contact your local Lafarge Pipe representative.

STORMTRAP® DETENTION RETENTION SYSTEMS



Detention System



Retention System



Detention tanks are designed to collect stormwater run off for a period of time and slowly release the run off into the public stormwater system. Retention tanks retain the run off for on-site use, and the overflow is directed to the public stormwater system.

The StormTrap system is a purpose-built stormwater detention and retention solution. Its flexible design and simple installation makes it a cost effective solution for residential, commercial or industrial projects. The StormTrap system helps to address the requirements of sustainability, flood mitigation, public safety and ecological protection without sacrificing valuable land and compromising the bottom line of the project.

The StormTrap system connects individual precast concrete modules into a configuration that can be customized to meet project-specific requirements. It is an ideal solution for sites needing a safe, low risk structural system for below parking lots, sports fields and roadways.



Infiltration Stormtrap System

STORMTRAP® OPERATION

StormTrap® systems are available in two configurations to provide conventional detention, high early discharge or infiltration to groundwater.

SingleTrap™ system

SingleTrap systems are made up of a single layer of modules. It can be founded on either a strip footing to create a large infiltrative surface area, or a conventional concrete slab for use as either a traditional detention basin, or a basin with high early discharge (refer to figure below). Water-tight options are available if required.

DoubleTrap™ system

DoubleTrap systems are made up of two layers of precast pieces which together form one StormTrap module. The DoubleTrap system is founded on a compacted aggregate base and can be configured to provide infiltration of detained runoff to groundwater or conventional detention, either with or without high early discharge. Water-tight options are available if required.



A standard SingleTrap module and system



A standard DoubleTrap module and system

A COMPLETE SOLUTION

Flexible footprint and design

The impressive flexibility of the StormTrap system enables Lafarge to design a system to best suit your project. We easily work around trees, building piles and existing services to minimize your project costs and maximize land use and detention volumes. The system is ideal for constrained sites and odd-shaped footprints, and modules can be varied to cope with sloping sites or other constraints.

Reduced design time

Using a custom StormTrap system design program, Lafarge is able to design your system and supply a full set of drawings as required for your project. Our experienced engineering team use our automated 3D CAD package to generate the ideal system design, a process which will save your project time and money.

Maximum detention volume for the smallest footprint

The relatively open structure of the StormTrap modules enables maximum storage volume for the system over the smallest possible footprint. This is of great benefit where existing services and site constraints prevent a large footprint.

High infiltration capacity

The unique design of the StormTrap system delivers a large available surface area in any given footprint and supports Low Impact Development objectives to manage frequent flows and overall runoff volumes. It also supports conventional fill and slow release detention. Watertight options are available in addition to infiltration/exfiltration designs.

LEED & LID

StormTrap can be used to gain credits towards LEED certification projects as it is a design for Low Impact Development (LID), limiting the disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, and managing storm water runoff. Up to 3 credits are available in LEED v4 under the “Rainwater Management” category.



STORMTRAP® OPERATION

Full trafficability and reduced risk

The precast concrete system is trafficable to CL800 traffic loadings (heavier designs are also available). It can be used under pavements and parking lots, and can withstand the impact of heavy vehicles that may load the system during construction or operation. Lighter duties are also available for parks and other areas not regularly subject to traffic.

Cost savings

The system delivers significant time and cost savings with a fast and simplified design process, the delivery of maximum detention volume from the smallest possible footprint, and a fully accessible and maintainable system.

Quick installation

The modular design and simple installation process means that large volumes can be installed in minimal time. The system offers significant installation economies when compared with other detention or retention systems, and delivers large detention volumes with each module installed.

Full access and maintainability

The StormTrap system features unobstructed open void spaces, a design feature which is less likely to clog with litter, sediment and debris than other systems. The StormTrap system also integrates maintenance access points so that system is accessible and maintainable should it be necessary.

Treatment

As a best practice, StormTrap should be designed in conjunction with an Stormceptor® oil/grit separator or Jellyfish® Filtration System. These devices will help to filter sediments and oils entering the system, and reduce nutrient loading (Nitrogen and Phosphorus) and other pollutants in downstream waterways.



