

Cosmoplast™



UPVC MANHOLES

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Cosmoplast, a primary member of Group Harwal, has been at the forefront of the plastic industry in the Gulf region since its founding in 1976. Through constant growth and product diversification, the company continues to be the largest thermoplastic pipe manufacturer in the region.

Continuously enhancing its capabilities in plastic manufacturing technologies, Cosmoplast now utilizes a diverse range of materials such as uPVC, polyethylene (PE100, PE80, LLDPE), cross linked polyethylene (PEX), random copolymer polypropylene (PP-R), and glass-reinforced plastic (GRP).

Cosmoplast's ongoing research and development programs continue to add new products to its pipeline systems product range that now includes pre-insulated pipes, reinforced thermoplastic pipes, specialized plumbing systems and fabricated uPVC and GRP manhole systems. Its state of the art engineering, design and tool room facilities are fully capable of manufacturing moulds, dies, machinery equipments and other specialized tooling requirements to meet the company's continual expansion and product development requirements.

With this extended product range, Cosmoplast's pipeline systems cater to an extensive range of market sectors and applications covering infrastructure development, plumbing, oil & gas, district cooling, irrigation, landscaping and water extraction.

An ISO 9001 certified company, Cosmoplast has its production facilities based in Sharjah, Abu Dhabi and Dubai converting over 75,000 metric tons of plastic per annum. In addition to these, Cosmoplast also has upcoming facilities in Saudi Arabia, Moscow and Kaliningrad.



COSMOPLAST PIPELINE SYSTEMS PRODUCT RANGE INCLUDES:

INFRASTRUCTURE PIPELINE SYSTEMS (uPVC, PE, GRP)

uPVC and Polyethylene pipeline systems with sizes ranging from 15mm up to 1200mm, well casings and screens and GRP pipeline systems with sizes from 100mm up to 1400mm for applications including

- Water extraction
- Water distribution
- Drainage
- Sewerage
- Gas distribution
- Cable ducting

PLUMBING SYSTEMS (uPVC, PP-R, PEX)

Comprehensive range includes uPVC systems for drainage, random polypropylene (PP-R) [plain and aluminium composite] and cross linked polyethylene (PEX) systems for water and sanitary applications and uPVC high pressure pipes and fittings for water supply and A/C drain. Plumbing accessories such as pipe clamps, polyethylene compression fittings, solvent cements, lubricants and adhesives compliment this product range.

PRE-INSULATED PIPES (HDPE-HDPE, HDPE-GRP, HDPE-STEEL, GRP-HDPE, GRP-GRP, GRP-STEEL)

Jacket – core pipe combination with polyurethane insulation are used for applications such as District Cooling systems, Oil & Gas and other industrial applications. Cosmoplast provides HDPE and GRP pipes as jackets and HDPE, GRP and steel as core pipes.

IRRIGATION SYSTEMS (LLDPE)

Consists of high precision inline drip pipes and landscape and lawn edging. This range also includes saline resistant valves, drainage systems, sprinklers and central controllers.

REINFORCED THERMOPLASTIC PIPES (RTP)

Available in length of upto 500m, with a working pressure of 150 Bar at a temperature of 60 degrees celsius. RTP is used for gas distribution networks, oil flow lines and water injection lines.



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uPVC MANHOLES

uPVC manholes can be used in conjunction with various outflow processes covering a variety of applications including drainage, foul water overflow, soil and waste and sewerage systems, chemical plants, large pipeline junctions and valve boxes.

Manholes are the largest entry chambers providing access to a sewer or drainage system for maintenance equipment and inspectors to enter. Minimum internal dimensions are usually in the region of 800mm in diameter and about 1,000mm in height.

Years of experience gained by Cosmoplast in developing application specific uPVC and PE pipes and fittings have helped to create a custom made uPVC manhole system that fully addresses the monitoring and control needs of the pipeline industry.



APPLICATIONS

Sewerage applications:

In sewage distribution systems, hydrogen sulfide is the primary corrosive agent as it combines with water to form a dilute sulfuric acid. Corrosion resistant uPVC manholes provide a rigid and durable inspection structure for sewage pipelines. Cosmoplast uPVC manholes are modular in concept and thus can be custom built in a variety of heights and diameters to enable their use as inspection or access chambers.

Vacuum sewerage applications:

The latest application of manholes are in the vacuum sewerage systems where the sewage is disposed using vacuum suction.

Landfill applications:

Concrete manholes used in leachate lines are attacked and weakened by the corrosive nature of the run off involved. As uPVC is an inert material to all but the most aggressive of materials, it is thus the ideal choice for use in such applications.



