SPUN CONCRETE PIPES

CERTIFIED ISO 9001 UKAS MANAGEMENT SYSTEMS 001

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CINLE
CONCRETE PRODUCTS INDUSTRIES SDN. BHD. (216631-X)

Butt Joint Concrete Pipes
(With Collar)

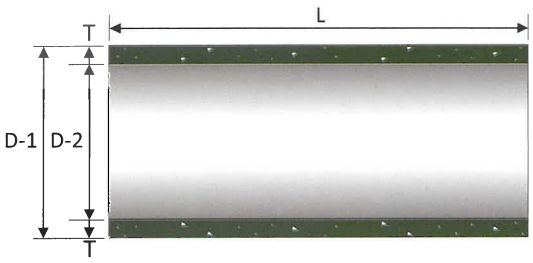


Figure 1. Typical cross section of Butt Jointed Concrete Pipe

Butt Joint Concrete Pipes Dimensions & Properties

Nominal Diameter	External Diameter	Internal Diameter	Effective Length	Wall Thickness	Approx. Weight per Pipe Classes to AS 1342 : 1973, MS 881 : Pt.3 : 1991			
mm	D-1 mm	D-2 mm	L mm	T mm	S/STD (Tonne)	X/L (Tonne)	Y/M (Tonne)	Z/H (Tonne)
300	363	300	1524	31.5	0.139	0.140	0.141	0.142
450	544	450	1524	47	0.23	0.25	0.26	0.27
600	700	600	1524	50	0.39	0.39	0.40	0.41
750	860	750	1524	55	0.53	0.54	0.54	0.55
900	1030	900	1524	65	0.76	0.76	0.77	0.78
1050	1210	1050	1524	80	1.02	1.02	1.04	1.05
1200	1370	1200	1524	85	1.31	1.33	1.34	1.35
1350	1540	1350	1524	95	1.65	1.67	1.69	1.70
1500	1710	1500	1524	105	2.04	2.05	2.06	2.08
1800	2050	1800	1524	125	2.90	2.92	2.95	2.98

Spigot & Socket Concrete Pipes
(With Rubber Ring Joints)

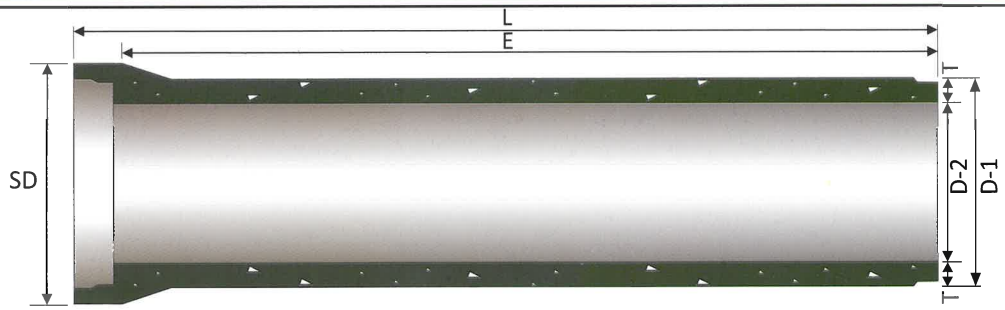


Figure 2. Typical cross section of Spigot & Socket Concrete Pipe

Spigot & Socket Concrete Pipes Dimensions & Properties

Nominal Diameter	Socket External Diameter	Barrel External Diameter	Barrel Internal Diameter	Overall Length	Effective Length	Wall Thickness	Approx. Weight Per Pipe Classes to AS 1342 : 1973, MS 881 : Pt.1 : 1991			
mm	SD mm	D1 mm	D2 mm	L mm	E mm	T mm	S/STD (Ton)	X/L (Ton)	Y/M (Ton)	Z/H (Ton)
450	624	530	450	3158	3048	40	0.51	0.51	0.52	0.52
600	814	700	600	3168	3048	50	0.86	0.86	0.87	0.87
750	996	860	750	3168	3048	55	1.17	1.18	1.19	1.20
900	1159	1030	900	3192	3048	65	1.68	1.69	1.71	1.73
1050	1349	1200	1050	3192	3048	75	2.27	2.28	2.31	2.33
1200	1539	1370	1200	3202	3048	85	2.95	2.98	3.00	3.03
1350	1729	1540	1350	3202	3048	95	3.71	3.74	3.78	3.81
1500	1918	1710	1500	3221	3048	105	4.65	4.67	4.70	4.74
1650	2108	1880	1650	3221	3048	115	5.64	5.66	5.69	5.75
1800	2298	2050	1800	3221	3048	125	6.70	6.73	6.79	6.85

Note: For Butt Joint Concrete Pipe with effective length of 3,048mm can be manufactured upon request.
Pipes with strength greater than H or Z class can be manufactured upon request.
Due to constantly improved products, specifications may change without prior notice.

