



UNITED FIBERGLASS™ BRIDGE DRAIN SYSTEMS

WE BUILD LONG-LASTING BRIDGE DRAIN SYSTEMS

COMPLETE BRIDGE DRAIN SYSTEMS

United Fiberglass's Bridge Drain System products provide the performance, value, and durability our customers demand for their applications. Our fiberglass bridge drain systems can be used practically anywhere that ductile iron, steel, PVC, clay, concrete, or other pipe materials are found. Our fiberglass bridge drain systems not only performs as well or better than these other, more "traditional" products, but it also offers extended benefits that range from significant overall cost savings to reduced environmental impacts.

ADVANTAGES

- Lightweight—1/5 the weight of steel
- Corrosion Resistant
- High Flow Rates
- Easier Installation & Lower Cost
- Lower Overall System Cost
- Easy On-Site Assembly or Factory Pre-Assembly available
- Custom Fabrications
- Wide Range of Colors to match structure colors using Federal Standard colors including our Concrete Gray and Weathering Steel Brown
- Long Unsupported Spans
- Thermal Stability and Freeze/Burst Resistant
- High Impact and Crush Resistance

PIPE FEATURES

- Iron Pipe Size OD (4" thru 12") Using Standard Sized Supports
- Adhesive Bonded Fittings and Saddles

CONNECTIONS AVAILABLE

- Custom Angle Elbows and Branch Fittings
- Large Concentric Reducers for Expansion Control
- Debris Covers to Aid in Keeping Nesting Birds out of the Drain System
- Fiberglass Scuppers
- Flexibility to Follow Contours of the Structure
- Flanged connections

ADDITIONAL SERVICES

ESTIMATING Take-Off and Bill of Material can be supplied with each job

ENGINEERING Drafting and system layout with AutoCAD submittals and layout drawings

FABRICATION Drain systems can be prefabricated into shippable sub-assemblies which may significantly reducing installation time

INSTALLATION United Fiberglass can help identify installing contractors to provide a complete drainage package

PIPE COMPOSITION

Filament-wound "E" type fiberglass reinforced thermosetting resin pipe manufactured in accordance with ASTM D2996

FITTINGS STANDARDS

Manufactured for bridge drain applications in accordance with NBS PS 15-69, ASTM D3840, and ASTM C582 standards.

STANDARD COMPONENTS

90° Elbows, 45° Elbows, 90° Saddle Tees, 45° Lateral Saddles, Concentric Reducers, Debris Covers, Couplings, Cleanout Fittings, Expansion Joints, Socket Flanges and Custom Fittings Available

PIPE FACTS

6IN PIPE / FRP vs. STEEL vs. PVC

TYPE	AVERAGE WEIGHT 6" PIPE	UNSUPPORTED SPAN
FRP	2.27 lbs/ft	16' at 125°F
STEEL	18.98 lbs/ft	—
PVC	5.33 lbs/ft	6' at 125°F

PVC: Must be prepped, primed and painted
FRP: Pigmented throughout
Steel: Must be prepped, primed, painted or galvanized

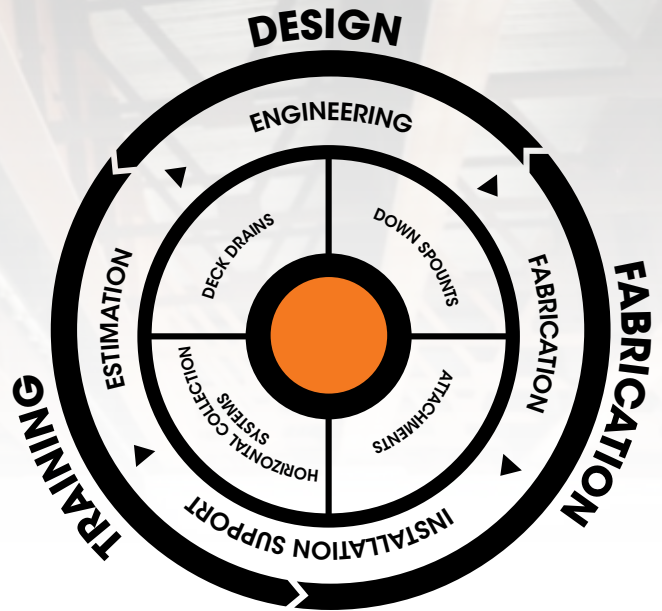
SERVICES / SUPPORT

We're committed to providing everything you need to complete your projects successfully; complete system on time and on budget. As a truly comprehensive partner, we offer a variety of support services to assist you throughout the project life cycle. In addition to our core product solutions, we can also provide on-site training, professional installation services, and pre-assembly of components for simplified installation. We can even take care of supply chain management issues and pre-production design engineering assistance—whatever it takes to create the solution you're looking for.

