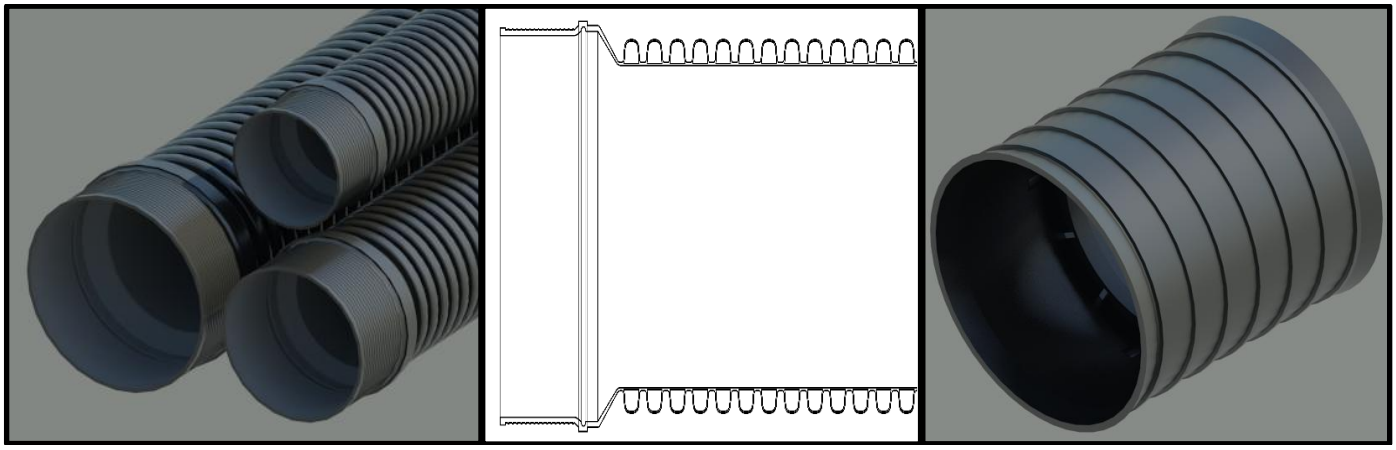
Condron Concrete Works

CONDRON CONCRETE WORKS IS A TRADENAME FOR CONDRON CONCRETE LTD.

ARDEN ROAD, TULLAMORE, CO. OFFALY, IRELAND.

TWINWALL ROAD DRAINAGE SYSTEM



Plastic Pipes for Surface Water Drainage Systems and Underground Ducting Systems

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CONDRON CONCRETE WORKS TWINWALL ROAD DRAINAGE SYSTEM

Introduction:

Condron Concrete Works is a 100% Irish owned Private Company founded in 1969 by John Condron. It is located just outside Tullamore, Co. Offaly, Ireland. The Company manufactures Twinwall Plastic Pipes, Concrete Pipes, Manholes and Gulley Traps as well as Concrete Roof Tiles and Accessories.

Condron Concrete Works Twinwall Plastic Pipes are available in 150mm, 225mm, 300mm, 375mm integrated sockets and 450mm diameter straight with coupler and can be supplied with associated fittings. The 100mm Twinwall Plastic Pipe and associated fittings will be available in August 2015.

Twinwall Plastic Pipes are compliant with EN 13476-3:2009 and have Irish Agrément Board Certification and British Board of Agrément Certification.

During production there is continuous quality control on all critical parts of the production process to ensure wall thickness, internal diameter, weight, external diameter and that socket diameters are all within dimensional tolerances.

Quality Control	
Test	**Frequency**
Appearance (visual inspection)	1/hour
Dimensional accuracy	1/hour
Perforation dimensions and appearance	1/hour
Impact resistance	1/day
Short term stiffness	1/day

In our purpose built lab, continuous assessment is carried out for melt flow index, ring stiffness, ring flexibility, impact resistance, heat resistance, internal pressure tests and jointing tests to the latest International and European Standards. Sealing ring are certified to EN681 and designed to exceed 0.5bar while under deflection and shear.

Advantages of Condron Concrete Works Twinwall Pipes:

- Low weight 6m pipes with/without socket for safer and faster installation.
- High chemical resistance.
- High impact resistance which may permit faster backfilling (depending on ground conditions).
- Smooth interior, resulting with less blockages and greater flow rates.
- It also permits easy cable installation.
- Slight curves can be fabricated to adapt to on site requirements.
- Joints are guaranteed to a 5m head of water.
- Made from recycled materials.
- High durability pipeline.
- Ring stiffness in excess of 6kn/m².
- Resistance to water jetting.
- Can be laid to a depth of up to 10m (depending on ground conditions).

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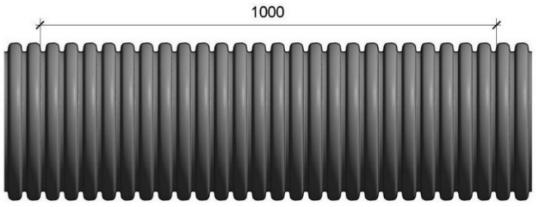
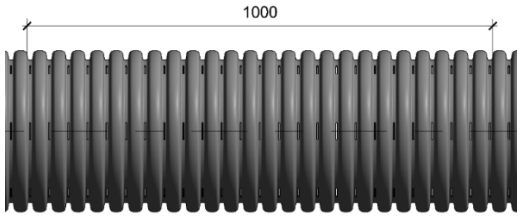
TWINWALL ROAD DRAINAGE SYSTEM DETAILS

Standard Twinwall Pipes				
ID Ø mm	**OD Ø mm**	**Length (m)**	**Weight kg/m (Approx.)**	**Socketed /Straight**
100	116	6	0.70	**Straight**
150	175	6	1.20	**Socketed**
225	260	6	2.38	**Socketed**
300	345	6	4.10	**Socketed**
375	435	6	6.80	**Socketed**
450	500	6	8.20	**Straight**



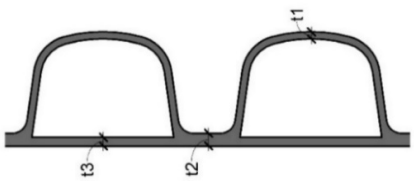
Standard Pipe

Perforated Twinwall Pipes				
ID Ø mm	**OD Ø mm**	**Length (m)**	**Weight kg/m (Approx.)**	**Socketed /Straight**
100	116	6	0.70	**Straight**
150	175	6	1.20	**Socketed**
225	260	6	2.38	**Socketed**
300	345	6	4.10	**Socketed**
375	435	6	6.80	**Socketed**
450	500	6	8.20	**Straight**