STORMTRAP SYSTEMS FOOTPRINT

Module Type	Dimensions	Comment
I, III and VI	2,085 mm wide x 4,270 mm long	Multiples of 2,085 mm wide and 4,270 mm long are the most cost effective.
II, IV, V and VII	2,085 mm wide x 2,135 mm long	

Module Type	Dimensions	Comment
I, III and VI	2,085 mm wide x 4,270 mm long	Multiples of 2,085 mm wide and 4,270 mm long are the most cost effective.
II, IV, V and VII	2,085 mm wide x 2,135 mm long	

Storage Capacity (m ³)		50	100	150	200	300	400	500
SingleTrap System Footprint (meters)	Span	4.2	8.4	12.6	8.4	12.6	16.8	16.8
	Length	8.0	8.0	8.0	16.0	16.0	16.0	20.0
	Depth	1.5	1.5	1.5	1.5	1.5	1.5	1.5
DoubleTrap System Footprint (meters)	Span	2.1	4.2	6.3	8.4	6.3	8.4	8.4
	Length	8.0	8.0	8.0	8.0	16.0	16.0	20.0
	Depth	3.0	3.0	3.0	3.0	3.0	3.0	3.0

NOTES: 1. Height of StormTrap can be customized for shorter height with decrease of 1 inch.

Sample Storm Trap System layouts and standard module types



Standard Type I



Standard Type II

IV	III	III	V
II	I	I	II
II	I	I	II
V	III	III	IV

VII	VI	VI	VII
-----	----	----	-----



Standard Type III



Standard Type IV



Standard Type V



Standard Type VI



Standard Type VII

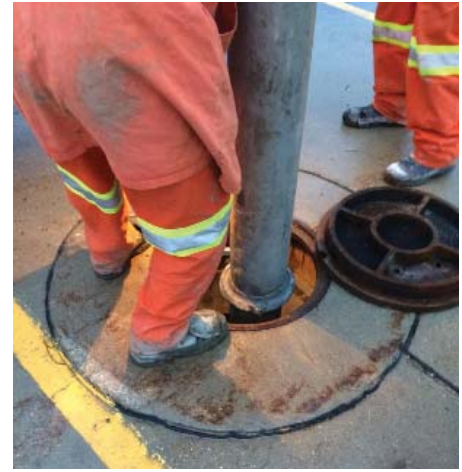
PERFORMANCE MONITORING PLAN

FROM SALE TO SERVICE

Lafarge offers a wide variety of stormwater solutions designed to meet your project needs, from StormTrap® detention and retention systems to our patented Stormceptor™ and Jellyfish™ technology. As part of our ongoing commitment to sustainability, Lafarge is now providing support services for ongoing operations and maintenance of our stormwater products.

All Stormceptor™, Jellyfish™, and StormTrap® systems offered by Lafarge now include a 5-year performance monitoring plan, including:

- Annual inspection for 5 years after installation
- Inspection reports, delivered to the owner and directly to the local municipality (if requested)
- Cleaning service, if required, at additional cost



BENEFITS FOR OWNERS:

- Annual inspections performed on a set schedule
- Effortless record management conforming to local regulations
- No cost for having the inspection performed
- Hassle-free service with no added coordination required
- No need to keep up with changing local regulations - Lafarge will address and inform owner of changes, as required



BENEFITS FOR MUNICIPALITIES:

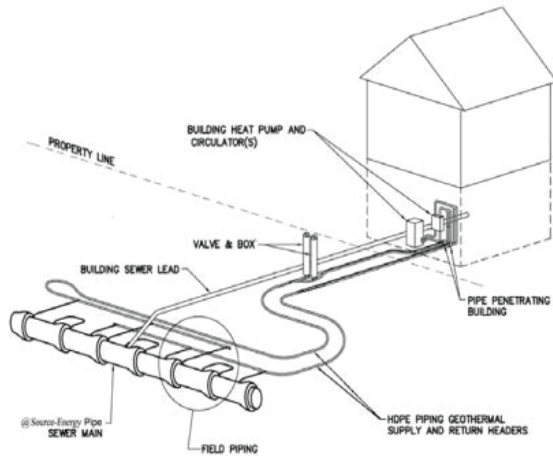
- Inspection and cleaning reports are automatically filed - no need to remind owners to submit them
- No added inspection efforts or staffing requirements
- Lafarge has the expertise to ensure all units are installed correctly and are functioning properly



Lafarge's performance monitoring plan takes the worry and effort out of maintaining your devices and helps to ensure compliance with local regulations. Our stormwater solutions team maintains the highest level of safety when performing services.

