



# Water Pressure Solutions

Choosing the Right Pipe for the Job

Engineered to Endure™

# Choosing the Right Water Pipe

## WHY CHOOSE HOBAS PIPE?

For more than 60 years Hobas pipe USA, Inc. pressure pipe has been specified and successfully used in high pressure applications. Hobas pipes have smooth interior surfaces that will not deteriorate—due to chemical attack—because of their high corrosion resistance, resulting in significantly lower friction than other materials. Smooth wall pipes maintain superior flow performance over time.

Our FRPM pipe may be slightly smaller for equal head loss than pipes with inferior flow characteristics. It is, however, more advantageous to maintain the same diameter to benefit from the 30% to 50% lower head loss versus traditional pipes. The reduced head loss translates into significant energy savings and lower

pump horsepower requirements. The projected figures depend on the system's operating conditions. Please contact Hobas Pipe to compute the future savings possible with our pipes on your project. Surge pressure (water hammer) is a pressure increase in a piping system due to a change in water velocity that is anticipated as a result of a change in velocity. This is a pipe material dependent load. In general, Hobas Pipe's self-dampening properties result in a water hammer pressure which is approximately 50% less than typical metallic pipe products used in pressure applications. Field testing pressure allowance is up to 1.5 times the pressure class of the pipe.

## PRESSURE CLASS

Hobas pipes are independent fully structural pipes. The chosen pipe pressure class is the highest of the following parameters:

- Operating Pressure
- Transient Pressure (Operating + Surge Pressure) / 1.4
- Test Pressure / 1.5

Per ASTM and AWWA Fiberglass standards the pipe's pressure class is to have factors of safety that among others include a minimum burst pressure of 4 times the pressure class of the pipe.

The normal operating pressure can be obtained from a hydraulic analysis for that particular system. For Hobas pipes with a smooth interior, a reduction in friction or headloss typically results in a lower operating pressure when compared to other pipe materials.

## PRODUCT RANGE

### Pipe Diameters and Lengths

Hobas Pipe offers a range of fiberglass-reinforced pipes from 12 to 126 inches and up to and including 40-foot sections, non-standard custom lengths, and even divisions of 40 feet.

### Pressure Ratings by Pipe Diameter

Nominal Diameter (in)	Pressure Rating (psi)								
	25	50	100	150	200	250	300	350	400
12-66									
69-72									
78-90									
96-118									
120-126									

### Features and Benefits

- Significant energy saving for pressure pipelines, delivering more fluid than traditional un-lined pipe materials
- Pressure applications pipes are designed to address operating and surge pressures as well as full vacuum
- Hydraulic characteristics are virtually unchanged with time

#### NOTE

25 psi is our non-pressure application pipe

# How Does Hobas Pipe Compare?

## Hobas FRPM pipe VS ductile: Pressure pipe direct bury applications pipe dimensions and weight

### Hobas FRPM pipe VS ductile iron pipe for Class. 150 psi working pressure, pipe stiffness - SN46.

Nominal Diameter (in)	Hobas FRPM Pipe		Pipe OD (in)	Ductile Iron	
	Min Wall T (in)	Pipe Weight (lb/ft)		Min Wall T (in)	Pipe Weight (lb/ft)
11	0.21	11	13.2	*	34.8
18	0.31	25	19.5	*	60.8
24	0.41	42	25.8	*	80.2
36	0.60	88	38.3	0.38	103.5
48	0.80	151	50.8	0.46	222.6
60	0.98	228	62.9	0.54	350.5

\*Not available for Class 150

### PIPE OD

- Hobas FRPM pipe are available in 20 feet, up to 40 feet lengths.
- Ductile pipes typically available with a maximum 20 foot length.
- Hobas FRPM pipe has the same OD up to 48-inch as ductile pipe, making emergency repairs or replacement simple.

### COATING

- Coatings not required for Hobas FRPM pipe. Inherent corrosion resistance with excellent abrasion and crack and high impact resistance.
- Coatings recommended for ductile pipe. Options available include zinc, polyethylene advanced, traditional encasement, asphaltic and epoxy, synthetic resins for both interior as well as exterior pipe surfaces.

### ADDITIONAL BENEFITS OF FRPM PIPE

- No need for expensive cathodic protection to install or maintain.
- High pipe stiffness allows for easy to bury installation using methods routinely specified for traditional pipes.
- Lighter, for example a 48" diameter FRMP pipe is typically 45% lighter than ductile iron pipe, which reduces cost for installation less time and with less expensive equipment required to handle pipe.

### TRENCHLESS REPLACEMENT OF PRESSURE PIPELINES BY SLIPLINING

Hobas Pipe manufactures class VI pressure pipelining, fully structural, structurally independent replacement by sliplining in accordance with AWWA product classification protocol for pressure pipe.

