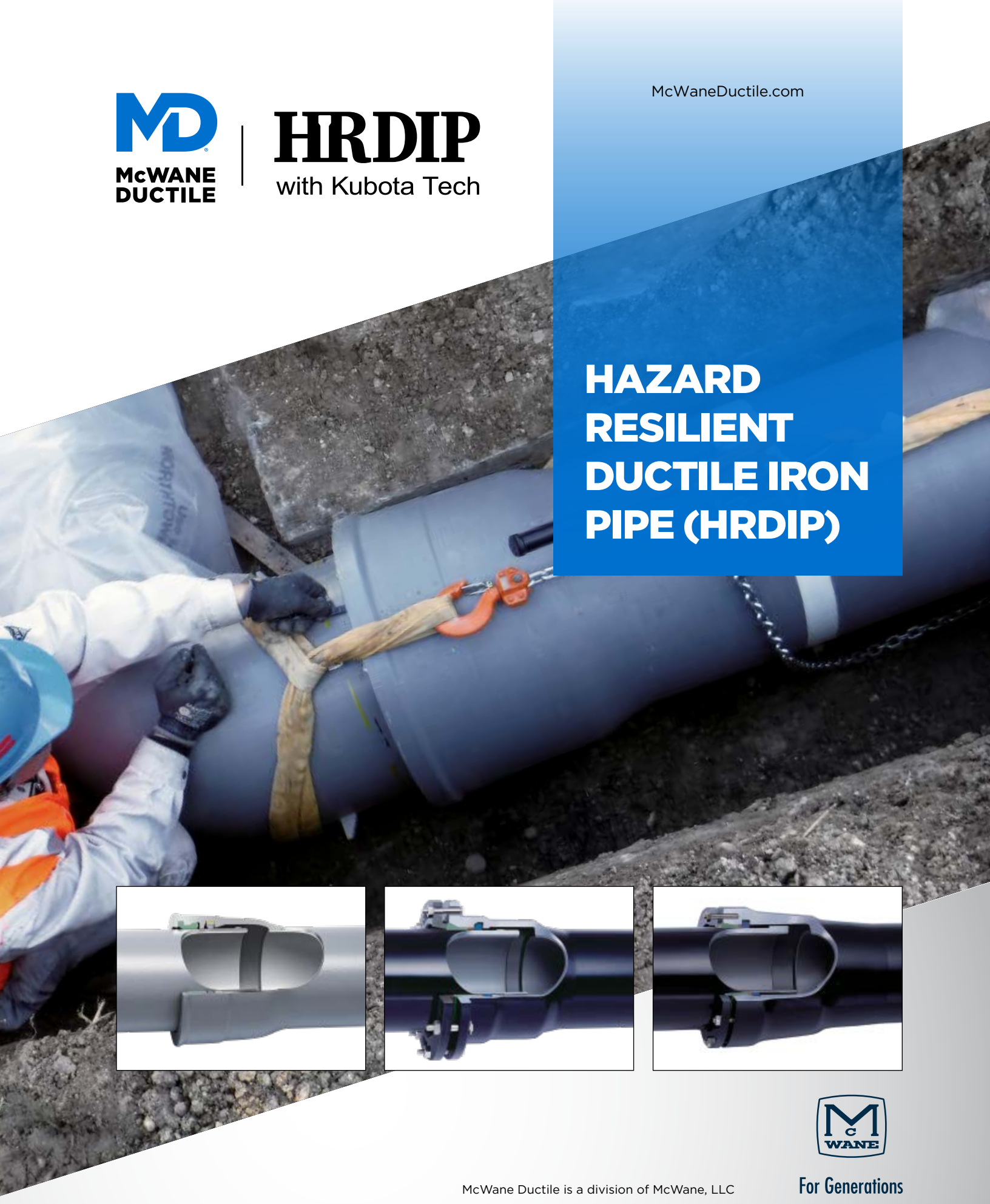
McWane Ductile

HRDIP
with Kubota Tech

McWaneDuctile.com

HAZARD RESILIENT DUCTILE IRON PIPE (HRDIP)



McWane Ductile is a division of McWane, LLC

For Generations

HAZARD RESILIENT FOR SAFE AND SECURE WATER SUPPLY

McWane Ductile has partnered with Kubota, a leading manufacturer of a wide range of advanced products for water systems, to offer Hazard Resilient Ductile Iron Pipe (HRDIP) technology that provides utilities, engineers, and contractors with a proven solution to strengthen water systems against seismic events and other hazardous ground conditions. Kubota has been supplying iron pipe for the safe delivery of drinking water since 1893, while continually advancing technical innovations and developing superior pipe products. In 1974, Kubota released the world's first Earthquake Resistant Ductile Iron Pipe (ERDIP).