We understand that no two bridges are exactly alike, so our skilled staff will work with you to design the ideal system for your application. Our goal is to ensure that your next bridge drainage project delivers optimal performance, longevity, and safety. And by taking advantage of our end-to-end support and service capabilities, you'll get it at a value that appreciates with time as our fiberglass drainage systems outperform and outlast alternative solutions. From planning and sourcing to helping job crews by addressing technical questions with expert field support, we're there when you need us, every step of the way.

END TO END SOLUTIONS:

- Planning
- Material Specification
- Design
- Supply Chain Support
- On-Site Support
- Manufactured in the USA



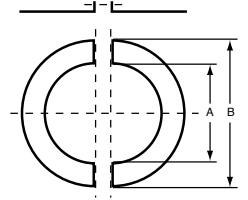
STANDARD PRODUCTS

BRIDGE DRAIN PIPE

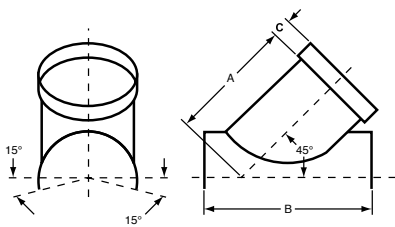
SIZE	OD
4"	4.50"
6"	6.64"
8"	8.64"
10"	10.75"
12"	12.75"
14"	14.32"
16"	16.32"
18"	18.36"

DEBRIS COVER ASSEMBLY 2-Piece P604

SIZE	A±0.125"	B±0.25"
8"x4"	4-9/16"	10-5/8"
8"x6"	6-11/16"	10-5/8"
10"x6"	6-11/16"	12-3/4"
12"x6"	6-11/16"	14-3/4"
10"x8"	8-11/16"	12-3/4"
12"x8"	8-11/16"	14-3/4"
12"x10"	10-13/16"	14-3/4"
14"x10"	10-13/16"	16-1/8"
14"x12"	12-13/16"	16-1/8"
16"x12"	12-13/16"	18-1/8"



Flat debris covers P606 available.



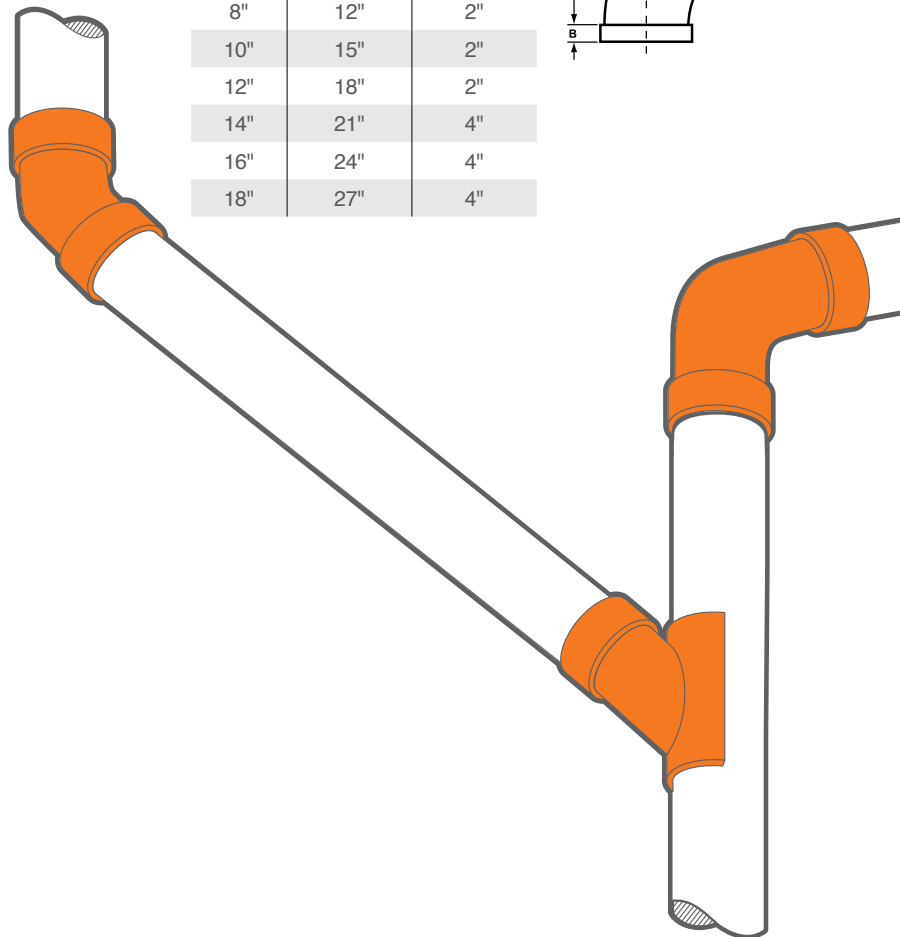
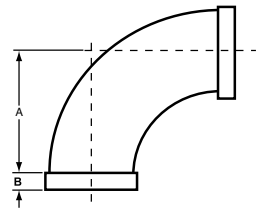
45° LATERAL SADDLE P615

