

Excellent Pipes Company L.L.C



**Reinforced Concrete Pipes and
Manhole Systems**

EXCELLENT



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A Member of Hedley Industrial Group



*Pioneering
Excellence
in Piping Systems*

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EXCELLENT PIPES COMPANY L.L.C

Established in the year 2000, Excellent Pipes Co. (EXCELLENT) operates state-of-the-art plant in Abu Dhabi for the manufacture and supply of RC, GRP, uPVC, PE, ABS and special GRP/RCP composite Jacking Pipes and Fittings and other associated services to government projects, infrastructure contractors and the construction industry at large.

EXCELLENT adopts a policy of continuous development as an integral part of its operation. We have in place advanced technology coupled with extensive research and assured quality. Our products are used in pressure application, underground drain and sewer systems, electrical and telephone networks, soil and waste discharge utilities, etc...

We offer support services to our clients and assist them with their project implementation from conception to successful commissioning.

EXCELLENT's pipes are manufactured to close dimensional tolerance with an uncompromising emphasis on quality and performance. As an industrial offshoot of Hedley Industrial Group, we enjoy a unique standing in the business community, capitalizing on the group's long history of successful achievements and awards. Our group's road to success is marked with several recognitions, including the Shaikh Khalifa industrial and Excellence Awards, American Concrete Pipe Association Certificate, and a triple certification under ISO 9001, 14001 & 18001. Excellent's RC pipes and RC Jacking pipes are certified by TUV, Germany and these pipes are produced under TUV's surveillance according to approved international standards.

Our technical and operational expertise supported by technology from leaders in the pipe industry, bring EXCELLENT to the forefront of international pipe manufacturers, providing value to our customers, in line with our motto of "PIONEERING EXCELLENCE IN PIPING SYSTEMS".



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PRODUCT DESCRIPTION

Product Description

A. General

Reinforced concrete pipe (RCP) is a composite structure and specially designed to use the best features of both concrete and reinforcement. The concrete is designed for the compressive force and the reinforcement for the tensile force. Reinforced Concrete Pipe is generally designed to carry loads well within the engineered load bearing capacity of a pipeline.

Excellent RC pipes meet or exceed the worldwide standards with its high technology pipe manufacturing system.

B. Applicable Codes & Standards:

- | | |
|----------------|---|
| BS EN 1916 | - Concrete pipes and fittings, unreinforced, steel fibre and reinforced. |
| BS 5911 Part 1 | - Specification for unreinforced and reinforced concrete pipes (including jacking pipes) and fittings with flexible joints. |
| ASTM C76M | - Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe. |
| ASTM C361M | - Standard Specification for Reinforced Concrete Low Head Pressure Pipe. |
| ASTM C443M | - Standard Specification for Joints for Circular Concrete Sewer & Culvert Pipe, Using Rubber gaskets. |

C. Outstanding Characteristics / Added Advantages

Design and Construction Flexibility

Pipes are manufactured with a variety of sizes. There is also an array of linings (HDPE/PVC) and coatings that can handle the most aggressive environment.

RC pipe is less susceptible to damage during construction, and maintains its shape, by not deflecting as does the flexible pipe.

Durability

With RC pipe, durability deals with the life expectancy and enduring characteristics of its materials. The capability of pipe to perform as expected for the design life of a project is a fundamental engineering consideration, especially in today's economic environment, where requirements have been set in place to ensure a sustainable buried infrastructure.

Hydraulic Efficiency

Precast concrete pipe's rigidity and mass allow it to greatly outperform flexible pipe systems in this critical area, which in turn helps to improve hydraulic efficiency by minimizing the resistance to water flow that often occurs when the shape or integrity of a flexible pipe is compromised.

The hydraulic capacity (the amount of water a pipe can convey) of all types of pipe depends on the smoothness of the interior pipe wall. The smoother the wall, the greater is the hydraulic capacity of the pipe.

Lining

HDPE / PVC liner can be included to make the pipe resistant to acids, alkalis, salts and harmful sewage gases.

Steel Reinforcement

Steel reinforcement in concrete pipe adds significantly to its inherent strength. Steel reinforcement shaped as cages is a precision-fabricated mesh welded by automatic cage welding machines. The cage machines fabricate machine formed bells that are dimensionally stable and have close engineered tolerances.

Both Structure and Conduit

RC pipe is a rigid pipe that provides both structure and conduit when it arrives on site. It is a rigid pipe system that is over 85% dependent on the pipe strength and only 15% dependent on the strength derived from the soil envelope.

Installation

Since Concrete pipe is a rigid pipe system that is over 85% dependent on the pipe strength and only 15% dependent on the strength derived from the soil envelope, installation process is made easy.

Environmentally Friendly

Precast concrete drainage products have a reputation for strength and durability. They will not burn, corrode prematurely, deflect or move off grade to reduce hydraulic performance, or collapse under loads designed into the pipe structure.

D. Uses & Applications:

Reinforced Concrete Pipes are used in the wide range of application which includes;

- Sanitary Sewers
- Storm Sewers
- Irrigation Systems
- Culverts
- Detention Systems
- Low Pressure Force Mains
- Jacking operations
- Pressure transmission
- Distribution systems.....etc

PRODUCT DESCRIPTION

Product Description

E. Product Range

Standard Reinforced Concrete Pipes & Jacking Pipes are manufactured to the following specification;

- Standard RC pipes with internal diameters ranging from 300 to 3600 mm.
- HDPE lined RC pipes with internal diameters ranging from 300 to 3600 mm.
- GRP lined RC Jacking pipes with internal diameters ranging from 1000 to 2600 mm

Type	Diameter	Nominal length	Internal Lining	External coating
Reinforced Concrete Pipes	300mm to 3600mm	3 meter	Unlined	Uncoated or Externally Coated as specified
Jacking Pipes		3 meter	HDPE T-Grip	
Rocker Pipes		< 3 meter	PVC T-Lock	
Short Pipes		< 3 meter	GRP or Steel	

Reinforced Concrete Pipes and Jacking Pipes are produced in accordance with the following Standards:

BS EN 1916

Concrete pipes and fittings, unreinforced, steel fibre and reinforced.