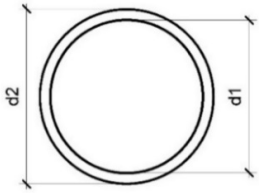


DN 300mm Perforated Pipe

Pipe Dimensions							
Nominal internal pipe diameter d_1 (mm)	**External pipe diameter d_2 (mm)**	**t_1 optimum (mm)**	**t_2 optimum (mm)**	**t_3 optimum (mm)**	**Nominal length (m)**	**Nominal weight (kg/m^{-1} Approx.)**	**Pitch (mm)**
100	116±2	0.6	1.2	0.8	6	0.70	13.25
150	175±2	0.8	1.8	1.4	6	1.20	26.61
225	260±2	1.1	1.9	1.4	6	2.38	34.80
300	345±2	1.4	2.5	1.7	6	4.10	41.13
375	435±2	1.9	3.5	2.7	6	6.80	50.27
450	500±2	2.1	3.4	2	6	8.20	56.55



Typical Pipe Corrugation Profile



Corrugated Pipe Section

Please contact our technical staff at our main office if you have any specific queries on +353 57 9349000, +353 57 9321220 or email condronconcrete@eircom.net

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TWINWALL ROAD DRAINAGE SYSTEM DETAILS

Perforated Pipe Details					
Internal pipe Ø (nominal)(mm)	**No. of slots per dwell**	**No. of dwells per metre**	**Slot length (mm)**	**Slot width (mm)**	**Permeable area min.(mm2/m-1)**
100	6	74	10-15	1.2-1.5	5256
150	6	38	10-18	1.2-1.7	2736
225	6	29	10-30	3.0-3.5	5220
300	6	25	15-31	3.0-3.5	6750
375	6	20	20-36	3.0-3.5	7200
450	4	18	35-50	3.0-3.5	7560
Semi-Perforated Pipe Details					
Internal pipe Ø (nominal)(mm)	**No. of slots per dwell**	**No. of dwells per metre**	**Slot length (mm)**	**Slot width (mm)**	**Permeable area min.(mm2/m-1)**
100	3	73	10-15	1.2-1.5	2628
150	3	38	10-18	1.2-1.7	1368
225	3	29	10-30	3.0-3.5	2610
300	3	25	15-31	3.0-3.5	3375
375	3	20	20-36	3.0-3.5	3600
450	2	18	35-50	3.0-3.5	3780

Material properties/ Typical values		
Property	**Test method reference**	**Typical values**
Bulk Density	EN ISO 60: 2000	0.58g /cc
Melt Mass Flow Rate (MFR)	EN ISO 1133: 2005 Procedure A (2.16 Kg)	0.66g/10 mins
Ash Content	EN ISO 3451 Method A	0.14%
Izod Impact	EN ISO 180 Type A	14.3 KJ / m²
Tensile Stress @ Yield	EN 527-2 Type A1	25.2 MPa
Tensile Strain @ break	EN 527-2 Type A1	250%
Oxidation Induction time	BS EN 728	≥ 4 mins

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TWINWALL ROAD DRAINAGE SYSTEM DETAILS

Coupler Fitting	Pipe Diameter Offset					
	100mm	150mm	225mm	300mm	375mm	450mm
Straight	✓	✓	✓	✓	✓	✓

Coupler Dimensions				
Nominal internal/external pipe diameter (mm)	Internal Diameter		Nominal length (mm)	Nominal seal height (mm)
	At first dwell (mm)	At second dwell (mm)		
225/260	272.5	264.0	220.0	23.5
300/345	356.5	346.0	245.0	31.5
375/435	449.5	439.0	330.0	40.6

T - Junctions Fitting	Pipe Diameter Offset				
	150mm	225mm	300mm	375mm	450mm
150mm	✓				
225mm	✓	✓			
300mm	✓	✓	✓		
375mm	✓	✓	✓	✓	
450mm	✓	✓	✓	✓	✓

Y - Junctions Fitting	Pipe Diameter Offset				
	150mm	225mm	300mm	375mm	450mm
150mm	✓				
225mm	✓	✓			
300mm	✓	✓	✓		
375mm	✓	✓	✓	✓	
450mm	✓	✓	✓	✓	✓

Bends	Pipe Offset					
	11.25º	15º	22.5º	30º	45º	90º
150mm	✓	✓	✓	✓	✓	✓
225mm	✓	✓	✓	✓	✓	✓
300mm	✓	✓	✓	✓	✓	✓
375mm	✓	✓	✓	✓	✓	✓
450mm	✓	✓	✓	✓	✓	✓

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TWINWALL ROAD DRAINAGE SYSTEM ACCESSORIES

Reducer Fitting	Pipe Diameter				
	150mm	225mm	300mm	375mm	450mm
150mm		✓	✓	✓	✓
225mm	✓		✓		
300mm	✓	✓			
375mm	✓	✓	✓		
450mm	✓	✓	✓		

PA Saddle Description
A Plastic Adaptor saddle to connect a 160mm OD PVC lateral pipe into a large diameter Twin Wall or Ribbed Sewer pipe DN 300mm – DN 600mm.

Pipe Diameter	Saddle Diameter Offset
	150mm
300mm	✓
375mm	✓
450mm	✓

Standard Couplings Description
Designed for sewerage, drainage and all non and low pressure applications up to 2.5 bar.

When used individually or combined with bushes, Flexseal Standard Couplings have many applications in the construction, repair and maintenance of pipe systems:

- As a joint for plain ended pipes
- Repair and maintenance of existing pipelines
- Connecting short and cut lengths of pipe
- Making post construction connections to an existing pipeline
- Reconnection of laterals on renovated sewers

Pipe Diameter	Repair Couplings				
	150mm	225mm	300mm	375mm	450mm
150mm	✓				
225mm		✓			
300mm			✓		
375mm				✓	
450mm					✓

Pipe Lubricant Description - For plastic pipes.
Pipe Lubricant NEUTREX® for plastic pipes: a white, water miscible paste based on synthetic materials. Standard application: general plumbing and construction. Neutrex is approved for drinking water applications after DVGW as well as WRAS.

