



NATIONAL PARTNERSHIP AGREEMENTS

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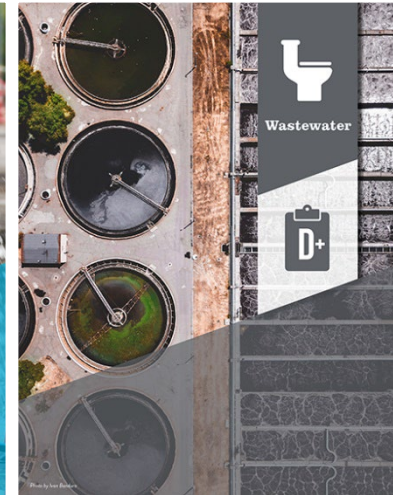
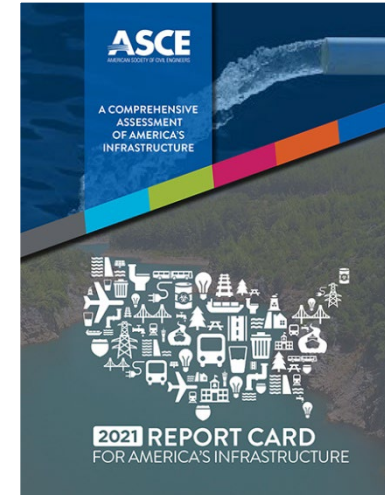
INGU



THE PERFECT FIT? UNRAVELING
FFRP'S CLOSE-FIT AND LOOSE-FIT
SHOWDOWN

Pipe Rehabilitation

- Owners prioritizing pipeline projects
- Limited budgets
- Employ new technologies and innovations



Pipe Rehabilitation

Choosing the Right Method

1. Reason
2. Comparative Cost
3. Site Conditions
4. Expected Life-Cycle Performance



Pipe Rehabilitation

AWWA Structural Classification of Lining Techniques

- Class I – Nonstructural, Inner Surface Protection
- Class II – Interactive and Semistructural
- Class III – Greater Class II Capabilities
- Class IV – Fully Structural



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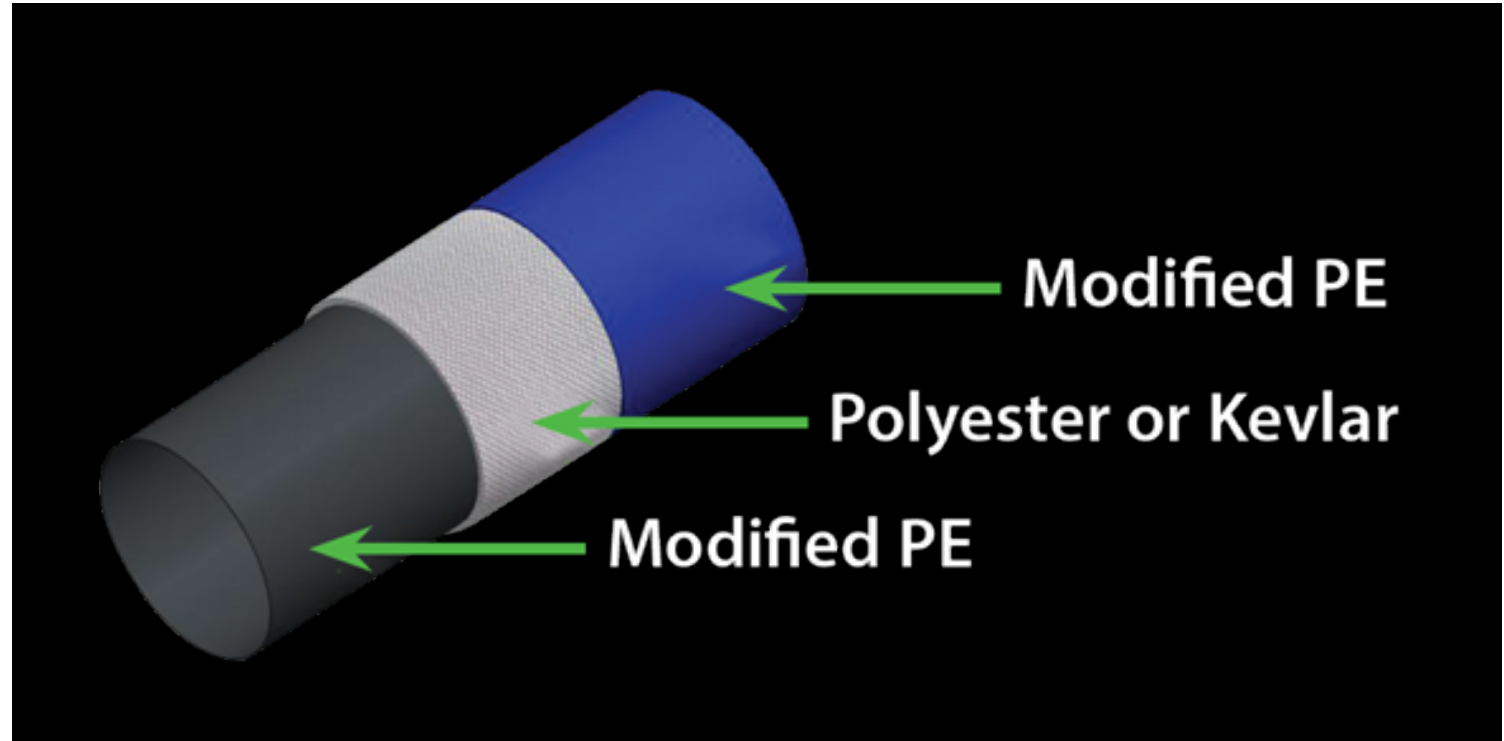
Construction. Rehabilitation. Asset Management.