BS 5911: Part 1 / BS 5911: Part 120

Specification for reinforced jacking pipes with flexible joints.

BS 5911: Part 100

Specification for un-reinforced and reinforced pipes and fittings with flexible joints.

ASTM C 76M

Reinforced concrete culvert, storm drain and sewer pipes.

ASTM C361 M

Reinforced concrete low head pressure pipe.

ASTM C443 M

Joint for circular concrete sewer and culvert pipe using rubber gasket.

The following specification covers EXCELLENT's current production range. We produce pipes to fulfill our customer's various needs, and offer them full assistance in the design, selection and other technical matters associated with our products for their intended use.

REINFORCED CONCRETE PIPES							
Nominal Diameter (mm)	Nominal Length (mm)	Effective Length (mm)	Wall Thickness (mm)	External (1) Diameter (mm)	Nominal Joint Lap (mm)	Joint Space (mm)	Approx Weight (kg.)
300	3000	3010	82.5	624	131	6.5	850
400	3000	3010	78	714	131	6.5	980
450	3000	3010	82	781	131	6.5	1150
500	3000	3010	88	832	131	6.5	1370
550	3000	3010	92	883	131	6.5	1550
600	3000	3010	94	924	131	6.5	1700
700	3000	3010	104	1077	131	6.5	2250
800	3000	3010	112	1177	131	6.5	2690
900	3000	3010	120	1286	131	6.5	3230
1000	3000	3010	128	1403	131	6.5	3760
1100	3000	3010	136	1503	131	6.5	4250
1200	3000	3010	144	1603	131	6.5	4900
1300	3000	3010	153	1703	131	6.5	5480
1400	3000	3010	162	1803	131	6.5	6200
1500	3000	3010	170	1900	131	6.5	6900
1600	3000	3010	178	2003	131	6.5	7700
1800	3000	3010	200	2200	131	6.5	9750
2000	3000	3010	210	2420	131	6.5	11200
2200	3000	3010	230	2660	131	6.5	13500
2400	3000	3010	244	2888	131	6.5	15700
3000	3000	3010	300	3600	131	6.5	23400
3100	3000	3010	310	3720	131	6.5	24900
3300	2500	2510	330	3960	131	6.5	23500
3600	2500	2510	360	4320	131	6.5	28000

(1) For diameter 300 mm to 1600 mm pipe, this dimension represents the external diameters of bell.

EXCELLENT is capable to manufacture Reinforced Concrete Pipes in diameters 300 mm to 3600 mm with the following joint systems.

- Concrete joint socket and spigot with regular wall thickness from diameter 1800 mm to 3600 mm pipe.
- Concrete joints and spigot with building up external diameter in order to increase the bearing area for diameter 300 mm to 1600 mm pipe.
- Steel Socket (Steel Collar) with concrete spigot joints.
- GRP with concrete surround.

PRODUCT DESCRIPTION

Product Description

Class	Concrete Strength* (N/mm²)			D-LOAD in kN / L.M**					
	III	IV	V	III		IV		V	
Nominal Diameter				0.3 mm Crack	Ultimate Load	0.3 mm Crack	Ultimate Load	0.3 mm Crack	Ultimate Load
300	27.6	27.6	41.4	19.50		30.00		42.00	
400	27.6	27.6	41.4	26.00		40.00		56.00	
450	27.6	27.6	41.4	29.25		45.00		63.00	
500	27.6	27.6	41.4	32.50		50.00		70.00	
550	27.6	27.6	41.4	35.75		55.00		77.00	
600	27.6	27.6	41.4	39.00		60.00		84.00	
700	27.6	27.6	41.4	45.50		70.00		98.00	
800	27.6	27.6	41.4	52.00		80.00		112.00	
900	27.6	27.6	41.4	58.50		90.00		126.00	
1000	27.6	27.6	41.4	65.00		100.00		140.00	
1100	27.6	27.6	41.4	71.50		110.00		154.00	
1200	27.6	27.6	41.4	78.00		120.00		168.00	
1300	27.6	27.6	41.4	84.50		130.00		182.00	
1400	27.6	27.6	41.4	91.00		140.00		196.00	
1500	27.6	27.6	41.4	97.50		150.00		210.00	
1600	27.6	27.6	41.4	104.00	160.00	160.00	240.00	224.00	280.00
1800	27.6	34.5	41.4	117.00	180.00	180.00	270.00	252.00	315.00
2000	27.6	34.5	41.4	130.00	200.00	200.00	300.00	280.00	350.00
2200	34.5	34.5	41.4	143.00	220.00	220.00	330.00	308.00	385.00
2400	34.5	34.5	41.4	156.00	240.00	240.00	360.00	336.00	420.00
3000	34.5	34.5	41.4	195.00	300.00	300.00	430.00	420.00	525.00
3100	34.5	34.5	41.4	201.50	310.00	310.00	470.00	434.00	542.50
3300	34.5	34.5	41.4	214.50	330.00	330.00	500.00	462.00	577.50
3600	34.5	34.5	41.4	234.00	360.00	360.00	545.00	504.00	630.00

* Concrete strength class as per ASTM C 76M – based on compressive strength of cylinders.

** External loading characteristics as per BS 5911 part 1 and ASTM C76M.

The details provided in the above tables are based on typical standard dimensions and requirements. Apart from these standard products, EXCELLENT can manufacture and supply any specific or special RCP products to meet Customer requirements.

In addition to its range of full length pipes, EXCELLENT has the technology to produce short pipes of any length, diameter and configuration by cutting and milling long pipes or using rocker pipe moulds.



EXCELLENT provides a comprehensive service including advice on trench construction methods, site storage, pipe laying and installation techniques as well as on-site welding of pipe joints. The company understands the needs of its customers and provided them with full after-sales support. Its active involvement in each project begins as early as the design stage and continues throughout the project execution up to final hand-over of the contract.

WARRANTY

EXCELLENT warrants that its products conform to the specified standards to which they are produced against defects due to faulty material or workmanship for a period of one year from the date of delivery.

