

Leading Through  
Quality & Technology



YL DUCTILE IRON PIPES & FITTINGS



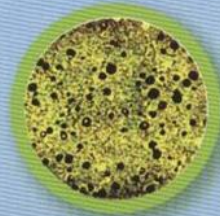
# Superior Design

## What Is Ductile Iron?

Carbon is always present in the form of graphite flakes, which favour crack initiation and brittleness. In Ductile Iron, spheroidal graphite iron, the carbon is present in the form of small spheres, thus eliminating the risk of crack propagation and resulting in higher strength.

This is done by adding magnesium into molten iron. Therefore, the continuity of the iron matrix is maintained, providing excellent ductility, flexibility and impact resistance.

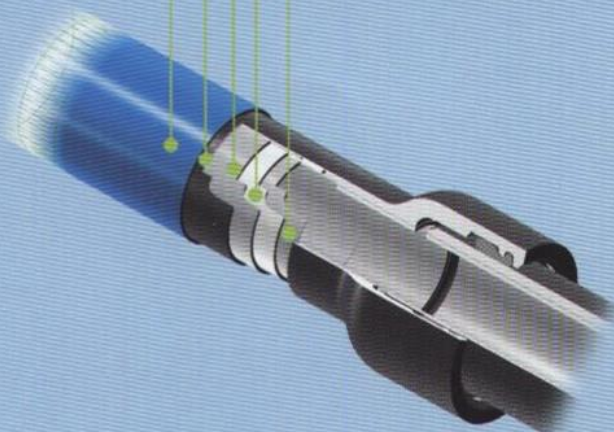
In "Ductile Iron", the graphite is in spheroidal form and hence, the risk of cracking is eliminated.



In "Cast Iron", the carbon is present in flaky form making the material brittle and susceptible to cracks.



- A Polyethylene Sleeving
- B Bitumen Coating
- C Zinc Coating
- D Ductile Iron
- E Cement Mortar Lining



## Protection

### Internal Lining

YL offers standard advanced centrifugally applied cement mortar lining that gives high mortar compaction, good adhesion and silk-smooth surface flow.

Other standard linings such as Mascrete, High Alumina and Sulphate Resistant cement are also available. YL is also capable of supplying superb quality epoxy coated pipes.

### External Coating

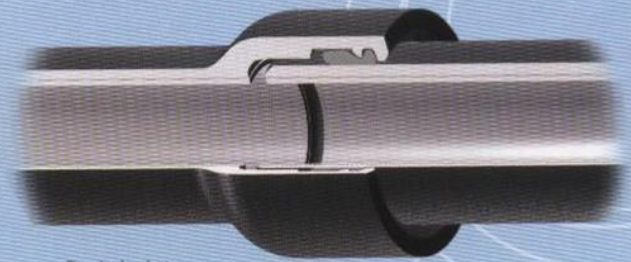
All YL pipes come with the basic requirement of Metallic Zinc coating, followed by Bitumen paint as the finishing coat.

Metallic Zinc coating protect the pipe by forming a stable protective layer of insoluble zinc salts. It also has self-healing characteristics of any damage and therefore, increases the life span of the pipe.

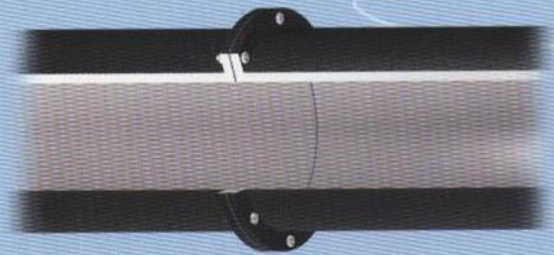
Other external coatings such as epoxy-based coating are also available upon request.

## Features Of Ductile Iron Pipes:

- *Excellent corrosion resistance*
- *High load bearing capabilities*
- *Low cost pipe installation*
- *Complete pipeline in shortest time*
- *No restriction from adverse weather and traffic*
- *Easy machining, tapping and cutting*
- *Suitable for piping in tunnels*
- *Widest range of factory fittings and accessories*
- *Pipe flanging made to specific length required*



