



Use of Fiberglass Casing in Texas Public Supply Wells

A Case Study

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Objectives

- Provide guidance for a new technology for Texas
- Identify engineering and regulatory considerations
- Compare cost
- Evaluate installation complexity

AWWA/TCEQ Material Comparison

Material	Collapse Strength	Corrosion Resistance	Heat Tolerance	Availability	Cost
Carbon Steel	High	Poor	High	Good	Low
High-Strength, Low Alloy Steel	High	Moderate	High	Poor	Moderate to High
Stainless Steel	High	Moderate to High	High	Moderate to Good	High
PVC	Low to moderate	High	Low	Good	Very Low

Why Fiberglass?

- Corrosion Resistance
- Economical
- Heat Tolerance
- Light Weight
- Available in Diameters Needed

The Product

- GreenThread® piping
- Manufactured by NOV Fiberglass Systems
- Glass Reinforced Epoxy (GRE)
- Eight (8) ASTM standards for GRE pipe
- Meets NSF/ANSI drinking water standards

GRE Manufacturing Process

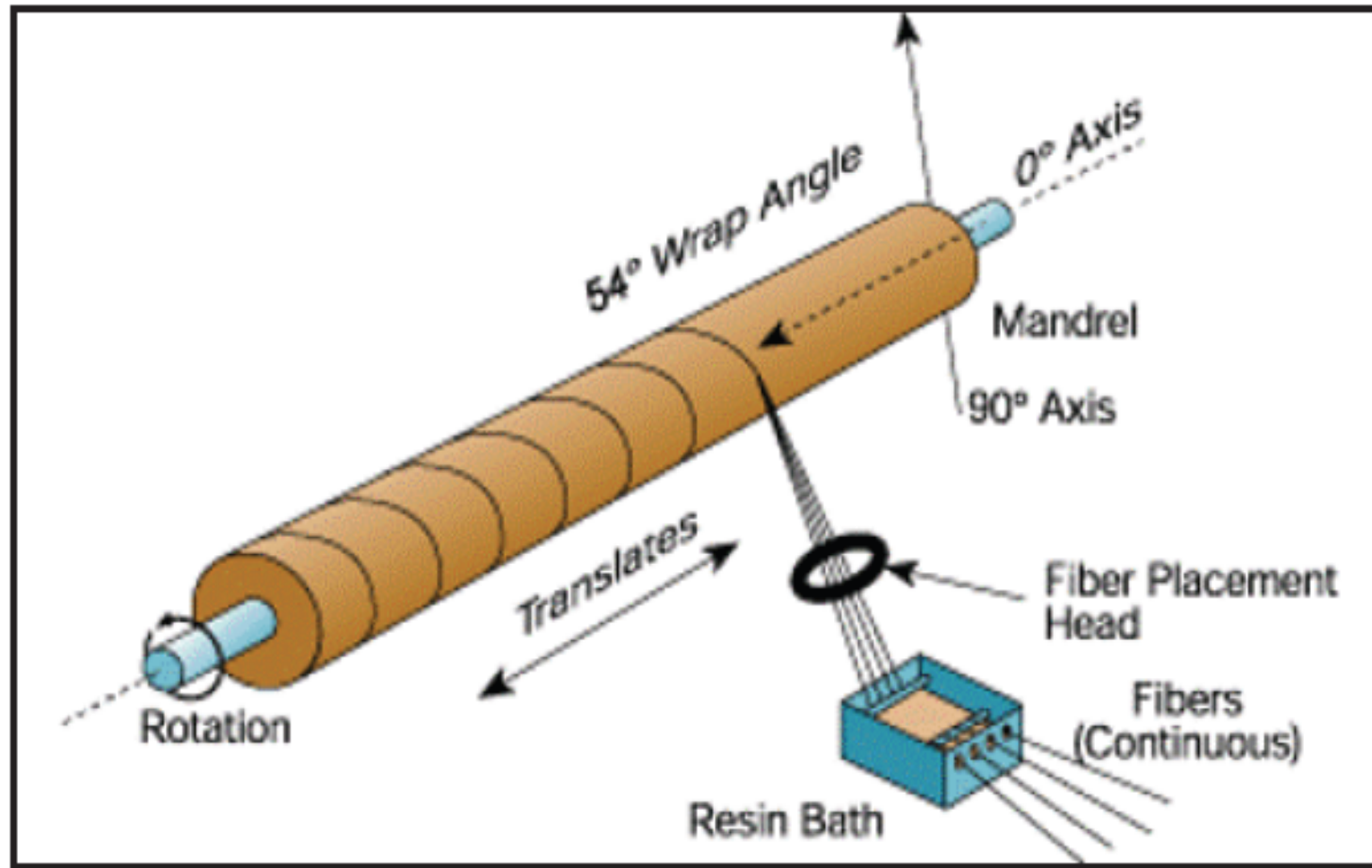
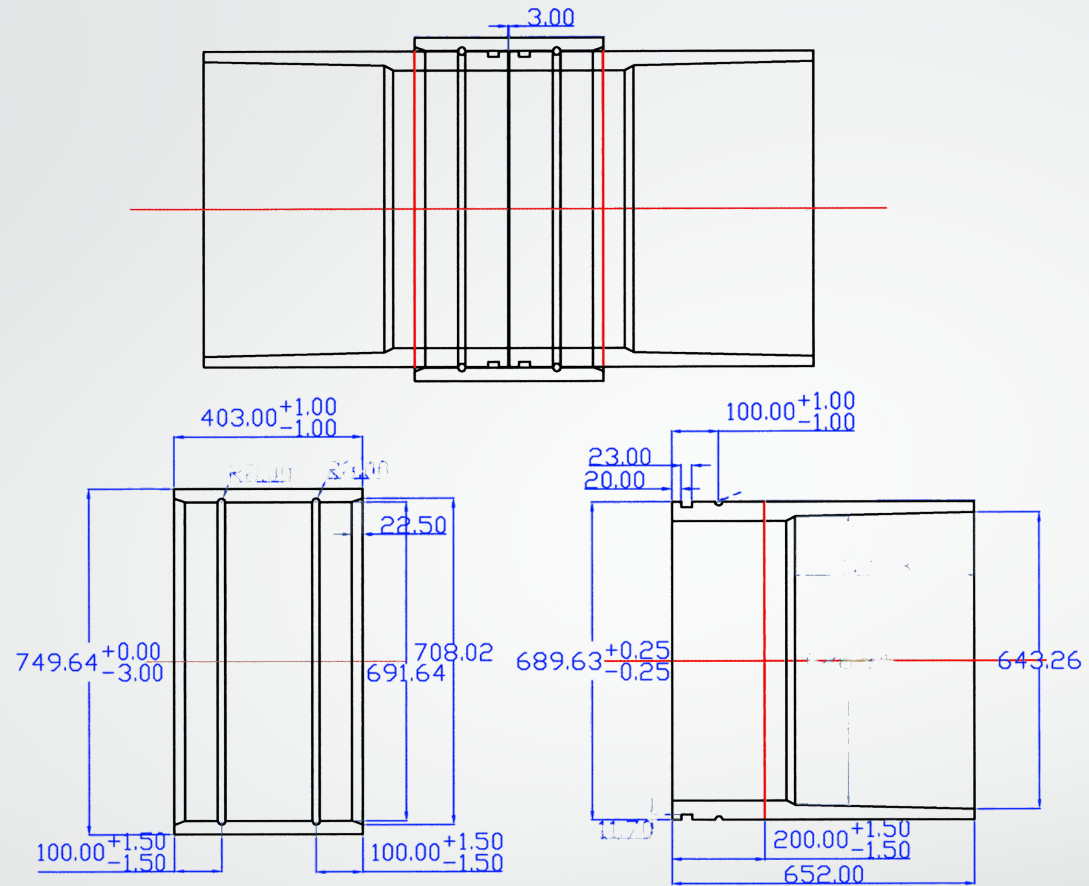