The product data sheets and information contained herein are of a general nature, intended to provide an overview of our products and services. Customers using our products are invited to follow current industry practice, client's standards, specifications and stated operating conditions. We expressly disclaim responsibility for conditions of use or any other factor outside our control.



Product Description

F. Manhole System



EXCELLENT is proud to be one of the manufacturing company producing precast concrete manholes with linings for the sewer projects in Abu Dhabi. This has culminated later on in a full fledged program for the production of precast underground structures, the “EXCELLENT Manhole System”. The system covers a wide array of utilities, including sewer and storm water networks, telecommunications manholes, surface water drainage in apron, fuel jet contaminated areas, catchment basins, pipelines and others.

EXCELLENT Manhole System comprises primarily a base with or without benching, a shaft formed in sections depending on the depth of the structure and a base slab. Ancillary items such as inner liner of GRP, PE or others, external coating, inlet and outlet connection ports, backdrops, fittings and accessories may be added as required by the project specifications. The distinct feature of this system is its similarity with the RC pipe joining arrangement, consisting of socket and spigot with rubber gasket where applicable.

The prime objective behind the manufacturing of precast manholes at EXCELLENT’s premises, compared to casting them in-situ at the project’s site, is to improve on the quality of the manhole and achieve ultimate benefits to the clients. This is accomplished by executing the casting activities under factory controlled conditions where raw materials are properly stored and handled, moulding and form work systems are of the highest quality, strict supervision and quality control are exercised during concreting, curing and other stages of the cycle.

Factory precasting eliminates the various logistical problems encountered when constructing these manholes, especially in remote project locations, making client’s representatives inspections an easy task. But perhaps one of the biggest advantages of the precast manhole system is the extreme reduction in the installation time, thus shortening the project duration. Quality and Economy are two salient characteristics of “EXCELLENT Manhole System”.

A. Reinforcement

The R.C. pipes are produced with one or two layers of circumferential reinforcement, formed by means of longitudinal reinforcement welded to them in a way to obtain steel cages. Welding is done through automated cage machine. As the cage revolves, steel wire is wound in a spiral around the longitudinal bars and automatically welded at each contact point.



B. Mould Assembly

A base pallet of the appropriate size is placed on even and clean ground and the steel reinforcement cage securely fixed around it. The outer mould is then lowered around the cage and locked to the base pallet, and the whole assembly is moved by the overhead crane to the pit. In the Wet Cast method, the same steps apply, except that the core is installed first on the base pallet, followed by the lining tube, the steel cage and the outer mould.



C. Installation of Lining.

In the vertical dry casting method, the mould assembly is lowered in the pit. The lining tube is then lowered and secured around the inner mould in the pit. The mould is now ready for concrete filling. In the wet casting method, similar steps are undertaken but in a different sequence with the mould assembly resting on the floor.





PIPE MANUFACTURING PROCESS

Pipe Manufacturing Process

D. Concrete Mixing & Feeding

Concrete mixing process takes place at fully automated Batching Plant in quantities sufficient for the amount of each pipe to be made. The Concrete Mix is transferred through the concrete feeder that runs forward and the filling of the pipe starts. The PLC will be set to automatic, ensuring the vibrators to start at the correct time. When the mould is full, the belt feeder is stopped and retracted. For Wet Cast the concrete is fed from the top of the mould via a traveling trolley and forklift mounted skip bucket.



E. Demoulding & Curing

The complete mould assembly is lifted by the overhead crane and is transported to the curing area, where the locks between the outer mould and the pallet are released and the outer mould is removed while the pipe is in the curing area, where it is wrapped with polythene sheet for a sufficient period.



F. External Coating

When the pipe is sufficiently cured, it is taken by the overhead crane to the coating area, or to the open store as applicable. In case of epoxy coated pipes, the pipe is securely mounted on a turning table. The coating operation starts while the table is rotating, with the speed of the spray gun and the rotating table adjusted according to the thickness of the epoxy coating required.



G. Final Curing

Upon completion of external coating where applicable, the pipes are transported by an Overhead crane to the turnover table, where they are picked up by the forklift and placed in the open storage area to complete a minimum curing period as specified. At this stage, the final inspection is carried out by the Quality Control Team in order to approve delivery of the pipes to the customer.



R&D and Quality Control

R&D and Quality Control

The philosophy behind EXCELLENT, even before the factory plans were committed to paper, was to be the best in its field. Total Quality Management was therefore the prime objective from the start.

Whilst acknowledging the input from international experts in the beginning, EXCELLENT has developed products and management systems that are very much of its own. The continuing parallel development of both is well documented. Cross-functional teamwork and communication have been extremely effective tools in these developments.

Research into new materials and technologies has a permanent place in the daily life of factory staff. For example, the quality control team worked closely with the production staff in developing the sliding joint, which has proved to be beneficial in terms of product quality as well as time and cost management. The efficiency of the production process was also enhanced with the development of the profile header.

In extending its range of products, the Company has added value to the local community and has gained additional advantage for itself. Transferring of the technology within the group has enabled it to establish a new plant, with obvious cost benefits to EXCELLENT.

EXCELLENT has developed the necessary plant & machinery to manufacture HDPE T-Grip Liner for captive use in the R.C pipe production. HDPE liner is more environmental friendly and cost effective compared to the PVC Liner.

Our commitment to the prevention of pollution, as well as to the health and safety of employees, led to further investment in a self contained unit for the application of epoxy coating and a system to control dust emissions from the batching plant.

A comprehensive safety manual is included in the Environmental Management System and EXCELLENT has one trained first aider for every twelve people employed.

Another clear example of our ambitious drive is the assessment of our group's RC pipe plants by the ACPA, making it the first manufacturer in the region entitled to identify its product, rather than its management system, as being certified to an international standard.

Further our groups both RC pipe plants are certified by TUV Germany for producing RC pipes as well as RC jacking pipes. Finally, EXCELLENT has its Integrated Management System (IMS) plus the triple certification of ISO 9001:2008 quality standard, ISO 14001:2004 Environmental Management Standard and OHSAS 18001:2007 Occupational Health & Safety Management standard. Total quality management is within our reach.