HYDRAULIC DESIGN

The Colebrook – White equation provides the most accurate results to assist in gravity sewer design. Hydraulic flow charts published in "Tables for hydraulic design of pipes, sewers and channels" 7th edition are most commonly used to simplify the Colebrook – White equation. Once a pipe roughness coefficient (ks) is determined, the corresponding flow chart details four variables, i.e. pipe internal diameter, water velocity, hydraulic gradient and discharge. Once two of the variables are known, the remaining two variables can be determined.
CCW twinwall pipes have a smooth inner wall giving excellent hydraulic performance. Sewers for adaption 6th edition stipulates a minimum roughness coefficient (ks) of 0.6mm for surface water sewer design and a minimum velocity of 1.0m/sec pipe full flow.

COLEBROOK – WHITE EQUATION

A number of formulas have been developed to assist in hydraulic calculations to determine flow rates in pipelines. The Colebrook – White equation is considered most accurate for commercial pipes as effective roughness is applied. The equation expressed in Engineering terms is as follow:

$$V = -2\sqrt{2g\,Di}\;\mathrm{Log}\left(\frac{ks}{3.7D} + \frac{2.51v}{\sqrt{2g\,Di}}\right)$$

Where
- V = Velocity
- G = Gravitational acceleration (9.81 m/s)
- i = Hydraulic gradient (m/m)
- D = Pipe internal diameter (m)
- ks = Hydraulic
- v = Kinematic viscosity of Water ($1.146 \times 10^{-6} m^2/s$)

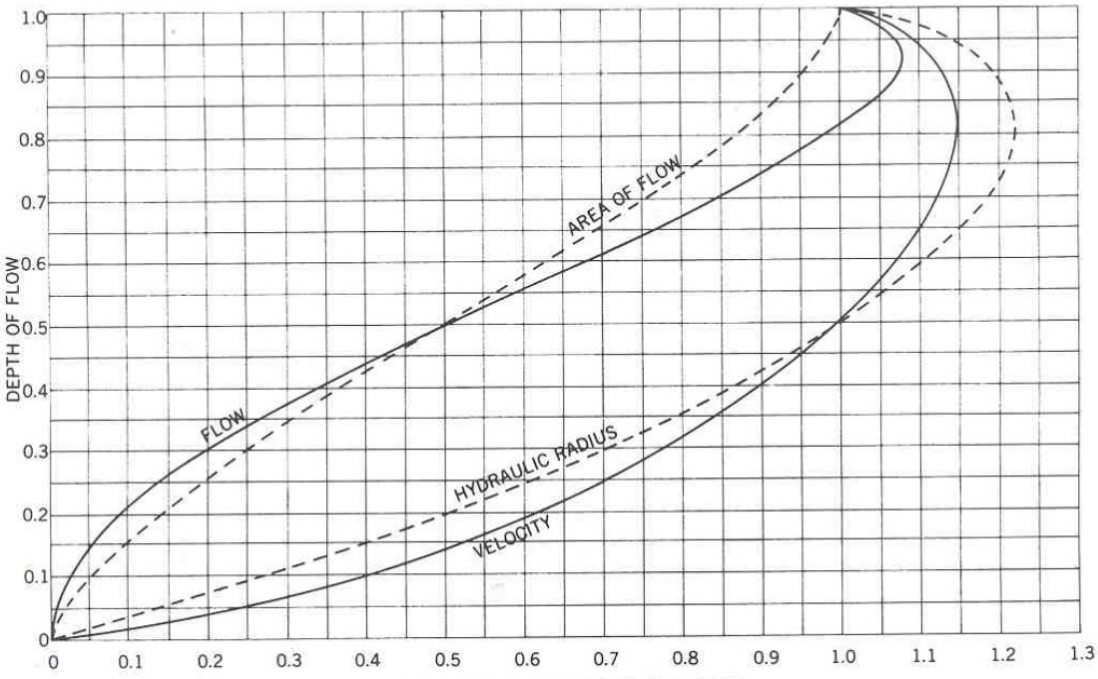
Now Q can be calculated using

$Q = VR\ (m^3/s)$

Where
- Q = Discharge (m^3/s)
- V = Velocity (m/s)
- R = Hydraulic Radius = $\frac{D}{4}$ (m)
- D = Internal Diameter of pipe

HYDRAULIC DESIGN

Relative Velocity and Flow in Circular Pipe for any Depth of Flow



NOTE: This graph complies with B.S. 8005: part 1 1987 and will comply to any new Irish, British or European Standards in the future.

Design Example

Design of storm water sewer where ks = 0.6mm and minimum velocity = 1.0m/sec.
Length of pipe = 1200m
Fall to outlet = 15m => gradient of 1:80
Design Discharge 0.1m³/sec.

Determine pipe size when flowing full.

Pipe size required is >225mm Ø, next available size is 300mm Ø
Check velocity for 300mm Ø pipe @ gradient of 1:80 = 1.7m/sec
1.7m/sec > 1.0m/sec, therefor satisfactory.

