



**SOLENO**

Mastering Storm Water

# CONVEYING

HIGH-STRENGTH PIPES WITH DEPENDABLE CONNECTIONS



## HIGH-STRENGTH PIPES WITH DEPENDABLE CONNECTIONS

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Pipe maintenance problems, combined with premature deterioration of concrete infrastructure, pose a major challenge on network managers. The impact of rapid building development puts pressure on systems with already insufficient capacity. When we add climate change, it becomes necessary to re-evaluate underground pipe design parameters.

### CONVEYING STORM WATER

Soleno specializes in designing and manufacturing products for moving, channeling and conveying storm water. Corrugated HDPE pipes are **strong** and adequately meet the loads and multiple conditions to which they are subjected. **Dependable connections** are available, including a patented bell outlet with integrated gasket (BIG).

Soleno is also a distributor of Weholite and DuroMaxx large-diameter HDPE pipes. These pipes are highly recommended for rehabilitating pipes at the end of their service life.

Soleno also manufactures in Quebec a complete line of corrugated steel pipes for specific applications in rural and forested areas.

Our solutions meet all storm water network managers requirements and ensure longevity of installations.

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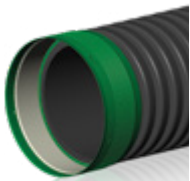
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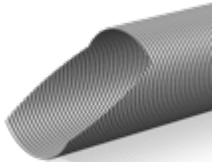
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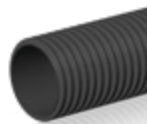
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## STORM WATER SEWER

Water pipe network distinct from sanitary sewers, specifically for conveying storm water, surface runoff and snow melt.

### LEED®

For several years in Quebec and elsewhere in Canada, it has been possible to obtain environmental certifications for the design and construction of sustainable buildings. Businesses and organizations use the LEED<sup>1</sup> certification program or other certification systems, to develop the necessary tools that have an immediate and measurable impact on their buildings' performance.

Some solutions available from Soleno are eligible for the obtainment of credits leading to certification. Whether for the Sustainable Sites (SS), Water Efficiency (WE) or credits relating to Materials and Resources (MR) under the LEED program, or for other opportunities for certification, please contact the Soleno team to learn more about how our solutions can positively contribute to your obtainment of a certification for your project.

<sup>1</sup> Canada Green Building Council's Leadership in Energy and Environmental Design



## WATERTIGHT NON-PERFORATED SOLFLO MAX (R320)

When regulations in effect require, for a gravity system, **perfect watertightness** and complete prevention of sediment infiltration and conveyed water exfiltration.

- **Soleno's exclusive patented bell with integrated gasket (BIG) ensures perfect watertightness.** The fixed thermofused gasket simplifies installation, and with its clips, considerably facilitates work supervision.
- The depth of the interlocked overlap of the gasket over two corrugations ensures watertightness.\*
- Available in Atlantic Canada and the USA in 6 m (19.68 ft) lengths.
- Available in Quebec in 4 m (13.12 ft) lengths for 100 mm (4 in) to 900 mm (36 in) diameters. Using Solflo Max watertight pipes minimizes flats and facilitates work progress in deep and multiple trench installations.
- For most diameters

### MODEL SHOWN:

Watertight non-perforated Solflo Max with integrated gasket bell and clips (BIGC).

## SOIL TIGHT NON-PERFORATED SOLFLO MAX (R320)

When the regulations in effect require **only tightness from sediment infiltration**.

- The depth of the interlocked overlap of the locking bell used on Solflo Max soil tight pipes wrapped with geotextile eliminates any risk of sediment infiltration.

### MODEL SHOWN:

Soil tight non-perforated Solflo Max with bell with clips (BC).

## DUROMAXX PIPES

DuroMaxx pipes should be favored for large and very large diameters of 750 mm (30 in) to 3000 mm (120 in).

- Available with watertight gasket up to 15 lb/in (1800 mm (72 in)) for a quick installation or sealed by a thermal fusion process to form a perfectly tight connection.
- Combining the structural performance of steel and the durability of polyethylene, DuroMaxx is suitable for storm water, sanitary and combined applications.
- DuroMaxx, made of steel reinforced polyethylene (SRPE), fits accessories available at Soleno.
- Perfectly withstands corrosion, root intrusion and biological growth.
- Inert to chemicals.
- Available in long sections with perfectly smooth interior walls, regardless of diameter.

### MODEL SHOWN :

DuroMaxx pipe

## MANHOLE WITH SMOOTH EXTERIOR WALL

WITHSTANDS CL-625, H-25 AND HS-25 HIGHWAY LOADS

Limits vertical structural displacement due to freeze-thaw cycles.

- Soleno's manholes, with a smooth exterior wall, **can be perfectly tailored for infrastructure repair work and designed** according to your specific requirements for new installations.
- **Manhole's diameter can be the same as that of the connections**, which prevents oversizing the manhole, at the same time lowering the cost of the whole system.
- Much lighter than traditional manholes, they **facilitate on-site installation**.
- Manholes with smooth exterior walls eliminate the need for frost-resistant geocomposite. As they are made from HDPE, they provide **excellent resistance to de-icing salts, abrasives, chemicals and vibration**.

### MODEL SHOWN :

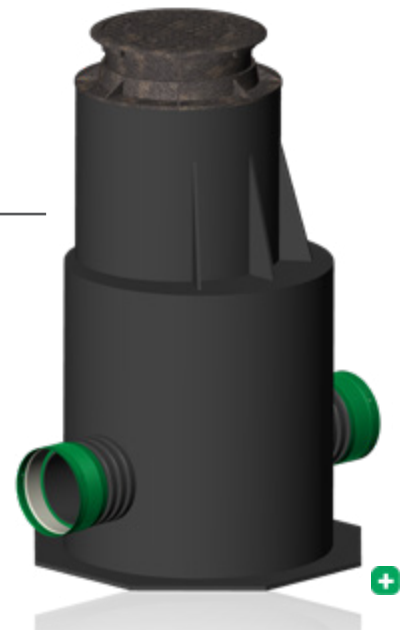
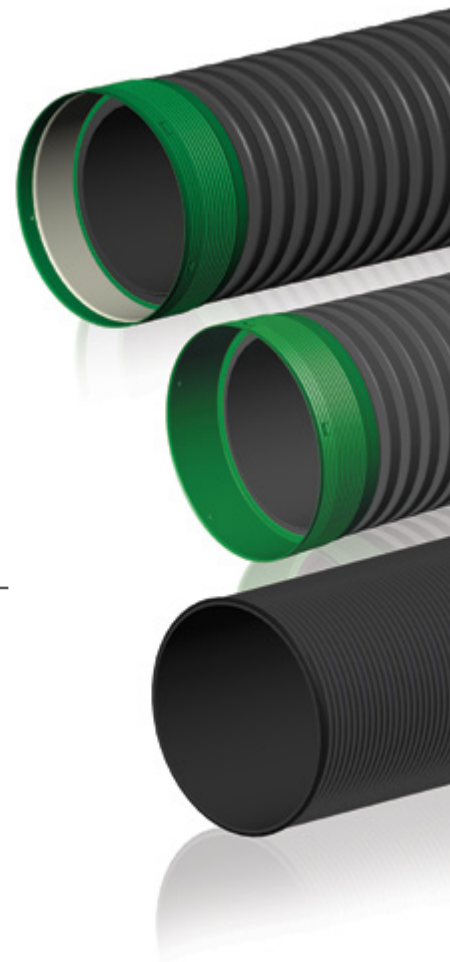
Manhole with smooth exterior walls with adjustable cast iron grate and lid, and double bell outlets with integrated gasket and clips (DBIGC).