HAZARD RESILIENT DUCTILE IRON PIPE (HRDIP)

ERDIP is not only resistant to earthquakes, but also effective against various natural hazards such as landslides, ground subsidence, liquefaction, as well as many others. Hence, the superior performance of ERDIP is also available as **Hazard Resilient Ductile Iron Pipe (HRDIP)**.

The demand for HRDIP in Japan has increased rapidly after the 1995 Kobe earthquake. Though a lot of water pipelines were damaged, HRDIP kept supplying water to the regional municipalities and their residents. Since its development in 1974, HRDIP has had no documented failures or leaks caused by any earthquakes, including the 2011 Great East Japan earthquake, nor any other natural hazards.

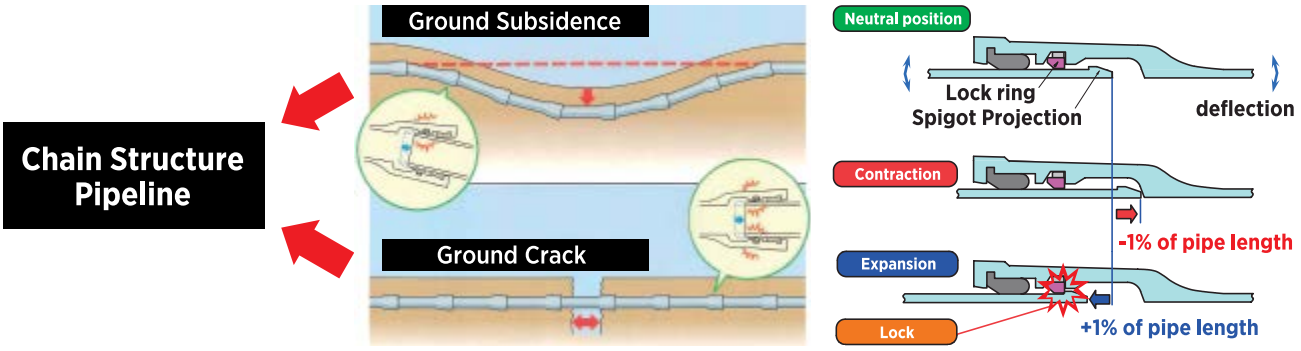
As HRDIP's presence and hazard resilient performance has been recognized widely, its share has increased and now it holds over 90% share of ductile iron pipe market in Japan. More than 41,000 miles (66,000 kilometers) of HRDIP has been installed so far and it's enough to travel around the Earth one and a half times!

With Kubota's history of innovation and success in Japan, HRDIP is increasingly accepted and employed globally. Besides Japan, the United States, Canada, Singapore and Nepal are the lead countries that introduce HRDIP into their water pipelines. Manufactured in sizes ranging from 3" to 104", Kubota's HRDIP is suitable for both Distribution and Transmission lines.

Kubota believes that HRDIP will contribute to the development of hazard mitigation plan and improve the resilience and reliability of water supply for years to come.

CONCEPT

Hazard Resilient Ductile Iron Pipe (HRDIP) absorbs the large ground displacement such as ground subsidence and crack by joints extension/contraction, deflection, and anti-pull out structure. When one joint fully extends, the joint can pull the next pipes one after another like a buried chain Therefore, this pipeline is called chain structure pipeline.

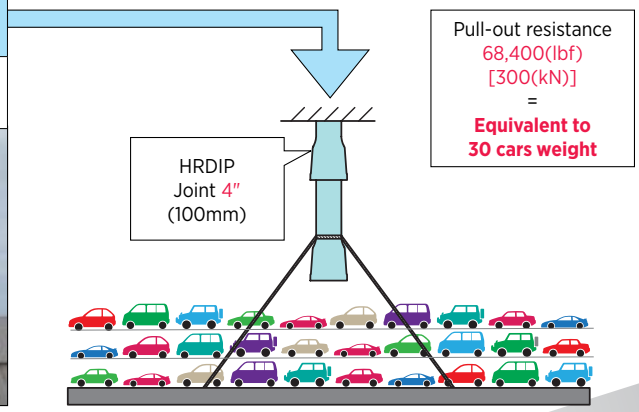


PERFORMANCE OF THE JOINT

The joint performance of HRDIP is the highest rank in ISO 16134:2020.