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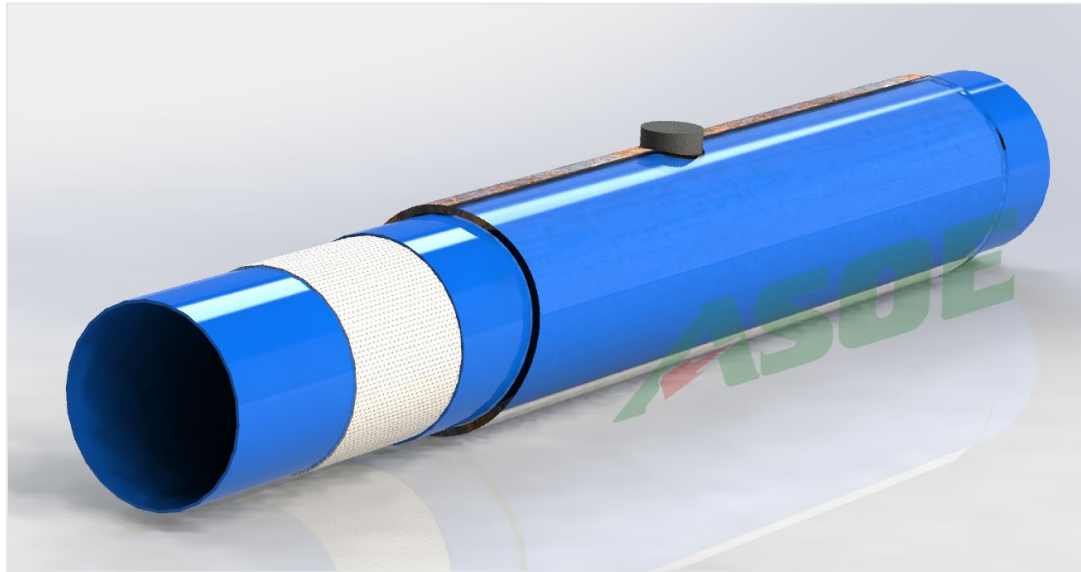
Flexible Fabric Reinforced Pipe

1. In US for over 10+ years
2. Consist of 3 Layers
3. Best Suited for Pressure Applications
4. Complex Pipeline Geometries