@SOURCE-ENERGY PIPE

Geothermal Energy Capture Reinforced Concrete Pipe



Industry Leading Innovation!

Lafarge Pipe and Renewable Resource Recovery Corporation (R3Corp) offer @Source-Energy Pipe in Western Canada. The @Source-Energy pipe system represents a major innovation in the concrete pipe industry that is focused around the concept of geothermal energy capture.

The @Source-Energy Pipe System

The @Source-Energy pipe system functions as standard concrete pipe, with the added service of extracting heat energy from the effluent in the pipes and from the adjacent ground. Manufacture of @Source-Energy Pipe is similar to standard concrete pipe, except that a small diameter HDPE conduit, similar to a natural gas line, is wound throughout the core along with the steel reinforcement. This HDPE conduit is filled with a 30% ethanol/ water blend that acts as a heat transfer fluid throughout the pipe system once installed.

The schematic to the left outlines a typical @Source-Energy installation. Here, a series of concrete pipe located along the sewer main service a home that controls the energy system using a heat pump. The advantage of using @Source-Energy pipe is that as the storm and sanitary pipe needs to be installed as part of development, the incremental cost of the @Source-Energy component is relatively minimal.

R3Corp

R3Corp is a Canadian owned and operated company based in Sudbury, Ontario. The @Source-Energy technology was pioneered by R3Corp, with the initial installation taking place in a 19 home Ontario sub-division in 2009.

We want to hear from you!

Please contact your local Lafarge Pipe representative for more information, product brochures, or if interested in receiving a lunch and learn presentation on @Source-Energy. We are also available to discuss your sustainable projects needs.



MISCELLANEOUS MATERIALS

Lifting Devices

Product	Price (\$) Each
4T Clutch for use with pipe sizes 1050mm up to and including 1800mm	-
4T Clutch Set including chains for use in homing procedure	-
8T Clutch for use with pipe sizes 2100mm up to and including 2700mm 8t set does not include chains set	-



Cement

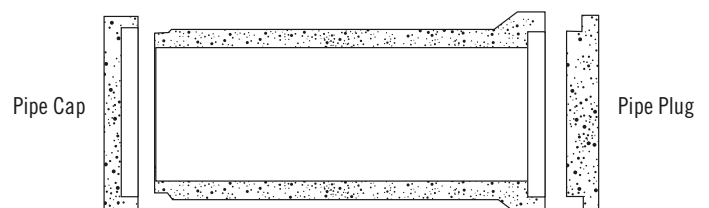
Product	Mass (kg)	Price (\$) Each
Hydrant Pads (450mm x 450mm x 200mm)	75	-
Kalcrete Cement (bagged)	20	-
Portland Cement (bagged)	20	-

Frames & Covers

Product	Mass (kg)	Price (\$) Each
TF101 Machined Frame	99	-
TF101 Machined Cover	77	-
Catch Basin Hood (plastic) with Pin	-	-
Aluminum Safety Step (MSU)	-	-

Plugs / Caps

Diameter (mm)	Mass (kg)	Price (\$) Each
300	46	-
375	65	-
450	88	-
525	113	-
600	142	-
750	210	-
900	291	-
1050	394	-
1200	469	-
1350	653	-
1500	799	-