Push-In Joint



Flanged Joint

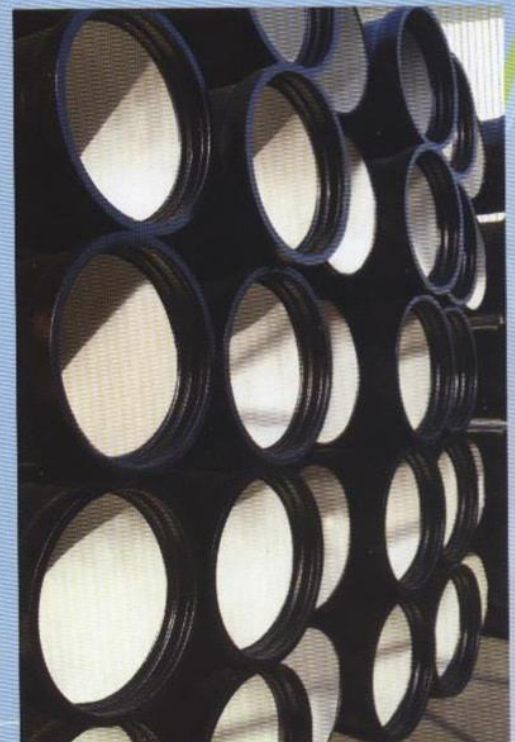
## Pipe Joints

The push-in-joint, also known as socket-spigot joint, provides leak-tightness even at pipe busting pressures and allows deflection in any direction up to 5 degrees.

The push-in method also allows easy and speedy jointing even in restricted space, or during adverse weather conditions as it does not require special tools or equipment. This reduces the pipe laying cost and time while increasing efficiency.

YL flanged joint offers an excellent mechanical system. All flanges are screwed-on or welded-on with precision workmanship that offers leak-tightness.

A flanged joint allows pipe sections to be installed or dismantled in line.





# The True Test of Quality



Hardness Tester



Microstructure Examination



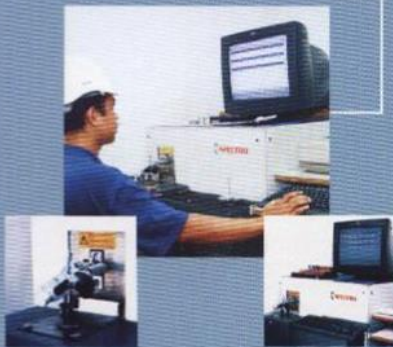
Tensile Testing

YL Ductile Iron pipes and fittings are certified by the Standard Industrial Research Institute of Malaysia (SIRIM) in compliance with BS EN 545:2002 and MS ISO 9001:2000 Quality Systems for Quality Assurance in Production, Installation and Servicing. Also in compliance with BS EN 598 : 1995 and ISO 2531.



MS ISO 9001:2000 REG. NO. AR1423

Chemical Composition Analysis



Pipe Quality Inspection



## Comparison Between Ductile Iron Pipes And Mild Steel Pipes

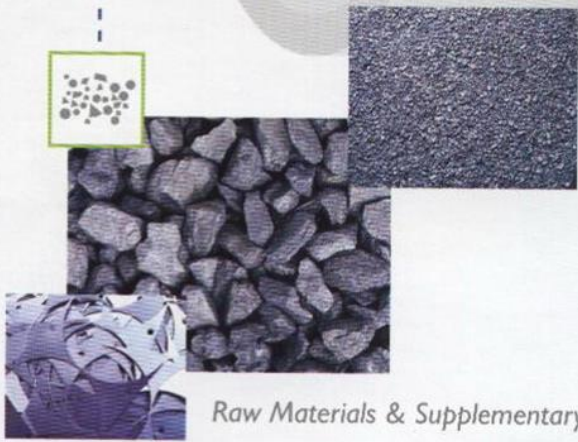
	Ductile Iron Pipe	Mild Steel Pipe
Tensile Strength (N/mm <sup>2</sup> )	Min. 420	Min. 360
Brinell Hardness (HB)	Max. 230	Max. 140
Bending Strength (kg/mm <sup>2</sup> )	Min. 61.1	Min. 41
Elongation (%)	10% < DN1,000	18%
Modulus of Elasticity (E)	170 GPa	



