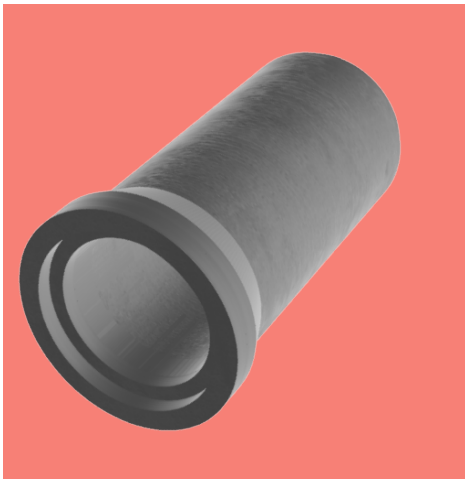
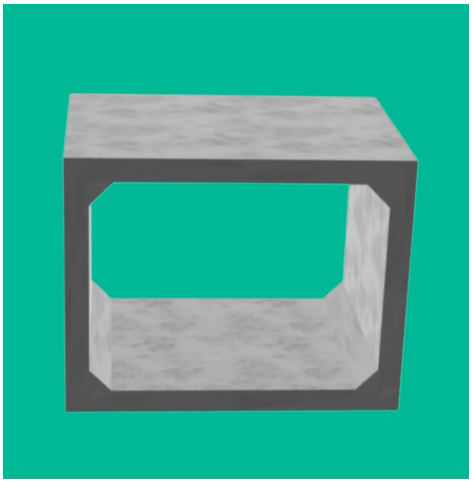


# CONCRETE PIPE 2021

## SOUTHERN ALBERTA



LAFARGE

# Index



# Contacts

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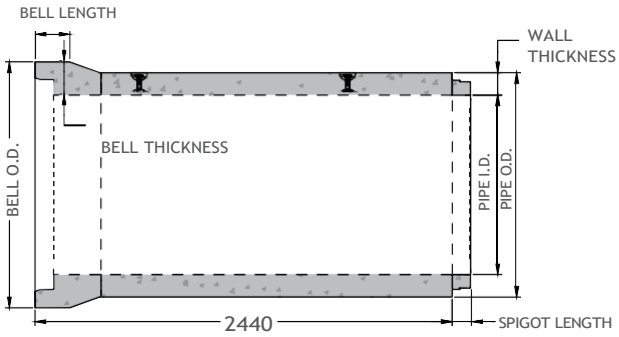
**Gerald Huizer**
gerald.huizer@lafargeholcim.com
(1403) 707-6091

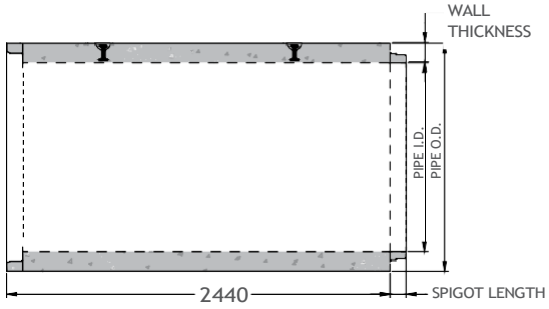
# CONCRETE PIPE - DIMENSIONS

| Nominal Inside Diameter | | Wall | Pipe Style | Lifting Clutches Required (Ton) | Weight | | Dimensions (mm) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | in | | | | kg/piece | kg/m | Pipe ID | Pipe OD | Bell OD | Wall Thickness | Spigot Length |
| 300 | 12 | C | Bell | - | 525 | 215 | 305 | 445 | 508 | 70 | 92 |
| 375 | 15 | C | Bell | - | 700 | 287 | 381 | 533 | 610 | 76 | 92 |
| 450 | 18 | B | Bell | - | 750 | 307 | 457 | 585 | 711 | 64 | 92 |
| 525 | 21 | C | Bell | - | 1125 | 461 | 533 | 711 | 806 | 89 | 98 |
| 600 | 24 | C | Bell | 2 | 1375 | 564 | 610 | 800 | 902 | 95 | 98 |
| 675 | 27 | C | Bell | 2 | 1650 | 676 | 686 | 889 | 1006 | 102 | 102 |
| 750 | 30 | C | Bell | 2 | 1950 | 799 | 762 | 978 | 1099 | 108 | 102 |
| 750 | 30 | X | Straight | 4 | 2875 | 1178 | 762 | 1085 | - | 162 | 102 |
| 900 | 36 | C | Bell | 4 | 2625 | 1076 | 914 | 1156 | 1302 | 121 | 102 |
| 900 | 36 | X | Bell | 4 | 2775 | 1137 | 914 | 1188 | 1302 | 137 | 102 |
| 1050 | 42 | C | Bell | 4 | 3275 | 1342 | 1067 | 1334 | 1461 | 133 | 108 |
| 1050 | 42 | X | Straight | 4 | 4525 | 1855 | 1067 | 1442 | - | 187 | 108 |
| 1200 | 48 | B | Straight | 4 | 3300 | 1352 | 1219 | 1473 | - | 127 | 102 |
| 1200 | 48 | C | Straight | 4 | 3825 | 1568 | 1219 | 1511 | - | 146 | 102 |
| 1350 | 54 | B | Straight | 4 | 4050 | 1660 | 1372 | 1652 | - | 140 | 127 |
| 1500 | 60 | C | Straight | 4 | 5575 | 2285 | 1524 | 1866 | - | 171 | 127 |
| 1650 | 66 | B | Straight | 4 | 5850 | 2398 | 1676 | 2006 | - | 165 | 127 |
| 1650 | 66 | C | Straight | 4 | 6575 | 2695 | 1676 | 2044 | - | 184 | 127 |
| 1800 | 72 | B | Straight | 8 | 6850 | 2807 | 1829 | 2185 | - | 178 | 127 |
| 1800 | 72 | C | Straight | 8 | 7625 | 3125 | 1829 | 2223 | - | 197 | 127 |
| 1950 | 78 | C | Straight | 8 | 8800 | 3607 | 1981 | 2401 | - | 210 | 140 |
| 2100 | 84 | B | Straight | 8 | 9100 | 3730 | 2134 | 2540 | - | 203 | 143 |
| 2400 | 96 | C | Straight | 8 | 12775 | 5236 | 2438 | 2934 | - | 248 | 127 |
| 2700 | 108 | C | Straight | 20 | 15800 | 6475 | 2743 | 3289 | - | 273 | 127 |
| 3000 | 120 | B | Straight | 20 | 17800 | 7295 | 3048 | 3606 | - | 279 | 152 |




a) Bell Type Concrete Pipe
PIPE I.D. Ranging 300mm diameter to 1050diameter

b)




Straight/Jacking Concrete Pipe
1200 mm diameter and larger

# CONCRETE PIPE - CLASS ESTIMATION TABLE



| Pipe Diameter (mm) | Installation Type | Maximum Depth to Invert (m) for: | | | |
|---|---|---|---|---|---|
| | | Class II | Class III | Class IV | Class V |
| 300 | 1 | | | | 14.9 |
| | 2 | | | | 10.5 |
| | 3 | | | | 8.2 |
| | 4 | | | | 5.4 |
| 375 | 1 | | | | 15.4 |
| | 2 | | | | 10.8 |
| | 3 | | | | 8.5 |
| | 4 | | | | 5.7 |
| 450 | 1 | | | | 15.7 |
| | 2 | | | | 11.0 |
| | 3 | | | | 8.7 |
| | 4 | | | | 5.9 |
| 525 | 1 | | | | 15.9 |
| | 2 | | | | 11.1 |
| | 3 | | | | 8.9 |
| | 4 | | | | 6.1 |
| 600 | 1 | | | 11.6 | 16.0 |
| | 2 | | | 8.1 | 11.2 |
| | 3 | | | 6.5 | 9.0 |
| | 4 | | | 4.5 | 6.2 |
| 675 | 1 | | | 11.6 | 16.1 |
| | 2 | | | 8.2 | 11.3 |
| | 3 | | | 6.6 | 9.1 |
| | 4 | | | 4.6 | 6.5 |
| 750 | 1 | | | 11.6 | 16.1 |
| | 2 | | | 8.2 | 11.3 |
| | 3 | | | 6.6 | 9.1 |
| | 4 | | | 4.6 | 6.5 |
| 900 | 1 | | 7.8 | 11.7 | 16.1 |
| | 2 | | 5.5 | 8.3 | 11.4 |
| | 3 | | 4.4 | 6.7 | 9.2 |
| | 4 | | 3.1 | 4.9 | 6.7 |
| 1050 | 1 | 6.2 | 7.9 | 11.8 | 16.3 |
| | 2 | 4.4 | 5.7 | 8.5 | 11.6 |
| | 3 | 3.5 | 4.5 | 6.8 | 9.3 |
| | 4 | | 3.2 | 5.0 | 6.9 |
| 1200 | 1 | 6.3 | 8.0 | 11.9 | 16.3 |
| | 2 | 4.6 | 5.8 | 8.6 | 11.8 |
| | 3 | 3.6 | 4.7 | 7.0 | 9.5 |
| | 4 | | 3.4 | 5.2 | 7.0 |

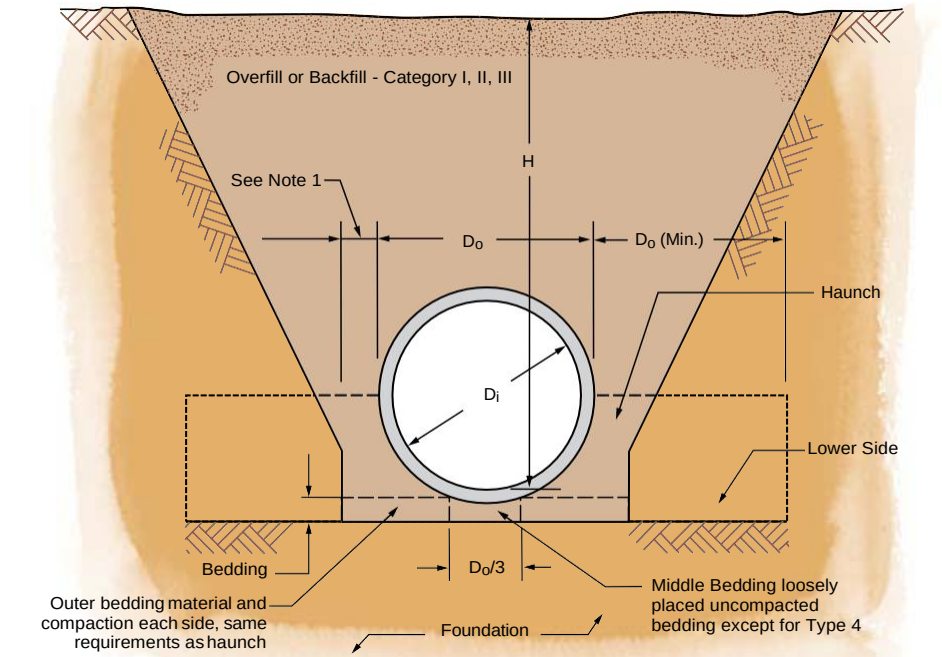
| Pipe Diameter (mm) | Installation Type | Maximum Depth to Invert (m) for: | | | |
|---|---|---|---|---|---|
| | | Class II | Class III | Class IV | Class V |
| 1350 | 1 | 6.4 | 8.1 | 12.0 | 16.7 |
| | 2 | 4.7 | 5.9 | 8.7 | 11.9 |
| | 3 | 3.7 | 4.8 | 7.1 | 9.6 |
| | 4 | | 3.5 | 5.3 | 7.2 |
| 1500 | 1 | 6.5 | 8.2 | 12.1 | 16.5 |
| | 2 | 4.8 | 6.0 | 8.8 | 12.0 |
| | 3 | 3.8 | 4.9 | 7.1 | 9.6 |
| | 4 | | 3.6 | 5.5 | 7.3 |
| 1650 | 1 | 6.6 | 8.3 | 12.1 | 16.5 |
| | 2 | 4.9 | 6.1 | 8.9 | 12.1 |
| | 3 | 3.8 | 5.0 | 7.3 | 9.7 |
| | 4 | | 3.7 | 5.6 | 7.5 |
| 1800 | 1 | 6.6 | 8.3 | 12.2 | 16.6 |
| | 2 | 4.9 | 6.2 | 9.0 | 12.2 |
| | 3 | 3.9 | 5.0 | 7.3 | 9.8 |
| | 4 | | 3.7 | 5.7 | 7.6 |
| 1950 | 1 | 6.7 | 8.4 | 12.3 | 16.7 |
| | 2 | 5.1 | 6.4 | 9.2 | 12.3 |
| | 3 | 4.0 | 5.2 | 7.5 | 10.0 |
| | 4 | | 3.9 | 5.8 | 7.8 |
| 2100 | 1 | 6.8 | 8.5 | 12.4 | 16.8 |
| | 2 | 5.2 | 6.5 | 9.3 | 12.4 |
| | 3 | 4.0 | 5.3 | 7.6 | 10.1 |
| | 4 | | | 6.0 | 7.9 |
| 2400 | 1 | 7.0 | 8.7 | 12.5 | 16.9 |
| | 2 | 5.4 | 6.7 | 9.5 | 12.7 |
| | 3 | | 5.5 | 7.8 | 10.3 |
| | 4 | | | 6.2 | 8.1 |
| 2700 | 1 | 7.2 | 8.9 | 12.7 | 17.0 |
| | 2 | 5.6 | 6.9 | 9.8 | 13.0 |
| | 3 | | 5.7 | 8.1 | 10.6 |
| | 4 | | | 6.4 | 8.4 |
| 3000 | 1 | 7.4 | 9.1 | 12.9 | 17.2 |
| | 2 | 5.8 | 7.2 | 10.0 | 13.2 |
| | 3 | | 5.9 | 8.3 | 10.8 |
| | 4 | | | 6.7 | 8.6 |

**NOTES:**

1. Above tables are based on recommended loadings and calculations for the "Standard Practice for the Design and Installation of Rigid Gravity Sewer Pipe in the City of Calgary". This table is provided for convenience, but is not intended to replace proper engineering design.
2. Minimum cover for Class IV and V pipe is 0.3m. Call for shallow designs for lower classes.
3. Design assistance available to suit installation conditions.
4. Type 1 installations require prior approval from the City of Calgary for Calgary based projects.

# STANDARDINSTALLATIONBEDDINGS

## Standard Trench Installation (Ref: ACPA)




Note 1: Clearance between pipe and trench wall shall be adequate to enable specific compaction, but not less than $D_O/6$.

| Installation Type | Bedding Thickness | Haunch and Outer Bedding | Lower Side |
|---|---|---|---|
| Type 1 | $D_0$/24 minimum; not less than 3 in. If rock foundation, use $D_0$/12 minimum; not less than 6 in. | 95% Category I | Undisturbed natural soil with firmness equivalent to the following placed soils: 90% Category I, 95% Category II, or 100% Category III, or embankment to use the same materials |
| **Type 2** | **$D_0$/24 minimum; not less than 3 In. If rock foundation, use $D_0$/12 minimum; not less than 6 In.** | **90% Category I or 95% Category II** | **Undisturbed natural soil with firmness equivalent to the following placed soils: 85% Category I, 90% Category II, or 95% Category III, or embankment to the same requirements.** |
| Type 3 | $D_0$/24 minimum; not less than 3 In. If rock foundation, use $D_0$/12 minimum; not less than 6 In. | 85% Category I, 90% Category II, or 95% Category III | Undisturbed natural soil with firmness equivalent to the following placed soils: 85% Category I, 90% Category II, or 95% Category III, or embankment to the same requirements. |
| Type 4 | No bedding required, except if rock foundation, use $D_0$/12 minimum; not less than 6 in. | No compaction required, except if Category III, use 85% Category III | No compaction required, except if Category III, use 85% Category III |

Pipe design in the City of Calgary and most major municipalities is based on Standard Installation Beddings, which outline four standard installation types. Type 1 installations represent the most compact soil material, while Type 4 installations represent poor soil material. Type 2 installations are generally considered the most common method. A generalized depiction of a standard installation for concrete pipe is presented below.

