Underground Double Wall Corrugated Pipes

A REVOLUTION TODAY FOR A CLEANER INDIA TOMORROW
A Revolution in India’s Piping System

Prince Pipes and Fittings Ltd. is a leading manufacturer of PVC Piping Systems in India. Working towards its vision of making India’s piping system a Zero-Defect System, Prince Pipes provides ideal solutions for Agriculture, Drainage, Plumbing, Sewerage and other applications with its extensive range of 7500+ products. With an array of products using wide range of polymers like CPVC, PVC, PPR & HDPE, Prince Pipes ensures that all the quality parameters are met before the product reaches our customers.

Prince Pipes has established an extensive distributor network spanning the entire length & breadth of India. With state-of-the-art facilities at Athal, Dadra, Hardav, Kolhapur and Chennai, Prince Pipes has the largest manufacturing capacity for its latest product Corfit DWC® Pipes.

*DWC - Double Wall Corrugated
What is Corfit?

Corfit DWC* Pipes are manufactured using HDPE polymer. These pipes are resistant to various types of gases & chemicals which are generated due to putrification of various ingredients flowing in the system.

Corfit DWC* Pipes are manufactured as per IS 16976 (Part-2), have a smooth internal surface and corrugated external surface. The corrugated external surface provides greater stiffness, withstands soil movement & takes higher loads (static & dynamic), whereas the internal surface helps in smooth flow of sewerage.

Corfit DWC* Pipes are available in SN 4 and SN 8 stiffness classes with sizes from 100 mm to 1,000 mm ID. These pipes have a standard length of 6 metre and are available with rubber ring jointings.

*DWC - Double Wall Corrugated
Salient Features of HDPE Material

High Density Polyethylene (HDPE) is a polymer material that is durable, strong and corrosion resistant.

- Impact Resistant
- Corrosion & Abrasion Resistant
- Chemical Resistant
- Flexible
- Lightweight
- High Flow Capacity
- Weather Resistant
- Recyclable Material
- Lightweight
- High Flow Capacity
- Weather Resistant
- Recyclable Material

Why use Corfit?

Currently, pipes that are widely used for underground non-pressure drainage & sewerage applications are made of RCC & Stoneware (Clay Pipes).

Due to their rigid nature, when embedded, these pipes experience severe stress because of the earth pressure & dynamic load which results in cracks and leads to system failure. In extreme cases, the pipe may collapse.

RCC or Stoneware pipes are generally available in 2 metre length thereby leading to more number of joints. As these pipes are heavy, during installation machines are required to lift & lay which is cumbersome.

In comparison to these pipes, Corfit DWC* Pipes are the ideal solution which addresses the main concerns of the underground drainage systems. We have enlisted some of the features here -

Features of Corfit DWC* Pipes

- Easy to Handle
- Long Life
- Flexible
- Long Pipes
- Minimum Joints
- Corrosion & Abrasion Resistant
- Anti-Rodent Material
- Environment Friendly

Material

Only the best and top notch materials are chosen for our products.

Manpower

An experienced team of experts ensure we always deliver the best.

Maintenance

Excellence in service is a habit we strictly follow every time.