Valve boxes:

Protection of valves and flow measurement devices requires strong and durable enclosures to guard against both harsh environmental conditions and external forces. Custom made uPVC manholes for valve box applications provide excellent access and protection for system accessories and associated instrumentation.





UNIQUE AND FOOLPROOF CONSTRUCTION

Cosmoplast's uPVC manholes are made of single or multiple sections designed to suit the operational depths required. Generally manholes of depths greater than 2.0 meter will have multiple sections incorporating a base section, riser section and an access section.

These base and riser sections can be assembled and sealed on site using the traditional and well-established uPVC jointing techniques.

The base section of the manhole construction is normally sealed using a welded uPVC base plate. This can then be encased with a concrete filling to ensure system balance and to counter any upthrusts encountered on site. At the same time, the concrete filling can also be shaped to easily match the individual pipe configurations and benching required at that location.

In and out flow pipes can be installed anywhere around the circumference of the base unit dependent upon pipe and site configuration. These inlet and outlet pipe sections are then connected to the external lines using solvent cement, rubber ring or flanges depending upon the local system connection requirements.

When the exact inlet and outlet pipe dimensions and configurations are specified beforehand, Cosmoplast can supply both manhole chambers and readymade inlet and outlet connections which exactly match onsite requirements.



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DESIGN FEATURES



Custom Built :

uPVC manholes can be custom built to suit individual project requirements thereby providing efficient and reduced on-site installation time and costs.

High Impact strength :

The manhole walls are made of uPVC material by a continuous extrusion process providing excellent impact resistance and full all round protection. This uPVC base material and structure provides total corrosion resistance thereby enhancing overall manhole life span.



Modular Structure :

The modular design concept enables the customer to match the exact site requirements of the project in terms of system height and pipe configurations, as well as providing flexibility in construction design, layout and easy installation.

SITE STORAGE

- uPVC manholes should be kept away from sharp projections, stones or other jagged outcrops.
- If uPVC manholes are to be kept in the open for any length of time then it is recommended that they are kept covered from direct sunlight.
- Keep uPVC manholes away from intense heat.
- Never place uPVC manholes in contact with lubricating or hydraulic oils, gasoline, solvents or other aggressive materials.



HANDLING OF UPVC MANHOLES

- For the safety of both the manhole and the handling personnel, care and attention should always be provided when handling uPVC manhole products.
- Manholes should never be dragged or dropped onto hard or uneven surfaces.
- uPVC manholes should always be lifted using a crane or heavy weight lifting device.
- While lifting manholes, use appropriate tools and clamps, which fit securely into the lifting hooks, which are mounted on the body structure thus ensuring that any connecting pipes are not used for lifting.
- Metal chains, metallic slings or hooks should never be brought into direct contact with uPVC manholes. Wide band webbed slings of polypropylene, nylon or similar material are recommended. Exercise special care when handling manholes in humid or wet conditions, as the surface may become slippery.
- Operate as close to the ground as possible when moving the load by forklift.



TRANSPORTATION

- Where uPVC manholes are transported by vehicles, the vehicles concerned should have a flat bed and be free from sharp edges or projections.



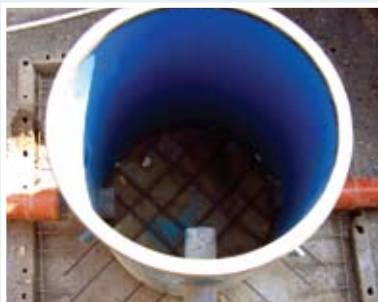
- For transporting from one place to another, each manhole should be packed on a single pallet.
- After the loading, each manhole is bound to the truck to avoid any movement or damage.
- Manholes should be evenly supported over their base diameter and not left overhanging the vehicle.



INSTALLATION PROCEDURES

The design and placement of inlet and outlet pipes or connectors shall be coordinated in line with the total structure and design of the drainage system network.

- uPVC manholes need to be mounted on a precast concrete base slab which may or may not have an inset circle of diameter slightly larger than that of the manhole. The inset circle helps to ensure the exact placement of the unit.
- The base slab should be placed plumb and level in order to ensure that the uPVC manhole placed within the slab is level.
- Small holes may then be cut on the manhole through opposite sides of the base unit in horizontal direction to enable the reinforcing bars to be incorporated through the walls of the unit. This ensures the connection and locking into the precast concrete base.
- Manhole may come with or without benching to allow end user flexibility in terms of their requirement of benching structure or material.
- Manhole installation is completed by the use of a pre-cast concrete top slab with inset circle formed into the bottom face of the slab. This inset circle is made slightly larger than the manhole diameter to allow it to fit snugly over and lock into the top of the manhole structure.
- According to the requirement for entry and access, the pre-cast concrete top slab could incorporate the normal covers and frames.
- Connection/rocker pipes may then be used to connect the manhole to the surrounding pipe networks.