SIZE	A±0.125"	B±0.25"	C±0.125"
4" x 4"	7.88"	11.13"	2"
6" x 4"	9.44"	11.13"	2"
6" x 6"	10"	13.5"	2"
8" x 6"	12"	14.5"	2"
10" x 6"	12.5"	14"	2"
12" x 6"	14"	14.5"	2"
8" x 8"	13"	17"	2"
10" x 8"	14"	17"	2"
12" x 8"	15.25"	16.31"	2"
14" x 8"	10"	16.88"	3"
16" x 8"	18.25"	17.25"	3"
18" x 8"	19.63"	17.25"	3"
10" x 10"	15"	19.25"	2"
12" x 10"	16.38"	19.13"	2"
12" x 12"	18"	22.75"	2"
14" x 14"	20"	25"	3"
14" x 14"	20"	27.25"	4"
16" x 16"	23.88"	30.75"	4"

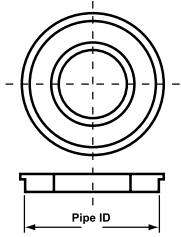
Additional sizes available.

90° ELBOW P657

SIZE	A±0.125"	B±0.125"
4"	6"	2"
6"	9"	2"
8"	12"	2"
10"	15"	2"
12"	18"	2"
14"	21"	4"
16"	24"	4"
18"	27"	4"



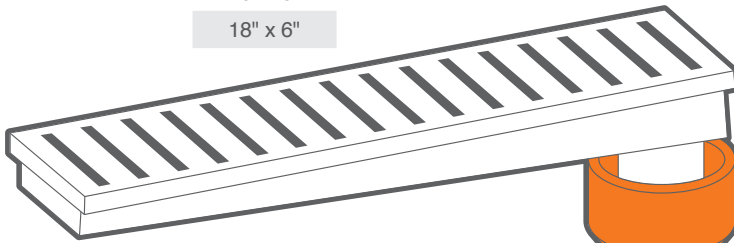
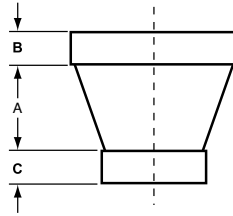
CLEANOUT FITTING P633



SIZE

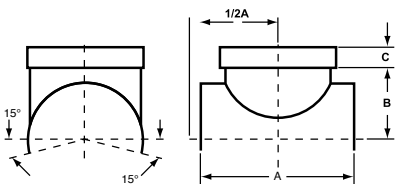
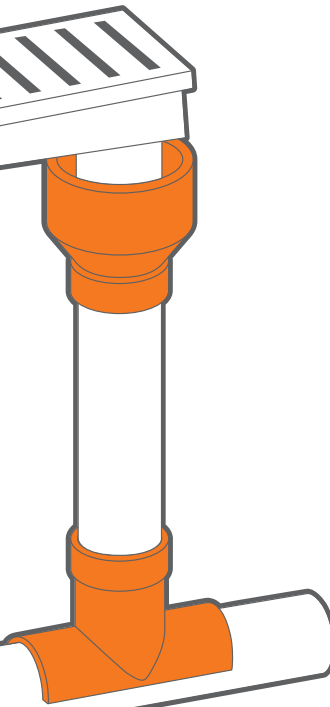
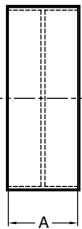
Pipe ID x NPT
Female Threaded
Pipe Size for
PVC-DWV Plug