**NOTES:**

1. Category I (Gravelly Sand) includes SW, SP, GW, GP
2. Category II (Sandy Silt) includes GM, SM, ML. Also, GC, SC with less than 20% assing #200 Sieve
3. Category III (Silty Clay) includes CL, MH, GC, SC, CH



LAFARGE

# CONCRETE PIPE DESIGN METHODS

## INDIRECT DESIGN
(Standard Class Pipe)

Indirect design provides a convenient and consistent method for designers, manufacturers and inspectors to simply select from a fill-height table, as indicated in Page 3. The reinforcement is designed in accordance to ASTM C76, and the pipe strength is verified by the D-Load (three-edge bearing) test relative to the 0.01 inch crack and ultimate loading values.

## DIRECT DESIGN
(Standard Installation Direct Design - SIDD)

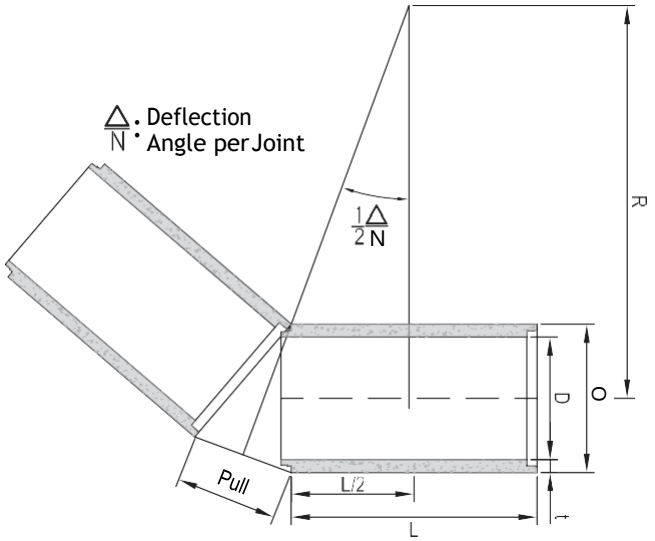
The SIDD method is typically considered when the pipe depth is beyond or above the cover indicated in the fill height table. Moreover, some specific pipe classes fall within a wide range of cover and the SIDD method can be selected for specific depths for potential cost savings.

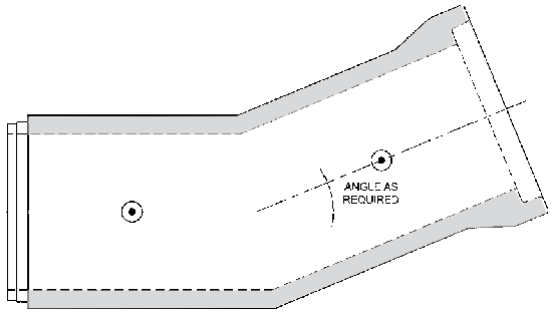
# CURVED ALIGNMENT

| Nominal Inside Diameter (mm) | | 12.5mm Joint Opening | | 12.5mm Joint Opening and 12.5mm Bevel | | Pipe Bends | |
|---|---|---|---|---|---|---|---|
| | | Minimum Radius (m) | Deflection Angle per Joint (Degrees) | Minimum Radius (m) | Deflection Angle per Joint (Degrees) | Weight kg/piece | Approximate Lay Length |
| 300 | C | 81 | 1.61 | - | - | 263 | 1.22 |
| 375 | C | 98 | 1.34 | - | - | 350 | 1.22 |
| 450 | B | 116 | 1.21 | - | - | 375 | 1.22 |
| 525 | C | 139 | 1.01 | - | - | 563 | 1.22 |
| 600 | C | 156 | 0.90 | - | - | 688 | 1.22 |
| 675 | C | 174 | 0.81 | 87 | 1.61 | 1650 | 2.44 |
| 750 | C | 191 | 0.73 | 96 | 1.46 | 1950 | 2.44 |
| 900 | C | 226 | 0.62 | 113 | 1.24 | 2625 | 2.44 |
| 1050 | C | 261 | 0.54 | 130 | 1.07 | 3275 | 2.44 |
| 1200 | B | 288 | 0.49 | 144 | 0.97 | 3300 | 2.44 |
| 1200 | C | 295 | 0.48 | 148 | 0.96 | 3825 | 2.44 |
| 1350 | B | 323 | 0.43 | 162 | 0.87 | 4050 | 2.44 |
| 1500 | C | 357 | 0.39 | 179 | 0.78 | 5575 | 2.44 |
| 1650 | B | 392 | 0.36 | 196 | 0.71 | 5850 | 2.44 |
| 1650 | C | 400 | 0.35 | 200 | 0.70 | 6575 | 2.44 |
| 1800 | B | 427 | 0.33 | 214 | 0.66 | 6850 | 2.44 |
| 1800 | C | 434 | 0.32 | 217 | 0.64 | 7625 | 2.44 |
| 1950 | C | 469 | 0.30 | 234 | 0.60 | 8800 | 2.44 |
| 2100 | B | 496 | 0.28 | 249 | 0.56 | 9100 | 2.44 |
| 2400 | C | 566 | 0.24 | 284 | 0.49 | 12775 | 2.44 |
| 2700 | C | 643 | 0.22 | 321 | 0.44 | 15800 | 2.44 |
| 3000 | B | 705 | 0.20 | 353 | 0.40 | 15350 | 2.10 |

**NOTES:**

1. If the specified radius is smaller than shown, bends and/or manholes will be required to meet the required alignment.
2. Bends are custom manufactured to meet required angle.
3. Beveled pipe are not available in pipe sizes 300-600mm.



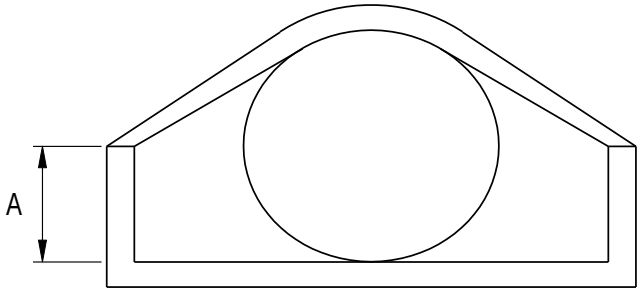



# FLAREDENDS/OUTFALLS

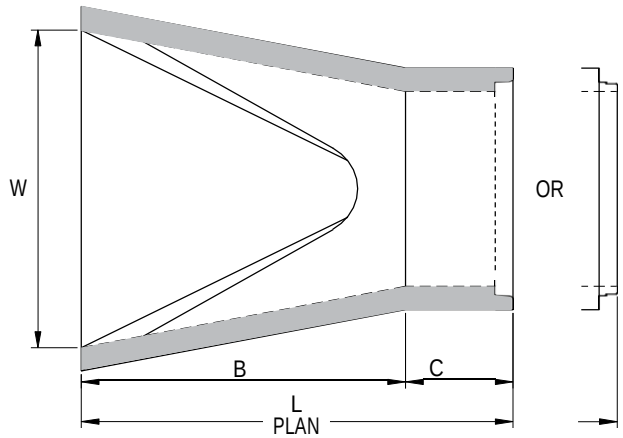
| Nominal Dia. (mm) | Weight kg/pc | Dimensions (mm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | A | B | C | | L | | W |
| | | | | Spigot | Bell | Spigot | Bell | |
| 300 | 250 | 186 | 610 | 1465 | 1455 | 2075 | 2065 | 600 |
| 450 | 460 | 305 | 685 | 550 | 550 | 1235 | 1235 | 914 |
| 525 | 1135 | 240 | 890 | 965 | 875 | 1855 | 1765 | 1067 |
| 600 | 710 | 255 | 1055 | 725 | 725 | 1780 | 1780 | 1200 |
| 750 | 1100 | 305 | 1395 | 530 | 445 | 1925 | 1840 | 1535 |
| 900 | 1865 | 380 | 1625 | 845 | 1015 | 2470 | 2640 | 1820 |
| 1050 | 2760 | 535 | 1670 | 780 | 1050 | 2450 | 2720 | 1980 |
| 1200 | 3000 | 650 | 1775 | 875 | 875 | 2650 | 2650 | 2100 |
| 1350 | 3690 | 685 | 1665 | 895 | 895 | 2545 | 2560 | 2545 |
| 1500 | 4010 | 760 | 1525 | 820 | 925 | 2345 | 2425 | 2740 |

**NOTES:**

1. Spigot end required for inlet, bell end for outlet.
2. No volume discount on bar screens.
3. Outfalls for other sizes available. Call for options.



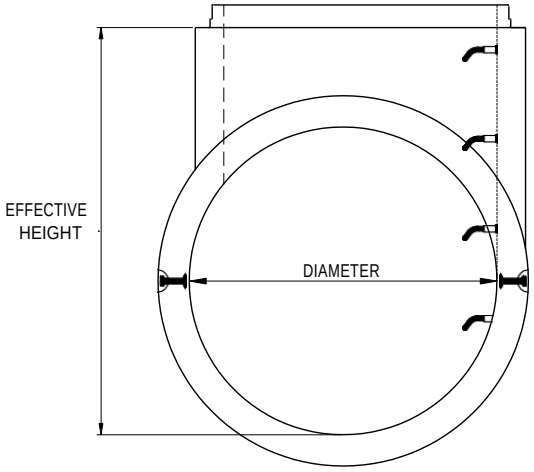

PROFILE



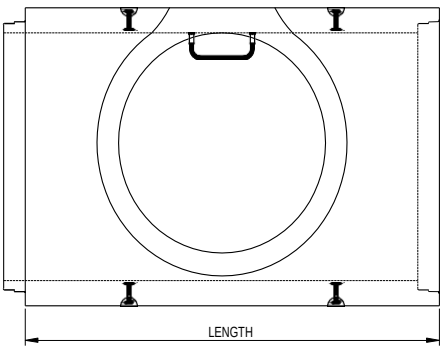

PLAN

# T-RISER

| Nominal Inside Diameter mm | Nominal Inside Diameter in | Wall Designation | Approximate Effective Height | Weight kg/piece |
|---|---|---|---|---|
| 1050 | 42 | C | 1237 | 3700 |
| 1200 | 48 | B | 1618 | 3725 |
| 1200 | 48 | C | 1599 | 4250 |
| 1350 | 54 | B | 1770 | 4735 |
| 1500 | 60 | C | 1904 | 6065 |
| 1650 | 66 | B | 2075 | 6335 |
| 1650 | 66 | C | 2056 | 7000 |
| 1800 | 72 | B | 2227 | 7275 |
| 1800 | 72 | C | 2208 | 8050 |
| 1950 | 78 | C | 2496 | 9225 |
| 2100 | 84 | B | 2642 | 9525 |
| 2400 | 96 | C | 2991 | 13200 |
| 2700 | 108 | C | 3321 | 16225 |
| 3000 | 120 | B | 3632 | 18200 |



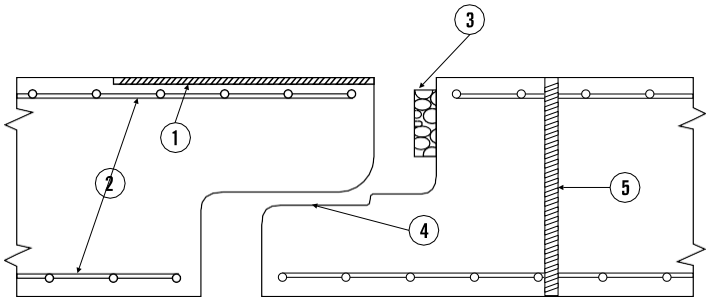

PROFILE



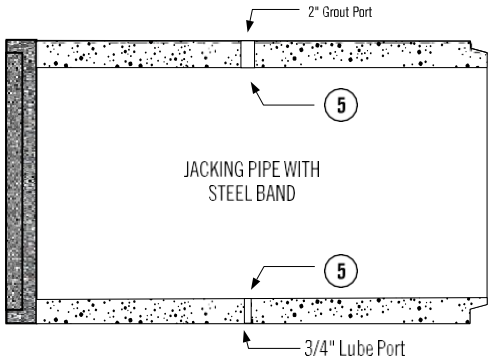

PLAN

# JACKING PIPE

## Jacking Pipe




1. Steel Band
2. Reinforcing
3. Jacking Cushion
4. Single Offset Spigot
5. Lube or Grout Port



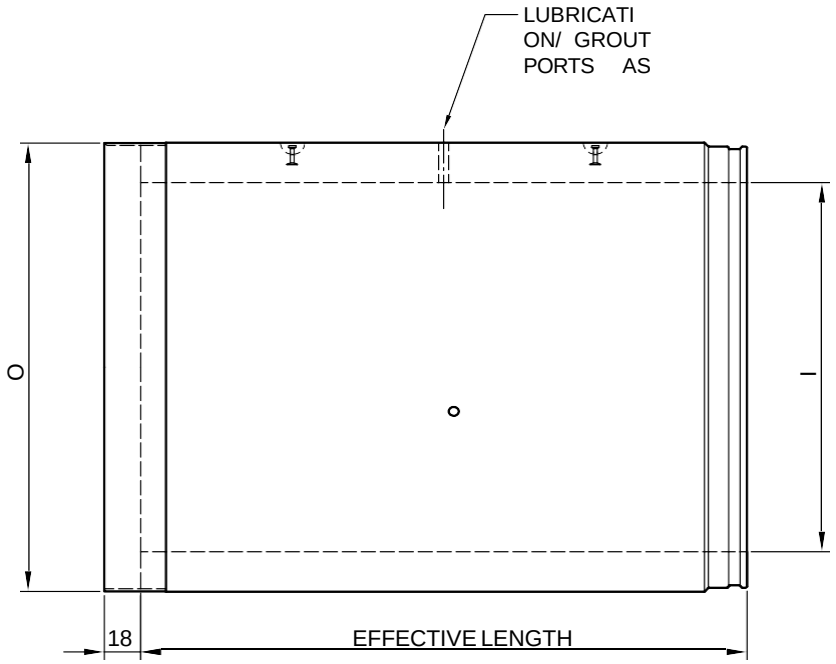

Jacking pipe is available in all straight wall pipe sizes.
See dimensions for straight wall pipe on page 2.