A. Product Identification

Quality control begins at the source of supply, where raw material is tested before being delivered. Materials are received and stored in specially constructed, segregated and shaded areas which are clearly identified so as to prevent cross contamination and accidental use of wrong supplies. Aggregate hoppers are set-up in a similar way to storage bins, and the yard between them and the storage area is swept mechanically, keeping the whole operation spotless and clean.



B. Storage and Preservation

Storage of all types of material is carefully controlled so as to prevent damage or deterioration and ensure that those affected by time are used before their expiry date. All storage areas are kept clean and tidy so that access is unimpeded and to reduce the likelihood of accident and incident.



C. Work Environment

EXCELLENT's philosophy of continuous improvement is clearly demonstrated by the adoption of the latest innovations in management tools and information technology. Coupled with an impeccable work environment, this contributes to the promotion of a high degree of motivation and the search for excellence among its employees.



D. Safety Measures

The surrounding bund of the fuel tanks ensures that any fuel leakage will be contained and emergency response kits are kept close to areas where volatile or potentially polluting materials are stored. Emergency response procedures are rehearsed regularly and sometimes simulated without warning.



R&D and Quality Control

R&D and Quality Control



E. Receiving Inspection

Round the clock control by trained personnel ensures that all supplies and ingredients are received in the ideal condition stipulated by our quality standards.

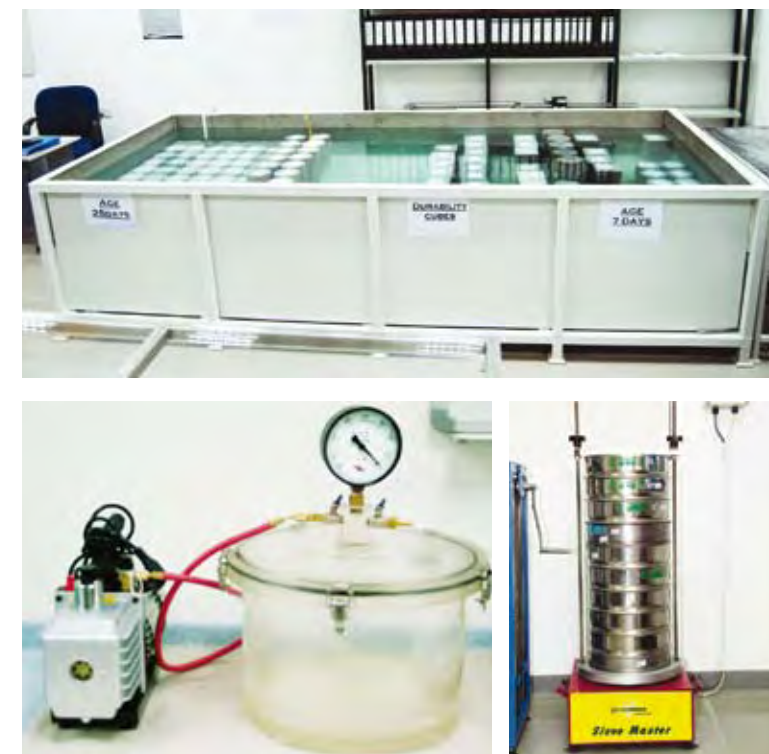


F. Process Control

EXCELLENT has been very successful in achieving its objective of producing high quality RC pipes. The attention given to every aspect of the entire process ensures that the end product exceeds its customer's requirements. This is illustrated by the use of the latest innovations both in terms of components and technologies. EXCELLENT care about every detail that can be seen in the above pictures showing the organized Quality Control facility.

G. Laboratory Services

A fully equipped laboratory is located in the factory, where the raw materials and finished product testing is carried out. Calibration is undertaken both in-house and by third parties, and is planned so that all inspection, measuring and test equipment is kept in optimum operating condition. Concrete mixes are carefully designed and tested before any production run is started, then adjusted and re-tested according to variations in the parameters to meet contract specifications. The laboratory control system is integrated with the company's quality system.



PRECAST MANHOLES

EXCELLENT

Precast Manholes

A. SCOPE

The method statement sets the process for production of circular sewer precast manholes with GRP Liners. Similar method statements for other type of precast manholes could be established based on project requirements.



B. BENCHING

- a- A base platform of the appropriate size is placed on an even, clean ground within the manufacturing area and coated with a thin film of de-moulding agent by sponge application.
- b- The inner GRP benching is then fixed firmly on the base shutter in upside down position and all parts are plugged properly to eliminate seepage of concrete.
- b- The steel outer jacket is carefully lowered by the overhead crane and locked to the base platform.
- d- The steel reinforcement is cut, bent and executed according to the bar bending schedules and to the specified codes of practice. When required, fabricated steel reinforcement elements will be stored under protected conditions until installation.
- e- A steel bracing is fixed to the outer jacket to secure the benching in place and avoid any lifting up by concrete force during casting.
- f- Once all pre-pour aspects are checked and found accepted by the Q.C. department of client/consultant as well as EXCELLENT, approved concrete will be cast directly by using forklift and hydraulic bucket.
- g- An appropriate number of Electrical vibrators connected to a frequency converter are put into operation in order to ensure proper compaction for the concrete.
- h- When the casting has been completed, the steel bracing is removed and final finishing is done manually by skilled masons.
- i- The outer jacket is de-moulded and any necessary finishing touches to the concrete surface are made before the identification number is marked in to the wall of the concrete benching.
- j- The precast benching is wrapped in polythene sheeting to preserve the mix coater from evaporation for a minimum period of 24 hrs according to the weather condition in a way to achieve optimum curing.
- k- The finished benching is shifted out of the factory by means of a conveying table then turns to its upright position using a turn and tilt table before delivery to the yard where final inspection and any minor touch work due to handling are carried out prior to the coating process.
- l- The completed precast benching is inspected, stamped by the Q.C. department and kept ready in preparation for consultant approval before delivery to the customer yard or installation are as applicable.