### FITTINGS AND ACCESSORIES

Soleno offers several watertight and soil tight fittings and a complete line of accessories that can be tailored to site requirements and network design. Consult « Fittings and Accessories » section of this brochure.

### OPTIONS

Several options are available: riser, ladder, lift eyelet, safety platform, special grate and lids. For more information on these options, consult the next page of this brochure and Soleno's technical catalogue.



# THE SUSTAINABLE ALTERNATIVE

## THE MANHOLE WITH SMOOTH EXTERIOR WALL

Soleno's manhole, with a smooth exterior wall, can be perfectly tailored for infrastructure repair work and designed according to your specific requirements for new installations. **For most applications, it is an excellent replacement for traditional concrete manholes.**

### CAST IRON ROAD WORK

A wide range of standard cast iron roadwork products is available at specialty retailers to complement the Soleno manhole with smooth exterior wall. Using an adjustable frame, frame guide and circular lid permits its use under a roadway encountering structural resistance to meet CL-625 highway loading requirements as defined in standard CAN/CSA-S6-06, and H-25 or HS-25 as defined in standard AASHTO.

### MANHOLE

As it is made from HDPE, the Soleno manhole with smooth exterior wall has **excellent resistance to de-icing salts, abrasives, chemicals and vibration** caused by vehicular traffic.

Available in customized heights for diameters of 600 mm (24 in) to 3,350 mm (132 in). Practical and easy-to-install risers help to adjust the final height of the manhole.

Manholes larger than 1,050 mm (42 in) are manufactured with a reduced-diameter upper section, allowing use of a 900 mm (36 in) cast iron frame. The upper section is equipped with angled structural reinforcements and a base plate facilitating anchoring and stabilization. A manhole can also be used as a pumping station since it **is completely watertight.**

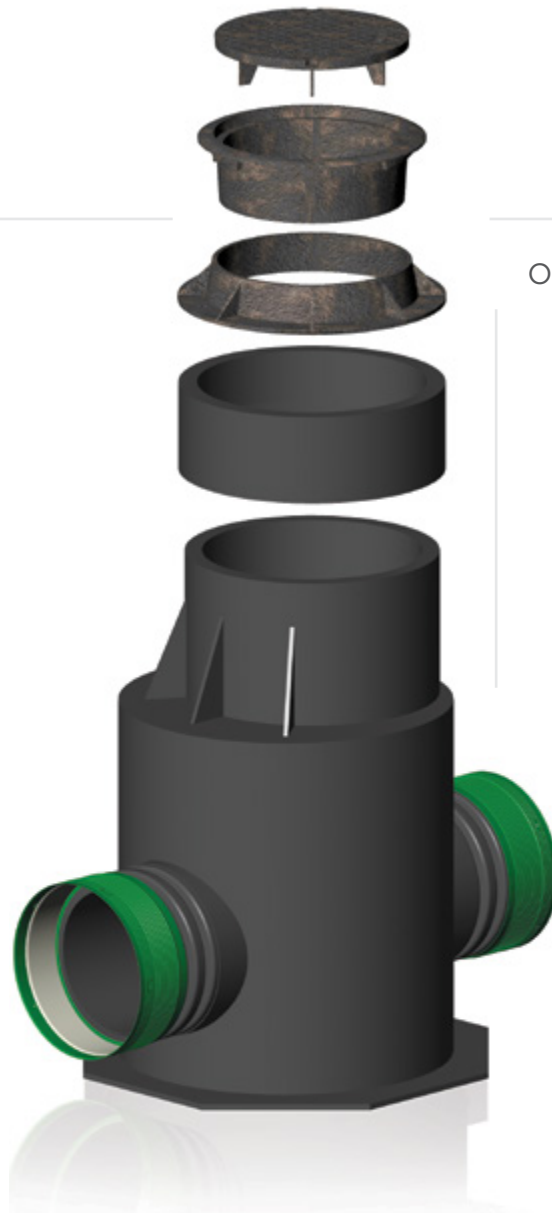
### ENTRIES AND OUTLETS

The welded HDPE design helps to assemble entries and outlets with diameters equivalent to the nominal exterior diameter of the manhole. It is therefore possible to connect a 900 mm (36 in) pipe (entry and outlet) to a 900 mm (36 in) manhole. **HDPE manholes provide substantial savings in purchasing, excavation and installation costs. Oversizing is not required, as opposed to traditional concrete installations.**

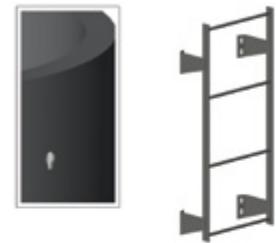
Soleno also provides all the basic connections for integrating the HDPE manhole to existing networks and connections for HDPE, PVC, concrete and "steel pipe".

### OPTIONS

Risers, ladder, eyelet lift and safety stop. These options complete the creation of a customized manhole.



### Options



### FLOW REGULATION

Soleno offers a line of high-quality flow regulators. Vortex flow regulators are often used in manholes, in temporary storage system outlets or directly in the storm water sewer network. Consult our Storage brochure to obtain more information about Soleno's flow regulators.



# DEPENDABLE CONNECTIONS

With Soleno's watertight and soil tight connectors, **connecting HDPE pipes is simple** in any situation.

## BELL WITH INTEGRATED GASKET THE WATERTIGHT SOLUTION

For gravity networks requiring **perfect watertightness from ground water infiltration and conveyed water exfiltration**, the patented bell with integrated gasket is the best solution.

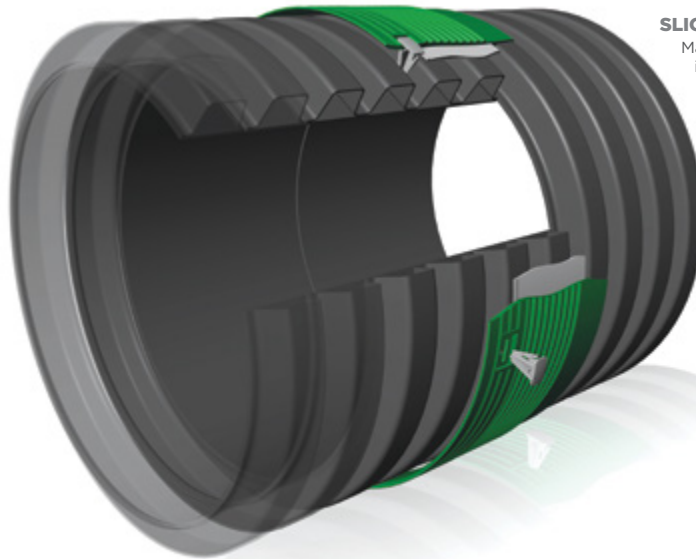
With the depth of its interlocked overlap, the unique integrated gasket (BIG) design ensures two permanent points of contact on the crest of the corrugations\*, ensuring watertight connections.

### FIXED THERMOFUSED GASKET

This unique property ensures the quality of every joint on the site by guaranteeing the presence and position of every gasket during installation.

### BELL WITH INTEGRATED GASKET

Protects the gasket from friction, displacement and inversed installation, while greatly facilitating the insertion of pipes.



