

Alecorr™ Double Wall Corrugated Ducts

Transportation, Handling, Installation and Jointing Guide

1. Transportation

The arrangement of loading the pipes in a telescopic manner is advised, i.e. smaller diameters inserted into the next higher sizes of pipes up to the height of 2.5 meters in a truck. While loading the pipes into the truck, care should be taken that the spigot/ coupler end should be arranged alternatively in the corresponding layer so as to avoid the damage to the coupling/ socket-end.

2. Handling

Following Recommendations shall be followed while handling the pipes:

- Pipes shall be smoothly lowered to the ground.
- Pipes should not be dragged against the ground to avoid the damages to the coupler/pipes.
- 900 mm and larger diameter pipes are carried with Slings at two points spaced approximately at 3 Meters apart.
- For smaller diameters (450 mm – 900 mm both exclusive) one lift point shall be sufficient.
- For diameters smaller than or equal to 450 mm manual labour can be used.
- Do not use a loading Boom or Fork Lift directly on or inside pipe.

3. Pipe Storage at Site

- 3.1 Stockpiling shall be done temporarily on a Flat Clear Area as per Fig. E1.
- 3.2 For avoiding collapse of Stacks use Wooden Posts or Blocks
- 3.3 Stacking shall not be higher than 2.5 Meters
- 3.4 While stacking, alternate the socket/coupler ends at each row of stacked pipes as per Fig. E2.

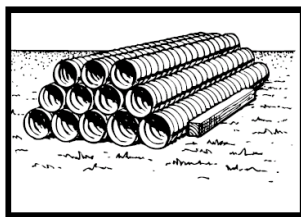


Fig E1

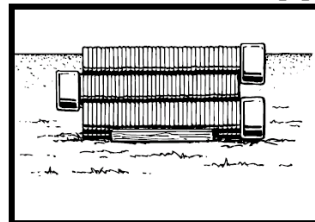


Fig E2

4 Construction Methods

4.1 Trench Preparation

4.1.1 Dimensions

The width of a Sewer Trench depends on the soil condition, type of side protection and the working space required at the bottom of Trench for smooth installations. Increase in width over required minimum would unduly increase the load on pipe and cost of road restoration. Considering all above factors, the Minimum Trench Width is specified as per Table 2.

Table 2

Minimum Trench Widths	
Pipe Diameter (mm)	Trench Width (M)
75-200	0.6
250	0.7
300	0.8
400	0.9
600	1.2
800	1.3
900	1.6
1000	1.8
1200	2.0

4.1.2 Excavation

Excavation of Sewer Trenches shall be in straight lines as much as possible and to the correct depths and gradients as specified in Drawings. However, because of inherent flexible property these pipes can also be laid at very wide and smooth curvatures without transitional manholes. Instead of conventional manholes, the specified fittings such as Tees and Bends etc. can be used at transitions. Excavated spoils shall not be deposited in the near proximity to prevent the collapse of side of the trenches. The sides of the trench shall, however, be supported by shoring (where necessary) to ensure proper and speedy excavations and concurrently ensuring necessary protections to contiguous structures.

In the event, the presence of ground water is likely to cause instability in soil conditions, a well point system may be adopted for lowering of Ground Water Table below the requisite Trench bed level. If excavation is made deeper than necessary the same shall be filled and compacted.

4.1.2.1 Shoring / M.S. Sheet Piling

The protective shoring works shall be strong enough to prevent caving in of Trench walls or subsidence of contiguous areas adjacent to Trench.

For wider and deeper trenches, a system of Wall Plates (Wales) and struts of heavy timber section is commonly used as per the requisite Structural Design.

In non-cohesive soils with high Ground Water Table, continuous interlocking M S Sheet Piling may be necessary to prevent excessive soil movements due to Ground Water percolation. Such sheet piling shall extend 1.5 m below the Trench Bottom unless the lower soil strata are adequately cohesive.

4.1.2.2. Underground Services

The underground Public & Private Utility Services exposed due to the Excavation shall be effectively supported under the guidance of the owners of such services

4.1.2.3 Dewatering

Sewer Installation Trenches shall be adequately dewatered for the placement of pipe at proper gradient till the pipe is integrated through socket & Spigot Joint/coupler Assembly with the already laid segment. Precautions are to be taken to arrest floating of installed Sewer Segments against buoyant forces in case of sudden accumulation of water in the Trench. The Diameter wise ‘Minimum Cover’ necessary to counteract the buoyant forces are tabulated as per Table 3:

Table 3

Required Minimum Cover to Prevent Floatation	
Nominal Diameter (mm)	Minimum Cover (mm)
75	65
100	77
150	102
200	127
250	178
300	368
400	505
600	711
800	1067
1000	1219
1200	1372

*Computation is based on the pipes being completely empty, water table at the ground surface, solid density of 2083 kg/m³ and a soil friction angle appropriate for most sand/gravel mixtures. The average of the inside and outside diameters was used to determine solid and water displacement.