Image Courtesy of NOV Fiberglass Systems



O-ring					Key	
Pipe Size	Diameter(mm)	Min. Diameter(mm)	Max. Diameter(mm)	ID(mm)	Diameter(mm)	Length(+/-5mm)
24"	18	17.5	18.5	611	15	2300

NO.	Technical Requirements	Reference Standard
1.	Tg value: Min.130°C	API 15LR Appendix B
2.	Fiberglass Content: Min.60%	API 15LR Appendix A
3.	MHI Pressure Test: 2.6MPa	ASTMD-1599
4.	ST Burst Test: 6.9MPa	ASTMD-1599
5.	Liner Thickness: 0mm	ASTMD-3567
6.	Electrical Resistance Per unit length:1X100,000 ohm/m	ASTMD F1173 Appendix X3
7.	Appearance	ASTMD-2563 Level 1

PRODUCTION DRAWING				Fiber Glass Systems			
REV.	DESCRIPTION	BY	DATE	MATERIAL	QTY	CONTROL DIMENSIONS	SCALE
MGR APPR				GRE		SYMBOL: ▲	1:1
QA CHECKED	Karl.Gou			DRAWING NO.			
CHECKED				SHEET			
DESIGNED	Uck.Li			Rev.			
	NAME	DATE		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM. FRACTION: ±1.59mm ANGLES: ±0.25°			