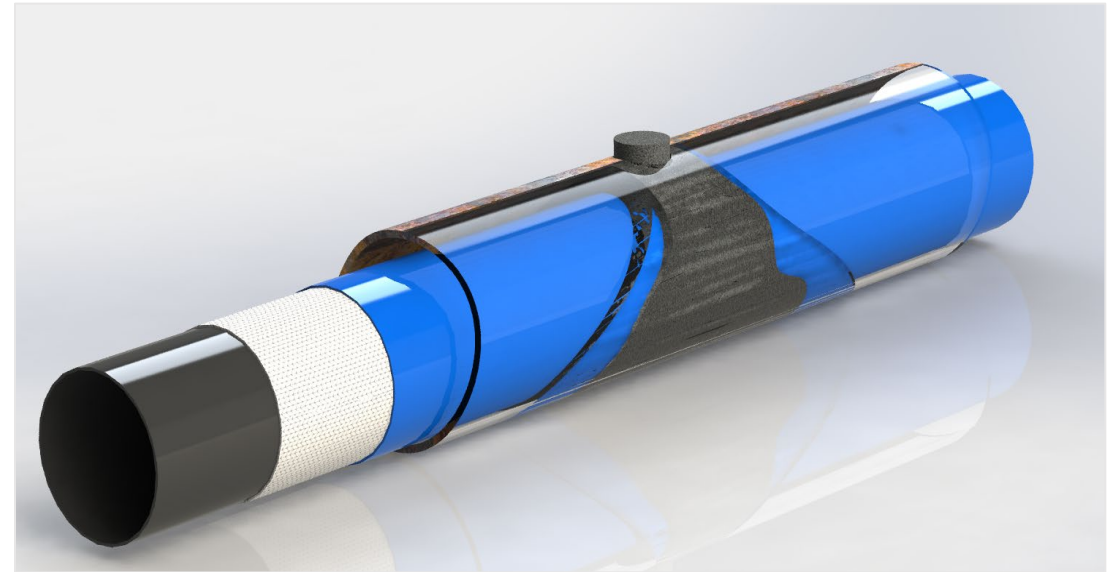


Flexible Fabric Reinforced Pipe

Close-Fit



Loose-Fit



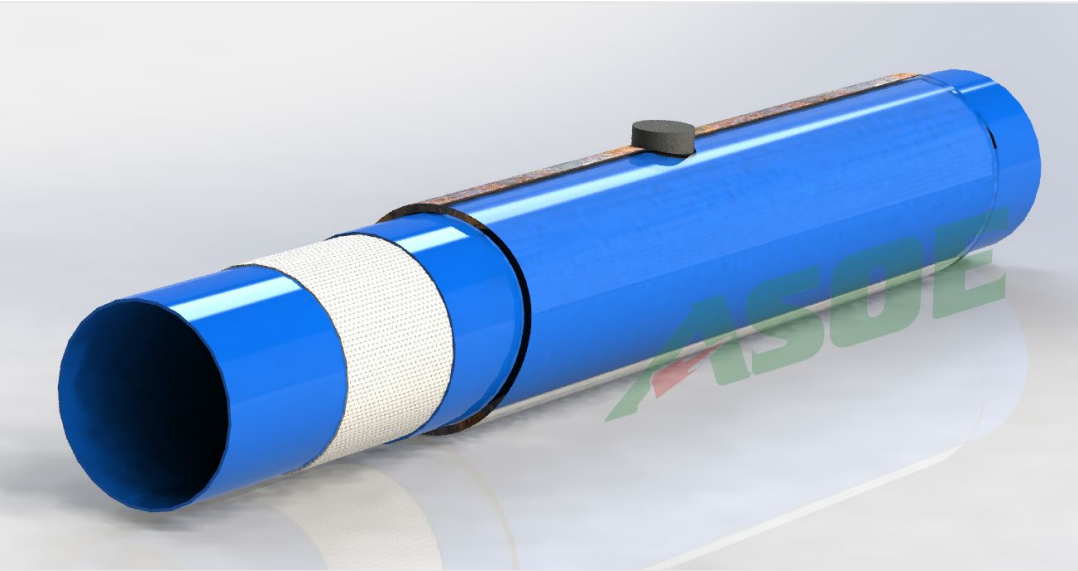
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Close-Fit FFRP