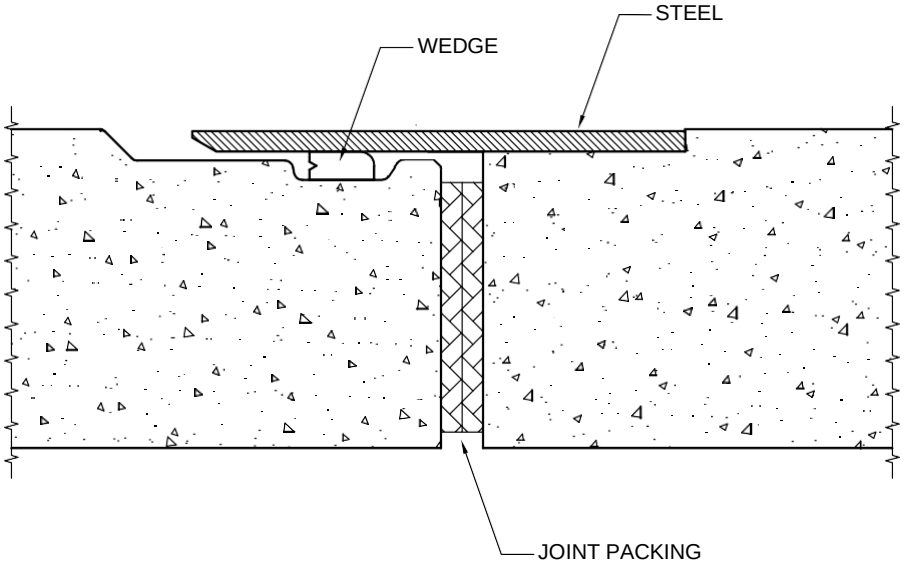
# MICROTUNNELING PIPE

| Normal Diameter | ID | OD | Wall Thickness | Effective Length | Weight (kg) |
|---|---|---|---|---|---|
| 1200 | 1220 | 1490 | 135 | 3000 | 4350 |
| 1500 | 1524 | 1866 | 171 | 3000 | 6850 |
| 1800 | 1830 | 2224 | 197 | 3000 | 9400 |
| 2500 | 2500 | 2980 | 240 | 3000 | 15500 |
| 3000 | 3000 | 3600 | 300 | 2500 | 19500 |

*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.*

# MICROTUNNELING PIPE



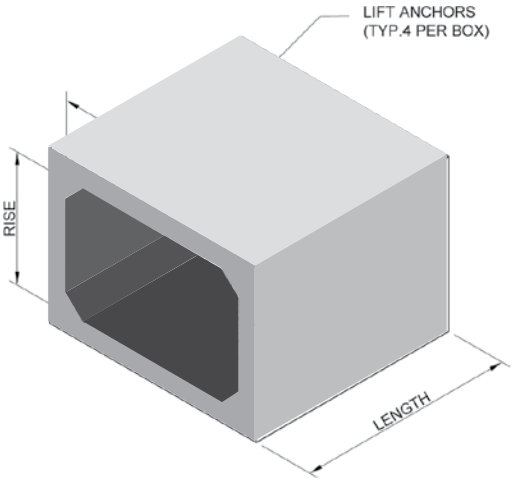

JOINT DETAIL

# CONCRETE BOX

Precast concrete box sections are designed to meet job specific requirements and are manufactured under factory controlled conditions. Precast box sections are the logical solution to problems of restricted head room, minimum cover, limited trench width or excessive over fills, and can be designed for jacking under roads without traffic interruption.

Concrete box sections can be used in a variety of applications to meet the needs of your project beyond the conveyance of storm water, industrial waste and sanitary sewage. Innovative product solutions include:

- Highway bridge culverts
- Stormwater retention tanks
- Rural bridge applications
- Vertical vaults
- Rip-rap lined culverts for fish crossing
- Utility corridors or pedestrian tunnel crossings




| Box Size Span x Rise | Standard Length | Side Wall Thickness | Top Wall Thickness | Bottom Wall Thickness | Haunch Length | Plug/Top/Base Slab Thickness | Approximate Storage Volume ($m^3$) |
|---|---|---|---|---|---|---|---|
| 1200 x 600 | 2000 | 125 | 190 | 150 | 125 | 300 | 1.35 |
| 1200 x 900 | 2000 | 125 | 190 | 150 | 125 | 300 | 2.05 |
| 1800 x 1200 | 2000 | 175 | 200 | 175 | 175 | 300 | 4.15 |
| 2400 x 1200 | 2000 | 225 | 215 | 215 | 200 | 300 | 5.60 |
| *2400 x 1800* | *2000* | *200* | *200* | *200* | *250* | *300* | *8.35* |
| *2440 x 2440* | *2440* | *200* | *200* | *200* | *200* | *300* | *14.30* |
| *3000 x 2400* | *2000* | *250* | *250* | *250* | *250* | *300* | *14.15* |

**NOTES:**

1. Shorter standard lengths are available for all box sizes with the exception of those highlighted in italics in the table above.
2. For box sizes up to 6m rise and span, refer to Big Box section for details.
3. Box lengths can be shortened, but not extended.

# CONCRETE BOX



| Span x Rise x Length | Item Description | Weight (kgs) Per Piece | Lift Clutches Required (Ton) |
|---|---|---|---|
| 1200 X 600 2.0m Long | Culvert | 3375 | 4 |
| | Plug/Cap | 1350/1150 | |
| | Bend | 3375 | |
| | Sloped/Outfall End | 2430 | |
| 1200 X 900 2.0m Long | Culvert | 3750 | 4 |
| | Plug/Cap | 1800/1500 | |
| | Bend | 3750 | |
| | Sloped/Outfall End | 2700 | |
| 1800 X 1200 2.0m Long | Culvert | 6450 | 8 |
| | Plug/Cap | 3500/2800 | |
| | Bend | 6450 | |
| | Sloped/Outfall End | 4635 | |
| 2400 X 1200 2.0m Long | Culvert | 9250 | 8 |
| | Plug/Cap | 4850/3750 | |
| | Bend | 9250 | |
| | Sloped/Outfall End | 6050 | |
| 2400 X 1800 2.0m Long | Culvert | 9825 | 8 |
| | Plug/Cap | 6125/4925 | |
| | Bend | 9825 | |
| | Sloped/Outfall End | 6915 | |
| 2440 X 2440 2.44m Long | Culvert | 13375 | 20 |
| | Plug/Cap | 8550/6400 | 8 |
| | Bend | 13375 | 20 |
| | Sloped/Outfall End | 9630 | 20 |
| 3000 x 2400 2.0m Long | Culvert | 15650 | 20 |
| | Plug/Cap | 11950/9375 | 8 |
| | Bend | 15650 | 20 |
| | Sloped/Outfall End | 11070 | 20 |

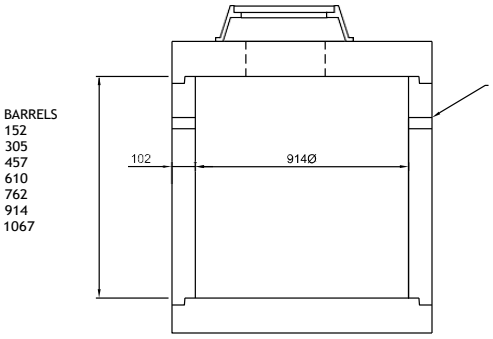
Cover Range:
1.0m - 3.0m
3.0m - 7.0m
0.0m - 1.0 & 7.0m - 10.0m

**NOTES:**

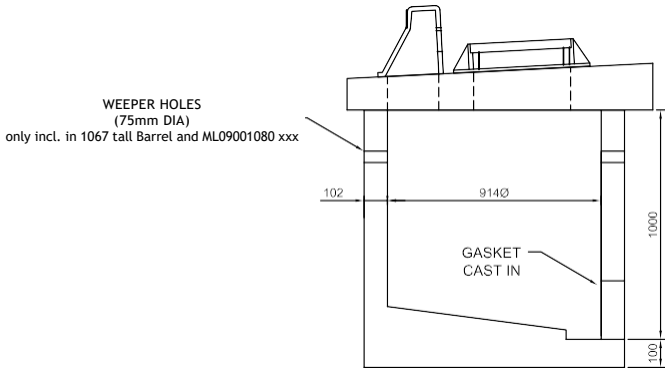
1. Prices are based on standard applications designed to ASCE26-97 for a Type B1 installation and produced to ASTM C1433. CHBDC and other designs available upon request.
2. See Large Manhole section for pricing of vertically installed boxes (Manhole).
3. Monolithic end pieces are available upon request.
4. Rough pipe openings and manhole openings available at an additional cost.
5. Additional Box sizes ranging up to 6m internal span are available. See Big Box section for additional information.

# CATCHBASIN COMPONENTS

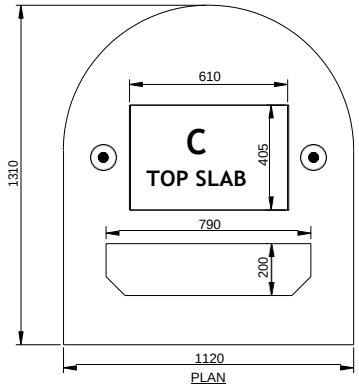
Catch basin is a chamber or sump usually built at the curb which separates debris and allows surface water runoff to enter the stormwater conveyance system.



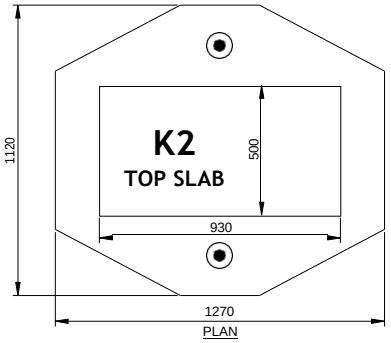

SEPARATE BASE CATCHBASIN



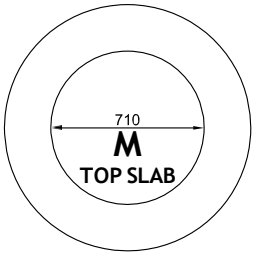

MONOLITHIC BASE CATCHBASIN



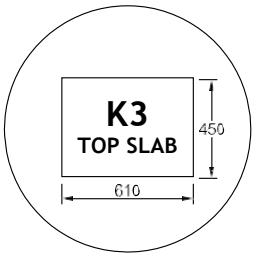

DEPTH= 130 - 120mm
SLOPED BACK TOWARDS CURB
FOR C OR K1 FRAME AND GRATE
SQUARE CURB




DEPTH= 130 - 120mm
SLOPED BACK TOWARDS CURB
FOR C OR K2 FRAME AND GRATE
ROLLED CURB




DEPTH= 150mm
FOR MANHOLE FRAME AND COVER
AREA DRAIN OR SOLID TOP COVER




DEPTH= 150mm
FOR K3 FRAME AND GRATE
AREA DRAIN

# CATCHBASINMATERIALS

| | Item | Description | Lifting Clutches (Ton) | Weight kg/pc |
|---|---|---|---|---|
| Bases 914 mm ID | Monolithic Catch Basin 1080 mm High Complete with Benched Base and 4 Weeping Holes | Up to 300 mm pipe. Complete with Gasket for SDR 35 or rough opening | 4 | 1425 |
| | Twin Upstream Monolithic Catch Basin Complete with Higher Benching 1080 mm High | Complete with Gasket for SDR 35 | 4 | 1425 |
| | Monolithic Catch Basin 1200 mm High Flat Bottom | Up to 300 mm pipe. Complete with Gasket for SDR 35 or rough opening | 4 | 1750 |
| | Monolithic Catch Basin 1080 tall Flat Bottom with Sump (Red Deer or Airdrie Spec) | Up to 300 mm pipe. Complete w/ gasket for SDR 35 or rough opening. | 4 | 1395 |
| | Shallow Monolithic Catch Basin 406 mm High Complete with Benched Base | Up to 300 mm pipe. Complete with Gasket for SDR 35 or rough opening | 4 | 715 |
| | Flat CB Base | 914 ID x 152 Deep Base | 4 | 405 |
| Barrels 914 mm ID | 1067 mm High w/ Weeper holes | 914 ID x 1067 High (36” x 42”) With 4 Weeper Holes | 4 | 865 |
| | 914 mm High | 914 ID x 914 High (36” x 36”) | 4 | 740 |
| | 762 mm High | 914 ID x 762 High (36” x 30”) | 4 | 615 |
| | 610 mm High | 914 ID x 610 High (36” x 24”) | 4 | 495 |
| | 457 mm High | 914 ID x 457 High (36” x 18”) | 4 | 370 |
| | 305 mm High | 914 ID x 305 High (36” x 12”) | 4 | 250 |
| | 152 mm High | 914 ID x 152 High (36” x 6”) | 4 | 125 |
| Tops & Collars | C Top | Square Curb (Tee Top) Opening | 4 | 345 |
| | K2 Top | Rolled Curb Opening | 4 | 325 |
| | K3 Top | Rectangular Opening | 4 | 285 |
| | M Top | Circular Opening | 4 | 285 |
| | K3 Collar | K3 Top/C Top Collar - 67mm High | | 40 |
| | Stormback Collar | C Top Side Inlet Collar - 67mm High | | 30 |
| Frame & Covers | City of Calgary Frame and Cover/Grate | 152 mm High Frame or Slotted Grate | | 150 |
| | ‘C’ Frame and Grate | C Top Rectangular Frame C Top Rectangular Inlet Grate C Top Side Inlet Grate | | 150 |
| | ’K2’ Frame and Grate To fit Rolled Curb | K2 Top Rectangular Frame K2 Top Rectangular Grate | | 210 |
| | ‘K3’ Frame and Grate | K3 Top Rectangular Frame K3 Top Rectangular Grate | | 85 |

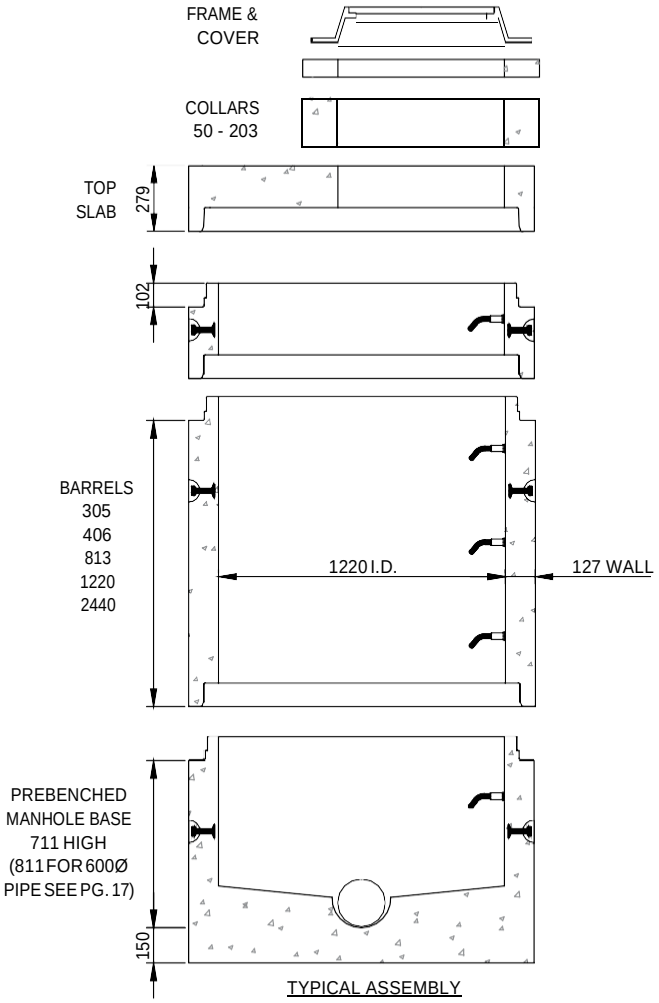
FOR CATCHBASIN PRICING, PLEASE EMAIL: ashik.ramdass@lafargeholcim.com

NOTES:

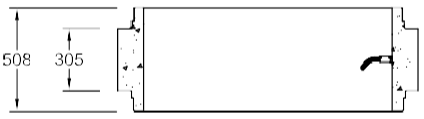
1. Pre-benching is for dead ends only.
2. Barrels, Flat Catch basin Base, Type M and K3 Top Slabs have a 25mm joint lip. Monolithic CBs, Type C and K2 Top slabs have a flat joint.
3. City of Calgary Sump Catch basins available upon request.

# 5AMANHOLE-COMPONENTS

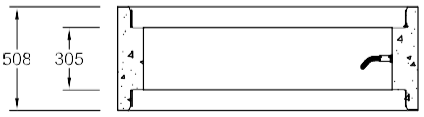
Lafarge produces 5A manholes with 1220mm (48”) internal diameter. The boot-style gasket clamps onto the pipe, reducing infiltration and exfiltration. For ribbed pipe, a straight wall adaptor is recommended to maintain the integrity of the seal, as per project specifications.