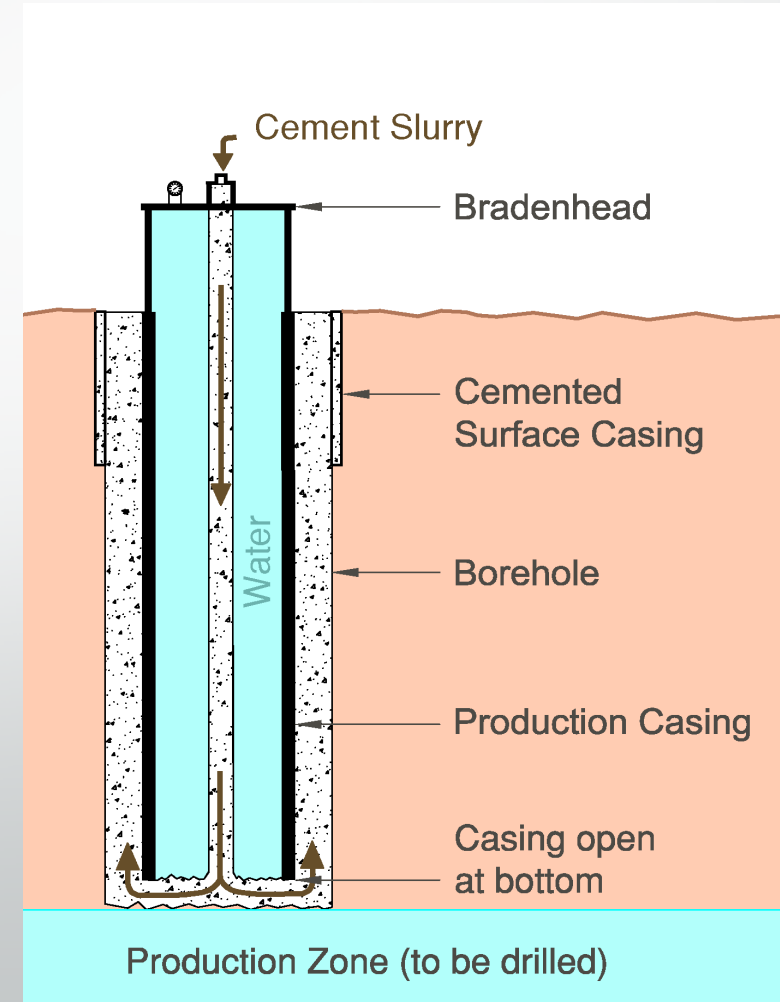
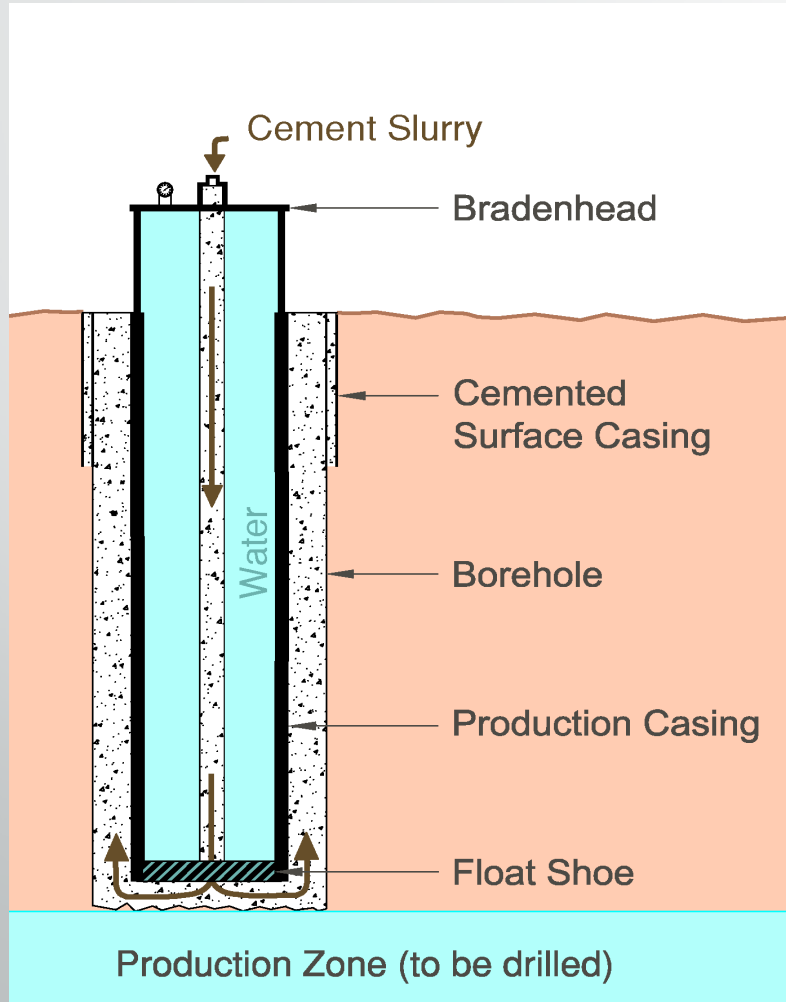
Image Courtesy of NOV Fiberglass Systems





Resistance to Hydraulic Collapse

Pipe Rating – 79 PSI Estimated PSI = 65



Regulatory Considerations

- Not a TCEQ approved casing material
- Requires exception process (6 months)
 - Well Specifications
 - Pipe engineering properties
 - NSF Certifications
 - Engineering calculations
 - FL and NE regulations

Cost Comparison

	304 Stainless Steel	Fiberglass
Contractor #1 - Well Cost	\$507,228	\$433,570
Contractor #2 - Well Cost	\$533,630	\$455,933
Contractor #1 Per foot Cost Difference (SS vs. Fiberglass)	\$298	
Contractor #2 Per foot Cost Difference (SS vs. Fiberglass)	\$315	

Use Considerations

- Corrosion-proof
- Lower cost
- Rapid installation
- Long delivery time (30-60 days)
- TCEQ Exception – (180+ days)
- Special attention to RHCP/Depth Limitations
- Special attention to abrasive damage
- Probably not suitable for under-reamed holes

URL

http://www.twdb.texas.gov/innovativewater/desal/projects/northalamo/doc/northalamo_final_rpt.pdf?d=74145.725