DESIGN AND SPECIFICATIONS

CINLE Spun Concrete Pipes are designed and manufactured to Australian Standard AS 1342 : 1973, and also conform to Malaysian Standard MS 881 : Part 3 : 1991 and British Standard Specification BS 5911 : 1981 to withstand crushing test load as per table below:-

Table 1 TEST LOADS FOR CLASSES 'S', 'X', 'Y' and 'Z' PIPES

Nominal Size	Test Load (Kilonewtons per metre of effective length)							
	Class 'S' Pipes		Class 'X' Pipes		Class 'Y' Pipes		Class 'Z' Pipes	
mm	Cracking Load	Ultimate Load	Cracking Load	Ultimate Load	Cracking Load	Ultimate Load	Cracking Load	Ultimate Load
100	10.0	15.0	13.0	19.5	19.5	29.5	26.0	39.0
150	10.0	15.0	13.0	19.5	19.5	29.5	26.0	39.0
225	11.0	16.5	14.0	21.0	21.0	31.5	28.0	42.0
300	12.0	18.0	15.0	22.5	22.5	34.0	30.0	45.0
375	13.0	19.5	17.0	25.5	25.5	38.5	34.0	51.0
450	15.0	22.5	20.0	30.0	30.0	45.0	40.0	60.0
525	17.0	25.5	23.0	34.5	34.5	52.0	46.0	69.0
600	19.0	28.5	26.0	39.0	39.0	58.5	52.0	78.0
750	21.0	31.5	32.0	48.0	48.0	72.0	64.0	96.0
900	23.0	34.5	37.0	55.5	55.5	83.5	74.0	111.0
1050	25.0	37.5	42.0	63.0	63.0	94.5	84.0	126.0
1200	27.0	40.5	46.0	69.0	69.0	103.5	92.0	138.0
1350	29.0	43.5	50.0	75.0	75.0	112.5	100.0	150.0
1500	31.0	46.5	54.0	81.0	81.0	121.5	108.0	162.0
1650	33.0	49.5	58.0	87.0	87.0	130.5	116.0	174.0
1800	35.0	52.5	62.0	93.0	93.0	139.5	124.0	186.0

Notes :-

1. The test load for a pipe of intermediate size can be determined by straight-line interpolation.
2. The pipe shall sustain the above crushing test loads without developing a crack width in accordance with the following: For minimum clear cover of 10mm- 0.15mm crack width; over 10mm up to and including 20mm- 0.20mm crack width; above 20mm-0.25mm crack width.
3. Maximum crack size is taken over a length of 300mm or more at intervals not exceeding 50mm.

SEWERAGE PIPE

CINLE Spun Concrete Sewerage Pipes range from 450mm ø to 1800mm ø with specifications and classes similar to those of Spigot and Socket with RRJ type for greater flexibility and complete water tightness of the sewer line. In cases where open excavation is not permitted, the installation of sewer lines by pipe jacking system can be used.

CINLE Spun Concrete Sewerage Pipes are manufactured in four categories:-

(i) Sulphate Resistant Cement to BS 4027-1980.
(ii) Ordinary Portland Cement lined internally with 12mm thick high Alumina Cement (Cement Foudu) lining.
(iii) Ordinary Portland Cement lined internally with PVC blankets.
(iv) Ordinary Portland Cement lined internally with additional layer of sacrificial concrete internally.

Advantages of **CINLE Spun Concrete Sewerage Pipe**:-

(i) Designed to withstand corrosive attacks from hydrogen sulphite and other sewer gases, acids and alkalis.
(ii) Resistant to fungus and bacteria attacks.
(iii) Resistant to a wide range of chemicals and salts.
(iv) The interior lining prevents the disintegration of the concrete.

HANDLING

General

Avoid damage when handling concrete pipes during off-loading, site transportation and laying. Never lift pipes by using a sling or chain passes through the barrel. Pipes should be lifted horizontally using a properly constructed C-hook or a canvas sling. Slings made of chain or steel wire rope, or a padded beam may be used with care. Never hook into sockets. Pipes should always be lifted where possible, and never dropped. Care should be taken to protect the ends of pipes from chipping and spalling.