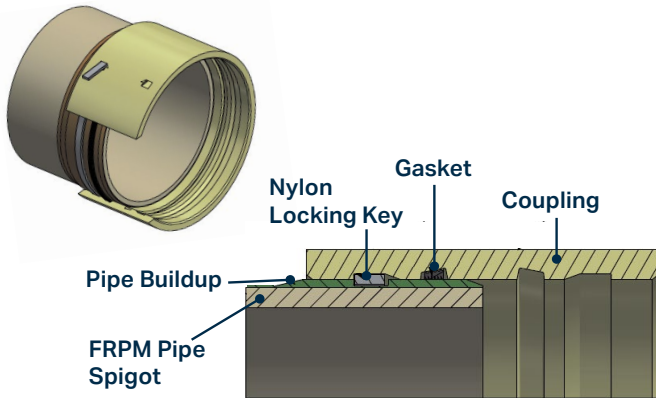
This trenchless replacement of pressure pipelines option addresses the growing need to replace the deficiencies in our existing water transmission and sanitary sewer force mains. Sliplining pressure pipelines substantially reduces the cost, eliminates mess and inconvenience that open cut replacement causes to our communities. Not to mention the safety and traffic issues for taxpayers, the environmental concerns and the impact to emergency services.

# Couplings

## FRP RESTRAINED COUPLING

Hobas also offers FRP Restrained Couplings. The all inclusive joint manages the unbalanced thrust forces at pressurized fittings (elbows, tees, reducers). This coupling eliminates the need for external concrete restraints.

### FRP Restrained Coupling—used in direct bury applications



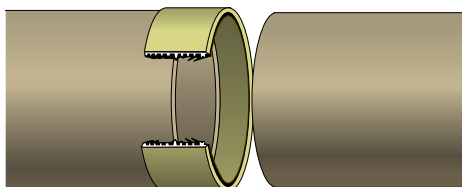
The above restrained joint option for 12 to 54-inch sizes with a maximum of 250 psi operating pressure, based on pipe diameter. See Restrained Keylock Coupling Range chart for details.

## FRP COUPLING

The FRP coupling is a structural filament wound sleeve that provides a gasket-sealed, lead-free connection. It is overwrapped and mechanically locked to an internal full-face elastomeric membrane. The sealing design includes lip and compression elements, making it suitable for both non-pressure and pressure service up to 450 psi and capable of higher than 150 psi external pressure.

Per the performance requirements of ASTM D4161, the FRP joint will remain leak-free from twice the rated class pressure to a -0.8-atmosphere vacuum under pressure even when angularly turned and vertically deflected.

### FRP Coupling—used in direct bury, above ground and tunnel carrier applications



## FRP Restrained Coupling Parameters

All pipes are manufactured per ASTM D3754, D3517 or AWWA C950 for pressure water and wastewater conveyance systems. All products are US made. The restrained coupling will be tested to ASTM D4161. The maximum allowable field test is 1.5 x PN. The maximum allowable surge is 1.4 x PN.

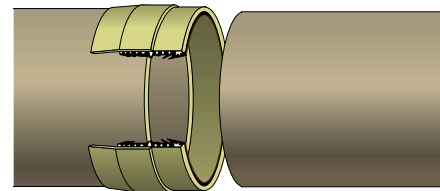
### Restrained Nylon Locking Key Coupling Range

Diameter (in)	150 PN	200 PN	250 PN
18-36			
42			
48-54			

## PRESSURE RELINING

The wrapped pressure relining joint is an overwrapped structural filament wound sleeve mechanically locked to an internal full-face elastomeric membrane.

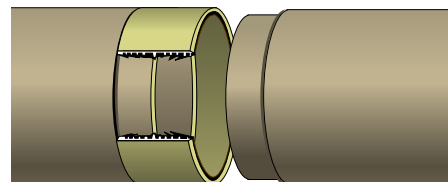
### Wrapped Pressure Relining—used in sliplining



## FLUSH FRP COUPLING

The flush FRP coupling is designed for low pressure service less than 40 psi in sliplining installations. The reduced diameter flush FRP coupling is fixed to one pipe end (in a recess) that seals to another pipe spigot (recessed) end by compressing the elastomeric gasket inside the coupling. The joint has approximately the same OD as a Hobas pipe, so when assembled, the joint is essentially flush with the pipe's outside surface. Allowable angular deflection limits and joining force are similar to the FRP coupling.

### Flush FRP Coupling—used for sliplining and low pressure applications

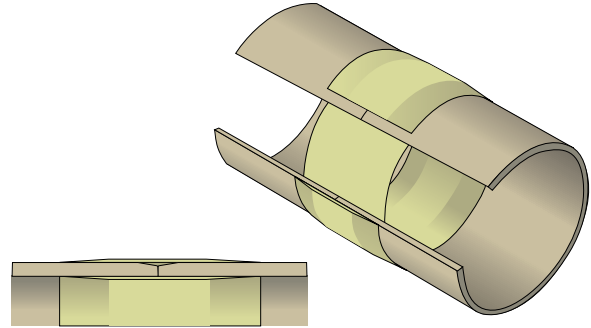


# Couplings

## LAMINATED JOINT

Laminated joints are customized, with many options available. The low profiled internal overlays are constructed of glass reinforcement fibers and thermoset (polyester) resin. Laminated joints are used when conventional external restraints such as **Axial Concrete, Thrust Blocks** or when outside the parameters of a FRP restrained coupling are needed. Note pressure pipe are also designed specifically to accept and address axial pressure thrust forces.