Meets AWWA M28

Cumulative pressure effect

Spans holes or gaps in host pipe

Prevents inflow and infiltration

Maximizes hydraulics

Minimal ID reduction



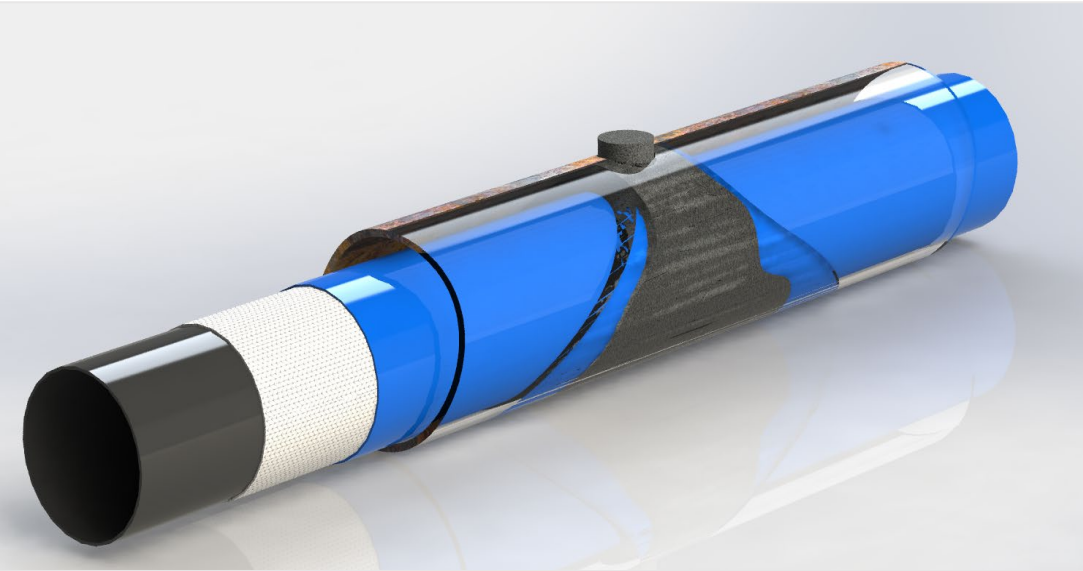
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Loose-Fit FFRP



Does not meet AWWA M28

Annular space between liner and host pipe

Does not span holes or gaps in host pipe

Absorbs entire operating pressure

Drainage of water accumulation

ID reduction



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FFRP Manufacturing

Close-Fit

1. PE extrusion through middle weave
2. Higher adhesion and tension values due to extrusion process
3. 64" diameter capability