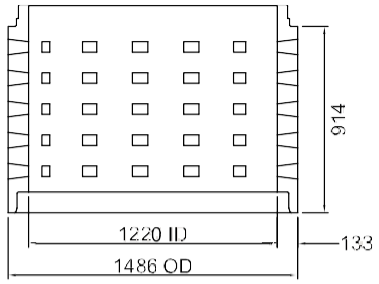

TYPICAL ASSEMBLY




SPIGOT-SPIGOT ADAPTER

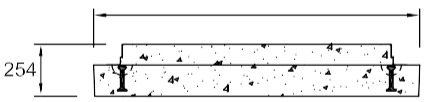



BELL-BELL ADAPTER




PERFORATED MANHOLE BARREL


ROUND PRE-BENCHED
MANHOLE BASE




FLAT BASE
(ALTERNATE TO PREBENCHED BASE)

# 5A MANHOLE COMPONENTS

ASTM C478, CSA A257.4

| | Item | Description | Lifting Clutches (Ton) | Weight kg/pc |
|---|---|---|---|---|
| Bases 1220 mm ID/813 mm High | 100/150 mm | Maximum Pipe size of 150mm (6") | 4 | 1960 |
| | Prebench 200 mm | Maximum Pipe size of 200mm (8") | 4 | 1960 |
| | Prebench 250 mm | Maximum Pipe size of 250mm (10") | 4 | 1960 |
| | Prebench 300 mm | Maximum Pipe size of 300mm (12") | 4 | 1960 |
| | Prebench 375 mm | Maximum Pipe size of 375mm (15") | 4 | 1960 |
| | Prebench 450 mm | Maximum Pipe size of 450mm (18") | 4 | 1960 |
| | Prebench 525 mm | Maximum Pipe size of 525mm (21") | 4 | 1960 |
| | Prebench 600 mm | Maximum Pipe size of 600mm (24") See notes 2 & 3 | 4 | 2020 |
| | Prebench Cul-De-Sac | 4 or more openings | 4 | 1960 |
| | Flat Mono Base | Monolithic Flat Base (710 tall) | 4 | 1670 |
| | Flat Base | 1220 ID Round x 254 mm Deep Base | 4 | 1020 |
| Barrels & Adapters 1220 mm ID | 2440 mm High | Spigot up or Bell up- 6 Steps | 4 | 3300 |
| | 1220 mm High | Spigot up or Bell up- 3 Steps | 4 | 1650 |
| | 813 mm High | Spigot up or Bell up- 2 Steps | 4 | 1100 |
| | 406 mm High | Spigot up or Bell up- 1 Step | 4 | 550 |
| | 305 mm High | Spigot up or Bell up- 1 Step | 4 | 425 |
| | 914 mm High Perforated | 914 mm High Perforated Barrel | 4 | 705 |
| | 305 mm High Spigot to Spigot Adaptor | Spigot-Spigot Adapter c/w 1 Step | 4 | 525 |
| | 508 mm High Bell to Bell Adaptor | Bell-Bell Adapter c/w 1 Step | 4 | 530 |
| Top Slab & Collars | STD Top Slab | 1220 ID x 178 Deep with 710 Dia. Offset Opening | 4 | 630 |
| | "C" Top Slab | 1220 ID x 178 Deep with Opening for 'C' Frame and Grate | 4 | 630 |
| | Red Deer Top Slab | 1220 ID x 178 Deep with 640 Dia. Offset Opening | 4 | 630 |
| | 203 mm MH Collar | 710 ID x 203 High c/w MH Step Recesses for Step-G | Hooks | 205 |
| | 152 mm MH Collar | 710 ID x 152 High c/w MH Step Recesses for Step-G | Hooks | 155 |
| | 101 mm MH Collar | 710 ID x 101 High c/w MH Step Recesses for Step-G | Hooks | 105 |
| | 75mm MH Collar | 710 ID x 76 High c/w MH Step Recesses for Step-G | | 75 |
| | 50 mm MH Collar | 710 ID x 50 High c/w MH Step Recesses for Step-G | | 50 |
| Accessories | City of Calgary Frame and Cover/Grate | 600 mm dia x 152 mm High Frame 600 mm dia x 254 mm High Frame Solid Cover (weight/price included with Frame) Slotted Grate (weight/price included with Frame) | | 150 170 |
| | Town and Country Style Frame and Cover/Grate | T&C 570 mm dia x 152mm High Frame T&C Solid Cover (weight/price included with Frame) T&C Slotted Grate (weight/price included with Frame) | | 190 |
| | Aluminum Step | 300mm Wide Ladder Rung - Install in Barrels with 25mm Dia. Drilled Hole | | |
| | Aluminum Poly Step | 300mm Wide Poly Coated Ladder Rung - Install in Barrels with 25mm Dia. Drilled Hole | | |
| | Galvanized Step | 300mm Wide Ladder Rung - Install in Collars in Step Recess | | |
| | Gasket | Super Seal - 1220mm ID Manhole Gasket | | |

FOR MANHOLE PRICING, PLEASE EMAIL: ashik.ramdass@lafargeholcim.com

NOTES:

1. Prebenched bases are made to order. Approved drawings or manhole order forms required for manufacture.
2. Standard Prebench height from invert to shoulder - 711mm, with the exception of Prebench with 600mm concrete pipe - 811mm.
3. Prebench manhole comes complete with cast in place gaskets for connection to SDR 35 PVC pipe. Other pipe styles are supplied with oversized openings.
4. In areas with high groundwater, manhole gaskets and 2440mm high Manhole Barrels are recommended.
5. All Manhole material designed to meet City of Calgary specifications. Please advise if other requirements are necessary.
6. Nitrile boot gaskets available for 200-600mm. Allow 4-5 weeks for delivery time. Please call for pricing.

# ESTIMATING GUIDE for 1200mm Diameter Type 5A Manholes

CHECK VALVE MANHOLE

| Depth to Lowest Invert (m) | Prebenched Base | | Manhole Barrels | | Top Slab | | Collars | | | 150mm Frame & Cover |
|---|---|---|---|---|---|---|---|---|---|---|
| | 720 | 1220 | 813 | 406 | 305 | 280 | 203 | 152 | 101 | |
| 2.00 | 1 | | | 1 | 1 | 1 | | 1 | | 1 |
| 2.10 | 1 | | | 1 | 1 | 1 | | 1 | 1 | 1 |
| 2.20 | 1 | | 1 | | | 1 | 1 | | | 1 |
| 2.30 | 1 | | 1 | | | 1 | | 2 | | 1 |
| 2.40 | 1 | | 1 | | 1 | 1 | | 1 | | 1 |
| 2.50 | 1 | | 1 | 1 | | 1 | | 1 | | 1 |
| 2.60 | 1 | | 1 | 1 | | 1 | | 1 | 1 | 1 |
| 2.70 | 1 | | 1 | 1 | | 1 | | 2 | | 1 |
| 2.80 | 1 | 1 | | | 1 | 1 | | | 1 | 1 |
| 2.90 | 1 | 1 | | 1 | | 1 | | | 1 | 1 |
| 3.00 | 1 | 1 | | 1 | | 1 | 1 | | | 1 |
| 3.10 | 1 | 1 | | | 2 | 1 | | | 1 | 1 |
| 3.20 | 1 | 1 | | 1 | 1 | 1 | | | 1 | 1 |
| 3.30 | 1 | 1 | 1 | | | 1 | | | 1 | 1 |
| 3.40 | 1 | 1 | 1 | | | 1 | 1 | | | 1 |
| 3.50 | 1 | 1 | 1 | | | 1 | | 2 | | 1 |
| 3.60 | 1 | 1 | 1 | | 1 | 1 | | | 1 | 1 |
| 3.70 | 1 | 1 | 1 | 1 | | 1 | | | 1 | 1 |
| 3.80 | 1 | 1 | 1 | 1 | | 1 | 1 | | | 1 |
| 3.90 | 1 | 1 | 1 | 1 | | 1 | | 2 | | 1 |
| 4.00 | 1 | 2 | | | 1 | 1 | | | 1 | 1 |
| 4.10 | 1 | 2 | | 1 | | 1 | | | 1 | 1 |
| 4.20 | 1 | 2 | | 1 | | 1 | 1 | | | 1 |
| 4.30 | 1 | 2 | | | 2 | 1 | | | 1 | 1 |
| 4.40 | 1 | 2 | | 1 | 1 | 1 | | | 1 | 1 |
| 4.50 | 1 | 2 | 1 | | | 1 | | | 1 | 1 |
| 4.60 | 1 | 2 | 1 | | | 1 | 1 | | | 1 |
| 4.70 | 1 | 2 | 1 | | | 1 | | 2 | | 1 |
| 4.80 | 1 | 2 | 1 | | 1 | 1 | | | 1 | 1 |
| 4.90 | 1 | 2 | 1 | 1 | | 1 | | | 1 | 1 |
| 5.00 | 1 | 2 | 1 | 1 | | 1 | 1 | | | 1 |
| 5.10 | 1 | 2 | 1 | 1 | | 1 | | 2 | | 1 |
| 5.20 | 1 | 3 | | | 1 | 1 | | | 1 | 1 |
| 5.30 | 1 | 3 | | 1 | | 1 | | | 1 | 1 |
| 5.40 | 1 | 3 | | 1 | | 1 | 1 | | | 1 |
| 5.50 | 1 | 3 | | | 2 | 1 | | | 1 | 1 |
| 5.60 | 1 | 3 | | | 2 | 1 | 1 | | | 1 |
| 5.70 | 1 | 3 | | 1 | 1 | 1 | 1 | | | 1 |
| 5.80 | 1 | 3 | 1 | | | 1 | | 1 | | 1 |
| 5.90 | 1 | 3 | 1 | | | 1 | | 1 | 1 | 1 |
| 6.00 | 1 | 3 | 1 | | 1 | 1 | | | 1 | 1 |

# CHECK VALVE MANHOLES & MISC. MATERIALS

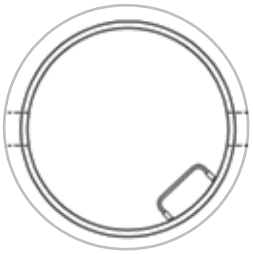
## Check Valve Manholes

| Nominal Pipe Size (mm) | Manhole Type | Weight (kg/piece) |
|---|---|---|
| 150 | 1200 dia. Monolithic base | 2200 |
| 200 | 1200 dia. Monolithic base | 2200 |
| 250 | 1.5m Type 1-S | 8880 |
| 300 | 1.5m Type 1-S | 8880 |
| 400 | 1.9m Type 1-S | 12250 |

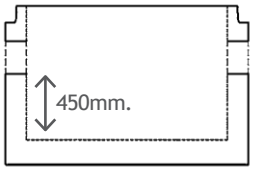
**NOTES:** 1. Distance from invert to base – 450mm.

### ROUND CHECK VALVE

PLAN

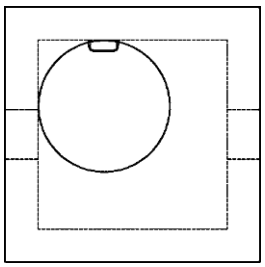


PROFILE

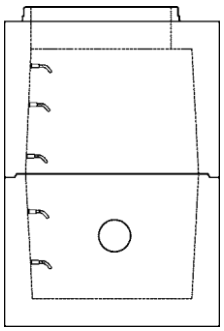



### I-S CHECK VALVE

PLAN



PROFILE



## Miscellaneous Material

| | Description | Price (Each) No Discount |
|---|---|---|
| Concrete, Cement Products, Gaskets & Lube | Wooden Pallets | $40 |
| | Kalicrete - Type HS (formerly Type 50) Cement 20kg bag | $50 |
| | Patching Cement Compound 20kg bag | $65 |
| | 1200 Dia. Manhole Barrel Gaskets | $65 |
| | 25mm Thick Mastic Coil Gasket 4.4m long | $65 |
| | Gasket Lubricant 3.5kg pail | $85 |
| | Subaqueous Gasket Lubricant (underwater use) 3.5kg pail | $100 |
| Lifting | Pair of 2 Ton Clutches (Final Sale) | $570 |
| | Pair of 4 Ton Clutches (Final Sale) | $640 |
| | Pair of 8 Ton Clutches (Final Sale) | $1,280 |
| | Pair of 20 Ton Clutches (Final Sale) | $3,610 |
| Others | Safety Platforms for manholes | Call |
| | Hatches | Call |
| | Dunnage | Call |

# 1-S MANHOLE/LIFT STATION - DIMENSION & PRIC-

| | Description | For Pipe Sizes up to (mm) | Weight (kg) per piece (Half Structure) | Dimension A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.2 1-S | Top & Bottom Half 1990 High | 900 | 3420 | 175 | 980 | 1010 | 200 | 150 | 1200 | 1500 |
| | 1000 High Intermediate | - | 2080 | - | 1000 | | - | 150 | 1200 | 1500 |
| | Top Half 980 High | 675 | 3420 | 175 | 980 | | | 150 | 1200 | 1500 |
| | Bottom Half 1010 High | 675 | 3420 | | | 1010 | 200 | 150 | 1200 | 1500 |
| | Flat Base Slab | - | 1530 | - | - | | 300 | - | - | 1500 |
| | Skimming Manhole (Top & Bottom Half) | - | 2950 | 175 | 1160 | | 200 | 150 | 1200 | 1500 |
| 1.5 1-S | Top & Bottom Half 1990 High | 1050 | 4440 | 175 | 1010 | | 200 | 150 | 1500 | 1800 |
| | 1000 High Intermediate | - | 2535 | - | 1000 | | - | 150 | 1500 | 1800 |
| | Top Half 980 High | 675 | 4440 | 175 | 980 | | | 150 | 1500 | 1800 |
| | Bottom Half 1010 High | 675 | 4440 | | | 1010 | 200 | 150 | 1500 | 1800 |
| | Flat Base Slab | - | 2520 | - | - | | 300 | - | - | 1800 |
| | Skimming Manhole (Top & Bottom Half) | - | 5015 | 175 | 1160 | | 200 | 150 | 1500 | 1800 |
| 1.9 1-S | Top & Bottom Half 1990 High | 1500 | 6125 | 200 | 980 | 1010 | 200 | 150 | 1930 | 2230 |
| | 1000 High Intermediate | - | 3200 | - | 1000 | | - | 150 | 1930 | 2230 |
| | Top Half 980 High | 675 | 6125 | 200 | 980 | | 200 | 150 | 1930 | 2230 |
| | Bottom Half 1010 High | 675 | 6125 | | | 1010 | 200 | 150 | 1930 | 2230 |
| | Flat Base Slab | - | 3860 | - | - | | 300 | - | - | 2230 |
| | Skimming Manhole (Top & Bottom Half) | - | 6915 | 200 | 1160 | | 200 | 150 | 1930 | 2230 |
| 2.4 1-S | Top & Bottom Half 2405 High | 1800 | 13000 | 250 | 1180 | 1225 | 250 | 230 | 2400 | 2860 |
| | 1000 High Intermediate | - | 6200 | - | 1000 | | - | 230 | 2400 | 2860 |
| | 1750 High Intermediate | | 10740 | - | 1750 | | - | 230 | 2400 | 2860 |
| | Top Half 1180 High | 900 | 13000 | 250 | 1180 | | 250 | 230 | 2400 | 2860 |
| | Bottom Half 1225 High | | 13000 | | | 1225 | | 230 | 2400 | 2860 |
| | Flat Base Slab | - | 6340 | - | - | | 300 | - | - | 2860 |
| | Skimming Manhole (Top & Bottom Half) | - | 13000 | 250 | 1200 | | 250 | 230 | 2400 | 2860 |
| 2.8 1-S | Top & Bottom Half 2805 High | 2100 | 17265 | 250 | 1380 | 1425 | 250 | 230 | 2800 | 3260 |
| | 1000 High Intermediate | - | 7143 | 250 | 1000 | | - | 230 | 2800 | 3260 |
| | 1750 High Intermediate | - | 12370 | - | 1750 | | - | 230 | 2800 | 3260 |
| | Top Half 1380 High | 1050 | 17265 | 250 | 1380 | | 250 | 230 | 2800 | 3260 |
| | Bottom Half 1425 High | | 17265 | | | 1425 | | 230 | 2800 | 3260 |
| | Flat Base Slab | - | 8240 | - | - | | 300 | - | - | 3260 |
| | Skimming Manhole (Top & Bottom Half) | - | 17265 | 250 | 1400 | | 250 | 230 | 2800 | 3260 |

