BWP vs DUCTILE IRON PIPE Comparison

First used in the early 1940's, Concrete Bar-Wrapped Steel Cylinder Pipe Type, commonly called Bar-Wrapped Pipe (BWP), combines a water-tight steel cylinder and helically wrapped reinforcing bar, with concrete or mortar lining and coating to produce a high-performance pipe suitable for a wide range of water conveyance applications, such as transmission mains, reclaimed water, industrial, intake and discharge pipelines. It's cement-rich mortar coating electrochemically protects the steel components from corrosion.

This document is a comparison between BWP and ductile iron pipe utilizing information available from industry standards and resources. It is intended to differentiate key performance attributes of the materials to assist specifiers in product selection for water and wastewater pipelines.

ITEM	BWP	DUCTILE IRON PIPE (DIP)
Pipe Standards	• AWWA C303 - Concrete Pressure Pipe, Bar Wrapped Steel- Cylinder Type • AWWA M9 – Concrete Pressure Pipe	• AWWA C151 Wall thickness has been continually reduced, resulting in premature corrosion and reduced durability. • AWWA M41 – Ductile-iron Pipe and Fittings
Service Life	[1] Estimated service life of 75 to 105 years	Today's ductile iron pipe thickness are designed for 50 year service life, but studies have shown corrosive environments can significantly reduce the actual service life. [2] AWWA WRF study - "Long - term Performance of DI Pipe" - 8-inch PC350 life expectancy in moderately corrosive soils = 11 to 14 years. [2] Ductile iron wall thicknesses today may have up to 76% wall thickness reduction than original Cast Iron Pipe designed for the same diameter and pressure class.
Fittings	• Custom fittings configuration and geometry to match customer needs. • Adaptability to all pipe types • Produced domestically by pipe manufacturers.	• Typically Imported • Limited configuration options • Long lead times • Availability of larger diameter fittings is limited • Long radius elbows not available
Design Pressures and Diameter Range	Typical diameters range from 10" through 72", although larger diameters may be available.[1] Bar Wrapped cylinder pipe has been designed for operating pressures greater than 400 psi	3" through 64" up to 350 psi pressure class.
Laying Length	• Available in lengths up to 40'.	Lengths of 18' to 20' require extra installation time.
Restrained Joints	• Mechanical restraint option utilizing Snap-Ring, Holdfast and/or Harness Clamp restraints for most pressures and diameters. • Welded joints available for all pressures and diameters.	Mechanical restraint options based on manufacturer. Pressure and diameter range limitation based on type of restraint. Bolt-type restraints are expensive and difficult to install correctly.
Installation Modifications	• Adjust length by cutting in field when necessary • Add outlets by welding	• Adjust length by cutting in field.
Corrosion Performance	Integrated cement mortar coating and lining provides protection for pipe and fittings. Supplemental corrosion protection available for adverse environments.	Ductile Iron Pipe requires additional external protection from corrosion which may include cathodic protection.

REFERENCES
[1] American Water Works Association (AWWA) (2015). "Buried No Longer: Confronting America's Water Infrastructure Challenge."
[2] AWWA WRF "Long-Term Performance of Ductile Iron Pipe" (2011); Folkman, S. "Water Main Break Rates in the USA and Canada: A Comprehensive Study" (2012); Spickelmire, W. "Corrosion Control Considerations for Ductile Iron Pipe – a Consultant's Perspective" (2012)

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