C. SHAFT

- a- A base pallet of the appropriate size is placed on an even, clean ground within the production premises and sponged with de-moulding oil.
- b- The GRP liner is placed on the pallet and the steel reinforcement cage is lowered around the liner.
- c- The outer mould is then installed and locked to the base pallet, and the overhead crane moves the whole assembly for placing it carefully in the casting pit.
- d- A plain PE tube may be placed around the core as a protection material to avoid scratches to the GRP liner.
- e- When concrete reaches the specified level in mould under powerful vibration, the concrete feeder shall move back to outside the pit area.
- f- After the steel protection cover is removed from the top of the core, the swivel arm is turned away from the center of pit and locked in place.
- g- The special rocking device designed to press and form the spigot is placed over the shaft and driven down by means of the swivel motors.
- h- The vibrator will be stopped when the spigot end is completely formed.
- i- The lifting yoke of the overhead crane is fastened to the outer mould and an air release system is activated to create a minimum separation cushion between the steel core and liner.
- j- The mould assembly is then lifted clear of the pit and transported to the curing area, where the locks between the outer mould and the pallet are released and the mould is removed from the shaft. The necessary finishing touches are made before the identification number is marked on the Wet concrete surface.
- k- The dry cast manhole shaft produced as above is transported to the curing area, where it is kept for a minimum specified curing period.
- l- As soon as the initial curing of the manhole shaft is achieved, the coating process will start in accordance with the coating manufacturer's recommendations.
- m- When the external coating is dry depending on the ambient temperature and wind condition, the precast shaft is checked, stamped by the Q.C. department and kept ready for consultant inspection before delivery to the project site.

PRECAST MANHOLES

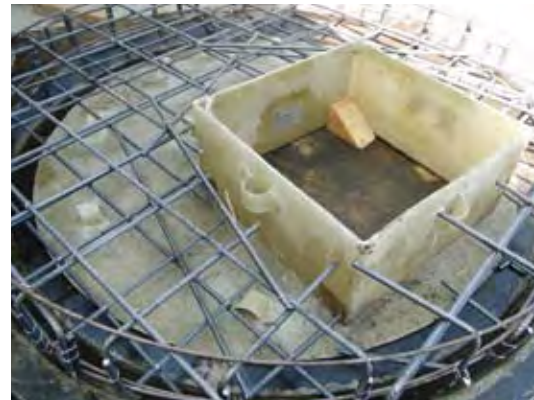
EXCELLENT

External Coating of Precast Elements

Precast Manholes

D. COVER SLAB

- a- A base pallet of the appropriate size is placed on an even, clean ground within the factory building and the surface treated with a special de-moulding material applied in a thin coat by means of sponge.
- b- The GRP cover slab liner is placed carefully on the base pallet and secured in place at the center of the pallet.
- c- A steel reinforcement mesh cut and bent according to the bar bending schedules and the specified codes of practice, fixed properly on top of the liner with necessary concrete spaces to avoid any damage to the liner.
- d- If required, on approved steel frame for the manhole cover supplied by others is fixed according to the exact line and level and secured within the steel guides specially provided for this purpose.
- e- The outer mould is then lowered by the overhead crane and locked to the base pallet, in preparation for starting the casting activities.
- f- Once all pre-pour aspects are checked and accepted by the Q.C. department, an approved concrete mix will be cast directly using a hydraulic bucket transported by a forklift and vibrated by a mechanical vibrator to ensure proper compaction for the concrete.



- g- Immediately after completing the casting, final finishing is performed manually by a qualified mason to provide a smooth finish to concrete surfaces.
- h- As soon as initial setting of the concrete is accomplished, the outer jacket will be de-moulded. Any necessary finishing touches are made at this stage.
- i- The precast cover slab is adequately wrapped in polythene sheeting and cured for the minimum specified curing period.
- j- When curing is satisfactorily achieved, the precast cover slab will be shifted to the yard where final touch-up may be applied, prior to commencing the coating process in accordance with approved methods.

A. SCOPE

This method statement describes the process for external coating of precast elements on the spraying station or in the yard. It ensures that the epoxy coating application and testing are achieved in a controlled manner.

B. PREPARATION

- The surface to be coated shall be free of dirt, dust, loose particles and other foreign substances.
- All inlet and outlets shall be properly covered.

C. COATING

a. Using Coating Machine

- A drum of base and an equal drum of hardener are properly mounted on the coating machine.
- The precast element to be coated is placed on the turntable by the overhead crane and the turntable is moved into the closed area.
- The distance between the precast element and the spray nozzle is adjusted according to the size of the precast element being coated.
- The electric supply is connected to the coating machine, the closed chamber door is shut and the machine is started.
- The coating machine program is set appropriate to the size of the precast element.
- The spray valve is opened and the coating operation is started.

- Immediately after the elevator stops in the parking position, the mixer and nozzle are cleaned with solvent. A second coat shall be applied to complete the specified coating thickness.
- The electric supply is disconnected from the coating machine, the turntable is moved out of the closed area and the pipe is shifted to the curing area.

b. Using Painting Roller

- Equal and small quantities of base and hardener are properly mixed in a plastic bucket.
- A first layer of coating is applied by using painting roller.
- Subsequent layers will be applied as necessary to complete the desired coating thickness.

D. INSPECTION TESTS

- Initially, WFT is checked to make sure that the required thickness is fulfilled.
- Visual inspection is then conducted by the quality department.
- Minor touch-up if necessary may be accomplished by using Nitomortar FC (Fosroc) and repeating the coating process.
- DFT and Pull-off tests are checked after 4 days of curing.

RC PIPE INSTALLATION

RC Pipe Installation

A. PURPOSE

The purpose of these procedures is to outline some important steps in concrete pipe installation. They are only intended as a guideline and do not replace or supersede project specifications and contract documents.

RESPONSIBILITY FOR IMPLEMENTATION

The contractor is responsible for ensuring the implementation of these procedures whilst the factory provides site support and technical advice to the contractor.