### SLIGHTLY OVERSIZED BELL

Makes it possible to cut the pipe being inserted to the required length. The bell outlet with integrated gasket accepts full diameter pipes.

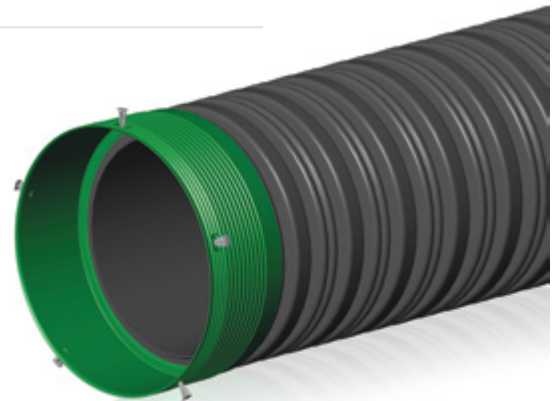
### CLIPS

Every bell is provided with clips that help validate the quality of the installation and the depth of the interlocked overlap, while preventing movement during backfill.

\* For most diameters

## BELL WITH CLIPS\*\* THE QUICK SOLUTION

For networks requiring protection from coarse sediment infiltration, a bell with clips system without gaskets is highly recommended. Soleno's locking bells interlock quickly with their integrated locks to prevent joint movement during installation.



## SPLIT COUPLER\*\* THE ECONOMICAL SOLUTION

A split coupler joins pipes by wrapping the junction with a moulded strip that perfectly matches the pipe contour. This is a simple and economical system that prevents infiltration by coarse sand.

\*\* The use of a geotextile is recommended when the installation is carried out in a soil composed of coarse sediments.



## DITCH PIPING

Water pipe network for storm water and non-roadway surface runoff that can lower or replenish ground water by infiltration and exfiltration or direct it towards an outlet.





## SOIL TIGHT NON-PERFORATED SOLFLO MAX (R320 AND R210)

When regulations in effect require **only tightness from sediment infiltration**.

- The depth of the interlocked overlap of the locking bell wrapped with geotextile eliminates any risk of sediment infiltration.

### MODEL SHOWN:

Non-perforated Solflo Max with bell with clips (BC).

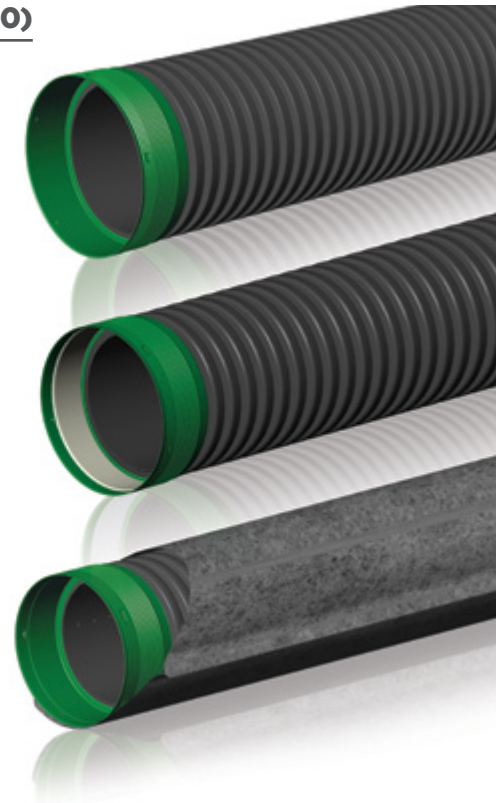
## WATERTIGHT NON-PERFORATED SOLFLO MAX (R320)

When regulations in effect require, for a gravity system, **perfect tightness** from water and sediment infiltration and conveyed water exfiltration.

- **Soleno's exclusive patented bell with integrated gasket (BIG) ensures perfect watertightness.** The fixed thermofused gasket simplifies installation, and with its clips, considerably facilitates work supervision.
- The depth of the interlocked overlap of the gasket over two corrugations for most diameters ensures watertightness.
- Available in Atlantic Canada and the U.S. in 6 m (19.68 ft) lengths.
- Available in Quebec in 4 m (13.12 ft) lengths for 100 mm (4 in) to 900 mm (36 in) diameters.
- Also available in diameters of 1,050 mm (42 in), 1,200 mm (48 in) and 1,500 mm (60 in), watertight or soil tight.
- Using Solflo Max watertight pipes minimizes deflection and facilitates work progress in deep and multiple trench installations.

### MODEL SHOWN:

Non-perforated Solflo Max with bell integrated gasket with clips (BIGC).



## PERFORATED AND FILTERED SOLFLO MAX (R320 AND R210)

To allow water infiltration while limiting small particle migration.

- Soleno offers a complete line of connectors equipped with the **exclusive locking bell technology**, ensuring quality installation.

### MODEL SHOWN:

Solfo Max filtered with a (Routex III-IV) nonwoven geotextile with bell with clips (BC).



## CORRUGATED MANHOLE/CATCH BASIN

An **economical** and **sustainable** solution for **non-roadway use**.

- As they are made from HDPE, our corrugated manhole/catch basins provide excellent resistance to de-icing salts, abrasives and chemicals.
- Easy to handle.
- Available with a cast iron or HDPE grate.

### MODEL SHOWN:

Corrugated manhole/catch basin with HDPE lid and double bell with integrated gasket with clips (DBIGC).

## ROUTEX III - IV

**FILTER SHEATH FOR PERFORATED SOLFLO AND SOLFLO MAX FILTERED WITH 110-MICRON OPENINGS**

Needle punched nonwoven geotextile.

Function: filtration, separation and drainage. Treated to resist UV rays. Physical and mechanical properties correspond to MTMDET (formerly called MTQ) geotextiles Types III & IV. Certified by the BNQ according to standard GCTTG 3001-06 and complies with MTMDET standards.

### FITTINGS AND ACCESSORIES

Soleno offers several watertight and soil tight fittings and a complete line of accessories that can be tailored to site requirements and network design. Consult « Fittings and Accessories » section of this brochure.

### OPTIONS

Several options are available: risers, ladder, hooking system: hook or eyelet, special grates and lids and safety stop.

For more information about these options, consult the previous pages and Soleno's technical catalogue.



## HDPE CULVERTS

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An engineered structure in a water course intended to allow crossing while ensuring the free flow of water and unrestricted movement of aquatic fauna. HDPE pipes are mostly used for roadway infrastructure.

Product selection depends on the specified service life. HDPE should be favored when infrastructure longevity is the primary consideration. Availability of various diameters and hydraulic capacity (Manning roughness coefficient, diameter and slope) must also be taken into account.



## NON-PERFORATED SOLFLO MAX

- With an **exceptional service life**, Solflo Max pipes are **strong**, and their **dependable connections** eliminate the potential destabilization of the road bed.
- Because of the length of the pipes, **installation time** is reduced and there are **fewer joints** compared to concrete pipes.
- **Soleno's exclusive patented bell with integrated gasket (BIG) ensures perfect watertightness.** The fixed thermofused gasket simplifies installation, and with its clips, considerably facilitates work supervision. The depth of the interlocked overlap of the gasket over two corrugations for most diameters ensures watertightness.
- Diameters of 1,050 mm (42 in), 1,200 mm (48 in) and 1,500 mm (60 in) are supplied with an O-ring bell gasket.