Loose-Fit

1. Made in separate layers
2. Lower adhesion and tension values
3. 20" diameter capability



Installation

1. Flattened and folded
2. Host pipe cleaning
3. Host pipe CCTV



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Installation

5. Pull liner through host
6. Inflate with air
7. Termination fittings
8. Air test (hydrostatic)
9. Connect to host pipe



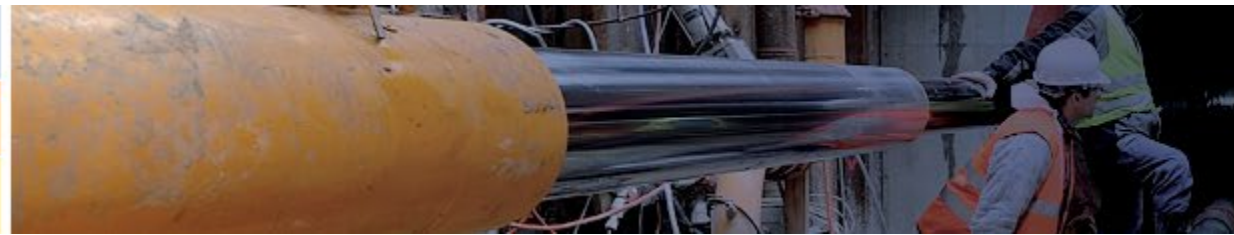
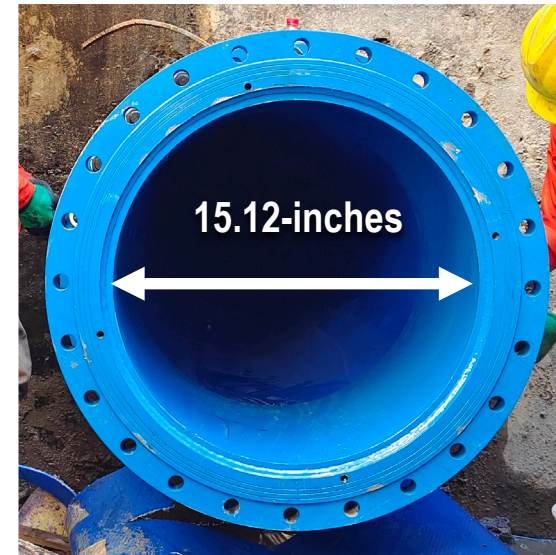
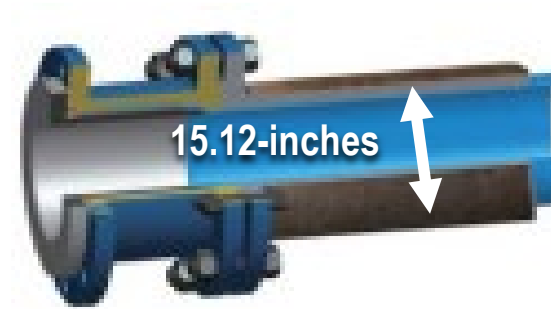
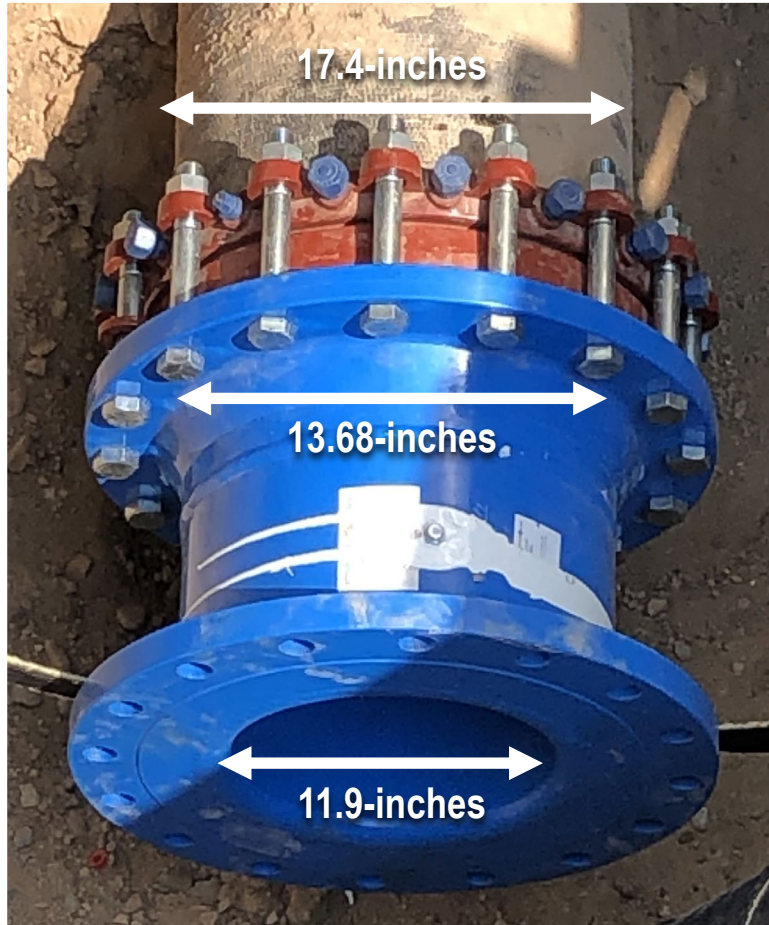
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Termination Fittings



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FFRP Benefits



Pull Long Segments

Quick Installation

Bend Navigation

No Curing

Small Footprint

Independent of Host Pipe Composition



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FFRP Challenges



CCTV Required

Valves

Services

Cannot Tap



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Questions



Advancing the Nation's infrastructure providing innovative inspection technologies and rehabilitation solutions that protect the environment and deliver efficient, sustainable results and value to our trusted network.

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