PROPERTY	PERFORMANCE	ISO 16134:2020
Amount of expansion/contraction	±1% of L	Class S-1
Pull-out resistance	3D kN 17,100Din (lbf) (3Dmm(kN)	Class A
Joint deflection angle	8° *1	Class M-1

Note) L: Nominal pipe length
Din: Nominal diameter of pipe (inches)
Dmm: Nominal diameter of pipe (millimeters)
***1)** In case of size 3"–16"

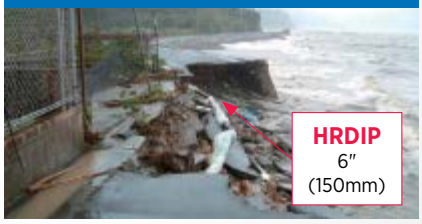


NO FAILURE

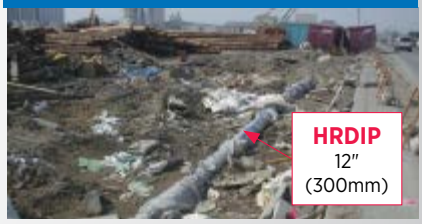
HRDIP has had no ducumented failures not only in the past seismic events but also in the past natural disasters such as heavy rain, typhoon and tsunami.

HEAVY RAIN

HURRICANE



SCOURED GROUND BY TSUNAMI



JOINT

LINEUP OF HRDIP

PIPES

G X

NOMINAL DIAMETER

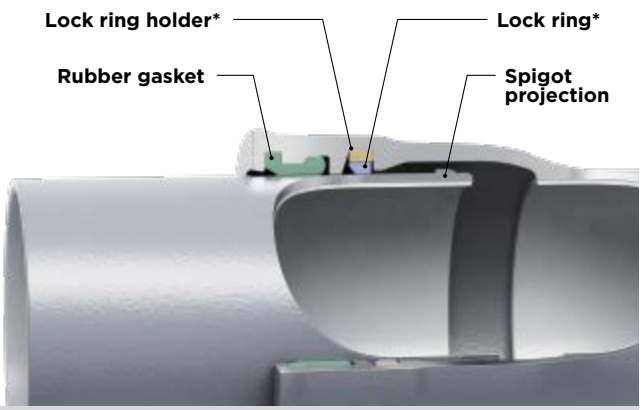
AWWA OD: 6″, 8″ AND 12″
McWane Ductile Brand