ENVIRONMENT, HEALTH AND SAFETY

All necessary precautions required by statutory regulations or dictated by actual circumstances are to be taken by the contractor during the installation of RC Pipelines to ensure safety of both the public and pipe layers, including provision of uniform support along the pipeline. Additionally, the contractor should avoid interrupting or damaging public or private utilities encountered during the course of the work.

B. PRE-CONSTRUCTION

a. Ordering

The ordering of materials should be closely coordinated between the contractor and the factory as per the approved engineer construction schedule thus enabling better coordination in order to avoid mistakes and possible delays in pipe deliveries. Once the order confirmation is received, then pipes will be produced, cured, checked, stamped and delivered to the project site.

b. Unloading and Handling

Unloading of pipe should be coordinated with the construction schedule and installation sequence to avoid double handling and unnecessary equipment movement. Access to the job site shall be provided to ensure that the trucks can deliver the pipes to the unloading area.

Special attention should be given to avoid damage when handling the RC Pipes, especially to the pipe ends. Pipes must never be dragged or rolled over on rough ground. Correct equipment should always be used for loading and unloading in order to protect the sockets and spigots.

RC Pipes must be stacked on even ground, either on timber or on a soft sand heap. The involved personnel should make sure that the bottom row is securely checked and that the following number of layers for stacking pipes on site is never exceeded:

Dia 600 to 900 : 2 layers
Dia 1000 and more : 1 layer

c. Joint Rubber Protection

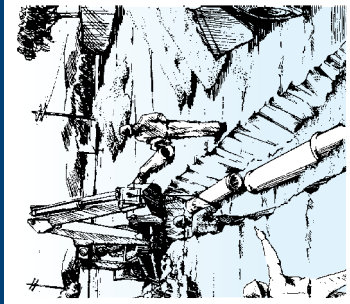
Joint rubber rings must be stored away from direct sunlight, heat, dust or possible contact with oil.

C. INSTALLATION

a. Layout and setting

The contractor is responsible to check the construction drawings and make trial holes to ensure that the area is free from obstructions or existing services.

Concrete Pipe Installation Procedures



Concrete Pipe Installation Procedures briefly outline some important steps in concrete pipe installation. They are intended only as a guide and do not replace or supersede project specifications or contract documents.

ALIGNMENT LINE & GRADE

Do check line and grade as each section is installed.

Do remove pipe section

Don't adjust pipe alignment or grade with pipe in the home position.

WARNING

Do [Diagram showing correct alignment]

Don't operate heavy construction equipment over the pipe until adequate backfill is in place.

EXCAVATION & FOUNDATION PREPARATION

Do [Diagram showing correct trench preparation]

Don't Trench Too Wide and Shallow

Sub-Trench

Pipe Bedding

Do 12 inches Even Fill

Don't Debris Voids

Do (support on barrels)

Don't (support on bells)

Don't (nonuniform support)

Unloading

Do [Diagram showing correct unloading]

Don't [Diagram showing incorrect unloading]

Handling

Do Balance

Don't Do Not Drag

Stockpiling

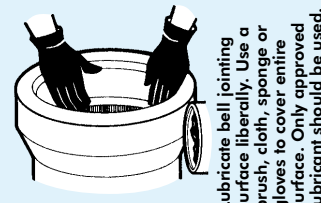
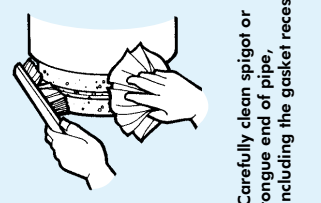
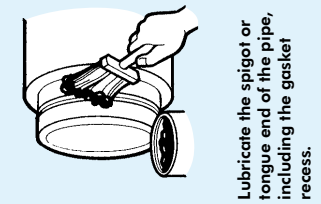
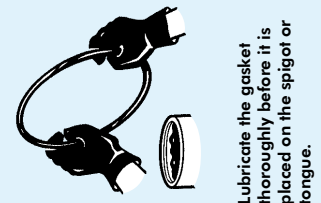
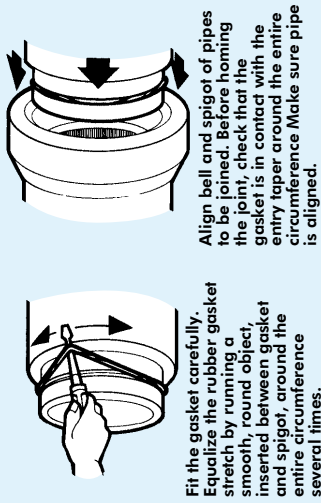
Do [Diagram showing correct stockpiling]

Don't Support on Bell

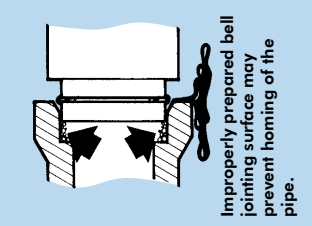
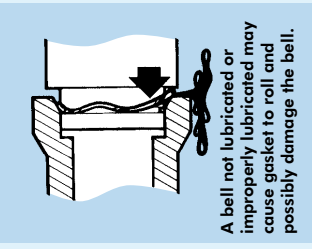
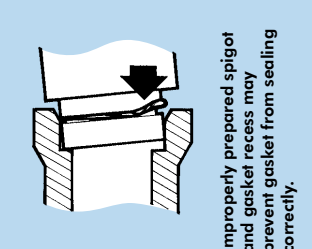
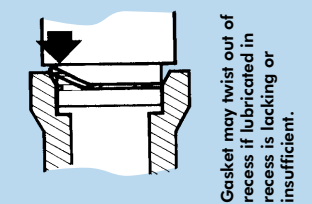
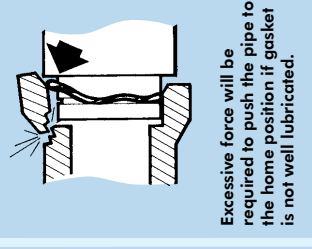
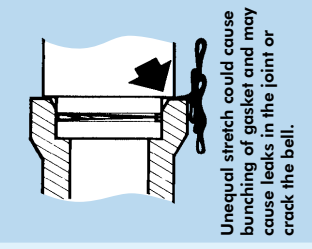
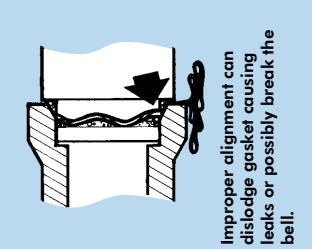
Do Support on Barrel