## Laminated Pressure Restrained Joint



## PRESSURE SYSTEM CLOSURE COUPLINGS

To effect closures in force mains, use Hobas stainless steel closure coupling or mechanical couplings (with appropriate corrosion protection) such as those manufactured by Dresser, JCM or Smith-Blair.

## CONNECTIONS TO OTHER PIPE MATERIAL SYSTEMS

Several methods may accomplish connections to other pipe material systems. Because of compatible ODs, Hobas pipes, from 18 to 48 inches, may be joined directly with ductile iron pipes using our couplings or ductile iron gasketed joints. In some diameters and applications. Third-party mechanical couplings may be suitable. Hobas Pipe can custom fabricate the mating bell or spigot for other gasket-sealed systems with the proper dimensions. Custom-fabricated mechanical couplings that connect pipes of different ODs may be used. The most expensive method, flanges built to ANSI or other drilling specs, is typically acceptable. Contact us regarding the suitability of or experience with other procedures.

### NOTE

1. When using mechanical joints, torque bolts to the minimum needed for sealing, with a maximum 25 ft/lbs.
2. Contact Hobas Pipe for the allowable angular gap and deflection.
3. To determine details and requirements for your specific project, contact Hobas Pipe for assistance.

# Fittings

Hobas fittings can be produced according to customer specifications in standard and non-standard forms and are available for pressure. Hobas offers standard fitting configurations as well as custom construction for any mitered fitting. Our fittings are available for many pressure applications. Pressure applications will require thrust restraints and may require full encasement in reinforced concrete to resist deformation due to internal pressure.



# External Restraints

**Based on your project parameters, some external restraints will work better than others. The following are a number of systems we recommend and some of the details that may define your choices.**

**Axial Concrete** The axial concrete restraint system could also be used when limiting easement boundaries or other obstructions, resulting in the concrete encasement dimensions being less than those required by a thrust block. Axial concrete uses the width of the trench as the width of the encasement. The length of the encasement is dependent on the thrust force, the friction support, and the bearing support. Axial concrete shall be placed against undisturbed earth and be designed by a professional engineer licensed in the state where the project is located.

**Thrust Blocks** The size of the thrust block bearing area is a function of the soil bearing capacity, thrust, and cover depth. Note that the block must be deep enough to avoid surface heaving and to achieve maximum restraint (resistance) –the typical minimum cover depth is at least one pipe diameter. The thrust block must surround the fitting and cover all the miters. Thrust blocks must be placed against undisturbed earth and be designed by a professional engineer licensed in the state where the project is located.

# Quality Control

**Ongoing improvement of quality performance is a key driver of our success.**

## INDUSTRY STANDARDS

Hobas Pipe USA manufactures pipes according to the applicable U.S. product standards as follows:

APPLICATION	STANDARD
<b>Sewer Force Mains</b>	ASTM D3754
<b>Industrial Effluents (Pressure)</b>	AWWA C950
<b>Pressure Water Systems</b>	ASTM D3517
<b>Fiberglass Pipe Design</b>	AWWA M45

Our computer-controlled process ensures consistent, high-quality pipes meeting ASTM and AWWA standards covering most applications. Routine pipe testing includes:

- Workmanship
- Dimensions
- Pipe Stiffness
- Ring Deflection without Cracking
- Ring Deflection without Failure
- Hoop Tensile Strength
- Axial Tensile Strength

## CERTIFICATIONS

- ISO 9001
- ISO 14001
- AREMA American Rail-way Engineering and Maintenance-Of-Way Association
- AASHTO American Association of State Highway and Transportation Officials
- NSF Standard 61
- BNQ Potable Water Approval

## PIPE TESTING STANDARDS

### Pipe Tests and Purposes

Test Designation	Purpose
ASTM D638	Tensile Properties by Coupon
ASTM D695	Compression by Coupon
ASTM D1599	Quick Burst
ASTM D2290	Tensile Strength by Split Disk
ASTM D2412	Pipe Stiffness
ASTM D2992	HDB Procedure
ASTM D3567	Dimensions
ASTM D3681	Chemical Resistance - Deflected
ASTM D4161	Joint Test

## LONG-TERM PERFORMANCE / DURABILITY

Hobas' long-term pipe performance and durability is measured by extended pressure and ring bending tests that continue for a minimum of 10,000 hours. Safe operating limits are established by applying design factors in the AWWA Fiberglass Pipe Design Manual, M45.

# Hobas Pipe USA, Inc.

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