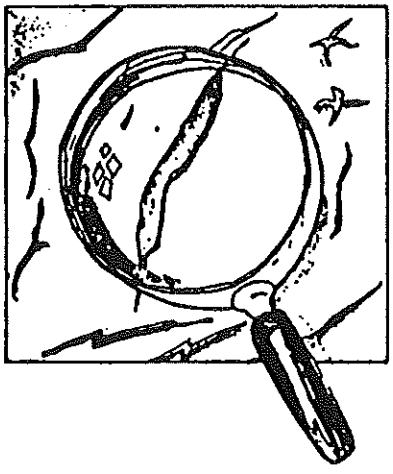
DUCTILE IRON METALLURGY

Ductile Iron Pipe has many unique and desirable capabilities which combines the physical strength of mild steel with the proven longevity of grey cast iron. This combination enables ductile pipe to "bend and flex" under stress while other pipe materials may fail.

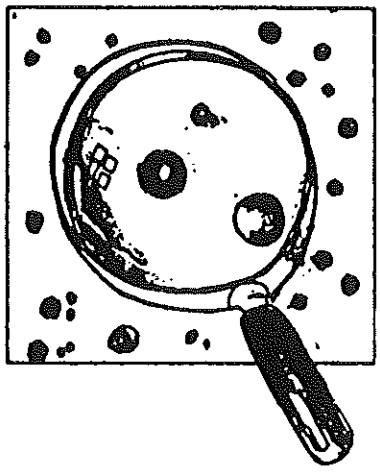
Ductile Iron evolved from a metallurgical process which involves the addition of magnesium to the molten iron. The basic composition remains unaltered while the flake graphite structure becomes nodular in form thereby increasing the tensile strength.

This molten metal is then centrifugally cast in water cooled metal molds. The cast pipe is then subjected to heat treatment in an annealing oven. After the pipe cools it is then passed to the finish line which includes hydrostatic testing, cement lining, coating and final inspection.

The superior strength and toughness of Ductile Iron provides a great margin of safety against failure and resists breakage during transportation and installation.



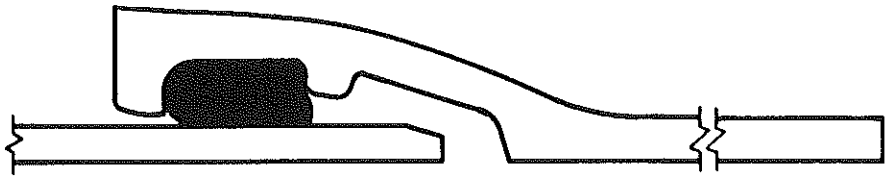
GRAY IRON METAL STRUCTURE



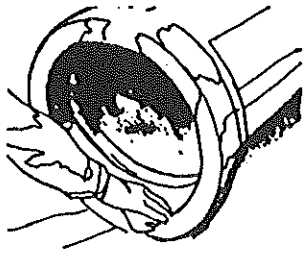
DUCTILE IRON METAL STRUCTURE

CUSTOM PIPE & COUPLING INC.

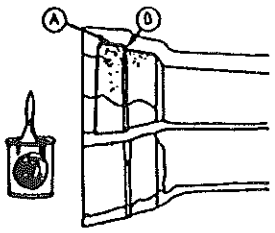
PUSH JOINT PIPE (ANSI/AWWA C111/A21.11)



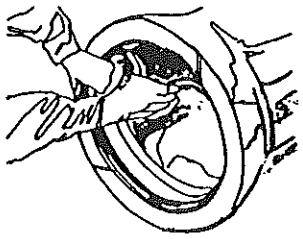
A single rubber sealing type joint employs a circular rubber gasket. This "push-on" type joint is simple to assemble and fast to install. Eliminates the need for bolts, nuts and glands. The rubber gasket fits the inside contour of the bell which seats the gasket. The plain end of pipe is slightly beveled to ease assembly. Push Joint pipe is highly recommended wherever there is a need for an easily assembled tight joint for ductile iron pressure pipe. It is particularly well suited for water or other liquid service, providing an almost bottle tight environment.



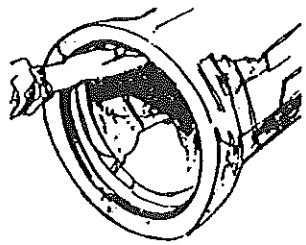
1. Thoroughly clean out the bell. Remove all foreign matter: sand, mud, ice or excess tar.



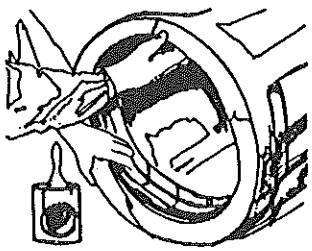
2. Brush-coat gasket retaining groove "A" and inner shoulder "B" with lubricant



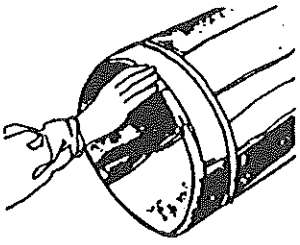
3. Insert gasket with face toward installer. Use one hand to hold a loop in the gasket, the other to tuck the remaining portion into its groove.