Melting



De Lavaud Centrifugal Casting



Raw Materials & Supplementary

# Realising Consist

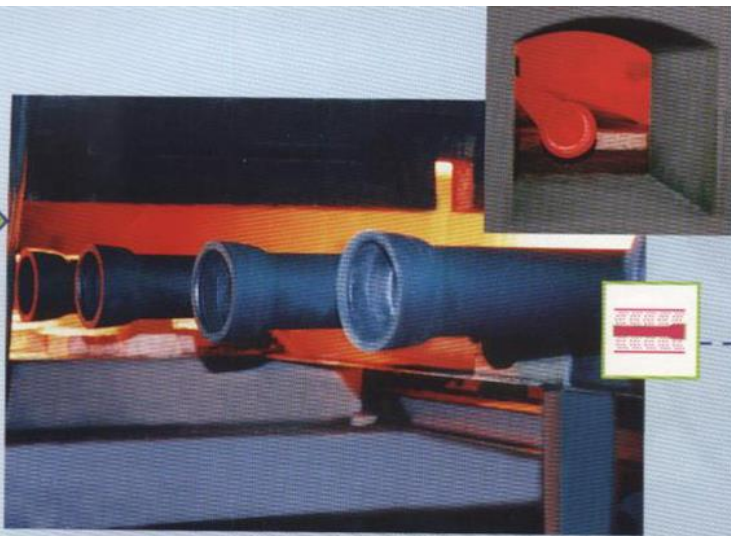


Packing & Delivery



Bitumen Coating





Continuous Annealing



Metallic Zinc Coating

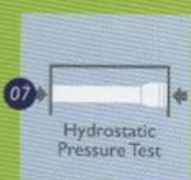


Hydrostatic Pressure Test

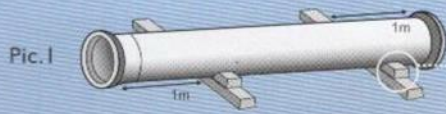


Cement Mortar Lining

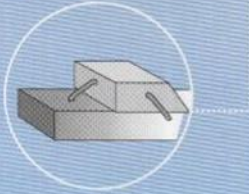
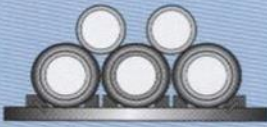
ency & Precision



# Transportation & Handling



Pic.2



## Recommended transportation and handling checklist:

Proper procedures for unloading of YL Ductile Iron pipes should be as recommended below:

- Use sufficient powerful lifting gear, i.e. crane, forklift and etc.
- Manoeuvre gently, controlled by the use of guide ropes. Avoid swinging, sudden jerking motions, impacts or pipes rubbing against other pipes, the ground or any other objects.
- Chain securing the pipe to the truck should not be released before ensuring the truck is positioned on level ground.
- Timber battens should be placed on the ground about 1m each end to the pipes to absorb shock and to prevent damage to the coatings (Picture 1).
- Always secure pipe with chocks with the same shape and size (Picture 2).
- Arrangement of the pipe should be parallel and equally spaced on top of the timber (Picture 3).

## Methods of lifting should be as shown below:

### Barrel Lifting

- Use wide, long and flat slings to maintain sufficiently wide apart support to prevent accidental slippage (Picture 4). Use of wire ropes as chain slings may potentially slip and damage the coating of pipes (strictly prohibited). A single sling may be used on site. In this case, lift the pipe at its centre of gravity, with the sling gripping the pipe to prevent slippage (Picture 5).

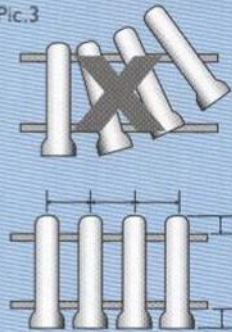
### Bundle Lifting

DN 100 to DN300 bundles is unloaded with long flat textile slings or a spreader bar (Picture 6).

### Forklifts

Use of forklift equipment for lifting is allowed.

Pic.3



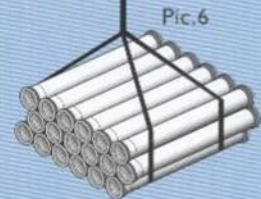
Pic.4



Pic.5



Pic.6





# Storage and Stacking

## Storage & Stacking

- The area must be level.
- Avoid: Marshy ground, Shifting, Corrosive soils.
- Stack the pipe in homogenous piles (same diameter), in accordance with rational storage plan.
- Use sufficiently strong, good quality hard woods (timbers, wedges).
- Commonly used methods of stacking should be of pre-bundle stacking, square stacking or pyramid stack as shown in pictures 7, 8 and 9.

## Recommended Stacking Height

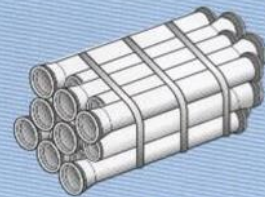
- The height of stacks are determined by consideration of:
  - The stress on the lowest layer of pipes in the stack.
  - The total lift given by the available crane.
  - The facilities available to ensure stable stacking.