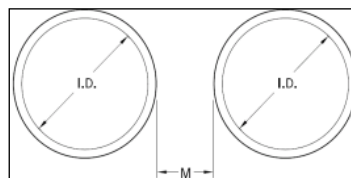
For exceptional cases of higher level of Ground Water, additional anchoring at equal intervals is proposed.

4.1.2.4 Bedding

- Normally, even for the 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 envelop with sand or gravel (as computed through structural design of buried flexible conduit) over a single BFS would be sufficient.
- In the event, anchorage becomes imperative the transverse concrete anchorage blocks spaced at suitable interval shall also act as chairs for defining and maintaining the sewer slopes.

4.1.2.5 Parallel Pipe Installation

For Cross Drainage under roads, often parallel pipe installations become necessary. In such cases allowance for adequate spaces between pipes are imperative. The proposed configuration of such system is depicted in Fig E3.



UP TO 600MM I.D.: M=300 mm
MORE THAN 600MM I.D.: M=1/2 I.D of Larger Diameter pipe

Figure E3

4.2 Laying and Jointing

4.2.1 Laying

4.2.1.1 For Shallow Trenches

Place the pipe manually on the initial backfill envelop directly.

4.2.1.2 Deep Trenches with shoring/MS sheet piling

- Make the trench reasonably free from ground water and other liquids.
- Place the pipe on the top level cross – struts of the timber shoring/MS sheet piling frame work
- Dismantle one/two cross struts and lower the pipe to the immediate lower layer of the cross-struts and re-fix the struts immediately
- In the same manner, reach up to the initial back filling and place the pipe at proper slope
- Ensure anchorage, if any, after laying

4.2.2 Jointing

Various methods for jointing such as regular coupler made by online process, Spigot and sockets are used.

The moulded socket will have a suitable internal surface with profiles ribs for insertion of the next pipe into it. The socket end of the pipe to be inserted will have corrugated outer layer. On first valley segment of corrugator pipe (destined to be pushed into the coupler) one elastomeric rubber ring needs to be placed which is pushed into the coupler socket. This provides sufficient gripping lock and leak proof joint.

Similar system is also used for fabricated accessories or moulded fittings required such as Tee, Bends, Elbows, Reducer end caps for the purpose of installation of the system related to drainage/sewerage.

For quality connections following steps are to be ensured, failing which the performance aspects are to be severely compromised:

- The non-coupler end needs to be thoroughly cleared and shall be free from any foreign material
- Use a clean rag or brush to lubricate the non-coupler end with lubricant.
- Clean and lubricate the coupler end of the pipe to be laid in similar manner.
- Lubricate the exposed Gasket in the same manner with pipe lubricant
- Keep the lubricated non-coupler end free from dirt, backfill material, and foreign matter so that the joint integrity is not compromised.
- Push the coupler into non-coupler and align properly. Always push coupler end into non-coupler end.

For smaller diameter pipes simple manual insertion shall be sufficient. In every methodology, it should be ensured that the coupler end is adequately 'Homed' within non-coupler end to ensure installation and tight joining seal. Therefore prior to insertion always place a 'Homing Mark' on appropriate corrugation of the 'Non-Coupler End'.

4.2.2.1 Jointing different pipe types or sizes

Sewerage/Drainage system often encounters connecting pipes of different materials/ sizes etc. The fittings or adapters specifically designed for the purpose are available.

A selection of fittings designed to make the transition from one material directly to another are also available. In few cases, fitting may need to be used in combination with separate manufacturer's gasket or coupler to give proper effect to the transition.

4.2.3 Manholes and Catch Pit Connections

Brick Masonry Manholes can also be used at changes in pipe material, size, grade, direction and elevation. Manufacturer specified prefabricated appurtenant structures made of thermoplastic materials shall also be available for onsite user friendly installations. Similar methodology shall be followed for integration of catch pits.

4.2.4 Sewer Connections

Other connecting lines shall be integrated with the already laid system in the same manner as of original sewer lines.

4.2.5 Construction of backfill envelope and backfilling of the trenches

These pipes and well compacted backfill envelope work together to support soil & traffic load.

In General, material used for construction of back fill envelop around the pipe comprises the following:

- Initial backfill
- Side Fill
- Top back fill

The material for backfill envelop shall be as per the structural design of flexible buried conduit. It can be the same material that were removed in the course of 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 materials that were removed in the course of excavation. These materials shall consist of clean earth and shall be free from large clod or stone above 75 mm, ashes, refuse and other injurious materials.
- After completion of laying of pipes, etc, first the backfill envelope shall be constructed as per design around pipe. Voids must be eliminated by knifing under and around pipe or by some other technique and compacted with necessary watering, either by hand rammers or compactors to a possible maximum level of proctor density.
- Backfilling shall start only after ensuring the water tightness test of joints for the concerned sewer segments. However, partial filling may be done keeping the joints open.
- Precautions shall be taken against floatation as per the specified methodology and the minimum required cover.

For additional inquiries or assistance feel free to contact us:

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