Preparation & Jointing

Doing

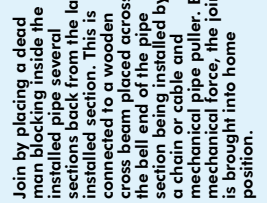
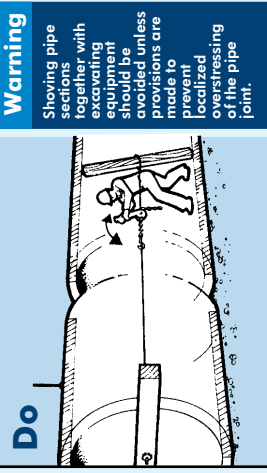


Prevents

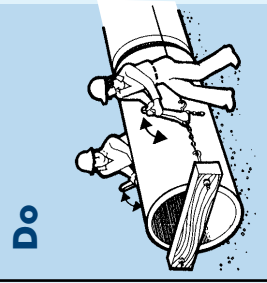


Joining Procedures

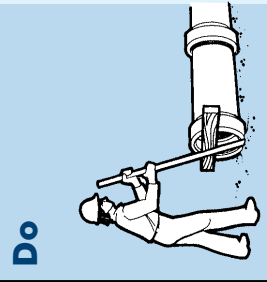
Large Pipe



Medium Pipe

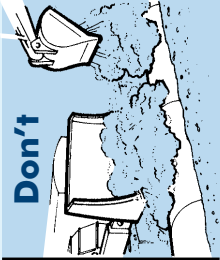


Small Pipe

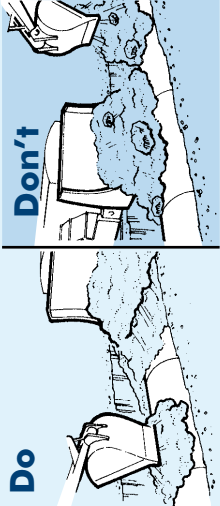


Backfilling

Backfilling Around Pipe



Final Backfill



b. Excavation and preparation

Trench should be kept to the specified width, since an increase in the trench width will increase the load on the pipe. On the other hand, a trench narrower than specified may impede the proper placing and consolidation of the bedding material and restrict working conditions in the trench during pipe laying. A trench adjacent to a manhole may need to be wider to allow for working area. However, care must be taken to ensure that the trench dimensions are kept to a minimum.

The depth of excavation should also be maintained as specified in order to avoid placing additional bedding material.

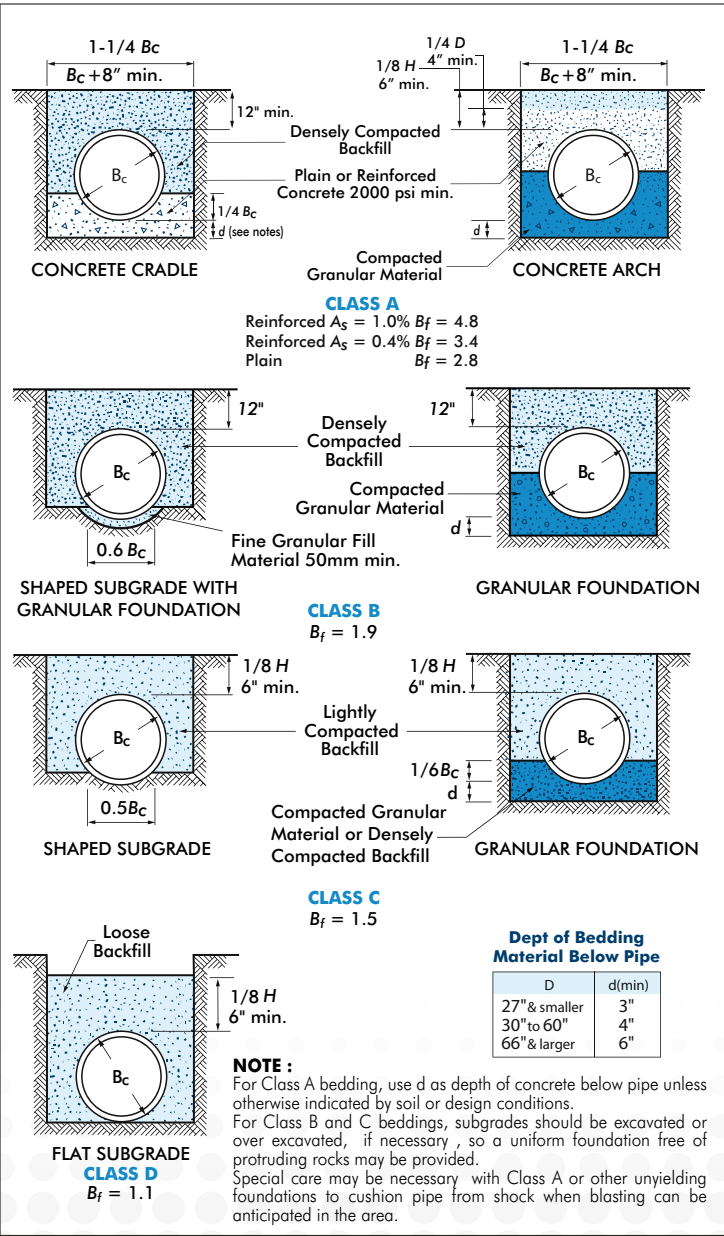
c. Trench Formation

The soil bearing capacity at the formation level must satisfy the design criteria. Any unstable or unsuitable material that can cause differential settlement should be dug out and replaced with selected material as recommended by the geotechnical report. Control of surface and subsurface water is required so that dry conditions will be provided during excavation and pipe laying. Ground water condition should, therefore, be monitored beforehand i.e. during the course of excavation and the water level should be kept below the bottom of the trench. Wherever possible, the water level should not be allowed to rise throughout the pipe laying activities until backfilling is completed by the use of suitable dewatering means.

d. Preparation and jointing

While temporarily supporting the pipe close to its final position, check the spigot end, the socket end and the rubber gasket to ensure that they are all clean. The rubber ring is then stretched over the inner end of the spigot. Finally, plucking and adjustment of the ring is done until it is uniformly seated around its circumference.