4" x 4"
6" x 4"
8" x 6"
10" x 6"
12" x 6"
14" x 6"
16" x 6"
18" x 6"



SOCKET COUPLING P614

SIZE	A ± 0.25"
4"	4.25"
6"	4.25"
8"	4.25"
10"	4.25"
12"	4.25"
14"	8.5"
16"	8.5"
18"	8.5"



TEE SADDLE P613

SIZE	A ± 0.25"	B ± 0.25"	C ± 0.125"	SIZE	A ± 0.25"	B ± 0.25"	C ± 0.125"
4" x 4"	9.38"	4.56"	2"	14" x 6"	13"	9.63"	2"
6" x 6"	11"	5"	5"	14" x 8"	13"	10.38"	3"
8" x 6"	13"	6"	6"	14" x 12"	18"	10.38"	3"
10" x 6"	15"	7"	7"	14" x 14"	20"	10.38"	4"
12" x 6"	11"	8"	8"	16" x 6"	14"	10.13"	2"
8" x 8"	13"	6"	6"	16" x 12"	18"	11.38"	3"
10" x 8"	15"	7"	7"	16" x 16"	22"	11.38"	4"
12" x 8"	17"	8"	8"	18" x 8"	14"	12.38"	3"
10" x 10"	15"	7"	7"	18" x 18"	24"	12.38"	4"
12" x 10"	17"	8"	8"				
12" x 12"	17"	8"	8"				

Additional sizes available.

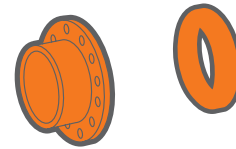
CONCENTRIC REDUCER P634

SIZE	A	B	C
8" x 6"	3"	2"	2"
10" x 6"	6"	2"	2"
12" x 6"	9"	2"	2"
10" x 8"	3"	2"	2"
12" x 8"	6"	2"	2"
12" x 10"	3"	2"	2"
14" x 10"	6"	2"	3"
14" x 12"	3"	2"	3"
16" x 12"	6"	2"	3"
15" x 8"	9"	2"	2"
16" x 10"	9"	2"	3"
18" x 8"	9"	2"	2"
18" x 10"	9"	2"	3"
18" x 12"	6"	2"	3"

Additional sizes available.

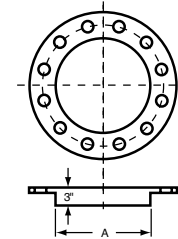
Pipe to Pipe Concentric Reducers P636 available.

Eccentric Reducers P635 available.



SOCKET FLANGE P618

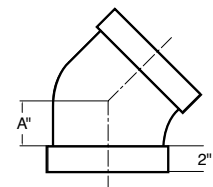
SIZE
6"
8"
10"
12"
14"
16"
18"



150# Drilling
or Blank Face
Available.
Flange Kits
Available with
Hardware and
Gasket.

45° ELBOW P665

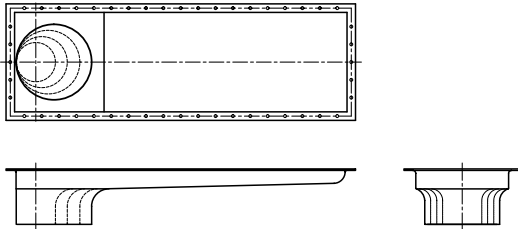
SIZE	A ± 0.125"
4"	2.38"
6"	3"
8"	3.5"
10"	4"
12"	5"
14"	7.5"
16"	9.13"
18"	10.5"



