



TPP MANUFACTURING SDN. BHD.
Fabricating Polyester Resin Concrete

www.tppmanufacturing.com.my



Company Overview

TPP Manufacturing Sdn Bhd

was established in July 2016 to produce Polyester Resin Concrete (PRC) pipes used in sewerage and drainage systems. The production facility is located in South Malaysia, Johor, Batu Pahat. Being the sister company of Japan's Tokai Hume Pipe Co., Ltd., the company uses technology transferred from Japan for their manufacturing of PRC pipes. TPP also benefits from Tokai's continuous R&D back in Japan to further improve on the quality and standard of PRC pipe produced.



Tokai Hume Co. Ltd.

established since 2001 is the leading PRC pipe company in Japan. The company is located in Gifu city, central Japan. The company began operations in 1960 as a cement concrete pipe manufacturer. Subsequently in 1998, they shifted their focus to manufacturing PRC Products. To date, the company employs more than 50 production staff in Japan, with products spanning across the central and northern regions of Japan.



What is Polyester Resin Concrete (PRC)?

Polyester resin concrete is the general term used in pipe production factory. In the market, it is also called as polymer concrete. The use of formularized polyester resin to substitute water and conventional cement as a binding agent is perfect against corrosive substances such as sulphuric acid, alkali liquid wastes and other chemical liquids found in sewerage systems.



On top of this, PRC provides remarkable mechanical strength against external pressure, axial pressure and bending, surpassing the conventional concrete and vitrified clay pipes.

In terms of compressive strength, PRC is at least 2-3 times stronger than conventional cement concrete, with a compressive strength exceeding 80N/mm². This allows PRC to remain lightweight without compromising structural strength. Finely moulded PRC products will inherit the polyester's smooth exterior and excel against liquid penetration.

If cost efficiency, productivity and durability are of utmost importance the qualities of high strength combined with flexibility and corrosion resistance of PRC make them the most attractive for use in pipe jacking for sewerage and drainage systems.

Characteristic of PRC



Life Cycle

Economical life cycle cost contributed by higher lifespan. Only minimal maintenance such as water jetting required over its entire lifespan.
(BS EN : > 50 year lifespan)



Liquid Permeability and Corrosion Resistance

Excellent resistant against water penetration and wide range of chemical liquid found in sewerage and soils. Concrete surface is non-permeable by any liquid and thus maintains its weight throughout the jacking process.
(ASTM : < 0.09% weight loss under corrosive solutions)



Lightweight

Thinner and lighter than similar strength class conventional jacking pipe. Product material able to reduce by half yet maintaining same jacking force due to PRC has higher compressive strength than cement concrete.
(BS EN : PRC [80 Mpa] & RC - 40 [Mpa])



Stress Resistance

Superior compressive strength with approximate 20% retained as flexural strength. Even without additional reinforcement such as rebar or fiberglass, well compacted concrete is great against pulsation stress causing by vehicle and quivering environment.
(BS EN : withstand 12Hz continues cyclic load, Lab result > 16 Mpa under 3 point load test)



Smooth Exterior

Smother surface reducing friction and require less jacking load during installation process while contributing higher hydraulic performance. Smooth inner surface increasing flow capacity which lead to cost reduction by opting smaller sizes.



Solid & Durability

PRC products are very durable due to its unique mechanical characteristic. Perfect balance between high compressive strength, high impact resistance and without any deformation within service lifespan.



Why TPP?

TPP Pipes are made with patented technologies from Japan. With the rich history and experience of the team in Japan, TPP pipes aims to replicate this success in the South East Asia region with the qualities as shown:

Process & Composition:



Centrifugal Spun Casting

Justifiable homogeneous concrete mixture and geometrical symmetry with seamless mould design.

Assuring consistence joint performance for each pipe able to withstand minimum of 4 bar internal and external static pressure.



Automated Machinery

Lowering human error in traditional vertical or horizontal casting method which workmanship is the deciding factor on mechanical performance of each pipe.