*DWC - Double Wall Corrugated
<table>
<thead>
<tr>
<th>Parameters</th>
<th>DWC (HDPE Double-wall Corrugated) Pipes</th>
<th>RCC Pipes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of pipes available</td>
<td>6.0 m</td>
<td>2.0 - 2.5 m</td>
</tr>
<tr>
<td>Pipe diameters available</td>
<td>100 - 1000 mm</td>
<td>150 - 600 mm</td>
</tr>
<tr>
<td>Pipe material property</td>
<td>Flexible pipe</td>
<td>Rigid pipe</td>
</tr>
<tr>
<td>Pipe design (structural property)</td>
<td>Due to its flexibility it allows deformation in diameter as well as joints under external load and soil natural movement and hence operates years after years without affecting the environment</td>
<td>Due to its rigid nature it could not deform and hence gets damaged under external load or leak due to natural soil movement at joints. Sewer water could also leak in ground water harming the environment</td>
</tr>
<tr>
<td>Pipe jointing</td>
<td>Socket &amp; Spigot joint with elastomeric sealing ring</td>
<td>1. Collar joint with help of cement mortar 2. Socket &amp; Spigot joint with rubber ring and cement mortar</td>
</tr>
<tr>
<td>Pipe weight</td>
<td>Very light</td>
<td>Heavy (19-20 times heavier than DWC* pipes)</td>
</tr>
<tr>
<td>Pipe roughness coefficient</td>
<td>0.009 Much higher flow rate due to less roughness coefficient and hence during design, pipe diameter requirement is less as compared to concrete &amp; DI pipes</td>
<td>0.014 Lesser flow rate due to more roughness coefficient and hence during designing, pipe diameter requirement will be higher than DWC* pipe</td>
</tr>
<tr>
<td>Handling of pipe</td>
<td>Easy due to its light weight</td>
<td>Difficult due to its heavy weight</td>
</tr>
<tr>
<td>Corrosion resistance</td>
<td>Highly corrosion resistance</td>
<td>Not resistant to Hydrogen Sulfide gas which is present in all waste pipes, hence Substrate resistant cement is used during manufacture</td>
</tr>
<tr>
<td>Installation</td>
<td>Good flexibility, low requirements for foundation base for laying, good bending</td>
<td>High rigidity, high requirement for foundation base for laying, not easy to handle &amp; bend, difficult to connect with other pipe</td>
</tr>
<tr>
<td>Pipe class</td>
<td>Softwre class SN 4, SN 8 (Non-Internal Pressure Applications)</td>
<td>NP 1, NP 2, NP 3, NP 4 (Non-Internal Pressure Applications)</td>
</tr>
<tr>
<td>Pipe stacking on site</td>
<td>Stacked on plain ground. Smaller diameter pipes can be nested in bigger diameter pipes</td>
<td>Stacked on plain ground separately. Can not be nested due to its heavy weight</td>
</tr>
<tr>
<td>Pipe handling on field</td>
<td>Light weight hence safe in manual handling, has high impact resistance and is non-breakable due to mishandling</td>
<td>Heavy weight hence poor safety during handling, may lead to damage due to mishandling</td>
</tr>
<tr>
<td>Working features</td>
<td>High safety under buried installation</td>
<td>Low safety under buried installation</td>
</tr>
<tr>
<td>Life time</td>
<td>More than 50 years</td>
<td>Around 15-20 years</td>
</tr>
</tbody>
</table>

**Application of Corfit DWC* Pipes**

Corfit DWC* Pipes are used for underground applications such as -

- **UNDERGROUND DRAINAGE**
- **SEWAGE**
- **STORM WATER & SURFACE WATER DRAINAGE**
- **HIGHWAY & ROAD DRAINAGE**
- **INDUSTRIAL LIQUID WASTE**

*DWC - Double Wall Corrugated
Do’s & Don’ts

HANDLING

Do’s
1. Use nylon sling or cushioned cable while unloading from vehicle and while shifting with the help of unloading equipments / devices.
2. While lifting, the nylon sling / cushioned wire should be wrapped on center 1/3rd portion of the pipe.

Don’ts
1. Do not drop, drag or bump against other pipes or objects during loading, unloading, shifting and jointing.
2. Do not nest smaller diameter pipes in larger diameter pipes if they can’t be removed easily.

STORAGE

Do’s
1. At the site, a storage area should be set aside to keep DWC* Pipes.
2. Stock the pipes by alternating the direction of the pipe lengths so that the pipe sockets are not stacked on / against each other.
3. Storage area should be flat, free of large rocks, rough surface and debris.

Don’ts
1. The stockpiled height of pipe stacks should not be more than 2.5 metres.
2. Onsite storage area should not obstruct construction traffic.

sizes (mm) id (mm) socket length (mm)

<table>
<thead>
<tr>
<th>Sizes (mm)</th>
<th>ID (mm)</th>
<th>Socket Length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>95</td>
<td>32</td>
</tr>
<tr>
<td>150</td>
<td>145</td>
<td>43</td>
</tr>
<tr>
<td>200</td>
<td>195</td>
<td>54</td>
</tr>
<tr>
<td>250</td>
<td>245</td>
<td>59</td>
</tr>
<tr>
<td>300</td>
<td>294</td>
<td>64</td>
</tr>
<tr>
<td>400</td>
<td>392</td>
<td>74</td>
</tr>
<tr>
<td>500</td>
<td>490</td>
<td>85</td>
</tr>
<tr>
<td>600</td>
<td>588</td>
<td>96</td>
</tr>
<tr>
<td>800</td>
<td>785</td>
<td>118</td>
</tr>
<tr>
<td>1000</td>
<td>985</td>
<td>140</td>
</tr>
</tbody>
</table>