### MODEL SHOWN:

Non-perforated Solflo Max with bell and integrated gasket with clips (BIGC).

## WEHOLITE PIPES

Weholite pipes should be favored for large and very large diameters of 1,500 mm (60 in) and over.

- Joints can be threaded or thermally fused to create a **perfectly tight connection.**
- Available in long sections with **perfectly smooth interior walls, regardless of diameter.**
- Perfectly withstands corrosion, root intrusion and biological growth.
- Inert to chemicals.

### MODEL SHOWN:

Weholite pipe with threaded joint (male side).

## DUROMAXX PIPES

DuroMaxx pipes should be favored for large and very large diameters of 750 mm (30 in) to 3000 mm (120 in).

- Available with watertight gasket up to 15 lb/in (1800 mm (72 in)) for a quick installation or sealed by a thermal fusion process to form a perfectly tight connection.
- Combining the structural performance of steel and the durability of polyethylene, DuroMaxx is suitable for storm water, sanitary and combined applications.
- DuroMaxx, made of steel reinforced polyethylene (SRPE), fits accessories available at Soleno.
- Perfectly withstands corrosion, root intrusion and biological growth.
- Inert to chemicals.
- Available in long sections with perfectly smooth interior walls, regardless of diameter.

### MODEL SHOWN:

DuroMaxx pipe.

## GEOTEXTILE

### ROUTEX V

**ROUTEX V PROVIDES EXCELLENT RESISTANCE TO PUNCTURING AND OTHER LOCALIZED PHYSICAL AGGRESSIONS**

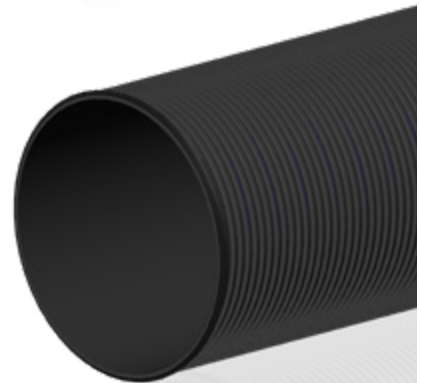
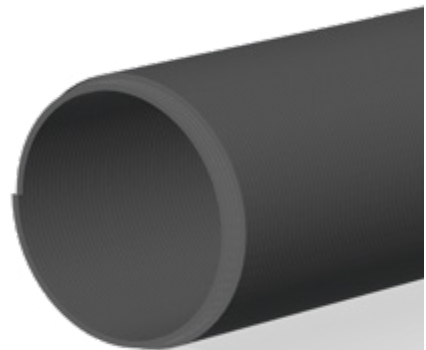
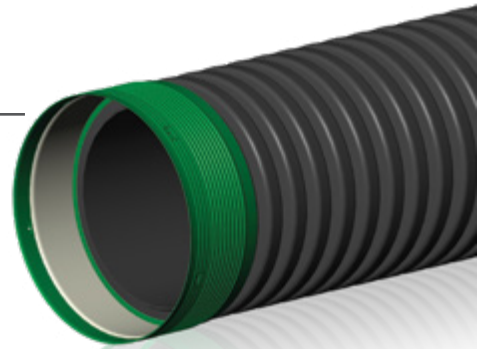
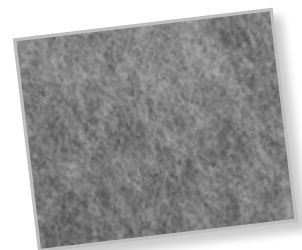
Function: reinforcement, filtration and separation

ROUTEX V was especially designed to play a role in filtration and reinforcement for protecting embankments and ditches beneath rockfills. Installed between soil and rockfill, it helps prevent leaching of small underlying material. It also prevents scouring at the base of the structure.

ROUTEX V is also used to reinforce roadways lying over soil with a low carrying capacity. It also performs a separation function by limiting interpenetration of other sizes of material.

Certified by the BNQ according to standard GCTTG 3001-06.

Complies with MTMDDET (formerly called MTQ) Type V geotextiles.



# TURBULENCE

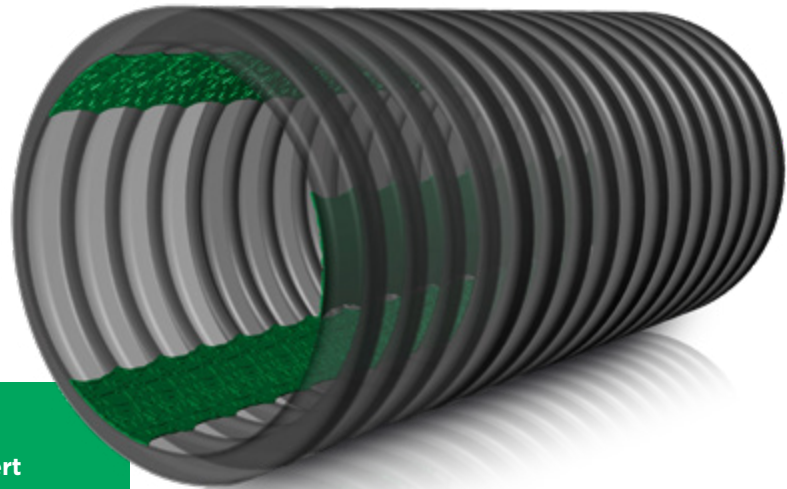
## FINALLY, A CULVERT THAT PROVIDES FLOW CONDITIONS SIMILAR TO A CREEK

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THE TURBULENCE CULVERT REPRODUCES THE NATURAL BED CONDITIONS OF A CREEK, WITH A MANNING'S N VALUE OF 0.021\*.

THIS PATENTED PRODUCT IS EXCLUSIVELY AVAILABLE FROM SOLENO, IN DIAMETERS OF 450 mm AND 600 mm (18 in and 24 in) AND IN LENGTH OF 6 m (19.7 ft).

WITH A RESISTANCE OF 210 kPa, THE ADDITION OF 3 REINFORCEMENT STRIPS ON THE CORRUGATED INTERIOR WALL PRESERVES THE LONGITUDINAL STRENGTH OF THE PIPE, CREATES WATER TURBULENCE AND FACILITATES NESTING FOR SHIPPING PURPOSES.



The decrease in velocity in the culvert reduces erosion at the outlet, which promotes slope conservation and stability.

THE CORRUGATED INTERIOR WALL REDUCES THE WATER RAPIDITY AND FLOW.

## ADVANTAGES AND BENEFITS

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- The Turbulence culvert pipe **meets the Quebec Regulation on Sustainable Forest Management**, as it allows the free flow of water and the free movement of aquatic fauna.
- **By increasing bed roughness**, it eases the passage and counter-current movement by the fish, while serving as a refuge for wildlife and fish fry.
- This lightweight and durable HDPE culvert is easy to install and handle in woodlands, in mining and rural environments, wherever water flow and velocity needs to be reduced.

**With a Manning coefficient 40 %\* higher than corrugated steel pipe, Turbulence is the ideal culvert to encourage ecosystem growth and mitigation of erosion.**

\*Calculated for a 450 mm (18 in) diameter pipe.