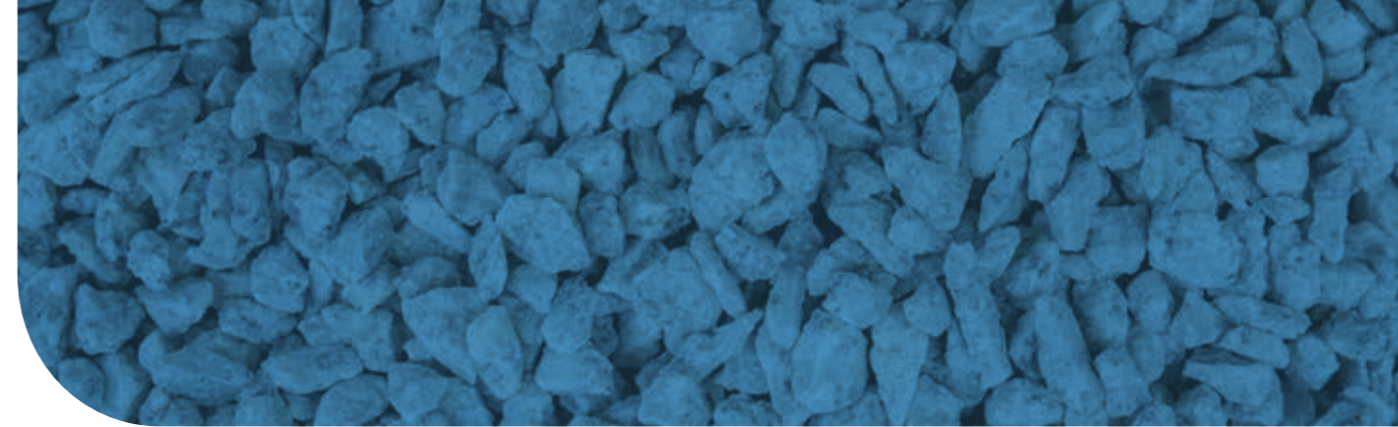


Reliable Concrete Strength

Specialize formula constantly tested to achieved 60 N/mm² within 1 day and 90 N/mm² within 7 days.

Eliminating possibility of unstable curing period resulting pipe failure during site installation. Simple direct visual inspection made available for all time to ensure each pipe is always in ideal condition.

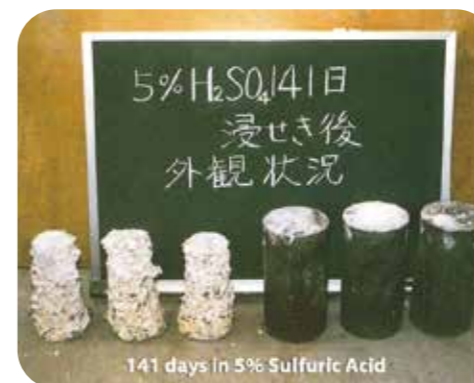
-BS EN 14636-1--Clause 5.4.3 - Compressive Strength \geq 80 N/mm²



Unique Concrete Against Corrosive Substance

Aside from complying all requirement stated in BS EN 14636-1, TPP polyester resin concrete do not require any additional protection or liner to match HDPE liner performance which widely used as protective barrier in sewerage pipeline.

-ASTM D 543--Resistance to Chemical Reagent



100 Years Lifespan

According to the Independent Laboratory Test Result, TPP Polyester Resin Concrete has been proven to comply with standard requirements after 100 years.

The long-term durability tests was carried out by applying load on pipe samples for more than 10,000 hours (416 days). The results were then extrapolated to 50 years, and proven to meet the standards.

Given the high performance of TPP pipes and regional regulation, we have further extrapolated the results to 100 years, and shown that that TPP pipe performance can still meet the standard requirements.

-BS EN 14636-1--Clause 5.4.6 - Crushing Strength \geq 50% initial value after 50 years

Polymer Concrete/Polyester Resin Concrete Jacking Pipe (PRCJP)

Pipes are connected with spigot-to-spigot with stainless steel sleeve as a bridge between pipe end. EPDM rubber ring mounted on both spigot as permanent seal against leakage. Wooden chipboard place between each pipe as jacking force distributor during installation. Connected joints are tested and proven to withstand minimum 4 bar hydrostatic pressure both internally and externally. During installation, user is required to align and push-to-insert spigot end into the stainless steel sleeve.

Jacking Pipe are available in 4 types :

S-TYPE

Designed for standard project. Fulfilling both economical budget and product standard requirement. These pipes allow lightweight and smaller machine handling during installation process.

CMY-TYPE

Specially designed for Malaysia with its sizes and thickness matching local industrial practice and soil condition.

T-TYPE

Designed for heavy duty project. These pipes consist thicker wall and allow higher jacking force in harsh soil condition. Impact strength and stress resistance are significantly higher than standard duty (S-type).

BS-TYPE

International recognized sizes. Thicker pipe wall contributing higher mechanical strength and pipes outer diameter is suitable for general tunnel boring machine.

Additional Lining

Pipes inner surface may coated with additional layer of liner as finishing touch.

Color can be customized as per user preference.