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TRANSPORTATION

Do’s

1. A flat bodied vehicle is ideal for transporting pipes
2. Layer of pipes with integral socket should be placed with socket protruding alternately
3. While stacking pipes ensure that higher diameter pipes are placed at the bottom
4. Use nylon sling / cushioned cable while loading in trucks, unloading from trucks, shifting and lowering in trenches at site
5. While lifting a pipe, the nylon sling / cushioned wire should be wrapped on center 1/3rd portion of pipe

Don’ts

1. Pipes should not overhang / hang outside the vehicle body
2. Maximum height while loading should not exceed 2.5 metres
Installation of DWC* Pipes

**TRENCH PREPARATION**
Sewer Trench width depends on the soil condition, type of side protection and the working space required at the bottom of the trench for smooth installations. Considering all the above factors, the minimum trench width as per IS 16098 Part 2 is:

- Sewer trenches should be in straight lines as much as possible.
- Instead of conventional manholes, DWC* fittings such as tees and bends should be used at transitions.
- Excavated spoils should not be deposited in the proximity to prevent the collapse of the side of the trenches.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Pipe Diameter (mm)</th>
<th>Trench Width (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>75 to 200</td>
<td>0.6</td>
</tr>
<tr>
<td>2</td>
<td>250</td>
<td>0.7</td>
</tr>
<tr>
<td>3</td>
<td>350</td>
<td>0.8</td>
</tr>
<tr>
<td>4</td>
<td>400</td>
<td>0.9</td>
</tr>
<tr>
<td>5</td>
<td>600</td>
<td>1.2</td>
</tr>
<tr>
<td>6</td>
<td>800</td>
<td>1.3</td>
</tr>
<tr>
<td>7</td>
<td>900</td>
<td>1.6</td>
</tr>
<tr>
<td>8</td>
<td>1000</td>
<td>1.8</td>
</tr>
</tbody>
</table>

**EXCAVATION**
- The sides of the trench should be supported by shoring (where necessary) to ensure proper and speedy excavations and concurrently ensuring necessary protection to contiguous structures.
- Dewatering: Sewer installation trenches should be adequately dewatered for the placement of the pipe at proper gradient till the pipe is integrated through socket and spigot joint with the already laid segment.

**BEDDING**
- For maximum combined loading (Wheel Load + Backfill), any form of cement, concrete structural bedding would not be necessary.
- For maintenance of sewer slopes, the initial backfill should be enveloped with sand or gravel (as computed through structural design of buried flexible conduit) over a single BFS (Brick flat soling) would be sufficient.

**LAYING AND JOINTING**
- For shallow trenches, place the pipe manually on the initial backfill envelop, directly.
- For deep trenches with shoring / mild steel sheet piling:
  a) Make the trench reasonably free from ground water and other liquids.
  b) Place the pipe on the top level cross-struts of the timber shoring / mild steel sheet piling frame work.
  c) Dismantle one / two cross struts and lower layer of the cross-struts and re-fix the struts immediately.
  d) In the same manner, reach up to the initial back filing and place the pipe at proper slope.
  e) Ensure anchorage, if any, after laying.

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CONSTRUCTION OF BACKFILL ENVELOPE AND BACKFILLING OF THE TRENCHES

• The material for initial backfill envelope should be as per the structural design of flexible buried conduit.
• It can be the same material that were removed during excavation or it can be fine sand / course sand / gravel depending on the over burden and superimposed load, but it should be the concrete which invariably induces undesired rigidity in the system.
• The remaining portion of backfilling shall be the material that were removed during excavation.
• These materials shall consist of clean earth and shall be from large clod or stone above 75 mm, ashes, refuse and other injurious materials.
• Backfilling should start only after ensuring the water tightness test of joints for the concerned sewer segments. However, partial filling may be done the joints open.

JOINTING PROCEDURE

Do’s

DWC* Pipes are manufactured with built in socket / bell.

1. Clean the surface of the spigot socket using a cloth
2. Insert the rubber ring on the spigot end in between two corrugation valleys
3. Insert the spigot end into the socket end of pipe
4. Connect the jointing jack which is in two halves on DWC pipe corrugation on socketed end and spigot end of pipe
5. Insert the rubber ring fitted spigot end of pipe inside the socket with ease with the help of jointing jack
6. Jointing can be completed within few minutes which is a leak-proof joint

*DWC - Double Well Corrugated
Service Life

Corfit DWC* Pipes have a very long service life, the wear and tear of the inner wall is very low due to the high abrasion resistance of HDPE material.

Under normal working conditions the life expectancy of these pipes is more than 50 years.

Corfit DWC* Pipes are reliable and durable which make these pipes suitable for long term drainage and sewerage applications.