## Must Avoid

- Dragging the pipes on the ground, as this risks damaging the external coating.
- Dropping pipes to the ground, even with tyres or sand interposed.
- Stringing out pipes in areas of risk: e.g. frequently moving machines, use of explosives (risk of airborne stones).
- Depositing pipes on precariously balanced surfaces.

Nominal Size DN	Recommended Maximum Number Of Layers In Stack
100	12
150	12
200	10
250	10
300	8
350	7
400	6
450	5
500	5
600	4
700	3

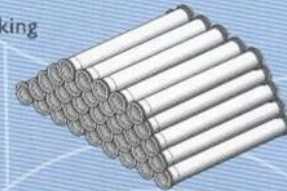
Pic.7: Pre-Bundle



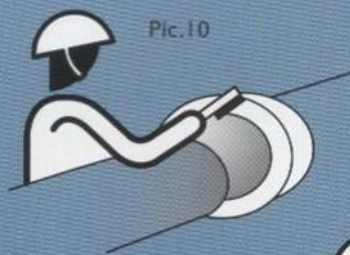
Pic.8: Square Stacking



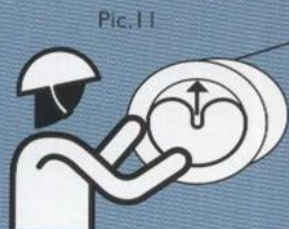
Pic.9: Pyramid Stacking



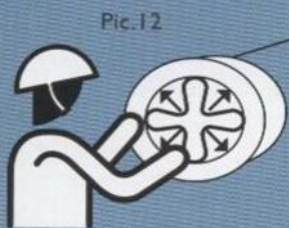
# Steps to Effective Jointing



Pic.10

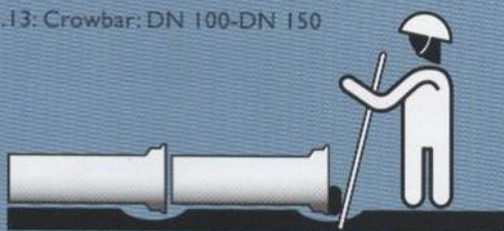


Pic.11

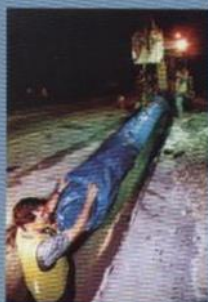
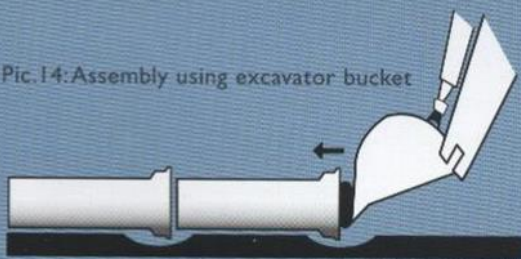


Pic.12

Pic.13: Crowbar: DN 100-DN 150



Pic.14: Assembly using excavator bucket



Night laying  
in Penang, Malaysia



Pipe laying  
in East Malaysia

## Assembly of Rubber Ring

- Ensure socket seat and gasket are free from all soil, sand and debris particles.
- Ensure spigot is chamfer and in good condition, even after pipe is cut, re-chamfer is needed.
- Ensure lubrication paste is apply to exposed surface of the gasket, the spigot end and chamfer.

## Joint Preparation

- Ensure the spigot is properly chamfered. This prevents the spigot from displacing the rubber ring.
- Clean and remove all foreign particles like sand and dirt from the spigot, internal part of socket of joint and the rubber ring (Pic.10).

## Rubber Ring Insertion

- Loop the clean rubber ring into a heart shape or cross shape and insert it into socket (Pic. 11 & 12).
- Apply radial pressure to the rubber ring at the heart-shaped or cross-shaped loop and fit it onto the retaining groove snugly.
- Check around its whole circumference and ensure that the rubber ring is seated correctly.
- Apply a thin film of lubricant to the internal surface of the rubber ring and to outside surface of spigot.

## Joint Assembly

- Align and center the spigot with the socket.
- Assemble by using either Crowbar Method (for smaller diameter only) or Excavator Bucket (Pic.13 & 14).
- Push slowly and steadily until the joint is made to the correct insertion depth, where one of the painted stripes on the spigot end disappears and the other stripe is visible outside.