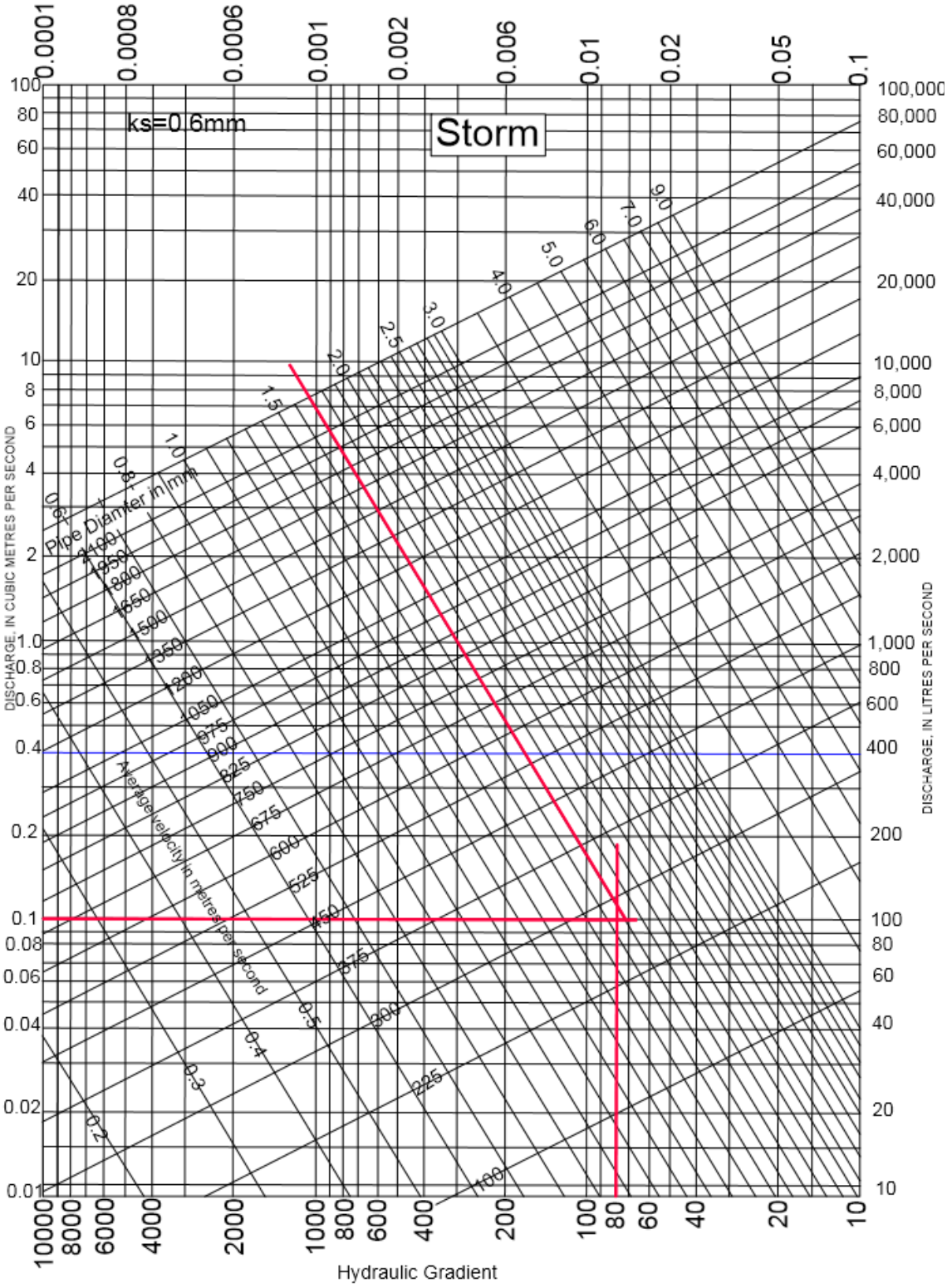
What is the pipe size required when the pipeline is flowing 35% full for the same discharge?

Using the chart "Relative Velocity and Flow in a Circular Pipe for any Depth of Flow" proportional discharge is 0.27 m³/sec when flowing at 35% full.
Discharge 0.1m³/sec ÷ 0.27 m³/sec = 0.37 m³/sec.
Return to ks 0.6 flow chart and extend a horizontal line at 0.37 m³/sec discharge to meet vertical line of1:80 gradient.
Pipe size required is 450mm Ø CCW TW pipe.
Check velocity 2.3m/sec x proportional velocity of 0.85 = 2.0m/sec.
Therefore satisfactory.

HYDRAULIC DESIGN

Colebrook – White) Water at 15°C

Flow Chart No.1



INSTALLATION

General

The pipes are installed using traditional drain-laying methods in accordance with NRA specifications and in accordance with HSA requirements and the MCDRW, Volume 1, Clauses 503, 505, 518.7 518.8 and NRA HD 140/15. Due to the lightweight nature of the pipe material, handling and jointing are easily performed. Pipes are available with a fixed socket or a connection collar.

Before laying the pipes and fittings must be checked for damage that may have occurred in transit or storage prior to installation. Damaged pipes or fittings must not be installed. The laying should be commenced at the lower end of the pipeline run (from the outlet).
The pipes are usually laid so that the sockets face to the top of the pipeline run. When 2 pipelines are laid side by side appropriate separation should be allowed to permit the appropriate compaction of the material between the 2 pipe runs.

Sealing rings are enclosed separately in order to avoid damages.

Trench Preparation

Trenches should not be excavated too far in advance of pipe installation and should be supported by trench boxes where required by Health and Safety requirements.

Trenches should be as narrow as practicable, generally the pipe diameter + 300 and 600mm. Where multiple pipes are installed in a trench sufficient spacing should be allowed between them to ensure that there are no voids and the material can be fully compacted. Local soft spots in the trench base should be excavated and filled with a suitable compacted granular material.

The bedding material is laid below the Condron Concrete Twinwall Road Drainage pipe to provide uniform support and to permit small adjustment of the pipe's line and level. All bedding material is to be compliant with the engineers' specification. No temporary supports (blocks of bricks, stones, wood, metal or other similar objects) should ever be used to prop the pipe during the installation process as it can damage the pipe integrity and cause pipe deformation.

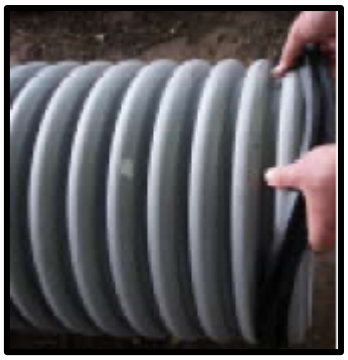
Backfill

The embedment, the main backfill and the removing of the shoring should be carried out in order that the pipe connections and bedding are capable of bearings. The material for the bedding, the main backfilling and the covering shall meet the planning guidelines.
Each covering has to be compacted either by hand or with a compacting plant. The covering above the soffit shall have a height of 300mm. For the main backfill the excavated material can be used, once the particle size is not larger than 300mm. For the main backfill equipment for mechanical compaction may be used. It is important to ensure that the main backfill is carried out in accordance with planning guidelines and NRA Manual of Contract Documents for Road Works (MCDRW).

INSTALLATION

Installation of Condron Concrete Works (CCW) Twinwall Pipes

From DN/ID 150 - 450 mm the CCW Twinwall Pipes are available with a fixed socket or a connection collar. Before laying the pipes and fittings must be checked for damage that may have occurred in transit or storage prior to installation. Damaged pipes or fittings must not be installed. The laying should be commenced at the lower end of the pipeline run (from the outlet).
The pipes are usually laid so that the sockets face to the top of the pipeline run. When 2 pipelines are laid side by side appropriate separation should be allowed to permit the appropriate compaction of the material between the 2 pipe runs.
Sealing rings are enclosed separately in order to avoid damages.