Stacking

Where stacking is necessary, it should be on flat ground and on timbers to protect spigots and sockets. The bottom layer of tiered stacks of pipes should always be securely wedged before further layers are added. Pipes should be stacked barrel to barrel with sockets overhanging. If space allowed, a single layer is always preferable and no stack should exceed 2 meters in height. Maximum recommended layers of stacked pipes are as follows:

NOMINAL PIPE DIAMETER	NUMBER OF LAYERS
300mm - 375mm	4
450mm - 600mm	3
675mm - 1050mm	2
above 1050mm	1

Rubber Rings

Careful checks should be made on the correct quantity, grade and diameter of rubber jointing rings when the pipes are delivered. Rubber rings should be stored flat to prevent distortion, and should be kept clear of direct sunlight, heat and oil.

TRENCHES

General

The design and preparation of a trench has a direct bearing on the load-carrying capacity of the finished pipelines. No variation should be made in trench width, depth, bedding or fill without prior consultation with the designing engineer.

Bottoming

Always prepare a uniform trench bottom free from hard or soft spots. Once a suitable bottom has been formed, keep trench traffic to a minimum.

Width

Maintain accurate trench widths exactly as designed. Trenches which are too wide will reduce the load carrying capacity of the pipeline.

Drainage

Provide good drainage by keeping the ground water level below the bottom of the trench, wherever possible, using temporary drains and / or pumps where necessary.

BEDDING

The load bearing capacity of a concrete pipeline is determined both on the strength of the manufactured pipe and on the support provided by its bedding. The 'bedding factor' is the ratio of the strength of the laid pipe to its test strength. The higher the bedding factor the greater is the load-carrying capacity of a given pipeline.

Where the pipe has a pronounced socket the care must be taken to ensure that adequate clearance is given beneath that socket to avoid point loads. The methods of bedding normally used with concrete pipes are to Class B (half round granular or full granular surround) and Class A (reinforced to plain concrete). Classes C and D (natural soil of the trench) can be used for small diameter pipes but only where uniform fine soil is available in dry conditions.

There are five different types of bedding as illustrated below:-

Notes: Fig. 1-5

1. **For all Class A Beddings**

   The concrete (reinforced or plain) should be monolithic and have a minimum cube strength with 28 days of 20N/mm² (3000 lb/in²). The concrete must be allowed time to gain strength before it is subjected to vibration from mechanical rammers or to loading from traffics or to considerable heights of backfill. The minimum time allowance will depend on the mix, the type of cement, the temperature and degree of loading to which the bedded pipe is likely to be subjected. All factors need to be taken into account but as a general guide, it is suggested that, apart from placing an initial 150 to 300mm layer of backfill over the pipe the main backfilling should not be commenced until at least 24 hours after placing of the concrete has been completed, and that heavy rammers should not be used nor traffic loads imposed until at least 72 hours after concreting. Where it is essential to reduce the time allowance to a minimum one or more of the following special precautions can be taken, namely the use of :(a) rapid-hardening cement, (b) a stronger mix, (c) heating methods in cold weather, (d) steel bridge plates where traffic passes over the trench.

2. **Granular Bedding (Type A)**

   For rock and coarse-grained soils - ideally broken stone or gravel, but other similar uniform material available locally may be used, e.g. crushed brick or crushed concrete. Material to pass 10-25mm sieve according to pipe size, and be retained on 5mm sieve. To prevent the intrusion of fine grained soils such as clays, silts or fine sands into the bedding, especially under wet conditions, add to the above about one part of free-draining coarse sand to two parts of stone or gravel and mix thoroughly, or use a free-draining 'all-in' mixture of similar particle size. Alternately a layer of well compacted sand or all-in mixture or weak concrete may be laid on the trench bottom before placing the depth Y of Type A material. If a concrete layer is used it would be advisable to increase Y as for rock (Note 4).

   Sand containing an excess of fine particles should be avoided for the Type A material since they are difficult to place and compact properly.

3. **Selected Fill (Type B)**

   Uniform readily compactible material - free from tree roots, vegetable material, building rubbish and frozen soil, and preferably excluding clay lumps retained on a 75mm sieve and stones retained on a 25mm sieve.

4. **Dimension Y**

   The following thicknesses are recommended: in rock or mixed soils containing rock bends, boulders, large flints or stones or other irregular hard spots, Y = ¼ Bc or 200mm, whichever is the greater, under the barrels but not less than 200mm under the sockets also. In uniform soils, Y=⅙ Bc or 100mm, whichever is the greater, under the barrels but not less than 50mm under the sockets.