JWWA OD: 75mm-400mm
Kubota Brand

Push-on joint

Wall Thickness: D1/DS

External coating: C-protect *Lock ring / Lock ring holder are preset

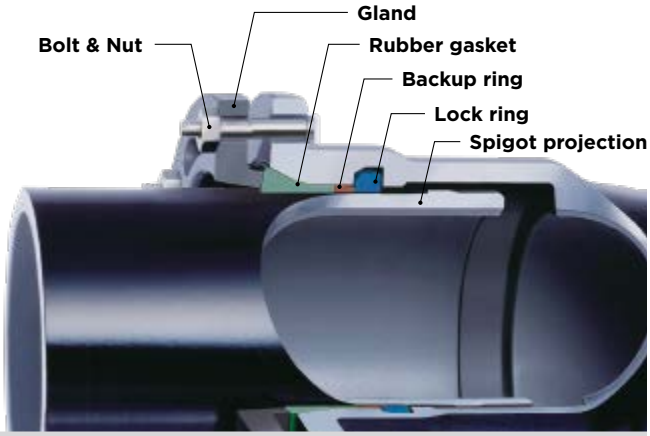


N S

NOMINAL DIAMETER
500MM–1000MM

Mechanical joint

Wall Thickness: DS

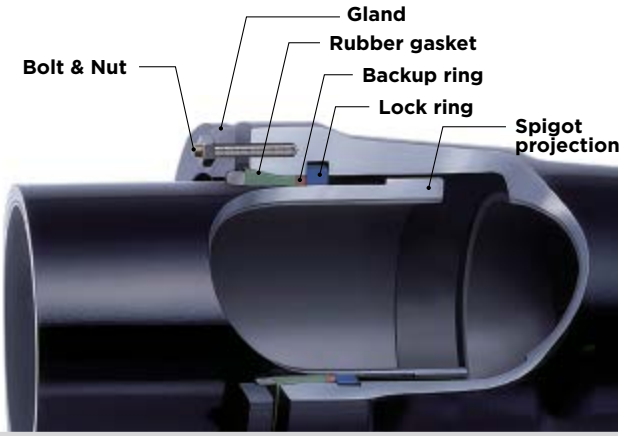


S

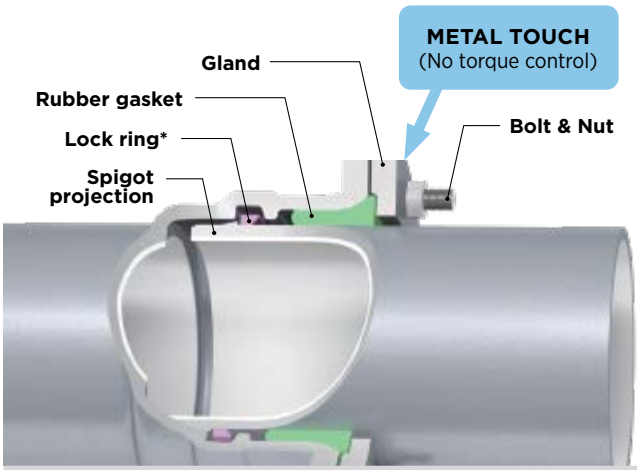
NOMINAL DIAMETER
1100MM–2600MM

Mechanical joint

Wall Thickness: D1/D2/D3



Kubota BRAND FITTINGS



G X

NOMINAL DIAMETER

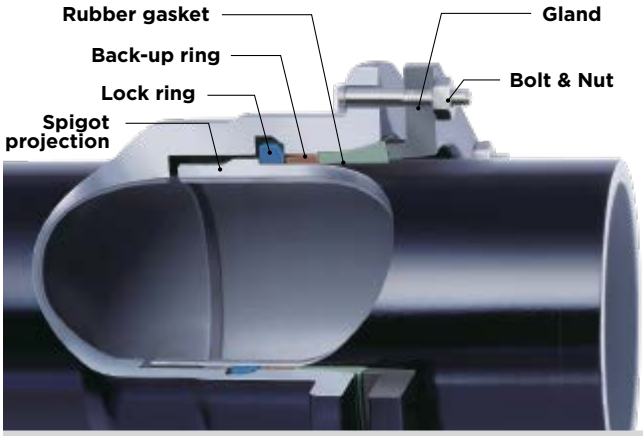
AWWA OD: 6″, 8″ AND 12″

JWWA OD: 75mm-400mm

Mechanical joint

Wall Thickness: D1/DS

External coating: C-protect *Lock ring / Lock ring holder are preset



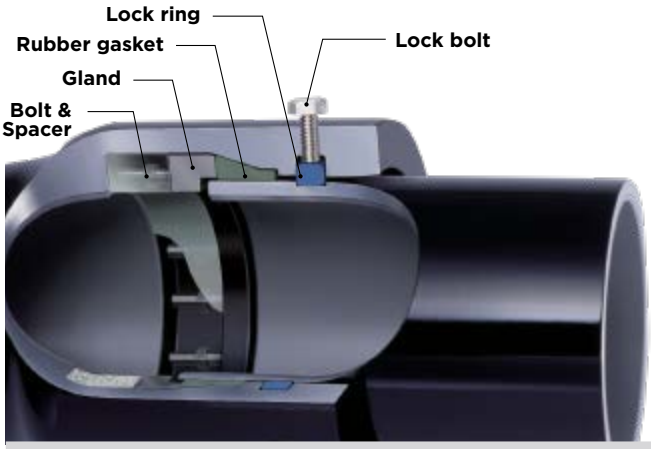
N S

NOMINAL DIAMETER

500MM–1000MM

Mechanical joint

Wall Thickness: DS



U F

NOMINAL DIAMETER

1100MM–2600MM

Mechanical joint

Wall Thickness: D1/D2/D3