Putting on the sealing ring.

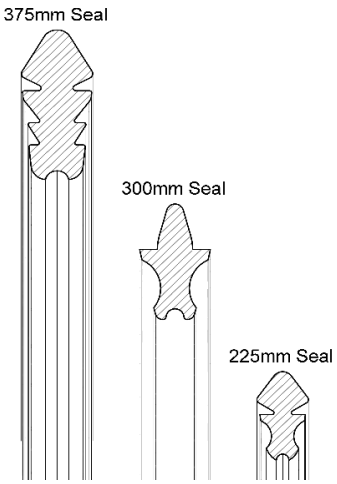
Connecting Pipes

Prior to inserting the Rubber Sealing Ring, determine the “Pipe Insertion Depth” by assembling the pipe Spigot end fully into the Socket / Coupler. Using Chalk, mark the position on the Rib of the pipe that lines up exactly with the entrance point of the Socket / Coupler.

Prior to jointing, ensure the pipe Spigot end, Rubber Sealing Ring and Lubricant are clean and grit free. Assemble the Rubber Sealing Ring into the first corrugated valley of the pipe Spigot end – ensuring that the text marked “TOP” on the Rubber Sealing Ring is orientated towards the top of the pipe.

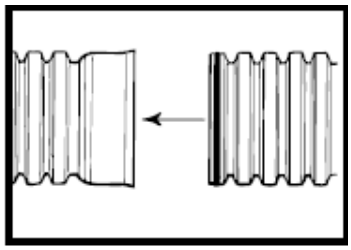
Open the lid on the tub of approved soluble / inert Condron Concrete lubricant, and (using a clean paintbrush) apply it around the outside perimeter of the Rubber Sealing Ring and also around the inside circumference of the adjoining Socket / Coupler.

Connect the Condron Concrete Twinwall Road Drainage pipe with constant axial force up to the previously marked insertion depth, without overloading the pipe components. The Condron Concrete Twinwall Road Drainage pipes must be laid in accordance with design specifications regarding the level and grade limits prescribed by the planning requirements and the NRA Manual of Contract Documents for Road Works (MCDRW).

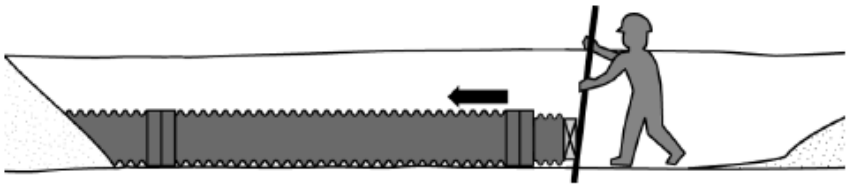


INSTALLATION

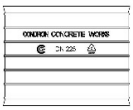
The CCW Twinwall Pipes must be laid in accordance with design specifications regarding the level and grade limits prescribed by the planning requirements and MCDRW.
The maximum angle at the socket and manhole connection must not exceed the following values according to EN 13476
2° CCW Twinwall Pipes DN/ID 100 – 300 mm
1,5° CCW Twinwall Pipes DN/ID 300 – 600 mm
Pipes of smaller diameters can be pushed together by hand. For larger pipe diameters, the use of equipment is required while the pipe should be protected at the end and no excess force is used.

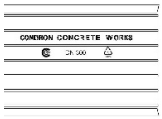


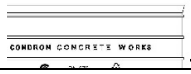
CCW Twinwall Pipes connection



Pushing the pipes together
NOTE: This method requires use of installation stub.
DO NOT push directly against pipe.







uplers

Cutting of the pipes

Pipes must be cut with a fine-tooth saw or other suitable tool to ensure that the cut is clean and plumb.
All cuts should be made in the centre of the appropriate pipe through and vertical to the tubular axle.
Ridges and unevenness of the cut pipe end should be removed with a rasp or bevelling tool.

Cutting the pipes.

Adapter to other materials

The CCW Twinwall Pipes may be connected to other pipes with an appropriate adapter. It is not recommended to install clamp-connections or other connection options on the outer layer. You should always use CCW Twinwall Pipes adapters.

Adaptors available in various sizes.
Please contact our sales team for further information.

TESTING METHODS

Pressure Testing

All pipe runs should be Air Pressure Tested in accordance with EN: 1610 at minimum or in accordance with the project specific requirements.

NOTE: All testing should be carried out periodically and prior to backfilling

Recommendations on Pressure Testing

Condron Concrete Works Twinwall Pipes may be tested using conventional air or water testing.

Air Test Method

1. Block the ends of the pipe, including any branches, using sealed, expanding stoppers.
2. Fill a U-tube manometer with water to the correct level, ensuring that there are no trapped air bubbles in the water.
3. Connect the manometer to the appropriate port of one of the stoppers.
4. Increase the pressure in the pipe until a pressure of 100mm of water (0.01 Bar) is reached.
5. Allow the pressure to stabilise for several minutes, increasing the pressure to 100mm head of water if it drops.
6. Record any change in pressure over a 5 minute period. Without further pumping it should not drop below 75mm head of water.

Air test problems are generally due to faulty equipment or test procedures and the following advice may be of assistance.

- Always install pipes in accordance with Condron Concrete Works Twinwall recommendations and the applicable site specific specification.
- Check that the test equipment does not leak and is in proper working order by testing a short length of pipe submerged in a water bath.
- Ensure that the test stoppers, tubes and pump are in good condition and that all seals are correctly fitted.
- Ensure that the pipe bores are free from dirt and debris that could affect sealing of the test bungs.
- Ensure that the test stoppers are placed tightly, squarely and in the pipe barrel, not the fittings.
- Ensure that all openings are properly sealed, including those to be buried underground, prior to testing and backfilling (e.g. gulley and lateral pipe connections).
- The air test is more sensitive than water tests and failure is not conclusive. The air test is very sensitive to temperature changes and must not be performed unless the pipe temperature is stable.

Failures due to testing immediately after backfilling a pipe that has previously been heated in the sun are common. A 1ºC temperature change in the air inside the pipe will result in a pressure change sufficient for the test to fail.

Water Test Method

1. Appropriate stoppers should be fitted, blocking the pipe ends and any junctions.
2. A standpipe or flexible pipe should be fitted at the top end of the pipeline, a maximum of 1.2 metres above the crown at the high end and 6 metres at the low end of the pipeline.
3. The pipe should be filled with water and allowed to stabilise for 2 hours, topping it up as required.
4. The loss of water from the pipeline should be determined by measuring the quantity of water added to the pipeline to maintain the level during the 30 minute test period.
5. The rate of water loss should not exceed 1 litre per hour per linear metre of drain per metre of nominal pipe diameter.