FORCES ACTING ON MANHOLES

Manholes may be acted upon by a variety of forces which may change with time due to the surrounding environment and any physical changes which may be acted upon it. Due to being installed below ground level, two of the primary forces acting on manholes are uplift forces due to ground water and downward forces due to the weight of the manhole inclusive of upper and lower plates and the frictional forces from both backfill and surrounding soil conditions.

Safe installation of the manhole requires a resultant downward force to balance and retain the manhole at equilibrium. This is represented by a safety factor, which is derived from the ratio of the total force acting downwards when compared to the uplift forces.

The table below illustrates the safety factor for manholes of different heights and depth of immersion in ground water.

STEP	DEFINITION	UNIT
D	Depth of the manhole	m
lw	Percentage of manhole depth immersed in ground water	(%)

D→ lw↓	1	1.5	2	2.5
25%	4.97	4.88	4.81	4.77
50%	3.1	2.9	2.77	2.69
75%	2.25	2.06	1.95	1.87
100%	1.65	1.52	1.44	1.39

- Manhole Diameter = 1.2 m.
- Width of bottom concrete slab = 1.5 m.
- Width of top concrete slab = 1.5 m.
- Thickness of slab = 100 mm.

LOAD BEARING CAPACITY

Cosmoplast's uPVC manholes have been specially tested for load bearing as below.

Load Test Details

Diameter	1000 mm
Wall thickness	20.8 mm
Height	3.0 meters
Test holding time	5.0 mins
Ambient temperature	30°C Average
Loading (Tons)	40 Tons

RESULT:

No signs of Deformation or Stress seen. (verified by an independent third party certification body)



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INSTALLATION COMPARISON WITH CONVENTIONAL MANHOLES

CONVENTIONAL MANHOLES
Extensive concrete used
8-10 days work per manhole
Labour intensive

UPVC MANHOLES
Minimal concrete used
2 - 3 days work per manhole
Modular construction

Installation Procedure Comparison

STEP	ACTIVITY	DURATION
1	Dewatering, excavation and side support	Min 2 days, dependent upon depth required.
2	Concrete base installation and curing	1 - 3 days.
3	GRP liner placement and pipe installation. Establish formers.	1 day
4	Build concrete surround and Curing	2 - 3 days.
5	Backfill and re-establishment of surface level. Backfilling requires pouring concrete grout in layers and compacting without any lumps or debris.	1 day

STEP	ACTIVITY	DURATION
1	Dewatering, excavation and side support.	2 days, dependent upon depth required.
2	Insert precast concrete slab and mount manhole with cement base.	1 day
3	Backfill, mount the top slab and re-establish the surface. Backfilling requires pouring of granular sand or nominal sized gravel free from debris or lumps complete with normal compacting.	1 day

uPVC MATERIAL PROPERTIES

Resistance to Corrosion

uPVC being a non-conductor is totally immune to all types of galvanic as well as electro-chemical influences which might lead to corrosion. Being non-metallic, it is also impervious to any type of corrosion caused by moisture as well as a large range of industrial liquids and chemicals. Seepage from high sulphate soils, as well as low hardness waters also do not threaten it. In total this translates into a longer installed life for the uPVC manholes.

Resistance to biological attack and growth

uPVC is completely immune to any microbial life that it might be exposed to nor offer a food source to any bacterial life form and is completely guaranteed to withstand any such growth.





Certain elastomer seals may sometimes disintegrate when exposed to certain micro organisms. Therefore, the water industry has specified that only those elastomer materials, which can withstand biological growths be used with uPVC manholes. Both the seals as well as lubricants recommended for use with Cosmoplast pipeline systems have been tested and proven to be immune from damage due to bacterial growth.