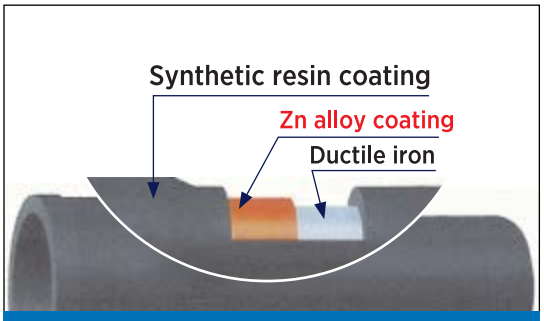
EXTERNAL COATING AND INSIDE LINING

Pipes and Kubota Brand Fittings will be coated externally and lined internally per the following table:

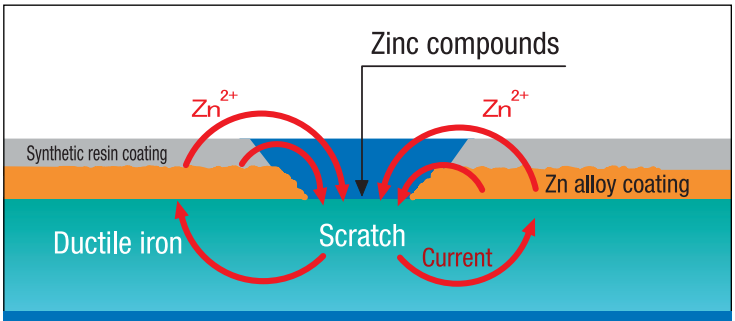
PRODUCT	G X 6″, 8″ & 12″, 75mm-400mm	N S 500mm–1000mm	S, U F 1100mm–2600mm
Coating	C-protect	Zinc rich paint followed by a synthetic resin paint	
Lining	Fusion Bonded Epoxy (FBE)	Cement-mortar Lining	

C-PROTECT (ANTI-CORROSION EXTERNAL COATING)

- C-protect (External coating) has excellent anti-corrosion performance.
- C-protect also has self-healing performance against scratches through the effect of sacrificial protection.
- C-protect is made of Zinc alloy, and synthetic resin coating.



C-PROTECT SPECIFICATION (Conceptual diagram)



SELF-HEALING MECHANISM (Conceptual diagram)

INSTALLATION

HRDIP can be installed very easily by using simple jointing tools.