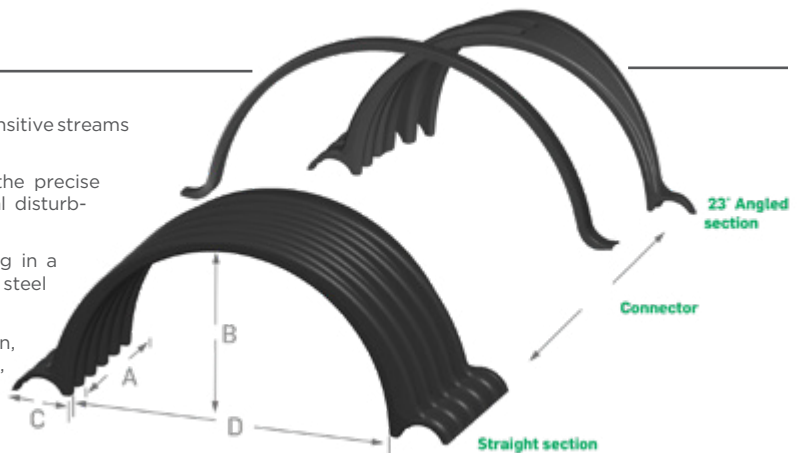
## ARCH CULVERTS MADE OF POLYMER

An engineered structure over a water stream that allows crossing while ensuring the free flow of water and unrestricted movement of aquatic fauna. These polymer arches are mainly used in rural, forestry and mining sectors.

They allow crossing of the stream without affecting its banks and bed and without disturbing the flora and fauna of its ecosystem.

### ENVIRO-SPAN® MODULAR ARCH CULVERT PATENTED SYSTEM

- Suitable for use over fish-bearing and environmentally sensitive streams without disturbing the stream bed.
- Available in straight or angled sections allowing for the precise contour of the natural stream bed without additional disturbance.
- Produced from liquid molded resin (polymer) resulting in a durable and reusable non-metallic alternative to heavy steel culverts.
- Due to its lightweight material and innovative design, the bottomless culverts require less time, equipment, and manpower for environmentally-friendly installations, when compared to traditional stream and ditch crossing.
- Stackable for easy and economical transportation.
- The modular arch culvert can withstand an off-highway load of 69,000 lb (31,298 kg) per axle load with tandem axle configuration overlain by 0,61 m (2 ft) of backfill.





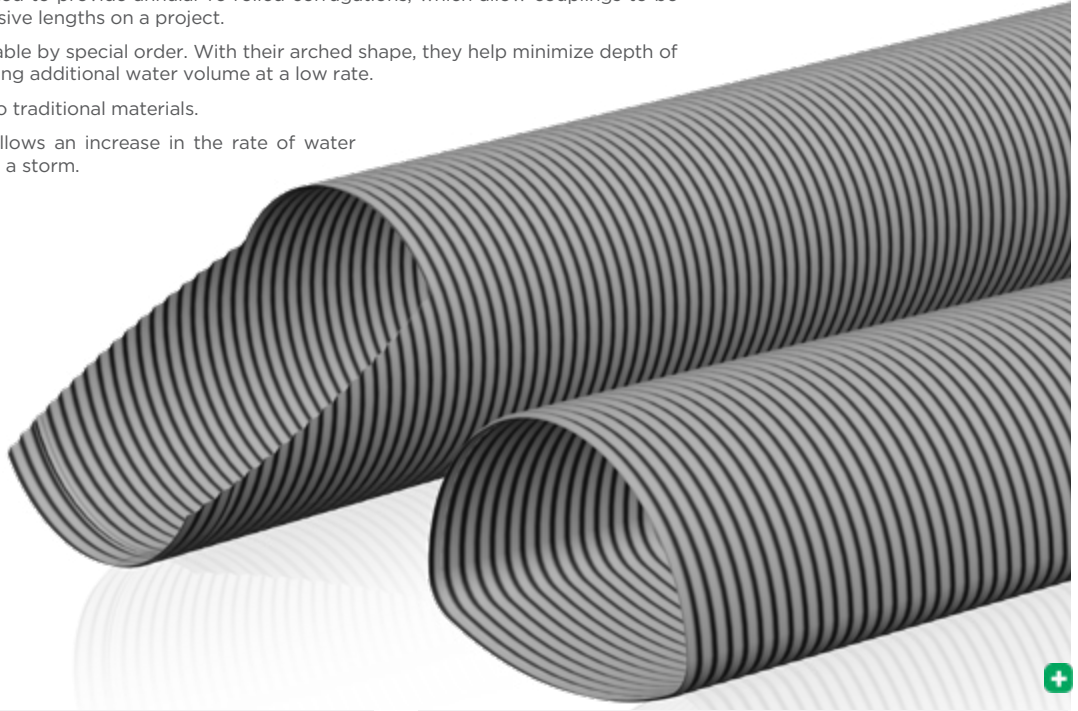
## STEEL CULVERT

An engineered structure in a water course intended to allow crossing while ensuring the free flow of water and unrestricted movement of aquatic fauna. Steel pipes are mainly used in rural, forestry and mining sectors.



## STEEL PIPES

- Customized **non-standard lengths** up to 18 m (60 ft).
- An **economical** solution for large diameter pipes providing conveyance savings due to optimization of the loading space.
- The pipe ends are adjusted to provide annular re-rolled corrugations, which allow couplings to be used to assemble successive lengths on a project.
- Arch pipes are also available by special order. With their arched shape, they help minimize depth of the backfill while conveying additional water volume at a low rate.
- **Lightweight** compared to traditional materials.
- Beveled cut available. Allows an increase in the rate of water flow in the culvert during a storm.



### MODEL SHOWN:

Spiral steel pipes with corrugated and beveled cut ends with split collar connector.

### MODEL SHOWN

Arch pipe

### ACCESSORIES

Soleno manufactures split collars for steel pipes. Consult « Fittings and Accessories » section of this brochure.

### OPTIONS

Spiral ends and beveled cut are available upon request. For more information about these options, consult Soleno's technical catalogue.

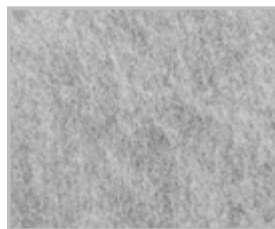
## GEOTEXTILE

### TX-F

#### FUNCTION: SEPARATION AND REINFORCEMENT

Manufactured exclusively for Soleno, non-woven TX-F textile is the **ideal solution for ballasting at the ends of culverts** and for **developing forestry roads**.

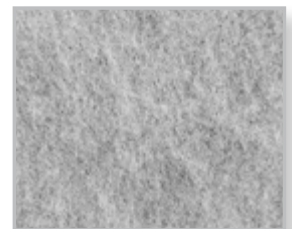
Its superior strength (1,000 Newtons) and its machined side result in a first class material to improve mechanical properties of soil and maintain integrity of underlying foundation materials.



### TX-170

#### FUNCTION: SEPARATION AND STABILIZATION

For applications requiring tearing resistance of less than 1,000 Newtons, the TX-170 helps increase soil carrying capacity and reduce rut formation.