TESTING METHODS

Maximum Permissible Water Losses During 30 Minute Water Test

DIAMETER (mm)	MAXIMUM LOSS (l/m)
150	0.075
225	0.1125
300	0.15
375	0.1875
400	0.2
450	0.225
500	0.25
600	0.3
750	0.375
900	0.45
1050	0.525

Bedding requirements

Installation of the Condron Concrete Twinwall Road Drainage system is typically carried out in accordance with the NRA Manual of Contract Documents for Road Works MCDRW (see Figure 4).

Granular pipe bed and surround material, consisting of natural and/or recycled coarse aggregate or recycled concrete aggregate, should have specification as per Table 6 (in accordance with clause 503.3 of the MCDRW).

Standard details

Granular pipe bed and surround material, consisting of natural and/or recycled coarse aggregate or recycled concrete aggregate, should have the following specification (in accordance with clause 503.3 MCDRW).

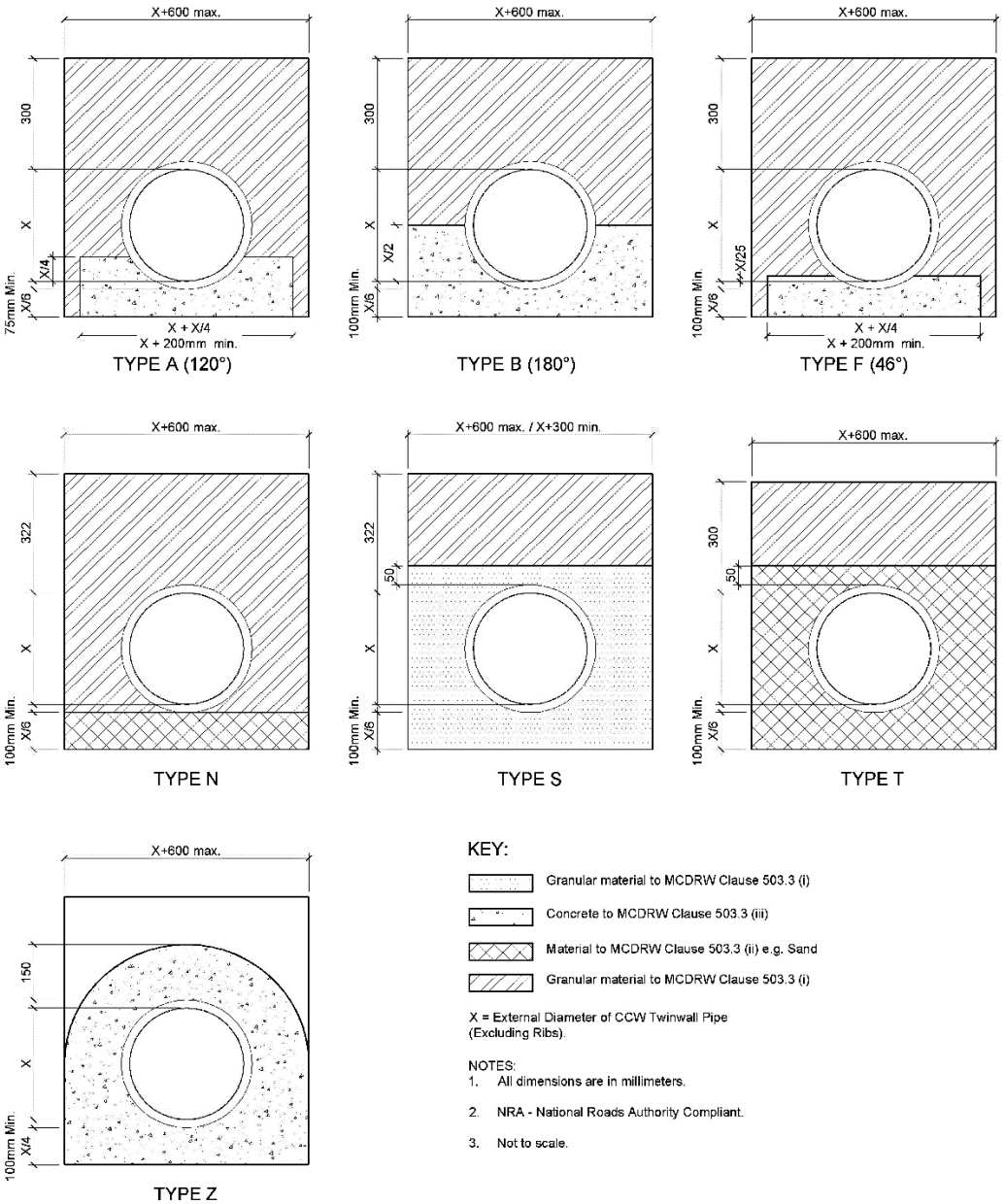
For pipes on beds shown on Drawing Number RCD/500/2 in MCDRW
BS EN 13242, Coarse aggregate (clause 4.3.2)

	Aggregate Size	
Nominal pipe diameter (mm)	Graded	Single
Up to 140		
>140 to 400	2/14 or 4/20	4/10, 6/10 or 10/20
>400	2/14, 4/20 or 4/40	4/10, 6/14, 10/20 or 20/40

a) Category for general grading requirements – GC80-20
b) Category for maximum values of fines content
   i. Gravel – f1.5
   ii. Crushed rock, recycled aggregate – f4
c) A resistance to fragmentation in Category LA50 in accordance with BS EN 13242, clause 5.2 and Table 9;
d) A water-soluble sulphate content of less than 1.9 grams of sulphate (as SO3) per litre when tested in accordance with BS EN 1744-1, clause 10;
e) All other requirements in Category NR.

BEDDING DETAILS – SURFACE WATER DETAILS

Standard bedding details Condron Concrete Works Twinwall Pipes to the NRA Manual of Contract Documents for Road Works (MCDRW).