G X 400mm

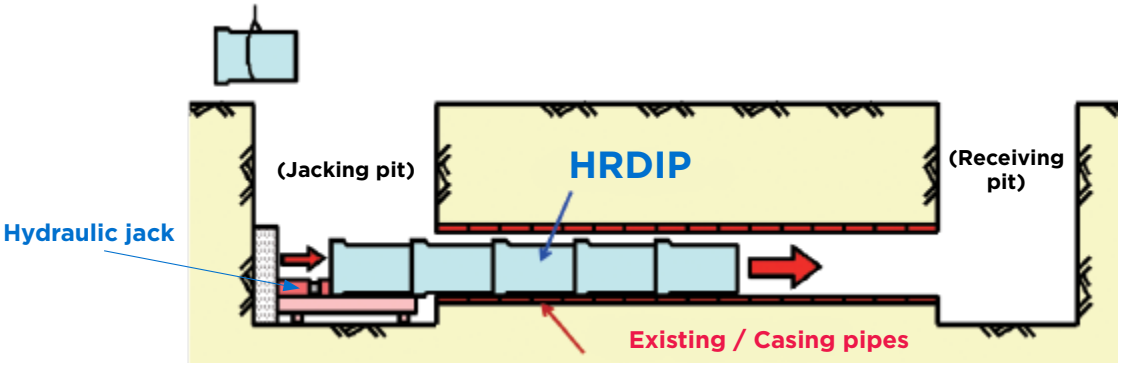
N S 500mm

S 1200mm

U F 1650mm

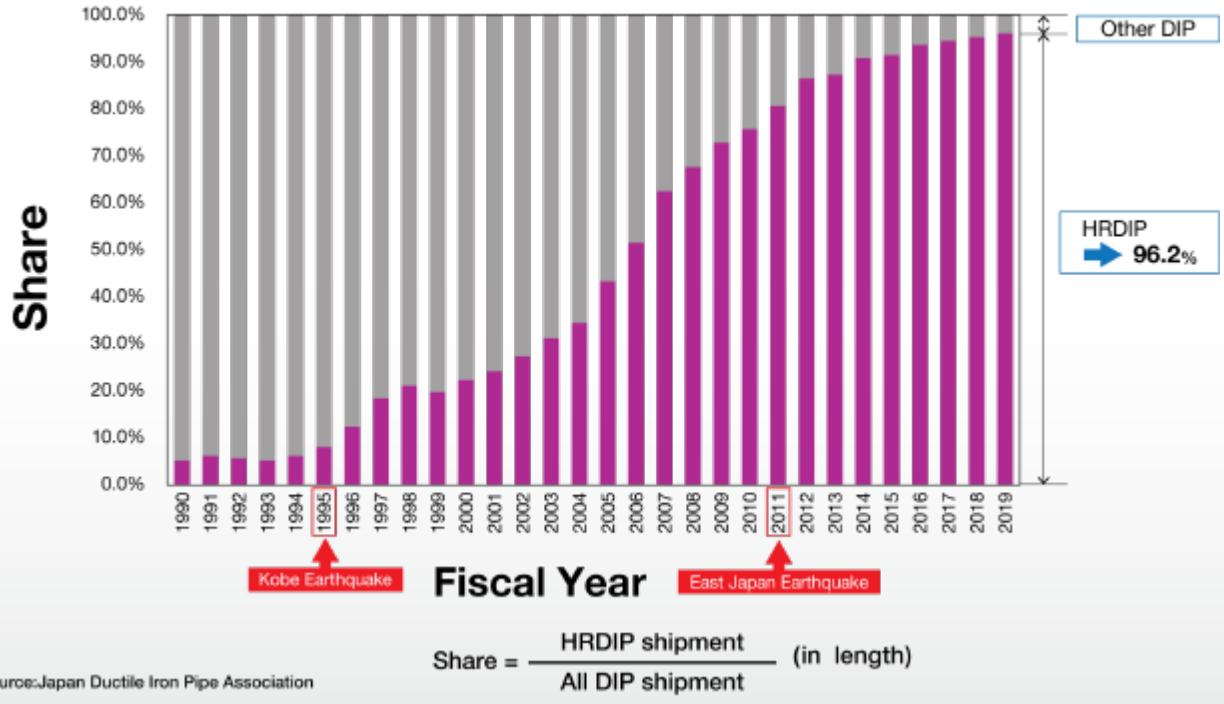
HRDIP FOR JACK AND BORE (PIPE THROUGH CASING) INSTALLATION METHOD

HRDIP is also available for jack and bore installation in the range of 12" (300mm) to 60" (1500mm) by inserting new HRDIP into an exiting casing pipe by trenchless construction methods. Please contact us for more details.



SHARE OF HRDIP IN JAPAN

The amount of installed HRDIP has increased drastically in Japan after the 1995 Kobe Earthquake.



Source:Japan Ductile Iron Pipe Association

$$\text{Share} = \frac{\text{HRDIP shipment}}{\text{All DIP shipment}} \text{ (in length)}$$

About McWane Ductile

McWane Ductile is one of the country's most experienced manufacturers and suppliers of Ductile iron pipe for water and wastewater infrastructure applications. With foundries in Phillipsburg, New Jersey; Coshocton, Ohio; and Provo, Utah, McWane Ductile provides 3-inch through 36-inch Ductile iron pressure pipe, fabrication services, fittings, accessories, linings, coatings, and technical support to customers throughout North America. Since 1921, the company has remained committed to safety, quality, innovation, and helping utilities build Iron Strong® utilities for generations.

About Kubota

Kubota has developed Ductile iron pipe technologies for water infrastructure applications worldwide, including Hazard Resilient Ductile Iron Pipe (HRDIP) technology designed to withstand earthquakes and other natural hazards. Kubota's Ductile iron pipe solutions are recognized for their strength, durability, corrosion resistance, and focus on supporting reliable water infrastructure systems.

All products illustrated in this brochure are manufactured by Kubota.
All photos, drawings, illustrations and graphs are courtesy of Kubota.

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