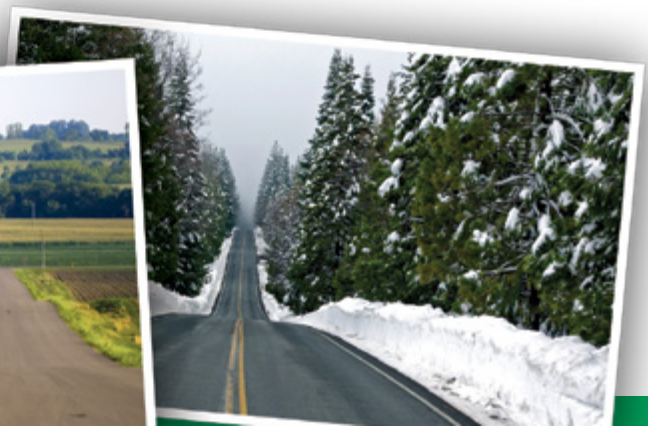




## DRIVEWAY CULVERT

Engineered structure in a ditch to allow crossing between a public roadway and adjacent land while ensuring the free flow of water.

Pipe choice depends on several factors: specified service life, structural capacity (strength under compression in kPa), pipe length, diameter availability and hydraulic capacity (roughness coefficient, diameter and slope). **HDPE is the logical choice when infrastructure longevity is the primary consideration.**





## NON-PERFORATED SOLFLO MAX (R210 AND R320)

- Sustainable solution resistant to de-icing salts.
- Solflo Max R210 pipes are available in 6 m (19.68 ft), 9 m (29.53 ft), 12 m (39.37 ft) m lengths, minimizing the number of joints compared to traditional pipes.
- Additional lengths available upon request.
- Optional beveled cut.
- Easy to handle without heavy equipment.

### MODEL SHOWN:

Solflo Max pipe with bell with integrated gasket and clips (BIGC) and beveled cut.



## STEEL PIPES

- Customized **non-standard lengths** up to 18 m (59.06 ft).
- An economical solution for large diameter pipes.
- **Lightweight** compared to traditional materials.
- Optional beveled cut.

### MODEL SHOWN:

Spiral steel pipe with corrugated ends.

## GEOTEXTILE

### ROUTEX V

**ROUTEX V PROVIDES EXCELLENT RESISTANCE TO PUNCTURING AND OTHER LOCALIZED PHYSICAL AGGRESSIONS**

Function: reinforcement, filtration and separation

ROUTEX V was especially designed to play a role in filtration and reinforcement for protecting embankments and ditches beneath rockfills. Installed between soil and rockfill, it prevents leaching of small underlying material. It also prevents scouring at the base of the structure.

ROUTEX V is also used to reinforce roadways lying over soil with a low carrying capacity. It also performs a separation function by limiting interpenetration of other sizes of material.

Certified by the BNQ according to standard GCTTG 3001-06.  
Complies with MTMDET (formerly called MTQ) Type V geotextiles.

### TX-80 AND TX-90

**MADE FROM NEEDLE PUNCHED POLYPROPYLENE FIBERS**

Function: filtration, separation and drainage

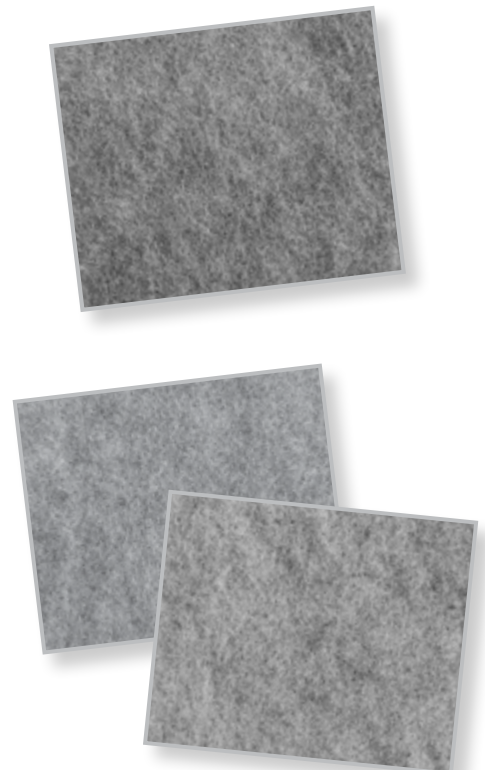
The **TX-80** and the **TX-90** serve as drainage and filtration geotextiles when applied as filters around percolation wells or between clean stone and in situ soil. The **TX-90** is used for the same applications as the **TX-80**. As it is thicker, it is more resistant to bursting and tearing.

The **TX-90** is mostly used in civil engineering work.

- Certified by the BNQ according to standard GCTTG 3001-06

TX-80: 100-micron openings.

TX-90: 90-micron openings.





## CULVERT LINING

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Renewal of a culvert with defects or nearing the end of its service life, by inserting an HDPE pipe with smooth interior and exterior walls.



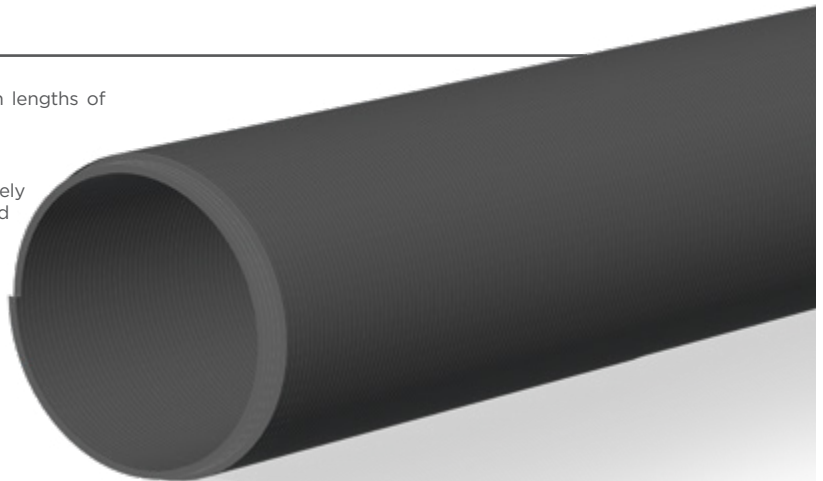
# LINING INSERTION

Currently, various levels of government are extremely concerned about infrastructure rehabilitation. Rehabilitation may appear to be a huge project. To reduce costs and inconvenience, Soleno offers rehabilitation by insertion.

Pipe choice should be based on diameter availability, the exterior diameter of the pipe being inserted and space available in the preparation area.

## WEHOLITE PIPES

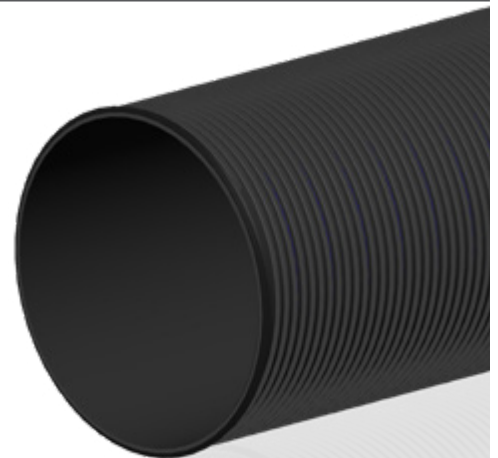
- Weholite pipes with threaded joints are available in lengths of 5 m (5.16 ft), 7.62 m (25 ft) and 15.24 m (50 ft).
- Diameter of 460 mm (18 in) to 3,350 mm (132 in).
- Pipes with smooth interiors and exteriors are extremely resistant to de-icing salts, abrasives, chemicals and vibration.
- Certified by the BNQ according to standard ASTM F894.