5. Where pipes are to be laid on Class C or D beddings and wide trench backfill loads are being taken from Table 4 the loads marked 'Wide (0.7)' should be used. For other beddings, the wide trench backfill loads marked 'Wide (0.5)' are appropriate.

CINLE SPUN CONCRETE PIPES

Our dedicated team at **CINLE CONCRETE PRODUCTS INDUSTRIES S/B** is committed to manufacture quality products to satisfy today's demand of stringent engineering specifications.

Currently our spun concrete pipes are manufactured in various sizes and classes

- The diameters range from 300mm to maximum 1,800mm
- Classes are "S" "X" "Y" & "Z"

CINLE has the facilities to conduct crashing load and hydrostatic tests in accordance with AS or MS standard.

CINLE Spun Concrete Pipes are categorised into the following classes:-

Australian Standard AS 1342 : 1973		Malaysian Standard MS 881 : Part 3:1991
S	Standard Reinforced	STD
X	Extra Strength Reinforced	L
Y	Special Strength Reinforced	M
Z	Special Strength Reinforced	H

Application of CINLE Spun Concrete Pipes

1. As Culvert Pipes
2. As Drainage Pipes
3. As Sewerage Pipes
4. As Concrete Tunnels
5. As Vertical Manhole Shafts and Wells

Extra special strength pipes, in excess of the special strength pipe specified in MS 881 : Part 3 : 1991 and AS 1342 : 1973, (Class1.5H, 2H (1.5Z, 2Z)), are available for all diameters upon request.

TYPE OF JOINTS

CINLE spun concrete pipes are manufactured in two different types of joints namely as the following:-

A. Butt Joint with or without Collar

As an improvement to the performance of the rebated joint, a precast concrete collar or cast-in-situ concrete collar can be used to provide better water tightness. This is also a rigid joint and no flexibility is provided. This joint is recommended for rigid foundations type of pipe bedding.

B. Spigot and Socket Joint

This joint is also commonly called the Rubber Ring Joint (RRJ). RRJ provides maximum water tightness and flexibility in concrete pipeline. A certain degree of linear deflection is allowed in this type of joint. For soft foundations, this type of joint is recommended.

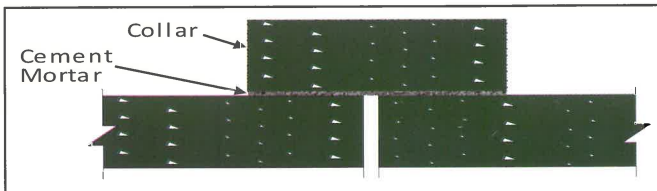


Figure 3. Typical cross section of Butt Joint With or Without Collar

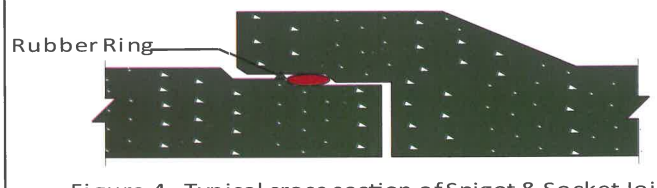


Figure 4. Typical cross section of Spigot & Socket Joint

Load crushing test of **CINLE Spun Concrete Pipe** at our factory

CINLE SPUN CONCRETE PIPES

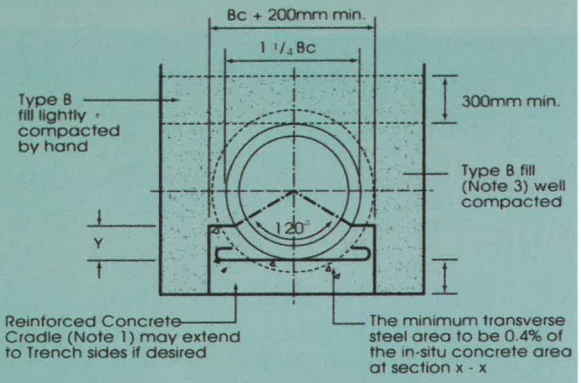
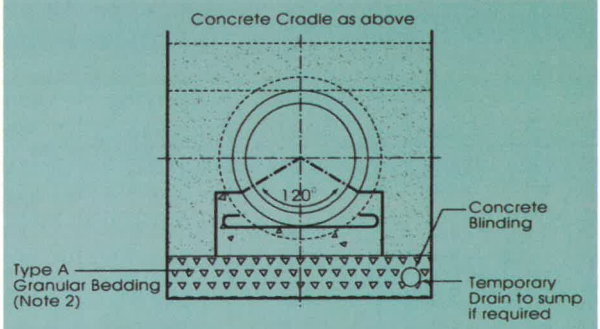


Fig. 1 Class A Bedding-
Reinforced Concrete Cradle Bedding Factor Fm = 3.4
(a) For Normal Conditions



(b) Granular base course for very wet conditions. Also suitable for use in rock in areas liable to mining subsidence.