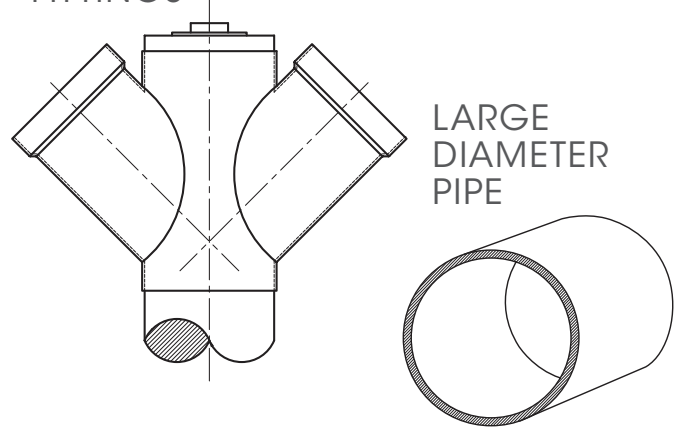
Additional sizes
available.

CUSTOM PRODUCTS

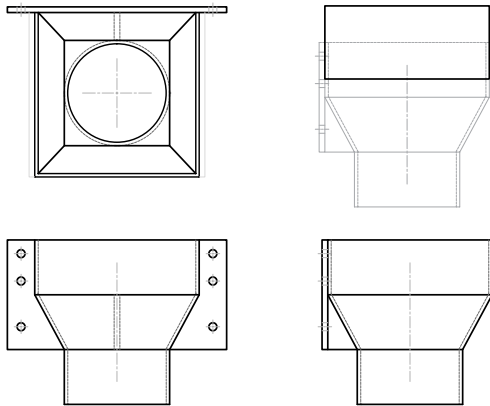
SCUPPERS



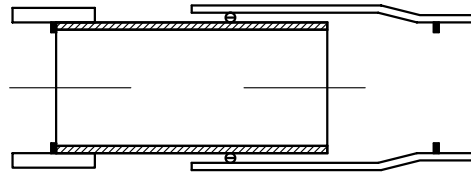
FITTINGS



DRAIN BOX

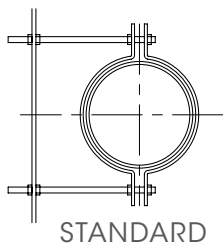


EXPANSION JOINT - SOCKET X SOCKET

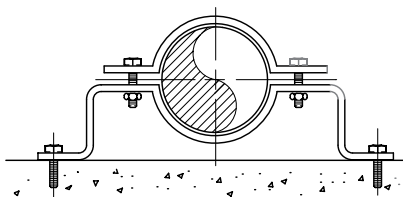


HARDWARE & ATTACHMENTS

VERTICAL

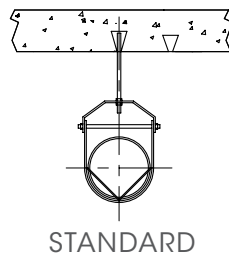


STANDARD

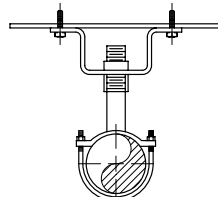


CUSTOM

HORIZONTAL



STANDARD



CUSTOM

TECHNICAL SPECS

BRIDGE DRAIN PIPE

NOMINAL SIZE	NOMINAL OD	NOMINAL WALL THICKNESS	WEIGHT/FT.(LBS)	GALLONS/FT.	**U.S.S. @ 125°F
4"	4.50"	0.08"	1.03	0.74	11.7'
6"	6.64"	0.12"	2.27	1.67	16.0'
8"	8.64"	0.12"	2.97	2.88	18.0'
10"	10.75"	0.15"	4.77	4.45	21.0'
12"	12.75"	0.16"	6.04	6.29	22.0'
*14"	14.32"	0.16"	6.58	8.00	19.7'
*16"	16.32"	0.16"	7.51	10.44	20.3'
*18"	18.36"	0.18"	9.51	13.22	23.1'

* Please contact the factory for specific ASTM D2996 specifications.