## DUROMAXX PIPES

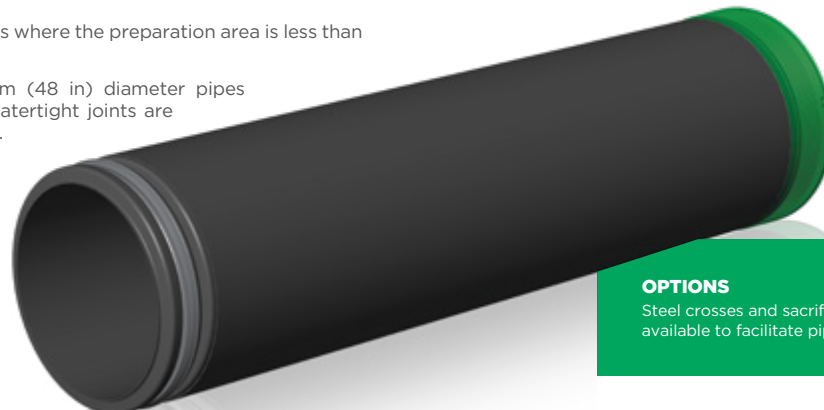
DuroMaxx pipes should be favored for large and very large diameters of 750 mm (30 in) to 3000 mm (120 in).

- Available with watertight gasket up to 15 lb/in (1800 mm (72 in)) for a quick installation or sealed by a thermal fusion process to form a perfectly tight connection.
- Combining the structural performance of steel and the durability of polyethylene, DuroMaxx is suitable for storm water, sanitary and combined applications.
- DuroMaxx, made of steel reinforced polyethylene (SRPE), fits accessories available at Soleno.
- Perfectly withstands corrosion, root intrusion and biological growth.
- Inert to chemicals.
- Available in long sections with perfectly smooth interior walls, regardless of diameter.



## PIPE WITH SMOOTH EXTERIOR WALL

- Ideal for installation in tight spaces where the preparation area is less than 4 m (13 ft) to 5 m (16 ft).
- 1,050 mm (42 in) and 1,200 mm (48 in) diameter pipes with smooth exterior wall and watertight joints are available in 3.08 m (10 ft) lengths.
- Available in diameter of 450 mm (18 in) to 1,500 mm (60 in).



### OPTIONS

Steel crosses and sacrificial pipes are available to facilitate pipe rehabilitation.



## COLLECTOR AND DRAINAGE OUTLET

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A collector is an underground pipe that collects water from several drainage lines to divert it towards a drainage outlet.



# COLLECTORS

## NON-PERFORATED DRAIN (TYPE 1)

Serves to convey water in order to minimize erosion on an extreme slope.

At the edge of a forest, a non-perforated **Type 1** drain is ideal, as it prevents roots from penetrating the drainage collector.

## PERFORATED DRAIN (TYPE 2)

## PERFORATED AND FILTERED DRAIN (TYPE 2)

The perforated drain **Type 2** is intended for installation in **clay soil**.

The perforated and filtered drain **Type 2 with 100-micron** openings is intended for installation in **sandy or silty soil**, with a **D85 between 21 and 120**.

### MODEL SHOWN:

Perforated drain Type 2 filtered with nonwoven polyester with 100-micron openings.

The perforated and filtered drain **Type 2 with 250-micron** openings is intended for installation in **sandy or silty soil**, with a **D85 between 121 and 400**.

## PERFORATED AND FILTERED DRAIN (TYPE 3)

The perforated and filtered drain **Type 3 with 100-micron** openings is recommended for installation in **loamy soil with fine loam to very fine sand** with a **D85 between 21 and 120**.

The perforated and filtered drain **Type 3 with 250-micron** openings is recommended for installation in **soil rich in fine and medium sand** with a **D85 between 121 and 400**.

The perforated and filtered drain **Type 3 with 450-micron** openings is recommended for installation in **soil containing coarse sand to gravel** with a **D85 over 400**.

### MODEL SHOWN:

Perforated drain Type 3 filtered with nonwoven polypropylene with 450-micron openings.

- Available diameter: 100 mm (4 in) to 300 mm (12 in).
- Available in 1,200 m (3,937 ft), 600 m (1,968 ft), 75 m (246 ft) and 45 m (147 ft) lengths.
- Fits all 100 mm (4 in) high-density plastic injection molded smooth interior wall fittings.

## NON-PERFORATED SOLIFLEX (TYPE 1)

- Flexible drain whose smooth interior minimizes sediment accumulation, while greatly facilitating cleaning.
- Provides a better Manning's value (0.012) than the standard corrugated drain, to promote rapid water evacuation.
- The **non-perforated SoliFlex (Type 1)** is recommended for **water conveyance that requires no collecting**.

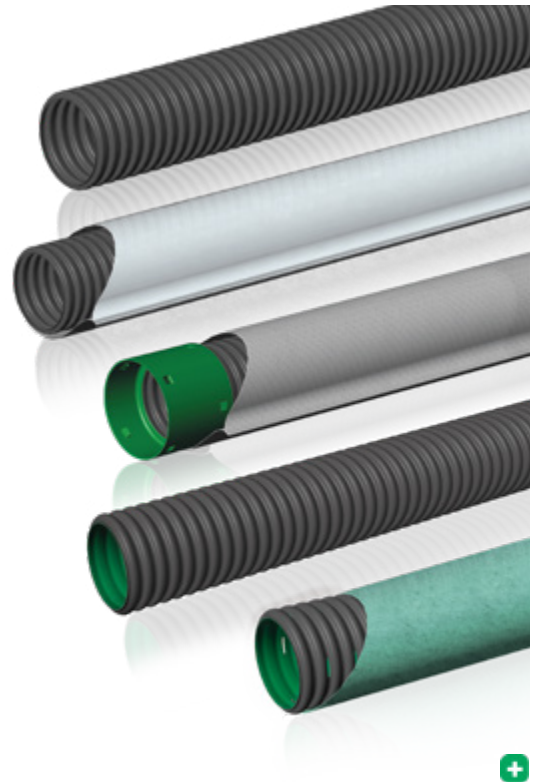
### MODEL SHOWN:

Non-perforated SoliFlex (Type 1).

# DRAINAGE OUTLET

## NON-PERFORATED SOLFLO MAX (R320)

- Optimal stiffness and flow allowing drainage water to evacuate.
- An optional stainless steel grate is available to prevent fauna and flora from settling in the pipe.



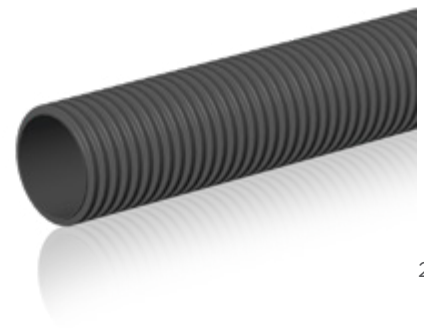
### FITTINGS AND ACCESSORIES

Soleno offers several watertight and soil tight fittings and a complete line of accessories that can be tailored to site requirements and network design. Consult « Fittings and Accessories » section of this brochure.

### FILTERING POCKET

The filtering pocket plays an important part in keeping fine particles from penetrating the interior of the perforated drainage pipe and causing drain obstructions.

Consult « Choosing the right filtering pocket » section found in the Collecting brochure.