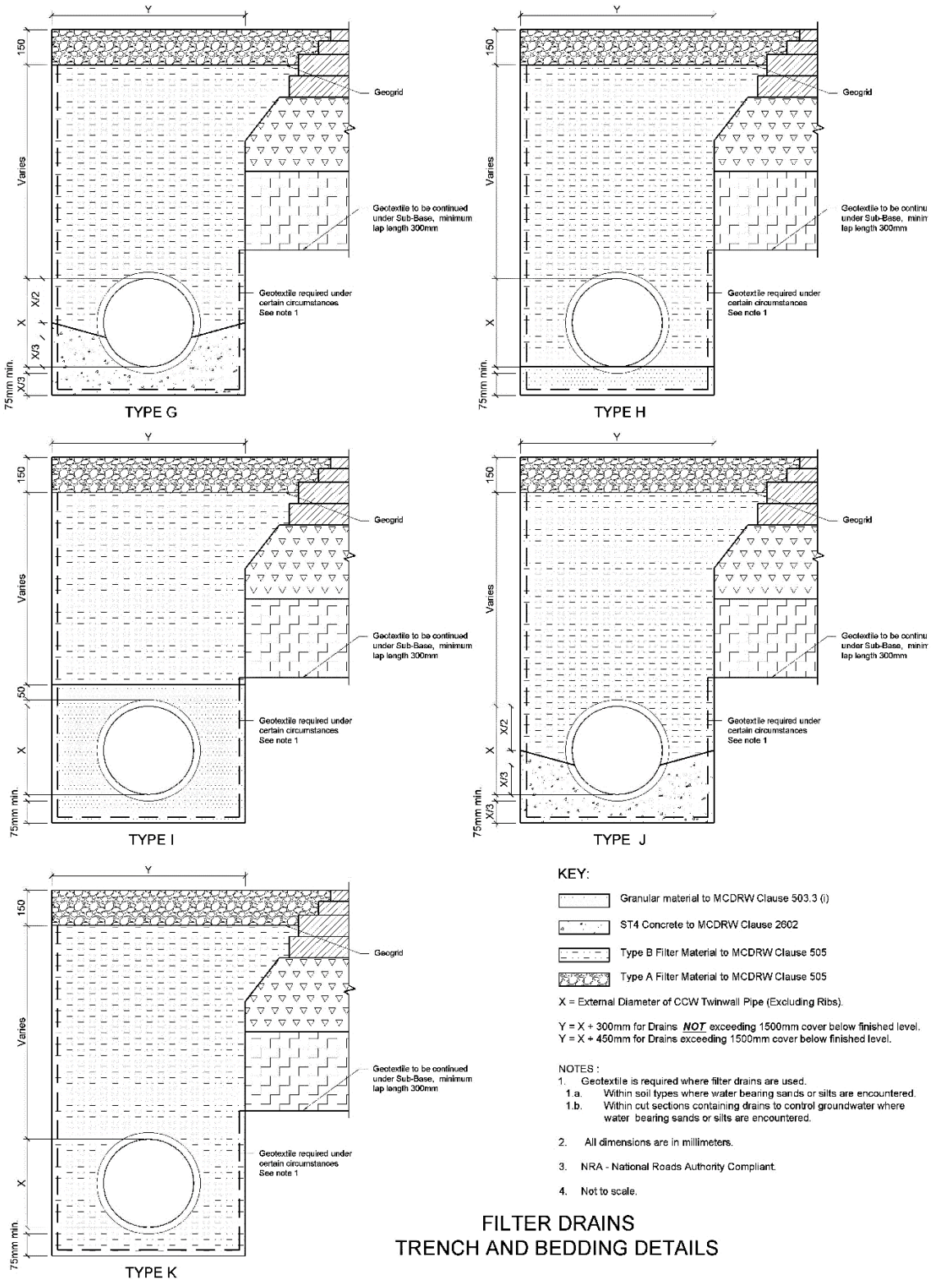


SURFACE WATER DRAINS
TRENCH AND BEDDING DETAILS

Notes:

All Dimensions are in millimetres.
X = pipe diameter.
Type S is the preferred granular bed and surround detail.
Type Z is recommended where depths of cover are less than 1.2m. Joint filler board shall be placed in contact with the end of the socket at a pipe joint and shall extend through the full thickness of the concrete in contact with the pipe. These should be placed at each pipe joint.

BEDDING DETAILS – FILTER DRAINS



BEDDING INFORMATION

Trench Preparation

Trenches should not be excavated too far in advance of pipe installation and should be supported by trench boxes where required by Health and Safety requirements.

Trenches should be as narrow as practicable, generally the pipe diameter + 300 and 600mm. Where multiple pipes are installed in a trench sufficient spacing should be allowed between them to ensure that there are no voids and the material can be fully compacted. Local soft spots in the trench base should be excavated and filled with a suitable compacted granular material.

The bedding material is laid below the Condron Twinwall Pipe to provide uniform support and to permit small adjustment of the pipe's line and level. All bedding material is to be compliant with the engineers' specification. No temporary supports (blocks of bricks, stones, wood, metal or other similar objects) should ever be used to prop the pipe during the installation process as it can damage the pipe integrity and cause pipe deformation.

Sidefill Placement

After a section of the pipe has been installed and successfully tested, the sidefill, the most important structural component of the fill, should be placed. The material should be placed evenly on both sides of the pipe, and compacted in accordance with the specification. Single-sized coarse granular materials, such as stone or gravel, may achieve the necessary density without compaction. Compaction of these materials is recommended where trench walls are relatively soft and weak. For well-graded granular soils compaction will be necessary. It is important that compacting equipment does not come into contact with the pipe at any stage of compaction. The sidefill material should normally extend a minimum 100mm above the pipe crown.

Backfill Placement

The backfill material that lies within 300mm of the pipe crown should be free from particles stones exceeding 40mm diameter. Heavy compaction should not be applied until the cover to the pipe is a minimum of 300mm in order to avoid the imposition of large stresses to the pipe. The material that is placed more than 300mm above the pipe crown should be placed and compacted in layers not greater than 300mm thick or in compliance with the specification. It is important that trench sheets or trench box, if used to support the trench, are removed progressively prior to compaction of the sidefill and backfill. Ref: Clause 505 of MCDRW.

Safety

Health and Welfare at Work (Construction) Regulations 2005. These notes are a brief summary of safety precautions based on the 2005 Regulations made under the Safety, Health and Welfare at Work Act 2005. It is the responsibility of employers, employees, and the self-employed, to ensure that legal requirements are complied with. Particular attention is drawn to the Safety, Health and Welfare at Work (Construction) Regulations 2013 and other legislation setting out the duties of owners, employers and employees in relation to the construction and maintenance of buildings.
Above notes are given for general information guidance only, and are not to be taken as comprehensive. All Condron Concrete Works Drivers have Personal Protective Equipment such as Hard Hats, Steel - Toe Boots, Safety Jackets and have completed SOLAS Safepass Training.