## Checking

Check the insertion condition. Confirm the proper position of the rubber ring by inserting a feeler gauge into the gap between the socket and spigot, and the socket end is positioned between the two dotted lines provided by the manufacturer on the spigot end (Consult YLI technical personnel if necessary).

## Methods for pipe laying

The pipe socket face must be protected with a piece of hard wood.

Push slowly and steadily, observing the rules for pipe jointing (consult YLI if necessary).

### Note:

#### Terms and Conditions

1. Each and every pipe and fittings come with factory warranty subjected to clauses as stipulated.
2. All pipes delivered to site are secured on loading, well packed and insured during transportation.
3. Upon receipt, pipes should be checked by site engineers, site supervisors or other authorized personnel.

#### Storage of rubber gaskets

- a) All rubber materials (gaskets, rings, etc.) needs to be stored away from heat and direct sunlight.
- b) Rubber gasket should be kept away from solvent, oil, grease and other deteriorative material.
- c) The rubber gasket should, whenever possible, be stored in a relaxed form free from tension, compression or other deformation.

# Fittings

Over 200 various sizes of fittings are available at your convenience. Tees, Bends, Flanged Sockets, Flanged Spigots, Concentric Tapers, Flanged Bellmouths, Blank Flanges, Reducing Flanges, and others (see technical specifications catalogue).

YL also offers a full range of tapping saddles and Joints (Gate valves) for Ductile Iron, uPVC and AC pipelines, gate valves and other accessories.

Bitumen coated externally,  
Cement Mortar lined internally



Hot Fusion epoxy coated  
(both internally and externally)



Hydrostatic Pressure Test

## Ductile Iron Fittings

Sizes Available:

DN 100 - 700 mm

### Bend

- Double-socket 90° bend
- Double-socket 45° bend
- Double-socket 22 1/2° bend
- Double-socket 11 1/4° bend
- Double-flanged 90° bend
- Double-flanged 45° bend
- Double-flanged 22 1/2° bend
- Double-flanged 11 1/4° bend
- Double-flanged 90° long bend

### Duckfoot Bend

- Double-flanged 90° bend

### Tee

- All-socket tee
- All flanged tee
- Double-socket tee with flanged branch

### Concentric Taper

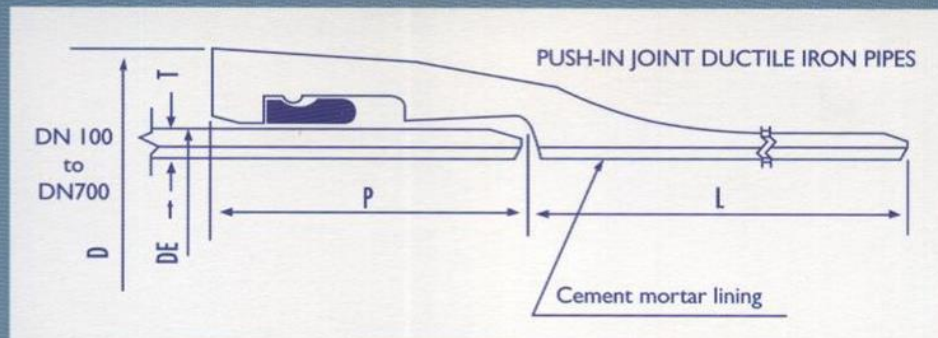
- Double-socket taper
- Double-flanged taper

## Gate Valve BS 5163 Type B

DN 80 - DN 300



# Technical Specifications



Dimensions for Class 40 and Class K-9 (All dimensions in millimetres)

Nominal Diameter DN	Class	DE	D±5mm	P±5mm	T	t	L
100	40	118	160	85	4.8	3.5	6000
150	40	170	215	90	5.0	3.5	6000
200	40	222	275	100	5.4	3.5	6000
250	40	274	325	105	5.8	3.5	6000
300	40	326	380	110	6.2	3.5	6000
350	40	378	445	110	7.0	5.0	6000
400	40	429	495	115	7.8	5.0	6000
450	K9	480	550	120	8.6	5.0	6000
500	K9	532	600	120	9.0	5.0	6000
600	K9	635	710	120	9.9	5.0	6000
700	K9	738	815	155	10.8	6.0	6000

DN 100 - DN 400 also available in Class K9 upon request.



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