ESTIMATING

1200mm Base with 1200mm Risers

Elev. (m)	Base	Reducers 1200mm Manhole Sections						1200-750mm Flat	Adjusting Ring			Frame & Cover	
		1.22m	1.83m	1.22m	0.91m	0.61m	0.46m		0.30m	0.23m	0.15m		0.10m
1.75	x							x	x				x
1.83	x							x	x		x		x
2.05	x							x	x				x
2.15	x							x	x	x			x
2.21	x						x	x	x				x
2.29	x							x	x		x		x
2.36	x							x	x				x
2.46	x							x	x	x			x
2.66	x							x	x				x
2.74	x							x	x		x		x
2.97	x							x	x				x
3.07	x							x	x	x			x
3.27	x							x	x				x
3.35	x							x	x		x		x
3.58	x	x						x	x				x
3.68	x	x						x	x	x			x
3.88	x	x						x	x				x
3.96	x	x						x	x		x		x
4.04	x	x						x	x				x
4.14	x	x						x	x	x			x
4.19	x	x						x	x				x
4.27	x	x						x	x		x		x
4.49	x	x						x	x				x
4.59	x	x						x	x	x			x
4.80	x	x	x					x	x				x
4.88	x	x	x					x	x		x		x
5.10	x	x	x					x	x				x
5.20	x	x	x					x	x	x			x
5.41	x	2x						x	x				x
5.49	x	2x						x	x		x		x
5.71	x	2x						x	x				x
5.81	x	2x						x	x	x			x

TERMS AND CONDITIONS

1. Quotations of Lafarge (the Seller) are subject to revision if not accepted by the purchaser in writing within 30 days from the date hereof, and is conditional upon arrangements satisfactory to the Seller being made with respect to payment.
2. Acceptance of any quotation shall not obligate the Seller until the Purchaser's credit is approved by our Credit Department.
3. The prices on any quotation are predicated on the receipt of the total concrete products order for the particular project. The Seller reserves the right to requote prices for partial order.
4. The price or prices in our quotation are subject to modification to the extent of any change (either before or after acceptance) in freight rates, import duties, sales taxes, excise taxes, or feign exchange rates.
5. Unless otherwise specified having regard to the work contemplated in this quotation in the event of failure of the Purchaser to take deliveries within a reasonable time the Seller reserves the right to increase prices in accordance with increased costs.
6. If at any time the financial responsibility of the Purchaser becomes impaired or unsatisfactory to the Seller, the Seller reserves the right to insist on payment in advance, or other security: otherwise any sales agreement may be declared null and void, at the option of, and without liability to the Seller. Time is of the essence of any sales agreement and if the Purchaser defaults there under or violates any of the terms or goes into bankruptcy, or if the supplied materials are sized or confiscated, or if any attempts be made to transfer the materials from the Purchaser without the Seller's written consent, the balance of the contract shall immediately become due and payable, in addition to any expenses the Seller may incur there under.
7. The Seller shall not be responsible for any direct or indirect damages whatsoever caused to the Purchaser or otherwise by delays in deliveries whether arising from fires, strikes, labour difficulties, material procurement difficulties, material procurement difficulties, damage to plant or equipment, governmental regulations, accidents, transportation delays, or from any other cause whatsoever.
8. The Purchaser must provide suitable roadways and entrances to points of delivery for other than on paved streets. If, in the opinion of the Seller, suitable roadways or approaches are not provided the Seller reserves the right to stop deliveries until conditions are remedied. In the event the Purchaser orders delivery beyond a curb line the Purchaser assumes liability for damage to sidewalks, driveways, or other property and the Purchaser shall indemnify and hold the Seller harmless against all liability, loss and expense incurred as a result of such damage.
9. Prices quoted herein are based on prompt unloading of the Seller's trucks. Trucks held at the job more than 30 minutes will be billed at the going hourly rate.
10. Specialty items covered by any quotation will be manufactured to the purchaser's order and no returns will be accepted. Changes can be made only if Purchasers request for changes is submitted to the Seller in writing prior to manufacture of the materials, subject to price adjustment. Shop drawings, where appropriate, will be forwarded to the Purchaser as quickly as possible after receipt of architect's or engineer's drawings. Shop drawings must be approved by the Purchaser and returned to the Seller prior to material fabrication or manufacture. Cancellation of orders cannot be accepted after materials for the job have been ordered or work started, without our consent.
11. This quotation is based on deliveries being made during normal working hours.
12. The Seller required not less than 24 hours notice of the Purchasers requirements to ensure adequate service and to enable the Seller to schedule his trucks and deliveries.
13. The Purchaser shall assume responsibility for any dirt left on the street by the Seller's trucks as a result of conditions at place of delivery.
14. The quantity shown on the signed delivery tickets shall be considered conclusive evidence of the quantity delivered unless otherwise reported at the time of delivery.
15. The Purchaser will inspect the concrete products and other goods purchased at the time of delivery and any claims in respect thereto must be made at that time. If any such concrete products or other goods are found to be defective, Lafarge will deliver new concrete products or there goods to the Purchaser at the site of the work in lieu thereof, but it is a condition of sale that this will be the limit of Lafarge's liability and it will not be liable for any labour costs or there consequential damages.
16. No warranties, representations, conditions, or agreements exist which are not set out in any quotation.
17. Waiver of any one or more of the terms and conditions hereby the Seller shall not constitute a general waiver of terms and conditions and the Seller reserves the right to enforce any and all conditions not so waived. Any such waiver must be in writing.
18. Pallets left at job site will be charged to the Purchaser, but full credit will be given when they are returned, in good condition, freight prepaid, to the Seller at 185 Dawson Road North, Winnipeg MB, R2J OS6.
19. Unless other arrangements are made, terms are net 30 days from date of shipment and on accounts with amounts outstanding over 30 days from end of month in which the purchases were made, a service charge of 2% per month will be made.
20. Price quotations are FOB, 185 Dawson Road, Winnipeg, MB.
21. Quoted prices do not include taxes.
22. Restocking charges will be 15% for undamaged stock items. Stock items with minor repairable damage that are returned are subject to a 30% restocking charge. No credit will be issued for not repairable products.