HANDLING, STORAGE AND TRANSPORTATION

Composition
The products are composed of plastic materials possibly admixtures.

Hazards
The finished products as supplied are of an inert nature and inherently non-hazardous to health. The individual items are generally heavy and many are so shaped that they can roll easily. Correct handling and stacking procedures as given below must be employed.

Handling/Use Precautions
The weight and surface nature of the products requires the use of protective gloves and footwear to avoid injuries.

- The manual handling of such loads may cause an injury should be avoided. Good slinging and lifting practices should always be used and the following points observed:
- Products must not be rolled off vehicles or around sites.
- Use correct craneage for offloading vehicles. Properly constructed 'C' hooks with spreader bar or canvas/fabric slings with a central lift are recommended.
- Where lifting points are provided, all the lifting points must be used.
- Where lifting points are not provided, then suitable slings (canvas/fabric) should be used around the product and never through it. Correct craneage must always be utilised.
- Care should be taken when breaking down product stacks either on the delivery vehicle or on site.
- When cutting or surface treating products by hand or machine, dust and flying fragments may be created. In such circumstances, respiratory protective equipment should be worn. Suitable eye protection should be worn to protect against dust and/or flying fragments.
- Provide Trench Supports where necessary.

Ensure compliance which the Health Safety and Welfare at Work Act 2005.

Handling, storage and transportation shall be in accordance with BS 5955-6: 1980.

When long-term storage is envisaged, Condron Twinwall perforated and unperforated pipes and couplers should be protected from direct sunlight.

If protection cannot be provided, consideration must be given to the effects of daily exposure to direct sunlight:

- Up to 3 months — negligible UV degradation but possible extreme surface temperatures of up to 80°C may cause some localised distortion.
- 3 months to 12 months — may have significant effect on the impact resistance and physical properties.
- Over 12 months — damage may occur unless protection provided.

The manufacturer has the option of adding chemicals to provide enhanced UV stability on request. The Pipes are generally delivered in pre-packed bundles and should be retained in their packaging until installation.

SURFACE WATER INFILTRATION SYSTEMS

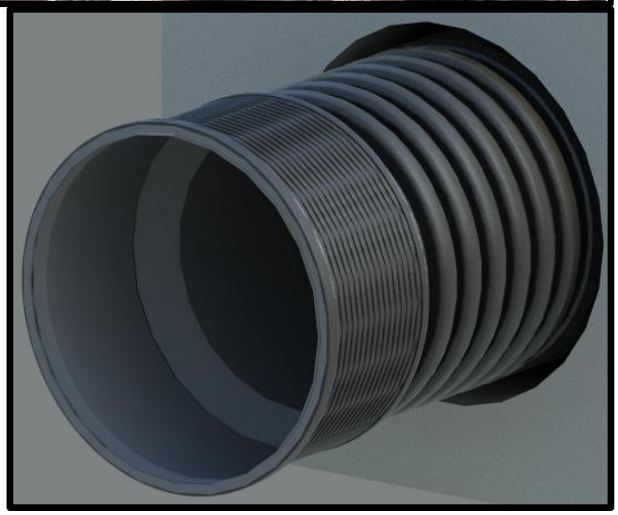
Infiltration Systems

Sustainable Urban Drainage Systems (SUDS) is becoming more prevalent in drainage design. One key SUDS technique is to encourage surface water to infiltrate into the ground at source.
The Condron Concrete Works Twinwall Pipe system is available in unperforated, half-perforated, one third-perforated and two thirds-perforated and fully perforated configurations. The perforated and half-perforated pipes may be used to form several different infiltration devices. With carrier pipes used to transport surface water to the point of infiltration, enabling a single integrated system to be used, where required.
Typical infiltration structures, using the Condron Concrete Works Twinwall Pipe system, are:

- Ring soakaway
- Horizontal tank soakaway
- Trench soakaway
- Infiltration trench
- As part of a drainage blanket (increasing its storage capacity and reducing the volume of stone required)

Please contact to Condron Concrete Works Technical Staff for further information of SUDS and infiltration structure design.

The Condron Concrete Works Twinwall Pipe system for applications subject to the Manual of Contract Documents for Highway Works in diameters up to 900mm.
The pipes shall be thermoplastic structured wall pipes. The system shall be stored, handled, transported and installed in accordance with the Manual of Contract Documents for Road Works. The pipes shall be of carrier / fully perforated / half perforated (solid invert) configuration. Solid invert and carrier drainage pipe shall be installed with sealed joints.



Disclaimer:

The information given in this manual is, to the best of our knowledge, correct, but customers, including Assigned Certifiers, Design Certifiers, engineers, architects and specifiers, must satisfy themselves that any particular product is suitable for their specific requirements. The installation of all Condron Concrete Works Twinwall Plastic Pipes, Fittings and Accessories shall be strictly in accordance with the manufacturer's instructions. Condron Concrete Works, or their employees, or agents, do not accept any liability whatsoever arising from anything contained in this Manual.

ADDITIONAL INFORMATION

Condron Concrete Works Twinwall Pipes can be delivered with any order for Roof Tiles, O.G. Pipes, S&S Pipes, Manhole Rings, Manhole Covers and Road Gullies on the same delivery.

Structural Twinwall - Pipe Loading per bale

Internal Pipe ¬	Approx. Number of Structural Twinwall pipes per bale
100mm	81
150mm	36
225mm	14
300mm	8
375mm	5
450mm	4

Hopefully this will make it easier to make up orders and get faster deliveries.
Please contact the office or the Sales Representative in your area for more details.

Office Email Web	+353 57 9349000 +353 57 9321220 condronconcrete@eircom.net www.condronconcrete.com	Contact	**John Cantwell** - Concrete Pipes, Manholes & Accessories & Twinwall Plastic Pipes. **John O Byrne** – Roof Tiles & Twinwall Plastic Pipes
For all queries from **Northern Ireland** on Concrete Pipes, Manhole's & Accessories, Twinwall Plastic Roof Pipes & Roof Tiles please contact the office		Contact	**David Dunne** – Concrete Pipes, Manhole's & Accessories, Twinwall Plastic Pipes & Tiles

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