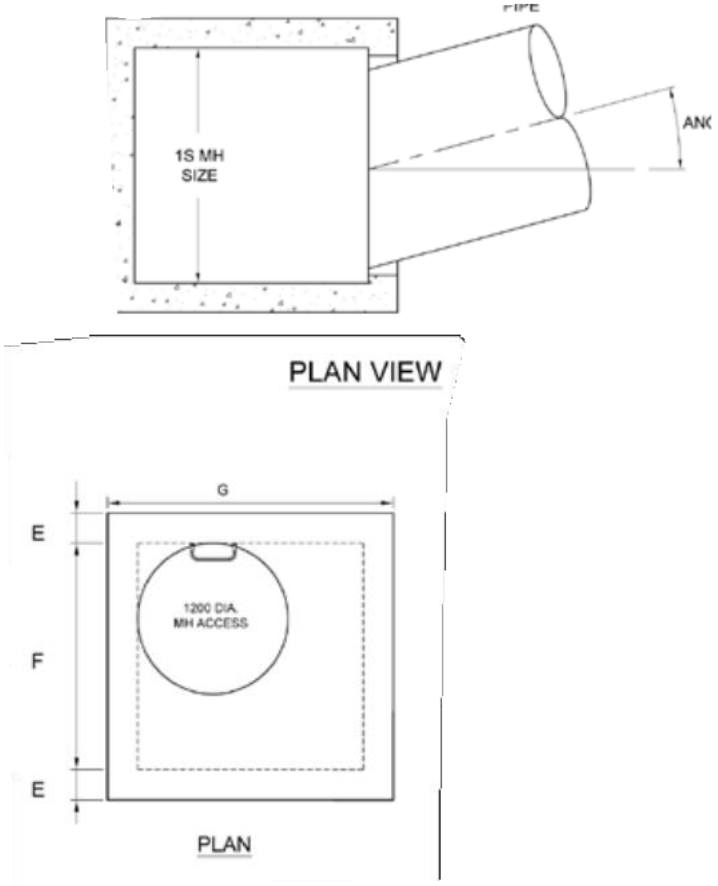
**4.0 x 3.0 1S manhole - Contact sales for details.**

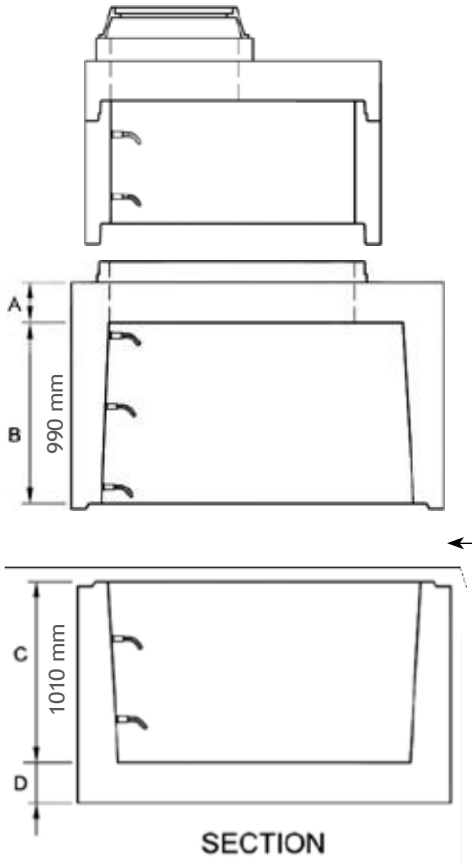
## NOTES:

1. Standard depth of cover is 5 meters
2. Use intermediate sections between top and bottom sections of 1-S Manhole to meet drop manhole invert requirements.
3. Mastic gaskets (see page 17) are available for 1-S Manhole joints. Additional measures by contractor may be necessary if a watertight joint is required.
4. Top and bottom half wall taper is from the thickest point at top/base slab to the center (dimension 'E'), including haunches in corners. This may affect mounting of equipment, gates, etc.

# 1-S MANHOLE - PIPE ANGLE ENTRY

| Pipe Size (mm) | Maximum Angle for Type 1-S Manhole Size: | | | | |
|---|---|---|---|---|---|
| | 1200mm | 1500mm | 1930mm | 2400mm | 2800mm |
| 300 | 45 | 45 | 45 | 45 | 45 |
| 375 | 45 | 45 | 45 | 45 | 45 |
| 450 | 45 | 45 | 45 | 45 | 45 |
| 525 | 40 | 45 | 45 | 45 | 45 |
| 600 | 35 | 45 | 45 | 45 | 45 |
| 675 | 30 | 45 | 45 | 45 | 45 |
| 750 | 25 | 40 | 45 | 45 | 45 |
| 900 | 0 | 30 | 45 | 45 | 45 |
| 1050 | - | 15 | 40 | 45 | 45 |
| 1200 | - | - | 30 | 45 | 45 |
| 1350 | - | - | 20 | 40 | 45 |
| 1500 | - | - | 10 | 30 | 40 |
| 1650 | - | - | - | 25 | 35 |
| 1800 | - | - | - | 10 | 30 |
| 1950 | - | - | - | - | 20 |
| 2100 | - | - | - | - | 15 |




TYPE 5A MH MATERIAL TO FINAL GRADE

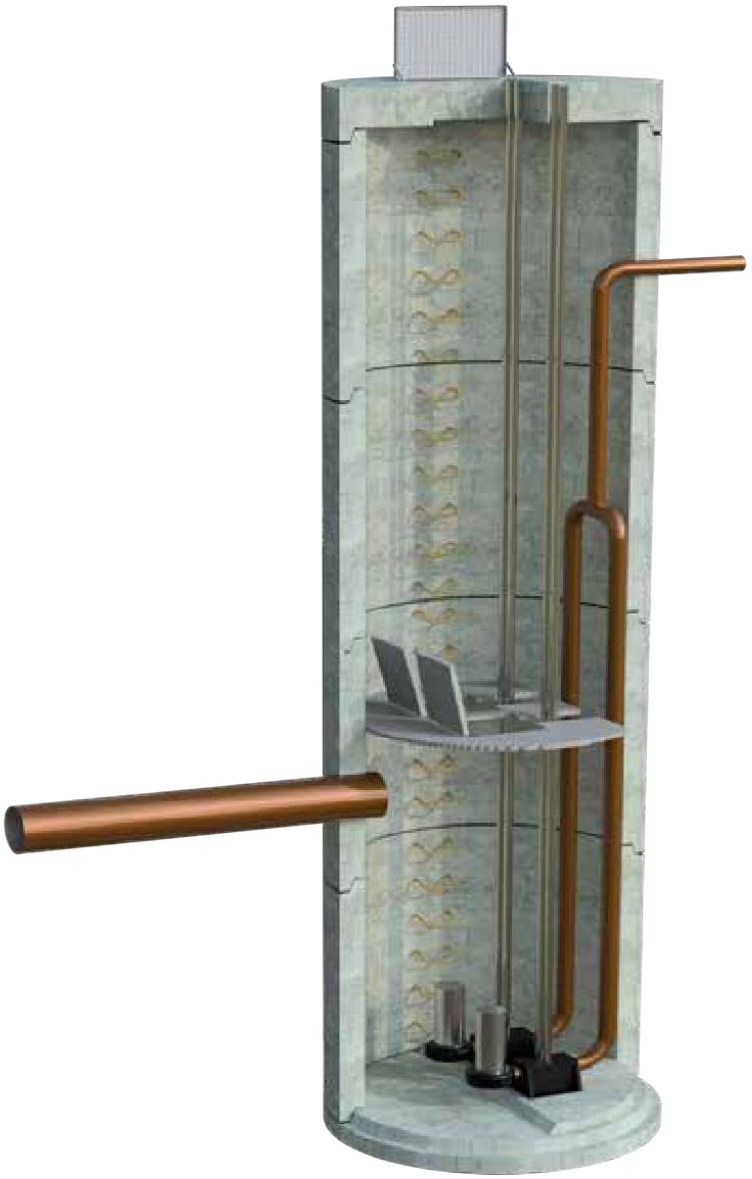
TOP HALF

INTERMEDIATE SECTION (IF REQUIRED)

BOTTOM HALF

# LARGE DIAMETER MANHOLE/LIFT STATION

Lafarge provides precast large diameter round manhole (from 1500 to 3000 mm ID), and rectangular/ square sections in a 1200x1200 ID. The applications of these structures are mainly for manholes with bigger inlet/outlet pipes, lift stations/pump stations, and control structures.

# LARGE MANHOLE/LIFT STATION MATERIAL DIMENSIONS & PRICING

| | Item | Description | Lifting Clutches Required (Ton) | Weight (kg/piece) |
|---|---|---|---|---|
| Large Diameter Manholes | 1524 Diameter<br>(C Wall Typical) | 2440 High Barrel<br>914 High Barrel<br>305 High Barrel<br>Top Slab/Base Slab | 4 | 5575<br>2100<br>700<br>1925 |
| | 1829 Diameter<br>(B Wall Typical) | 2440 High Barrel<br>1829 High Barrel<br>1220 High Barrel<br>Top Slab/Base Slab | 8 | 6850<br>5140<br>3425<br>2600/2725 |
| | 2130 Diameter<br>(B Wall Typical) | 2440 High Barrel<br>Top Slab/Base Slab | 8 | 9100<br>3525/3800 |
| | 2440 Diameter<br>(C Wall Typical) | 2440 High Barrel<br>Top Slab/Base Slab | 8 | 12775<br>4675/5175 |
| | 2743 Diameter<br>(C Wall) | 2440 High Barrel<br>Top Slab/Base Slab | 20<br>8 | 15800<br>5950/6525 |
| | 3048 Diameter<br>(B Wall) | 2100 High Barrel<br>1220 High Barrel<br>610 High Barrel<br>Top Slab/Base Slab | 20<br>8<br>8<br>8 | 15350<br>8925<br>4475<br>7050/8000 |
| Concrete Boxes | 1200x600 | 2000 High Box<br>Base Slab/Top Slab | 4 | 3375<br>925 /1150 |
| | 1200x900 | 2000 High Box<br>Base Slab/Top Slab | 4 | 3750<br>1225/1500 |
| | 1800x1200 | 2000 High Box<br>Base Slab/Top Slab | 8 | 6450<br>2325/2800 |
| | 2400x1200 | 2000 High Box<br>Base Slab/Top Slab | 8 | 9250<br>3225/3750 |
| | 2400x1800 | 2000 High Box<br>Base Slab/Top Slab | 8 | 9825<br>4150/4400 |
| | 2440x2440 | 2440 High Box<br>Base Slab/Top Slab | 8 | 13375<br>5725/6400 |
| | 3000x2400 | 2000 High Box<br>Base Slab/Top Slab | 20<br>8 | 15650<br>7150/8100 |

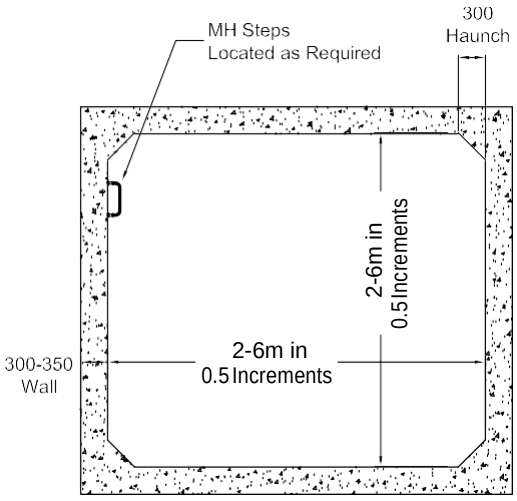
**1500 & 1800 Dia. Pre benched manholes available. Please call for pricing.**

**NOTES:**

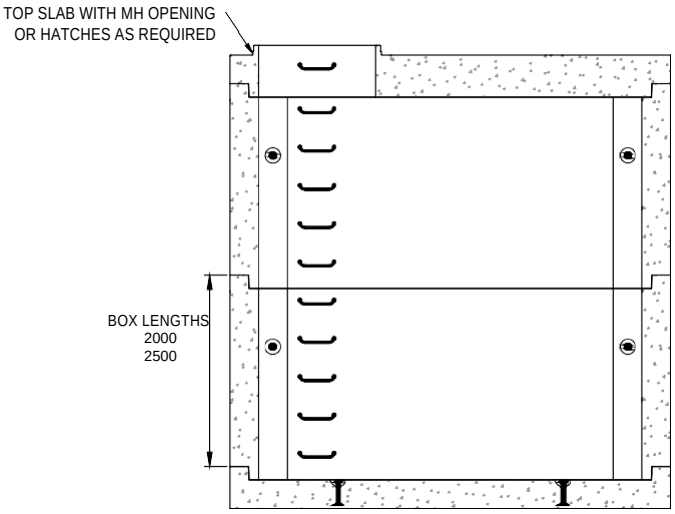
1. Standard barrel and box heights shown. Monolithic base is available for custom heights.
2. Cored holes and rough openings available at an additional cost.
3. Oversized base slabs available to resist flotation in high ground water conditions. Please call for pricing.
4. Prices include rubber wedge gaskets and lube for large diameter round manholes only. Mastic gaskets are also available for box manhole joints. Additional measures may be needed if a watertight joint is required.
5. Top Slabs are typically 450 mm thick and base slabs are typically 300 mm thick; however the thickness may vary to suit engineering design.
6. 3 lifting clutches are required to lift all circular bases and top slabs, and 4 required for square/rectangular slabs. Circular bases and top slabs require 3 lifting clutches. Square/rectangular slabs require 4 lifting clutches.
7. 1500 and 1800 DIA. pre-bench manholes available. Please call for pricing.

# BIG BOX MANHOLES & CONTROL STRUCTURES

Big box manholes are available for use as Type 1-S manholes or lift stations. These sections are able to handle up to 3000mm diameter pipe. The Big Box size ranges from 2m, up to 6m with .5m increments in spans. The wall thicknesses are adjustable to 300 and 350mm thicknesses, and the joints are similar to those of a standard box section measuring 140mm in length.




**Plan**




**Section**

ASTM C1433

Adjustable form allows variations with 0.5m increments for square or rectangular manholes.

The adjustable wall thickness allow deep design.

Weir walls included in control structures.
Slide gates available as needed.
Via supply only.