** U.S.S. Unsupported Spans

PIPE FLOW RATES AND VELOCITY FOR FULL BORE GRAVITY FLOW

NOM. SIZE	1/2% GRADIENT		1% GRADIENT		2% GRADIENT**		4% GRADIENT	
	FLOW (ft ³ /sec)	VELOCITY (ft/s)	FLOW (ft ³ /sec)	VELOCITY (ft/s)	FLOW (ft ³ /sec)	VELOCITY (ft/s)	FLOW (ft ³ /sec)	VELOCITY (ft/s)
4"	0.23	2.3	0.33	3.3	0.46	4.6	0.65	6.6
6"	0.65	3.0	0.93	4.3	1.31	6.0	1.85	8.5
8"	1.35	3.6	1.90	5.1	2.69	7.2	3.81	10.2
10"	2.43	4.2	3.43	5.9	4.86	8.4	6.87	11.8
12"	3.90	4.7	5.51	6.7	7.79	9.4	11.02	13.3
*14"	5.54	5.1	7.83	7.3	11.07	10.3	15.66	14.6
*16"	8.09	5.7	11.44	8.0	16.18	11.3	22.88	16.0
*18"	11.03	6.1	15.60	8.6	22.07	12.2	31.21	17.3

* Custom Size: 14"– 18" Note: the above flows and velocities are based on Manning Formulas, dimensionless roughness coefficient n=0.009.

To convert ft³/sec to g.p.m. multiply by 449. For partial flow multiply by the following factors:

% Flow	75%	50%	25%
Factor	0.910	0.500	0.137

90° ELBOW

Ultimate bending moment
90 Elbow vs as changed

NOM. SIZE	MOMENT FOOT/LBS
4"	1,900
6"	3,600
8"	5,700
10"	11,200
12"	16,300
14"	3,200
16"	4,200
18"	6,400

The actual operating conditions should never exceed 25% of the ultimate values shown, i.e., for the 10" size, the operating movement should not exceed 4,500 foot-pounds.

COMPRESSION

End loads due to restrained compression thermal expansion of an uninsulated pipe

NOM. SIZE	LBS/°F
4"	24.3
6"	36.0
8"	46.0
10"	84.0
12"	99.0
14"	102.0
16"	110.0
18"	123.0

Above data based on Modulus of Elasticity values at Ambient Temperature. This data is used to determine expected tensile and compressive loads from the thermal expansion and contraction on the piping for design of anchors, expansion joints and bending moment considerations.

EXPANSION

Thermal expansion of an uninsulated pipe

Δ °F	Δ LENGTH (IN/100')
25	0.375
50	0.750
75	1.125
100	1.500
125	1.875
150	2.250

Δ = Change.
The coefficient of thermal expansion for uninsulated Bridge Drain pipe is 12.5x10E-6 in/in°F

PROPERTIES

Nominal ultimate properties.
Hoop tensile stress (PSI)
based on reinforced thickness

NOM. SIZE	@ 75°F
4"-12"	30,000
12"-18"	30,000

Test method used: ASTM D1599 and ASTM D2996

UNITED FIBERGLASS

A Division of Creative Composites Group

United Fiberglass is the industry's leading manufacturer of quality fiberglass pipe, conduit and bridge drain infrastructure systems. Known as much for our unmatched service and support as for our high performance products, we work closely with our customers to provide you with everything you need to complete your projects on time and on budget. From expert consultation before the sale to state-of-the-art manufacturing processes, all the way to logistics services, global supply chain management and field support, our clients come first in everything we do.

We produce our high-performance bridge drain systems, fiberglass conduit, elbows and pipe products using a filament winding process, which uses a mandrel surface to wind polymer resin-impregnated glass fiber reinforcements in a precise geometric pattern. Filament wound FRP (Fiber Reinforced Polymer) uses continuous strands of glass reinforcement to create conduit and pipes that are engineered to be stronger and lighter than steel can be manufactured. Since the final shapes and physical properties are based largely upon how the polymer is engineered and reinforcement fiber is wound, the process is easily adaptable to create customized products for unique or custom specifications. Our in-house engineering and comprehensive manufacturing capabilities allows us to deliver a full range of filament wound FRP systems for our customers.

ABOUT CCG

Advance your infrastructure projects beyond the limitations of traditional materials by leveraging the capabilities of the Creative Composites Group (CCG). We are the largest manufacturer of structural composites in the U.S. with a technically innovative product line.

CCG delivers innovative, engineered solutions so that our customers take advantage of the benefits of Fiber Reinforced Polymer (FRP) composites. This means our customers have products that are lightweight, high strength, corrosion-resistant and long-lasting! CCG combines the expertise of many companies to offer the best in composite design and advanced manufacturing processes.

Contact us for your next engineered FRP bridge drain system or electrical conduit project. We'd be thrilled to discuss it with you.



United Fiberglass Division

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