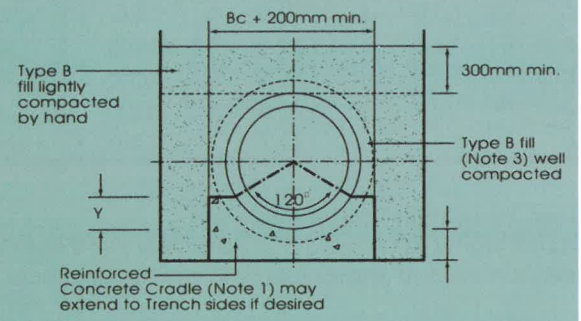


Fig.2 Class A Bedding Plain Concrete Cradle Bedding Factor Fm = 2.6
For Normal Conditions
For very wet conditions or for rock in areas liable to mining subsidence, use granular base course as in Fig. 1b

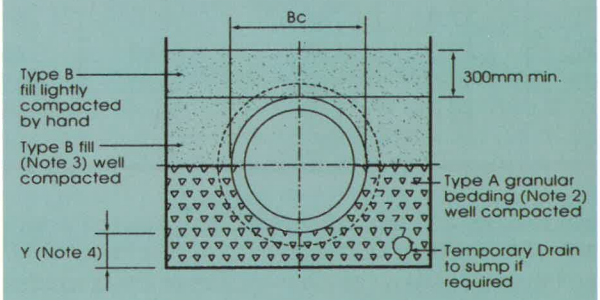


Fig.3 Class B Bedding - Granular Bedding Material Bedding Factor Fm = 1.9
For most conditions in very wet, unstable soil conditions the possibility of some settlement occuring should be in mind (See also Note 2)

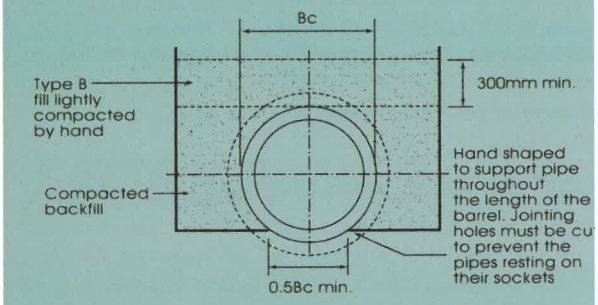


Fig. 4 Class C Bedding - Hand-shaped trench bottom Bedding Factor Fm =1.5. Generally only suitable for pipes up to 300mm diameter in uniform fine-grained soils where conditions are relatively dry. (See Note 5 regarding 'wide trench' loads)

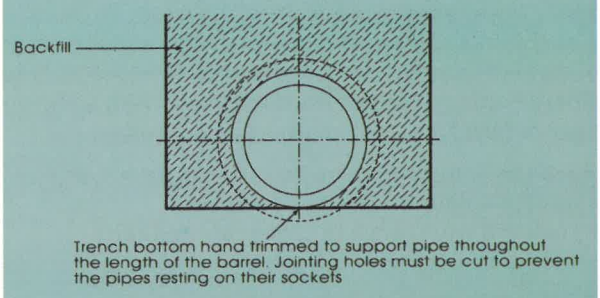


Fig. 5 Class D Bedding - Hand-trimmed flat-bottomed trench Bedding Factor Fm = 1.1. Generally only suitable for pipes up to 300mm diameter in uniform fine-grained soils where conditions are relatively dry. (See Note 5 regarding 'wide trench' loads)

CINLE
CONCRETE PRODUCTS INDUSTRIES SDN. BHD. (216631-X)

MAIN OFFICE / FACTORY:
Lot 1744, Block 71, Jalan Landeh Cinle,
10th Mile, Kota Padawan,
93250 Kuching, Sarawak.
P.O. Box 2263, 93746 Kuching, Sarawak, Malaysia.
Tel: 082-611235, 627588, 628588, 629588
Fax: 082-628288

BRANCH OFFICE :
1st Floor, Lot 857, Tabuan Jaya Commercial Centre, 93350 Kuching, Sarawak.
Tel: 082-368523, 369523
Email:ccpi@cinle.my

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www.cinlegroup.com