4. Release gasket and press remaining loop firmly up into lubricated groove.

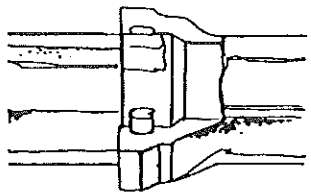


5. Be sure the gasket is completely seated — and apply a generous coating of lubricant to the exposed gasket surface.



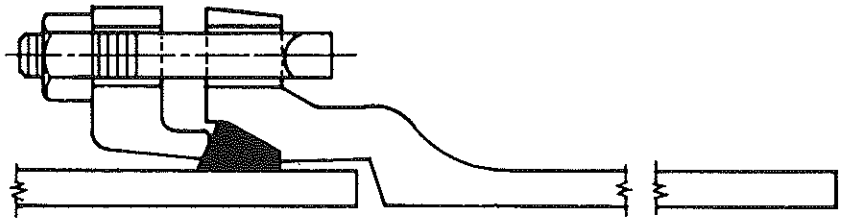
6. Clean the plain end of pipe and grind or file sharp edges which might damage the gasket. Lubricant may be applied to the beveled nose.

7. Place plain end in the companion bell and provide reasonably straight alignment. Push pipe straight home with the aid of a bar or more powerful means.



8. Check the assembly — the joint is completely assembled when the stripe is no longer visible. Deflection should be taken after joint is assembled.

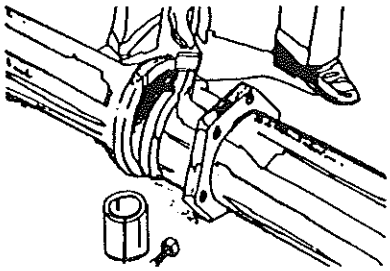
MECHANICAL JOINT PIPE (ANSI/AWWA C111/A21.11)



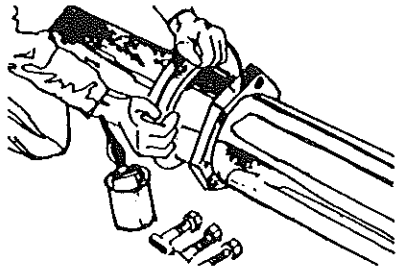
Mechanical joint is a time-saving, easily installed joint that insures long-term, trouble-free performance. Uncomplicated, this joint comprises a gland, gasket and bolts. It requires no mechanical skill to install, is unusually easy and fast to assemble. No special tools are required for installation other than a standard ratchet wrench. When properly installed, this joint will maintain a perfect seal indefinitely without further maintenance.

Mechanical joint is recommended for any gas, water or other fluid service, and where a virtually bottle-tight joint is a requirement. Parts are interchangeable with fitting accessories. Mechanical joint pipe is generally available thru 24" and fittings through 48".

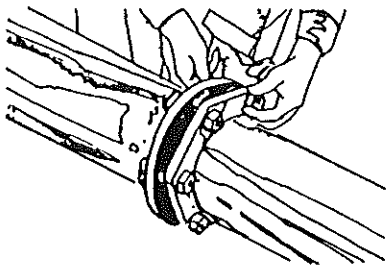
The plain end of mechanical joint pipe has the same outside diameter as other push-on type joints. As a result, it can be fitted into such joints in the field merely by beveling the plain end pipe.



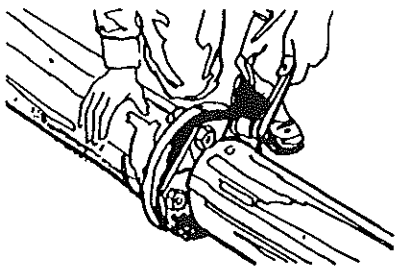
1. Clean bell, plain end, and lubricate gasket with soapy water. The joint area must be free of dirt.



2. Slip gasket into position — assure even seating in the bell.



3. When gland is in position, insert bolts, partially tighten with fingers.



4. Tighten with standard ratchet wrench (only tool needed). Tighten bolts alternately, bottom bolt, then top bolt and so on, maintaining approximately the same distance between the gland and the face of the flange.

STANDARD LAYING CONDITIONS

The success of a pipe product is due not only to its material composition but also to its proper design. The design must consider and respond to many adverse influences. The primary design considerations for ductile iron pipe are as follows.

1. Trench Load
(ANSI/AWWA C150/A21.50)
The consideration includes the basic static earth load, the dynamic truck load together with the force of the resulting impact upon pipe structure. To resist this influence a design ring bending stress of 48,000 psi is utilized.

2. Internal Pressure
(ANSI/AWWA C150/A21.50)
Here the concern is with the intended working pressure of the pipeline together with an additional surge allowance of 100 psi. These values combine to provide the required design standard. In response to this requirement, a tensile strength of 42,000 psi is utilized.

3. Laying Conditions
(AWWA C-600)
Once the above criteria has been determined, it is necessary to decide on how the pipeline shall be bedded and backfilled in the field. There are five standard methods, each offering its particular design value.
The above is intended to provide a general understanding of the design environment of an underground pressure pipe product.

4. Field Cutting
(AWWA C-600)
Beveling of the spigot end should be adequately performed to assure proper installation. The various pipe manufacturers recommend that under no circumstances should large diameter pipe (14" +) be cut unless the pipe is identified for field cutting. Out of round barrels are common throughout the industry on ductile iron pipe. During manufacturing spigot ends may be rounded to facilitate field assembly.

Cutting of all diameters of pipe within 24" of the bell face may result in outside diameters too large to join into the bell of another pipe, fitting, valve or accessory. Maximum diameters of the initial 24" of pipe barrel from face of bell cannot be assured due to tapering of the pipe molds. This tapering is necessary in order to facilitate extraction of the pipe from the molds during the manufacturing process.

5. Conductivity
Push Joint and Mechanical Joint gaskets act as insulators. Therefore, means must be provided to conduct electricity where electrical thawing, cathodic protection or a grounding system is required. There are several methods to provide electrical conductivity: copper conductivity straps, bronze wedges, etc. **Contact your NAPF member for information.**