# BIG BOX MANHOLE - DIMENSIONS

| Box Size Span x Rise | 300mm Wall Thickness | | | | 350mm Wall Thickness | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Base Slab/Top Slab Weight (kgs) | | Weight of Section (kg) | Lifting Clutches (Ton) | Base Slab/Top Slab Weight (kgs) | | Weight of Section (kg) | Lifting Clutches (Tons) | Haunch Dimension |
| 3.0m x 2.5m | 10650 | 8000 | 24000 | 20 | 11325 | 8525 | 28250 | 20 | 300 |
| 3.0m x 3.0m | 12300 | 9500 | 25875 | 20 | 13000 | 10075 | 30450 | 20 | 300 |
| 3.0m x 3.5m | 14050 | 10900 | 27750 | 20 | 14700 | 11600 | 32625 | 20 | 300 |
| 3.0m x 4.0m | 15725 | 12375 | 29625 | 20 | 16400 | 13150 | 34825 | 20 | 300 |
| 3.5m x 3.5m | 15925 | 12600 | 29625 | 20 | 16625 | 13375 | 34825 | 20 | 300 |
| 3.5m x 4.0m | 17800 | 14325 | 31500 | 20 | 18525 | 15150 | 37000 | 20 | 300 |
| 4.0m x 4.0m | 19900 | 16250 | 33375 | 20 | 20650 | 17125 | 39200 | 20 | 300 |

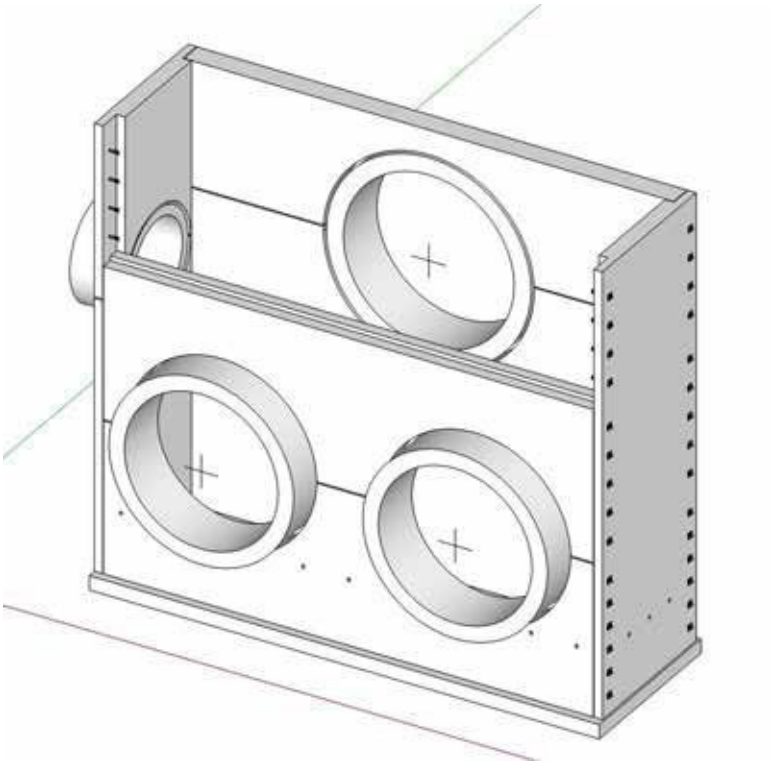
***For larger sizes please contact your Lafarge representative.**

**NOTES:** 1. All weights are approximate and based on 2.5m section lengths.

# MULTI PANEL VAULT

# MULTI PANEL VAULT

For larger precast concrete underground structures, Lafarge offers custom designed multi panel vaults. This serves as a cost effective alternative solution to a cast in place structure.



## Stormceptor® MAX

The StormceptorMAX responds to the needs of large-scale industrial and residential areas which may require a single stormwater management device. It provides stormwater quality treatment for areas 10 to 100+ acres and industrial spill volume capture of 55,000+ litres.

One StormceptorMAX can provide protection for an entire neighbourhood, a full-scale industrial plant or other large developments.

### Unique, comprehensive site coverage.

- Larger sedimentation chamber extends horizontally rather than vertically.
- Non-turbulent treatment environment allows oil to rise and sediment to settle.
- Industrial spill protection in dry and wet conditions.
- Patented scour prevention technology contains captured oil and sediment for safe storage and easy removal.

Stormceptor MAX installation.
A ten box Stormceptor MAX unit was used to treat 110 ha.
*(5 boxes shown)*


Stormceptor MAX installation. A nine box Stormceptor MAX.

Please call your local Lafarge Pipe representative for pricing based on individual project requirements.

# Stormceptor® EF

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 higher flow rates than other oil grit separators

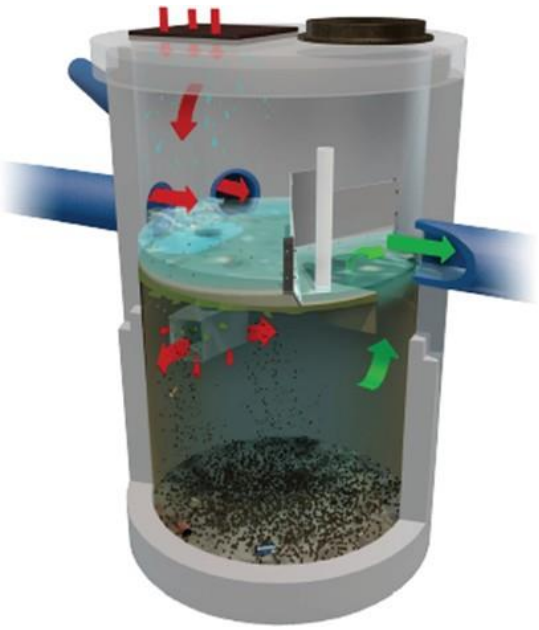
## *The Newest Oil Grit Separator (OGS) Stormwater Treatment Technology*

### Stormceptor® EF

- Improved TSS capture at higher flow rates
- Tested and verified through the ISO14034 ETV program

### Stormceptor® EFO

- Captures and retains 99% of free hydrocarbons (oils)
- Ideal for gas stations, garages, and other oil hotspots



***Easy to install***

Small footprint saves time and money with limited disruption to your site.

***Seamless***

Minimal drop between inlet and outlet pipes makes Stormceptor ideal for retrofits and new development projects.

***Flexible***

Multiple inlets can connect to a single unit.

Can be used as a bend structure.

## *Multiple configurations available to meet each project's specific needs*

### Single Inlet Inline

- Single inlet
- Allows 90 to 270 degrees between inlet and outlet

### Multi-Inlet Inline

- Multiple inlets
- Allows 180 degrees between inlets

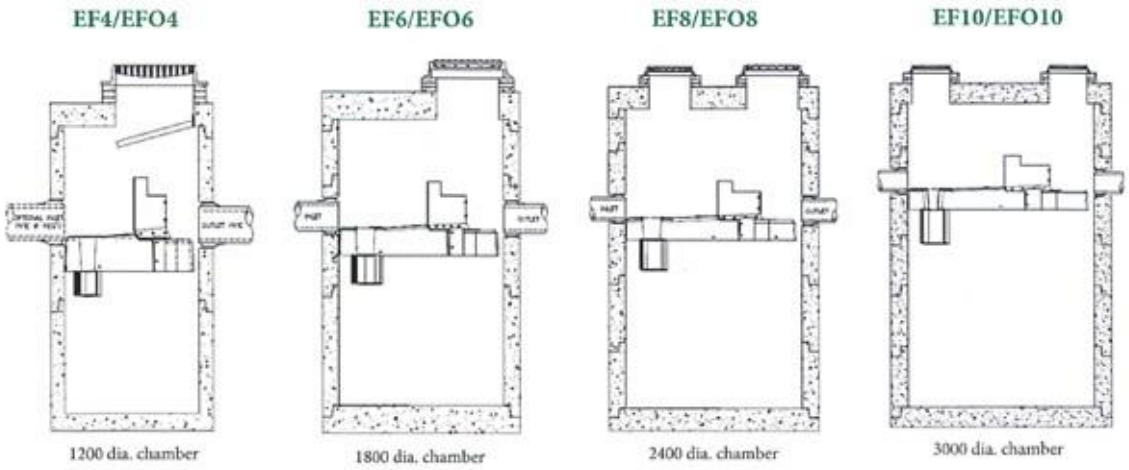
### Grated Inlet

- Grated inlet
- Multiple inlet pipes
- Allows 90 degrees between inlet pipes

### Submerged

- Handles submerged conditions up to 1.2 meters
- Single or multiple inlets

# Stormceptor® EF (Enhanced Flow)



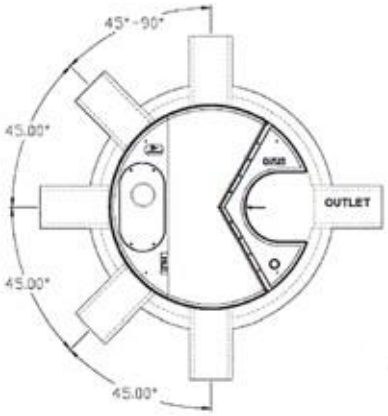

- Stormceptor **EF** is for standard applications
- Stormceptor **EFO** is specific for enhanced oil capture. An EFO is recommended for gas stations or parking lots

### All Stormceptor EF/EFO models can accommodate

- Single Inlet
- Multiple Inlet
- Grate Inlet

### Inlet to Outlet Drop

- 0° – 45°: The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
- 45° – 90°: The inlet pipe is 2-inches (50mm) higher than the outlet pipe.




**PRODUCT DETAILS**

| METRIC DIMENSIONS AND CAPACITIES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Stormceptor Model | Inside Diameter | Minimum Surface to Outlet Invert Depth | Depth Below Outlet Pipe Invert | Wet Volume | Sediment Capacity[1] | Hydrocarbon Storage Capacity[2] | Maximum Flow Rate into Lower Chamber[3] | Peak Conveyance Flow Rate[4] |
| | (m) | (mm) | (mm) | (L) | ($m^3$) | (L) | (L/s) | (L/s) |
| EF4 / EFO4 | 1.22 | 915 | 1524 | 1780 | 1.19 | 265 | 22.1 / 10.4 | 425 |
| EF6 / EFO6 | 1.83 | 915 | 1930 | 5070 | 3.47 | 610 | 49.6 / 23.4 | 990 |
| EF8 / EFO8 | 2.44 | 1219 | 2591 | 12090 | 8.78 | 1070 | 88.3 / 41.6 | 1700 |
| EF10 / EFO10 | 3.05 | 1219 | 3251 | 23700 | 17.79 | 1670 | 138 / 65 | 2830 |

# Jellyfish® Filter

## Pollutant Removal

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

## 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.

# 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
- Reduced design time
- Maximum detention volume for the smallest footprint
- High infiltration capacity
- LEED & LID
- Full trafficability and reduced risk
- Cost savings
- Quick installation
- Full access and maintainability

# STORMTRAP SYSTEM FOOTPRINT

| Module Type | Dimensions | Comment |
|---|---|---|
| I, III and VI | 2085 mm wide x 4270 mm long | Multiples of 2085 mm wide and 4270 mm long are the most cost effective. |
| II, IV, V and VII | 2085 mm wide x 2135 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. Maximum (typical) inside height is 1524mm for SingleTrap and 3048mm for DoubleTrap.
2. Heights customizable to suit site conditions.

*Standard Type I*

*Standard Type II*

*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
- Provided 5 Years Free Inspection, and quoting for Cleaning
- Cleaning service, if required, at an additional cost

Five Years Free Inspection and quoting for cleaning included

# PERFORMANCE MONITORING PLAN

## 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 requires

## Benefits for Municipalities

- Inspection and cleaning reports are automatically filed - no need to remind owners to submit them
- Provided technical support at installation
- 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. Lafarge also provides support for installation of all cleaned operated Jellyfish filters.

Provided technical support at installation

3 year old Jellyfish filters after cleaning

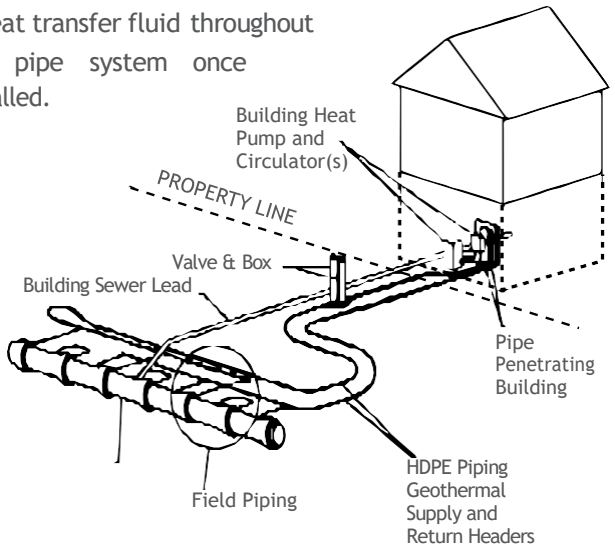
# @SOURCE-ENERGY GEOTHERMAL ENERGY CAPTURE CONCRETE PIPE

- **Industry leading Innovation!**

  The @Source-Energy pipe system represents a major innovation in the concrete pipe industry that is focused around the concept of geothermal energy capture.

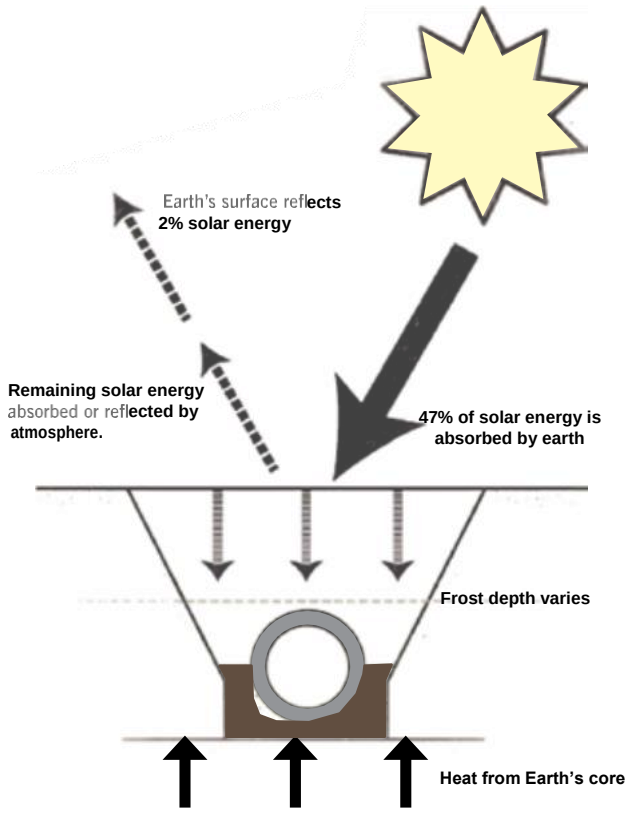
- **The @Source-Energy Pipe System:**

  Heat energy is stored in the ground where it lies dormant and largely underutilized. 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 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. The mass of concreate, being a dense material, makes it an ideal casing for heat transfer to the ethanol/water conductive media. The result is an innovative, highly efficient system that uses 100% on-site renewable energy.