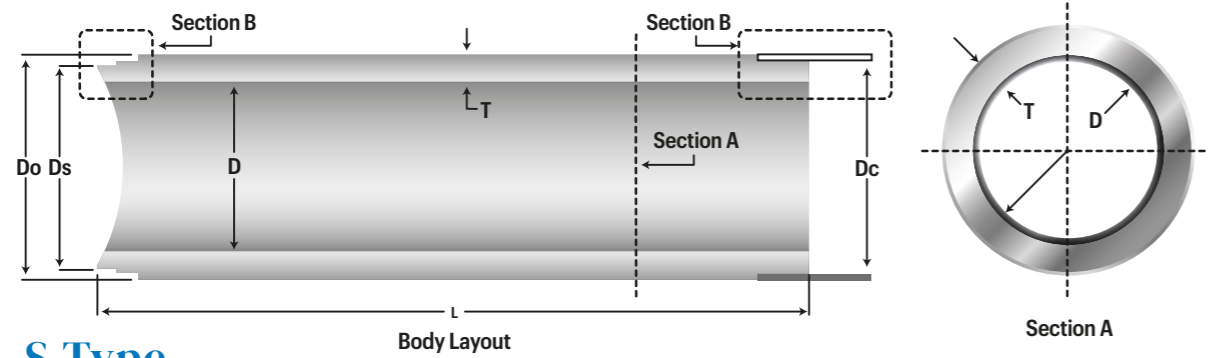


Delivery Handling

Packing service is available and being practiced for pipes with inner diameter of 300 or below. All TPP pipes are delivered with EPDM rubber ring secured with adhesive and wrapped with layers of films to avoid unnecessary damage and foreign object affecting joint performance.

This is TPP effort to diminishing defective during transport related activities while expediting the whole process: delivery-to-installation in quick and safe manner.

Product Specifications



S-Type

Unit of Measurement: Millimeter (mm)

Inner Diameter	Nominal Size (BS EN)	Outer Diameter	Thickness	Spigot Outer Diameter	Sleeve Inner Diameter	Total Weight	Pipe Length	Recommend Jacking Load ^① (F_{cj})
D	DN	Do	T	Ds	Dc	(kg)	L	MT
260	231	328	34	310	322	147	1m / 2m	55
300	268	374	37	356	368	184	1m / 2m	71
400	359	488	44	469	482	286	1m / 2m	115
450	396	544	47	525	538	342	2m	141
500	445	600	50	581	594	402	2m	168
600	550	710	55	686	697	528	2m	213
700	668	828	64	801	812	722	2m	291
800	800	960	80	920	943	1038	2m	397

Inner Diameter	Sleeve / Coupling			Spigot			Deflection Gap	Recommend Deflection
	Thickness	Length	Allowable Insertion	Allowable Insertion	Gasket Seat Width	Gasket Seat Height		
D	tc	Lc	Lc1	Ls1	Ls	ts	ts1	mm/m
260	2.0	120	60	60	30	3.5	2.5	35(2°)
300	2.0	120	60	60	30	3.5	2.5	35(2°)
400	2.0	120	60	60	30	4.0	2.5	35(2°)
450	2.0	120	60	60	30	4.0	2.5	35(2°)
500	2.0	120	60	60	30	4.0	2.5	35(2°)
600	2.0	160	80	80	40	4.0	1.5	35(2°)
700	4.0	160	80	80	40	4.0	1.5	35(2°)
800	4.0	200	100	100	40	10.0	1.5	35(2°)

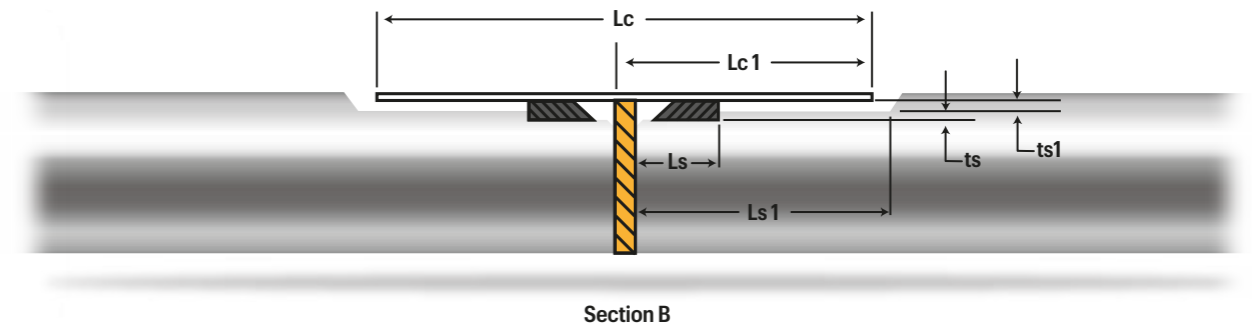
T-Type

Unit of Measurement: Millimeter (mm)