LAFARGE PIPE eManual



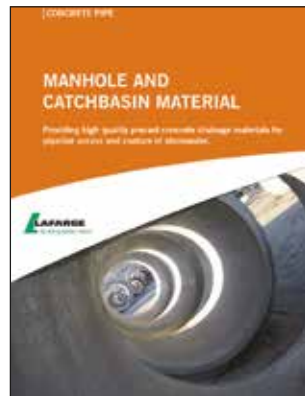
Launched in 2012, this online resource represents an innovative marketing tool designed to better communicate the key design considerations involved in specifying concrete pipe and precast concrete drainage materials.

The eManual can be found at <https://www.lafarge.ca/en/pipe>



The Lafarge Pipe eManual is a living document designed to be a one-stop shop for all concrete pipe and precast concrete drainage structures offered by Lafarge, both across Western Canada and in specific market areas.

Underground construction is an industry that involves a number of key stakeholders and a variety of alternatives that can change from project to project. It is especially important in light of federal, provincial, and municipal specifications and codes that our industry remain well informed and technically knowledgeable concerning underground infrastructure. The purpose of the eManual is to accomplish this goal. We hope you find this manual an asset in designing and constructing quality underground projects.



Lafarge Pipe designs and manufactures a wide range of precast underground infrastructure components, including:

- > Concrete Pipe
- > Box Culverts
- > Manhole and Catch Basin Components
- > Stormceptor (Oil/Grit Separators)

Lafarge Pipe is based in Western Canada with offices in Calgary, Edmonton and Winnipeg. For a list of complete product offerings, please download the most up to date Lafarge Pipe Catalogue for your market area through the links provided at www.lafarge.ca





Joe Klippenstein
General Manager
204-958-4885
joesph.klippenstein@lafargeholcim.com

Erin Anseeuw, C.E.T.
Sales Manager
204-958-6345
erin.anseeuw@lafargeholcim.com

Michelle Jaramilla, C.E.T.
Sales Estimator
204-958-6205
michelle.jaramilla@lafargeholcim.com

Jade Sobczak
Pipe Shipping Coordinator
204-958-4886
jade.sobczak@lafargeholcim.com

Paige Tibold
Pipe & Pile Shipping
204-958-6377
paige.tibold@lafargeholcim.com

Jason Gavel, C.E.T.
Operations Manager
204-226-0693
jason.gavel@lafargeholcim.com

Teneil Allen, C.E.T.
Superintendent
204-226-2609
teneil.allen@lafargeholcim.com

Kulwinder S Loyal, P.Eng.
Quality Control Manager
204-391-2634
kulwinder.s.loyal@lafargeholcim.com

Param Bakhahish S Dhillon
QC Technician
204-988-9164
param.dhillon@lafargeholcim.com

Gerry Huizer, C.E.T.
Stormwater Specialist
403-707-6091
gerald.huizer@lafargeholcim.com



LAFARGE CANADA INC.

185 Dawson Road N
Winnipeg, MB R2J 0S6
204-958-6333 tel
204-233-5644 fax

www.lafarge.ca