**Geothermal Energy Recovery**





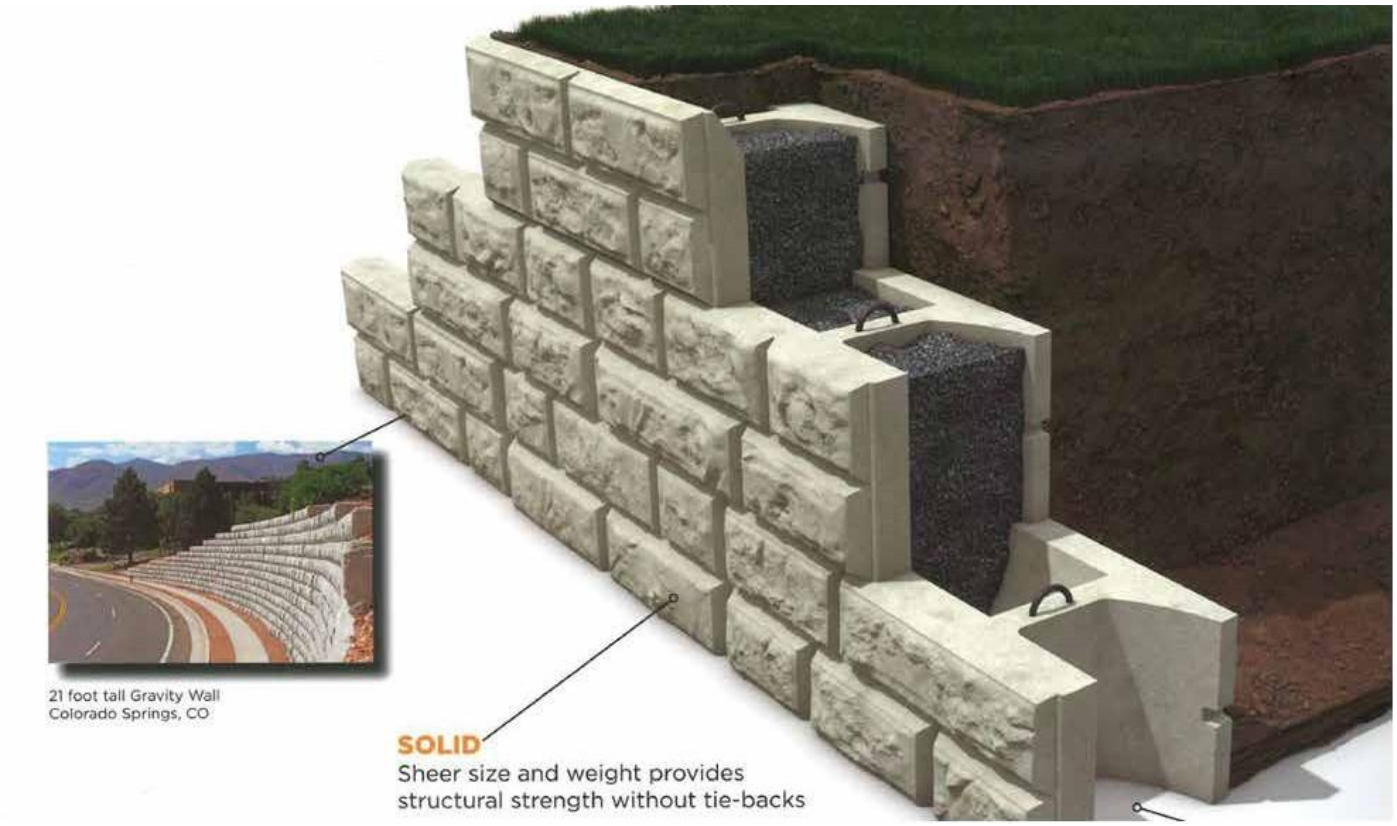



LAFARGE

# STONESTRONGRETAININGWALL

## STONE STRONG SYSTEMS®

There are Stone Strong blocks. Then there's everything else. With the biggest, best and most innovative precast block in the industry, Stone Strong Systems delivers fully and intelligently engineered retaining wall solutions that greatly reduce installation time and labor costs with unmatched safety, durability and aesthetics. State of the art? We go one better. This is state of the block.




### *Available in four custom patterns and can be stained to match any colour*


### *Fully engineered both structurally and geotechnically*

**DRAINAGE**
Innovative, hollow design provides built-in drainage.

**LIGHTER**
Lighter weight makes jobs go faster, easier, at a lower cost.

**BIGGER**
Its 24-sq.-ft. size reduces labor costs and installation time.

**INTERLOCKING**
System designed to ensure blocks stay secure and level.

# STONE STRONG RETAINING WALL

### 24 SF BLOCK
Face 8' x 3', Width 44"

The 24 SF Block contributes to the speed of installation. A small crew and a couple pieces of equipment can install 1,200 SF a day.

### 24-86
Face 8' x 3', Width 86"

Setting the standard for tall gravity walls. At 22.5,' it can go vertical with no tie-back.

### 24 SF MASS EXTENDER BLOCK
Face 8' x 3', Width 56"

The addition of the extender to the 24 SF Block provides for greater gravity wall heights.

### 6 SF BLOCK
Face 4' x 18", Width 44"

The 6 SF Block allows for tighter turning radius, wall steps at 18" increments and vertical and horizontal adjustments. Also includes a top block with recess.

### 6-28
Face 4' x 18", Width 28"

A perfect solution for smaller walls, get up to 60 pieces per truckload. Easy to move around on-site with a skid loader or mini-excavator.

### 24 SF TOP BLOCK
Face 8' x 3', Width 44"

The Top Block has an 8" recess at the top of the face to allow for multiple finish options.

### 3 SF BLOCK
Face 2' x 18", Width 44"

The 3 SF Block allows the wall to stay on running bond.

### 90° BLOCK
Face 4' x 18", Width 4'

The 90° Block provides for inside and outside 90° turns.

### 45° BLOCK
Face 4' x 18" x 8.25"

The 45° Block provides for inside and outside 45° turns.

### DUAL FACE BLOCK
Face 8' x 18", Width 28"

The Dual Face Block provides for above-grade applications.

### END / CORNER BLOCK
Face 4' x 18", Width 2'

The End / Corner Block is used for 90° turns and for end finish treatments.





LAFARGE

## Concrete Pipe Handling

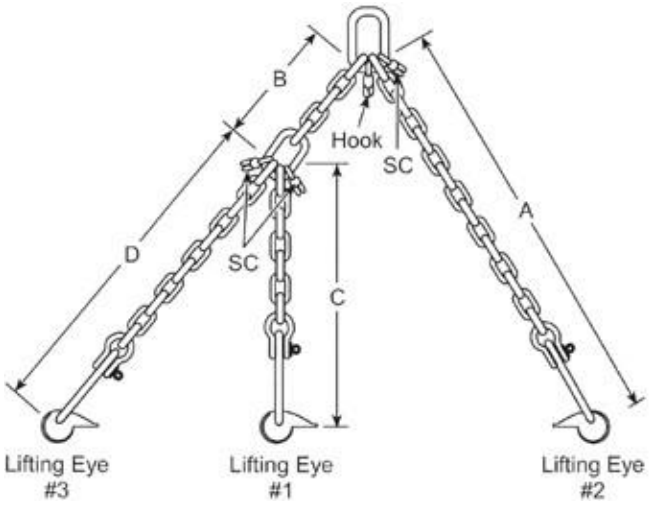
Although each shipment of pipe is blocked and tied down by the hauler, inspect each pipe shipment upon arrival before unloading. Set aside damaged pipe and notify the pipe plant so that repair or replacement can be arranged. Damaged ends, chips or cracks that do not pass through the wall can usually be repaired. Provide padding between the pipe and lifting device to avoid damage during offloading. Stockpile pipe with all the bells arranged at the same end. If stacking pipe, each row should be arranged in the opposite direction with the spigot end protruding to keep the bells from resting on them. Ensure that the bottom row of stockpiled pipe is securely blocked at each end.

All flexible gasket materials, including joint lubricating compounds, should be stored in a cool dry place. Rubber gaskets and performed bulk mastics should be kept clean, away from oil, grease, excessive heat and out of the sun. Gaskets are made so that a percise volume of rubber is used from each joint, to provide long lasting, tight and flexible joint. O-ring gaskets for ASTM C76 & C361 pipe require a lubricant for proper installation. See "Gasket Installation" on the following page for gasket and lubrication procedures.

Do NOT transport pipe over uneven ground using 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 would include heating, hammering, welding, or side loading the pins or anything else that could damage the pin or concrete.

Keep the trench clean and dewatered with a firm bottom free of mud, taking care to prevent foreign material from entering the joint or pipe. Before the pipe is installed a bell hole must be dug in the bedding to accommodate the bell. Failure to do this can cause beam breaks or cracks in the barrel of the pipe.

During insertion of the spigot into the bell, before the pipe is homed, the pipe should be partially supported 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 as shown or 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.



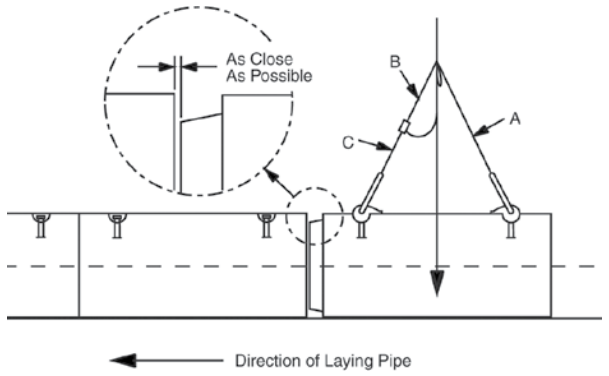

| | Length of Chain (mm) |
|---|---|
| A | 1440 |
| B | 400 |
| C | 1040 |
| D | 1940 |

# CONCRETE PIPE INSTALLATION PROCEDURES

- **Transporting, Lowering and Placing Pipe in Trench**

  Pipe is laid into position using the Pipe Laying Sling in its symmetrical mode. They are lowered into the trench close to the previous pipe laid.

  The pipe may be prevented from rolling laterally by partial backfilling.

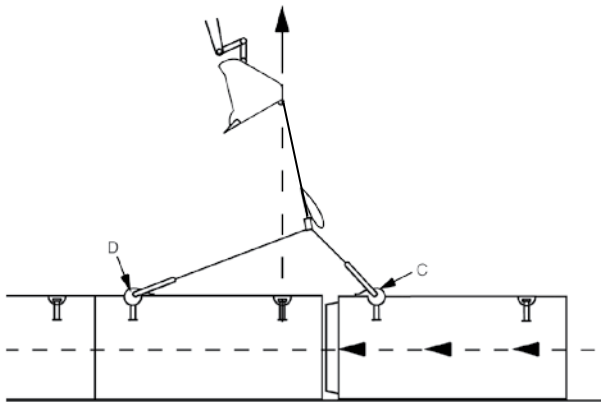



- **Joining Pipe**

  The long leg of the Pipe Laying Sling is attached to the farthest anchor on the previously laid pipe. The free leg is attached - out of the way – on the clevis link provided.

  Locate the center of lift over the closest anchor of the previously laid pipe. This will properly align the direction of pull.

  The pipe is pulled into position by slowly raising the boom on the crane or backhoe without moving the boom forward or backward.



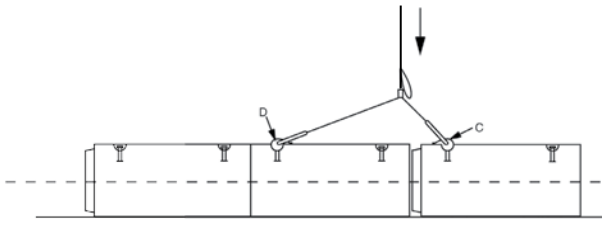

- **Releasing the Load**

  When the pipe has been pulled into position, the load is released and the Pipe Laying System is moved to the next pipe, and the process is repeated.

  Warning: Anchors can become overloaded and fail if the crane or backhoe continues to apply load after the connection has been completed.

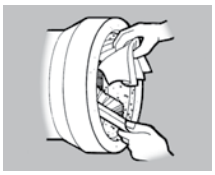
  When handling precast concrete elements, extreme care should be taken to ensure that impact or dynamic loads are kept to a minimum. Impact or dynamic loads can greatly increase the applied load to the anchors.

  Failure to observe the above warnings may lead to property damage, personnel injury and death.

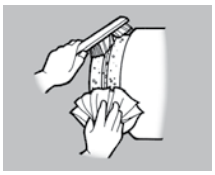


# GASKET INSTALLATION - PIPE

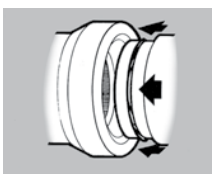
- Self-Lube Gasket
- Wedge Gasket
- O-Ring Gasket

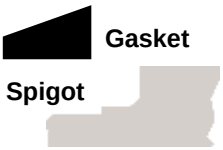
Carefully clean all dirt and foreign substances from the jointing surface of the bell or groove end of pipe.

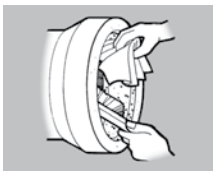


Carefully clean spigot or tongue end of pipe, including the gasket recess.



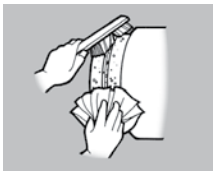
Align bell and spigot of pipes to be jointed. Before homing the joint, check that the gasket is in contact with the entry taper around the entire circumference. Make sure pipe is aligned.



Carefully clean all dirt and foreign substances from the jointing surface of the bell or groove end of pipe.

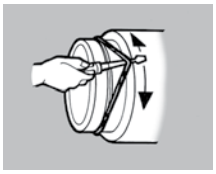
Lubricate bell jointing surface liberally. Use a brush, cloth, sponge or gloves to cover entire inside surface. Only approved lubricant should be used.



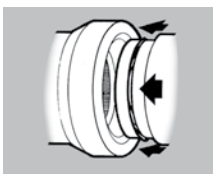
Carefully clean spigot or tongue end of pipe, including the gasket recess.

Lubricate the spigot or tongue end of pipe, especially the gasket recess.

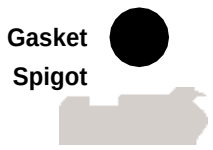
Lubricate the gasket thoroughly before it is placed on the spigot or tongue.

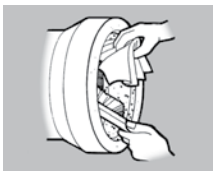


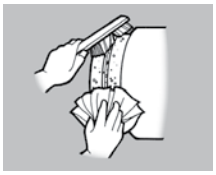
Fit the gasket carefully. Equalize the rubber gasket stretch by running a smooth, round object, inserted between gasket and spigot, around the entire circumference several times.

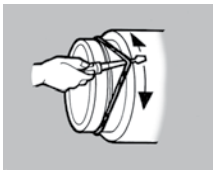


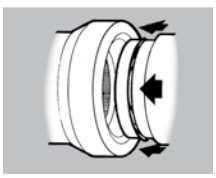
Align bell and spigot of pipes to be jointed. Before homing the joint, check that the gasket is in contact with the entry taper around the entire circumference. Make sure pipe is aligned.