Inner Diameter	Nominal Size (BS EN)	Outer Diameter	Thickness	Spigot Outer Diameter	Sleeve Inner Diameter	Total Weight	Pipe Length	Recommend Jacking Load ^① (F_{cj})
D	DN	Do	T	Ds	Dc	(kg)	L	MT
260	250	360	50	326	351	228	2m	74
300	300	400	50	366	391	256	2m	84
400	384	526	63	492	517	427	2m	158
450	450	605	77	571	596	595	2m	237
500	482	640	70	606	631	582	2m	225
600	600	760	80	720	743	793	2m	304
700	710	870	85	830	853	980	2m	382

Inner Diameter	Sleeve / Coupling			Spigot			Deflection Gap	Recommend Deflection
	Thickness	Length	Allowable Insertion	Allowable Insertion	Gasket Seat Width	Gasket Seat Height		
D	tc	Lc	Lc1	Ls1	Ls	ts	ts1	mm/m
260	2.0	120	60	60	30	10.0	2.5	35(2°)
300	2.0	120	60	60	30	10.0	2.5	35(2°)
400	2.0	120	60	60	30	10.0	2.5	35(2°)
450	2.0	120	60	60	30	10.0	2.5	35(2°)
500	2.0	120	60	60	30	10.0	2.5	35(2°)
600	2.0	160	80	80	40	10.0	1.5	35(2°)
700	4.0	160	80	80	40	10.0	1.5	35(2°)

Joint Details



CMY-Type

Unit of Measurement: Millimeter (mm)

Type	Nominal Size (BS EN)	Inner Diameter	Outer Diameter	Thickness	Spigot Outer Diameter	Sleeve Inner Diameter	Total Weight	Pipe Length	Recommend Jacking Load ^① (F_{cj})
CMY	DN	D	Do	T	Ds	Dc	(kg)	L	MT
225	209	225	290	32.5	275	285	117	1m / 2m	48
300	250	300	360	30	345	355	148	1m / 2m	56
375	329	375	443	34	425	436	206	1m / 2m	77
450	384	450	526	38	507	518	273	1m / 2m	105

Type	Sleeve / Coupling			Spigot			Deflection Gap	Recommend Deflection
	Thickness	Length	Allowable Insertion	Allowable Insertion	Gasket Seat Width	Gasket Seat Height		
CMY	tc	Lc	Lc1	Ls1	Ls	ts	ts1	mm/m
225	2.0	120	60	60	30	2.5	2.5	35(2°)
300	2.0	120	60	60	30	2.5	2.5	35(2°)
375	2.0	120	60	60	30	3.0	2.5	35(2°)
450	2.0	120	60	60	30	3.0	2.5	35(2°)

BS-Type

Unit of Measurement: Millimeter (mm)

Type	Nominal Size (BS EN)	Inner Diameter	Outer Diameter	Thickness	Spigot Outer Diameter	Sleeve Inner Diameter	Total Weight	Pipe Length	Recommend Jacking Load ^① (F_{cj})
BS	DN	D	Do	T	Ds	Dc	(kg)	L	MT
200	200	200	275	37.5	241	266	131	2m	35
225	225	225	318	46.5	284	309	187	2m	58
250	250	250	360	55	326	351	247	2m	84
300	300	300	400	50	366	391	256	2m	84
375	375	375	513	69	479	504	448	2m	171
400	400	400	550	75	516	541	519	2m	204
450	450	450	605	77.5	571	596	595	2m	237

Type	Sleeve / Coupling			Spigot			Deflection Gap	Recommend Deflection
	Thickness	Length	Allowable Insertion	Allowable Insertion	Gasket Seat Width	Gasket Seat Height		
BS	tc	Lc	Lc1	Ls1	Ls	ts	ts1	mm/m
200	2.0	120	60	60	30	10	2.5	35(2°)
225	2.0	120	60	60	30	10	2.5	35(2°)
250	2.0	120	60	60	30	10	2.5	35(2°)
300	2.0	120	60	60	30	10	2.5	35(2°)
375	2.0	120	60	60	30	10	2.5	35(2°)
400	2.0	120	60	60	30	10	2.5	35(2°)
450	2.0	120	60	60	30	10	2.5	35(2°)

Notes

^① The 'Jacking Load (with SF)' quoted above is for guidance only and with the assumption 'closed joint' situation there is no joint gap between two adjacent pipes, any deflection being taken up within the packer.
 -BS EN 1916 -- Annex B.3.2 - $F_{cj} = 0.5 F_{jmax} = 0.3 f_{ck} \times A_c$ ($f_{ck} = 80N/mm^2$)

^② Non standard pipes can be designed and manufactured to meet individual customer requirements such as pipe outside diameter (to suit the size of cutter head of the tunnelling machine), special strength classes for high depth of fill, etc.

Standard materials for Pipe Joint

Sleeve / Coupling :Stainless Steel G304/G316
 Gasket :Vulcanized Rubber Ring
 Packing / Cushion Ring :Wooden Chipboard

* Alteration of materials and design is prior to client request and approval from related parties.



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