Resistance to weathering

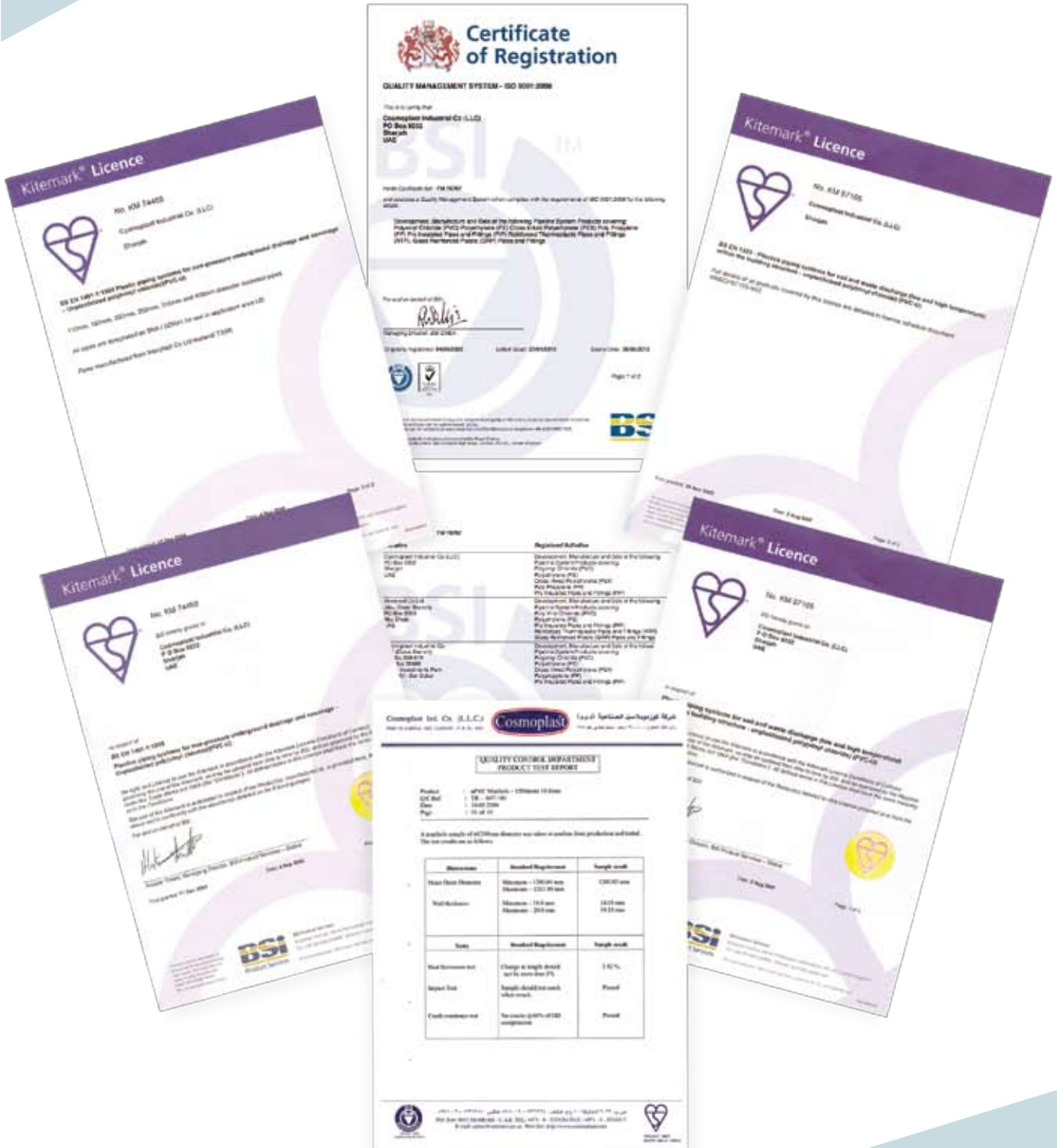
Long and elevated temperature exposure to sunlight and ultraviolet radiation, especially in the Middle East where the surface temperature of pipes may rise significantly above the ambient temperature may considerably reduce the tensile strength of uPVC manholes, hence proper precautions must be taken while storing manholes as detailed previously in this brochure.

uPVC Properties

PROPERTY	UNITS	VALUE
Specific gravity	gms/cm ³	1.41 + 0.02
Specific heat	KCal/kg/ °C	0.25
Co-efficient of linear expansion	mm/m/ °C	.08
Vicat softening temperature	°C	85 @ 1kg load
Tensile strength @ 20 °Cmin	Mpa	50
Water absorption	mg/cm ²	<4
Modulus of Elasticity	Mpa	3000
Impact Strenght	KJ/m ²	4.75 - 5.42
Thermal Conductivity	w/m.K	0.13
Flammability		Will not support combustion



CERTIFICATIONS



Inline with our product development programme, Cosmoplast reserves the right to modify or change any of the information contained herein without prior notice



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