The recommended lubricant should be liberally applied to the installed rubber gasket and the socket giving special attention to the lead-in bevel. Any excess lubricant on the spigot need not be removed.



RC PIPE INSTALLATION

RC Pipe Installation

e. Laying

Keeping the pipes centered in line, carefully move the spigot towards the laid socket until the entire rubber gasket makes contact with the lead-in bevel around the full circumference.

The spigot should then be pulled or pushed slowly into the socket as far as possible. Maximum force is required at the beginning of travel when the rubber gasket is being compressed between the spigot head and the smooth cylindrical face of the socket. During travel, a much smaller force will slide the gasket into the socket until the joint is completely homed.

If the gasket does not slide smoothly and uniformly into the joint or if any point becomes pinched between the socket and the spigot shoulder, then the pipe must be withdrawn, alignment and gasket position checked and the above steps repeated after ensuring rubber integrity.

D. SITE WELDING & TESTING

a. General

This method statement covers the field welding of PE and PVC T-Lock sheets at the joints of RC Pipes. It aims at establishing a procedure for welding, testing, setting an acceptance standard for inspection of joint welding and auditing the welding operation for compliance with the required quality.

Responsibility for implementation is as follows:

- The welding foreman is responsible for overseeing on-site welding operation.
- The welding team shall normally comprise two trained workers, one of them is the welder operating inside the line and the other is the helper who is on standby at the starting point of the line. The helper will not enter the line except in case of emergency and will strictly observe the operations at all times maintaining continuous contact with the welder.

- The project safety inspection personal have the responsibility to ensure compliance with safety regulations.

b. Preparation

- A line will normally consist of the RC Pipes laid between two adjacent manholes, called the starting point where the welding activities will begin and the finishing point located on the opposite end.

- The line should be clean and free from water before welding commences.

- The following apparatus shall be made available:

a- A ventilation extract fan of sufficient capacity shall be placed at the finishing point.

b- Necessary tools e.g. grinder, hot air welding gun, extruder and spark test instrument are kept ready.

- For diameters below DN 900, the following additional equipments are required:

a- A wheeled trolley attached to a rope of sufficient length to reach through the whole line and leave enough slack with the observer to work with in case of emergency. In addition, the following shall be observed:

- The trolley wheels shall be inspected for free movement before commencement of the welding works.

- The rope and its connection to the trolley shall be inspected at regular intervals and frayed rope will be replaced immediately.

b- Electrical cable laid together with the trolley rope for the purpose of providing power to the light and hot air welding gun. The cable and connectors shall be already inspected to ensure they are in safe condition at all times.

In case of ventilation failure or any other accident or emergency, the observer shall immediately use the rope to withdraw the trolley and extricate the welder.

b. Welding Procedure

- Ensure all the preparatory activities are completed as applicable.

- Install the extract fan and put in operation prior to the commencement of the welding process.

For small diameters, the welder shall access the line by means of the wheeled trolley.

- Commence welding activities from the starting point, completing one pipe joint and moving to the next pipe joint until reaching the finishing point.

- Clean the flat sides of T-Lock liner and lightly grind the surface and edge of the overlap using a circular grinder.

PE Liner

- Lightly tack weld the flap overlap from the spigot end of the pipe to the bell end of the adjoining pipe using hot air welder, in order to ensure that the overlapping flap will not move during extrusion process.

- Keep the surfaces clean dry and free of dust, oil and water prior to welding, in order to achieve a strong bond between the extrusion material. The surface of the liner should be slightly scored using a circular grinder.

- Insert test wire into the "step" at the joint interface using a hot air welding tool with appropriate nozzle.

- Set the extrusion welder at a temperature of approximately 270 °C – 300 °C.

- Set the Pre-heater between 5-8 on the temperature gauge.

- Apply the extrusion material to the seam formed ensuring cover to both sides of overlap and test wire the finished extrusion seam which shall be a minimum of 16 mm in width.

PVC Liner

- The overlapping area between the lines of the two adjacent pipes shall be properly welded by hot welding machine. The project inspector shall regularly monitor the welding team's operation to ensure compliance with this method statement from a safety perspective.



c. Testing of the welded joints

- All the finished welded joints will be tested using a spark tester.
- Mark all defects discovered.
- Any damaged liner, patches, pinholes, detected by the spark test shall be repaired as per approved repair procedure.

Awards & Achievements



Limitation of Liability

While the information, opinions, advice and recommendations contained in this publication have prepared with proper care, they are offered only in pursuance of the objective to provide useful information and assist those interested in technical matters associated with pipeline design, selection and installation.

The information contained herein is not intended to be an exhaustive statement of all relevant data as the successful installation in each case may depend on numerous factors outside the control of Excellent Pipes Company L.L.C. e.g. particular design requirements, site preparation, quality of workmanship during installation, etc. EXCELLENT accepts no responsibility for or in connection with the quality or standard of any pipeline or installation nor its suitability for any purpose when installed.

All conditions, warranties, obligations and liabilities of any kind which are or may be implied or imposed to the contrary by any statute, rule or regulations or under the general law, whether arising from the negligence of EXCELLENT, its servants or otherwise are or may be implied or imposed to the contrary by any statute, rule or regulations or under the general law, whether arising from the negligence of EXCELLENT, its servants or otherwise are hereby excluded except to the extent that EXCELLENT may be prevented by any statute, rule or regulation from doing so.

Excellent Pipes Company L.L.C. warrants its RC pipes are free of defects caused by faulty manufacture or materials, for a period of 12 months from date of delivery.