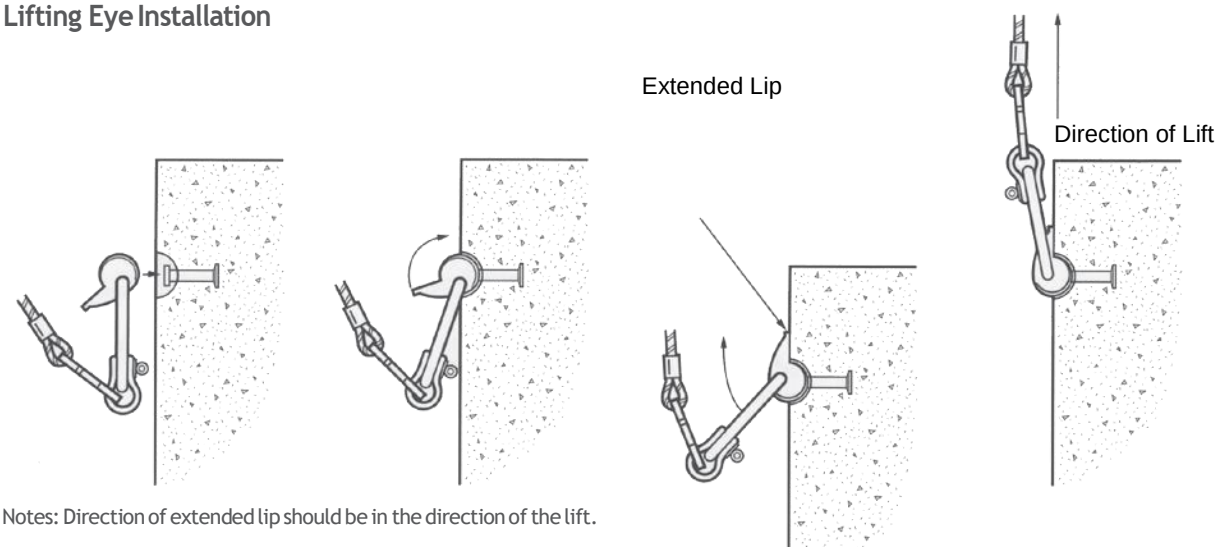






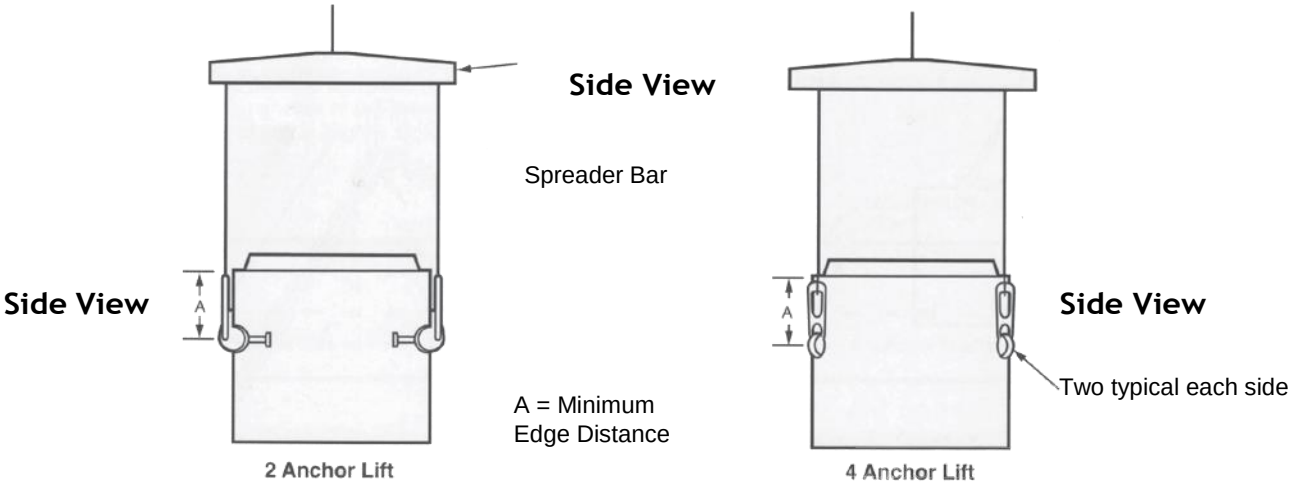
# CATCHBASIN AND MANHOLE HANDLING

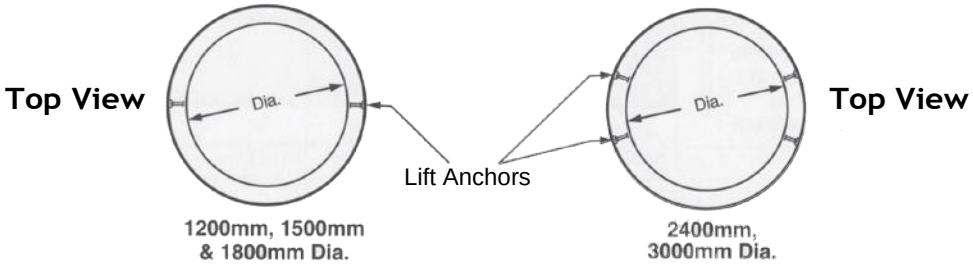
- **Lifting Eye Installation**




Notes: Direction of extended lip should be in the direction of the lift.

- **How to Use the Universal Lifting Eye**



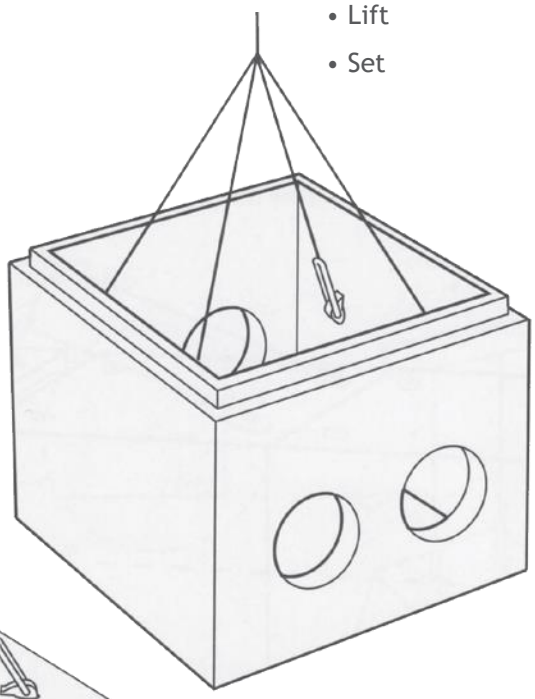

**NOTES:** 1. Load must be applied simultaneos to all Swift Lift Anchors in order to safely lift product.

# CATCHBASIN AND MANHOLE HANDLING

- **Typical Applications**

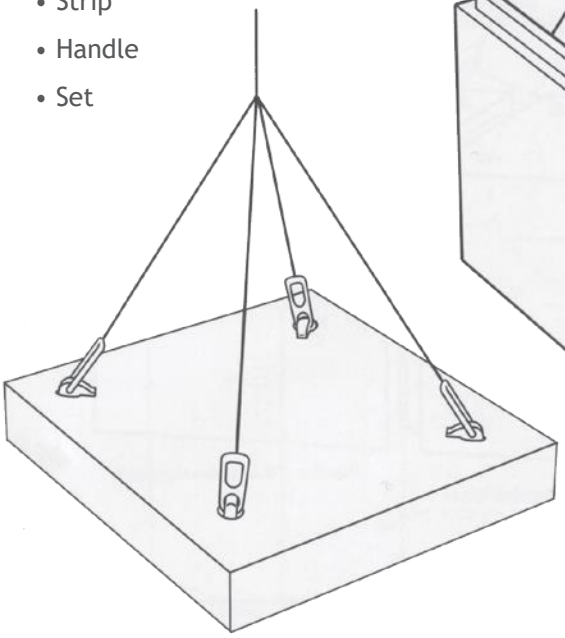
**Base/Extension**

- Strip
- Lift
- Set



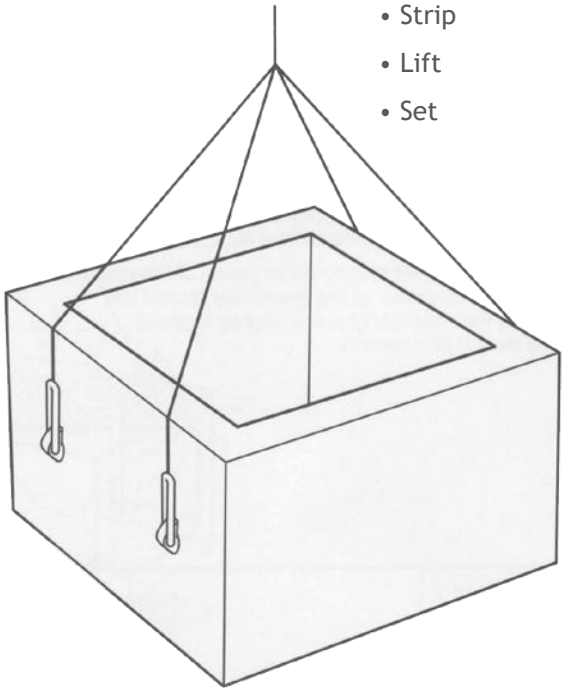
**Base/Slab/Lid/Roof**

- Strip
- Handle
- Set



**Base/Extension/Roof**

- Strip
- Lift
- Set

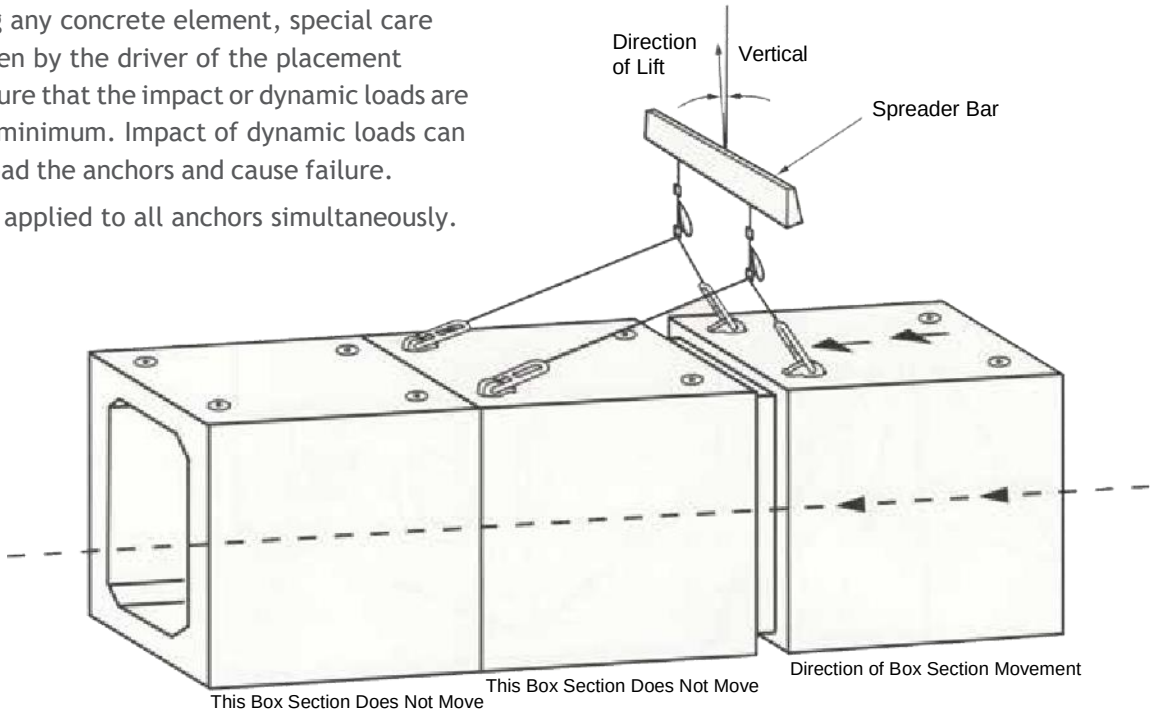


# BOX CULVERT HANDLING

- **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.

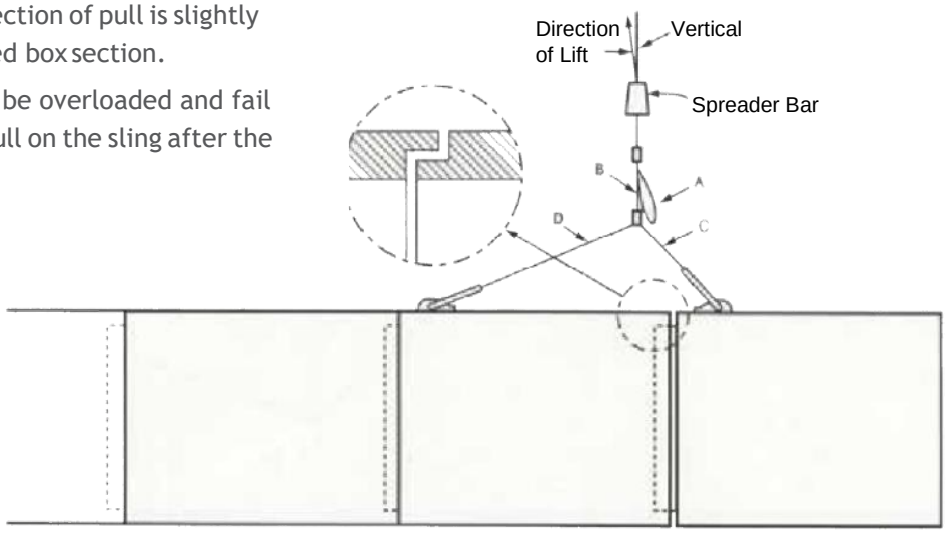



- **Correct Method for Pulling Box Sections Together**

  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 pulley 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.



# TERMS & CONDITIONS

1. All concrete products in this catalogue are manufactured using sulphate resistant cement – CSA A3000 Type HS.
2. Restocking/Cancelled order fee for undamaged stock material will be 15%.
3. Restocking/Cancelled order fee for damaged or unrepairable products may be up to 100%.
4. Restocking/Cancelled order fee for custom produced material may be up to 100%.
5. Prices effective January 2021, subject to change. Tax and freight NOT included.
6. Acceptance of terms: The purchaser agrees that the prices levied by Lafarge Canada Inc. for product/services take into consideration and are predicted on the purchaser assuming and releasing Lafarge Canada Inc. of certain liabilities and responsibilities by requesting product/services of Lafarge Canada Inc., the purchaser voluntarily elects to enter into this agreement and to be bound by all terms and conditions hereof rather than negotiate a different agreement which would execute the exculpatory indemnification, hold harmless and other provisions herein and wherein, such negotiated agreement would among other things involve substantially higher prices and/or require provisions of adequate insurance by and for the expense of the purchaser to protect Lafarge Canada Inc. against the liabilities and responsibilities assumed by the purchaser herein.
7. Lafarge Canada Inc. 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, damage to plant or equipment, governmental regulations, accidents, transportation delays, or from any other cause whatsoever.
8. Orders will be accepted for reasonable color uniformity and finish of material. However, Lafarge Canada Inc. does not accept responsibility for exact shade duplication or finish.
9. Any production and delivery commitments made by Lafarge Canada Inc. are subject to the receipt by Lafarge Canada Inc. of all necessary information, details, and final approved drawings within the time specified.
10. Material will be delivered in full truck-load quantities as close to the job site as trucks of Lafarge Canada Inc. can reasonably proceed under their own power. Unloading time in excess of 1 hour will be charged by Lafarge Canada Inc. to the purchaser at prevailing rates.
11. The purchaser shall inspect all material at the time of delivery and mark any damage or shortage on the delivery ticket. The use or installation of material or the failure to notify Lafarge Canada Inc. of any defect within seven days after delivery will be deemed unconditional acceptance of the material and all obligations of Lafarge Canada Inc. with respect to such material shall thereupon terminate. The obligation of Lafarge Canada Inc. under this warranty is expressly limited to repairing or replacing defective material and the purchaser shall not have any claim for labour, other material or anything other than for such repair or replacement. This warranty is in lieu of all other warranties, expressed or implied, with respect to the material covered hereunder.
12. Lafarge Canada Inc. will not assume liability for any charge for defective materials or for alterations of defective materials, or for any work, except in cases where the prior written authorization of Lafarge Canada Inc. has been given.
13. All Clutches are considered as final sale and not returnable.
14. The purchaser shall assume responsibility for any dirt left on the street by Lafarge Canada Inc.'s trucks as a result of conditions at the place of delivery.
15. Terms of payment: Terms of payment rendered by Lafarge Canada Inc. are net cash within thirty (30) days from the date of invoice issuance, in Canadian dollars and in accordance with any payment instructions written on the invoice. If any invoice is not paid by the end of the said thirty (30) days, interest at the rate of two percent (2%) per month (26.8% per annum) shall be charged on all outstanding amounts. For unpaid amounts collected through legal proceedings or by a collection agency, the purchaser shall pay attorney and agency fees and reasonable costs thereof incurred by Lafarge Canada Inc. in addition to the amount of the invoice and any accrued interest.

Southern Alberta

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BUILDING FOR net zero PEOPLE & PLANET