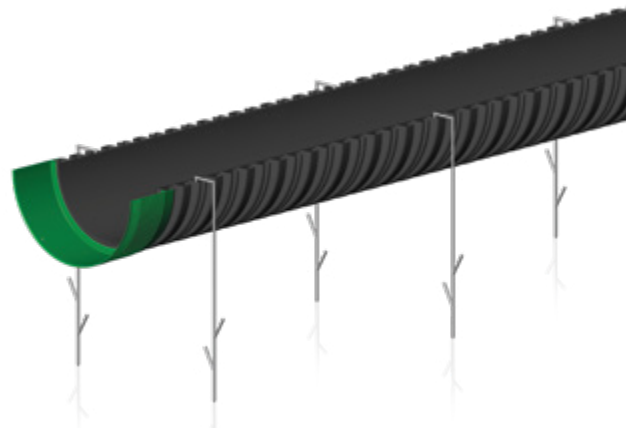
## SURFACE EVACUATION

For conveying surface water towards an outlet.

- No risk of clogging.
- Direct access for visual inspections.
- Resistant to abrasion and de-icing salts.
- Prevents erosion of embankments.

### MODEL SHOWN:

HDPE scupper and galvanized steel anchors.



## ROUTEX V

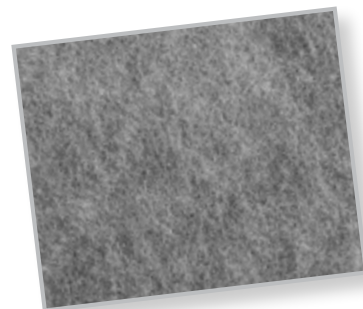
**ROUTEX V PROVIDES EXCELLENT RESISTANCE TO PUNCTURING AND OTHER LOCALIZED PHYSICAL AGGRESSIONS**

Function: reinforcement, filtration and separation.

ROUTEX V was especially designed to play a role in filtration and reinforcement for protecting embankments and ditches beneath rockfills. Installed between soil and rockfill, it prevents leaching of small underlying material. It also prevents scouring at the base of the structure.

ROUTEX V is also used to reinforce roadways lying over soil with a low carrying capacity. It also performs a separation function by limiting interpenetration of other sizes of material.

Certified by the BNQ according to standard GCTTG 3001-06.  
Complies with MTMDET (formerly called MTQ) Type V geotextiles.



# OTHER APPLICATIONS

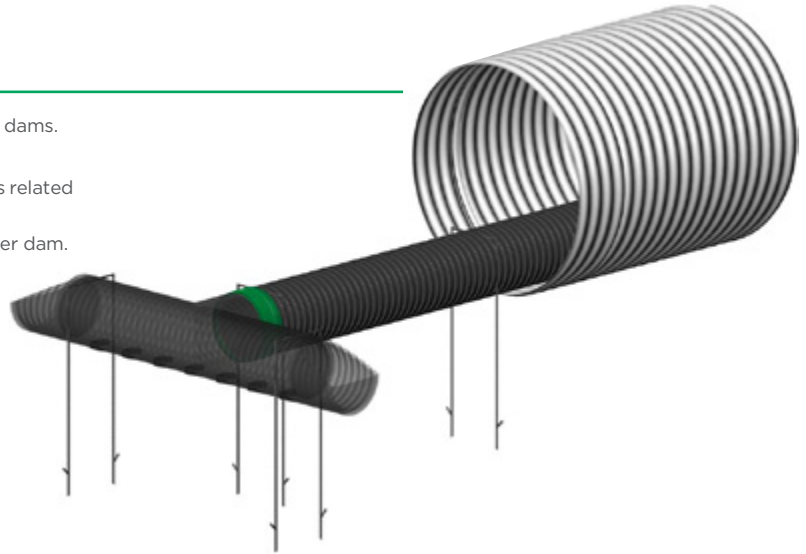
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## BEAVER BARRIER

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Maintains water flow continuity in culverts in spite of beaver dams.

- Sustainable permanent solution for water flow problems related to beaver dam obstructions in culverts.
- Can also be installed as an overflow in an existing beaver dam.
- Available in 300 mm (12 in), 375 mm (15 in) and 450 mm (18 in) diameters.
- Easy to ship, handle and install.



## VENTILATION PIPES AERIAL AND SUBSURFACE

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### Underground heat exchanger:

Surface geothermal system that allows preheating or refreshing air from outside a building before distributing it in the inhabited space.

### Aerial ventilation:

Pipe used to suck up and evacuate stale air from a building.

### Hay dryer and pig farm ventilation:

Pipe network used to control product humidity or mechanically evacuate odors from a farm building.



## PUMPING STATION

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With Soleno's extensive pipe selection, it is now possible to **custom design large format deep pumping stations**.

Weholite pipes are available in continuous lengths up to 15 metres (50 ft) and in diameters up to 3,350 mm (132 in). When combined with Soleno's expertise in manufacturing complex customized

parts, these pipes ensure watertightness and resistance to local constraints for any installation.

**Soleno provides design assistance for building special projects.**

# FITTINGS AND ACCESSORIES

Soleno offers several watertight and soil tight fittings and a complete line of accessories that can be tailored to site requirements and network design.

Various grates are also available. Our accessories are available in bags or cases. For more information, consult the « Fittings and Accessories » section found in the Collecting brochure or Soleno's technical catalogue.

## FITTINGS



**SPLIT COUPLER**



**DOUBLE BELL WITH CLIPS  
(SOIL TIGHT)**



**DOUBLE BELL WITH INTEGRATED  
GASKET WITH CLIPS  
(WATERTIGHT)**

## ACCESSORIES



External end cap



22.5-degree Elbow



45-degree Elbow



90-degree Elbow



90-degree Elbow  
- 3 section



Cross



Reducing Cross Tee



Reducer



Tee



Reducing Tee



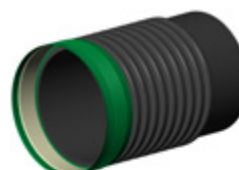
Wye



Reducing Wye



Manhole Adapter -  
PVC DR35 format



Manhole Adapter  
- Soleno format  
(concrete)



Universal Sol Tee



## ACCESSORIES (CONT.)

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O-ring Gasket



PVC Transition  
O-ring Gasket



Beveled Pipe



Beveled Ends



Steel Cross



Sacrificial Pipe



Steel Clamp

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### COMMENTS:

- Every precaution has been taken to ensure the accuracy of facts and dimensions. We do not accept any liability for any possible errors or omissions. We are constantly improving, and the indicated specifications may be subject to change without prior notice. This documentation cancels and replaces all earlier documentation.
- All references to LEED in our brochures correspond to the Canadian Green Building Council requirements. Please consult Soleno for information on the U.S. Green Building Council requirements.



# REFURBISHMENT OF A COLLAPSED CULVERT

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Replacement of a culvert under Highway 25 :  
HDPE is the only solution





**SOLENO OBTAINED**

its **ECORESPONSIBLE** Certification - level **2. Performance** in sustainable development from the Council for sustainable industries (CSI) **ECORESPONSIBLE™** Program.

(Solenio plant located at 1160, route 133, Saint-Jean-sur-Richelieu only)



**SOLENO IS ISO 9001 CERTIFIED**

(Saint-Jean-sur-Richelieu plant only)

**SOLENO IS A MEMBER OF THESE AGENCIES:**



**OUR HDPE PRODUCTS AND SOLUTIONS ARE DESIGNED AND MANUFACTURED ACCORDING TO THE MOST RIGOROUS STANDARDS.**