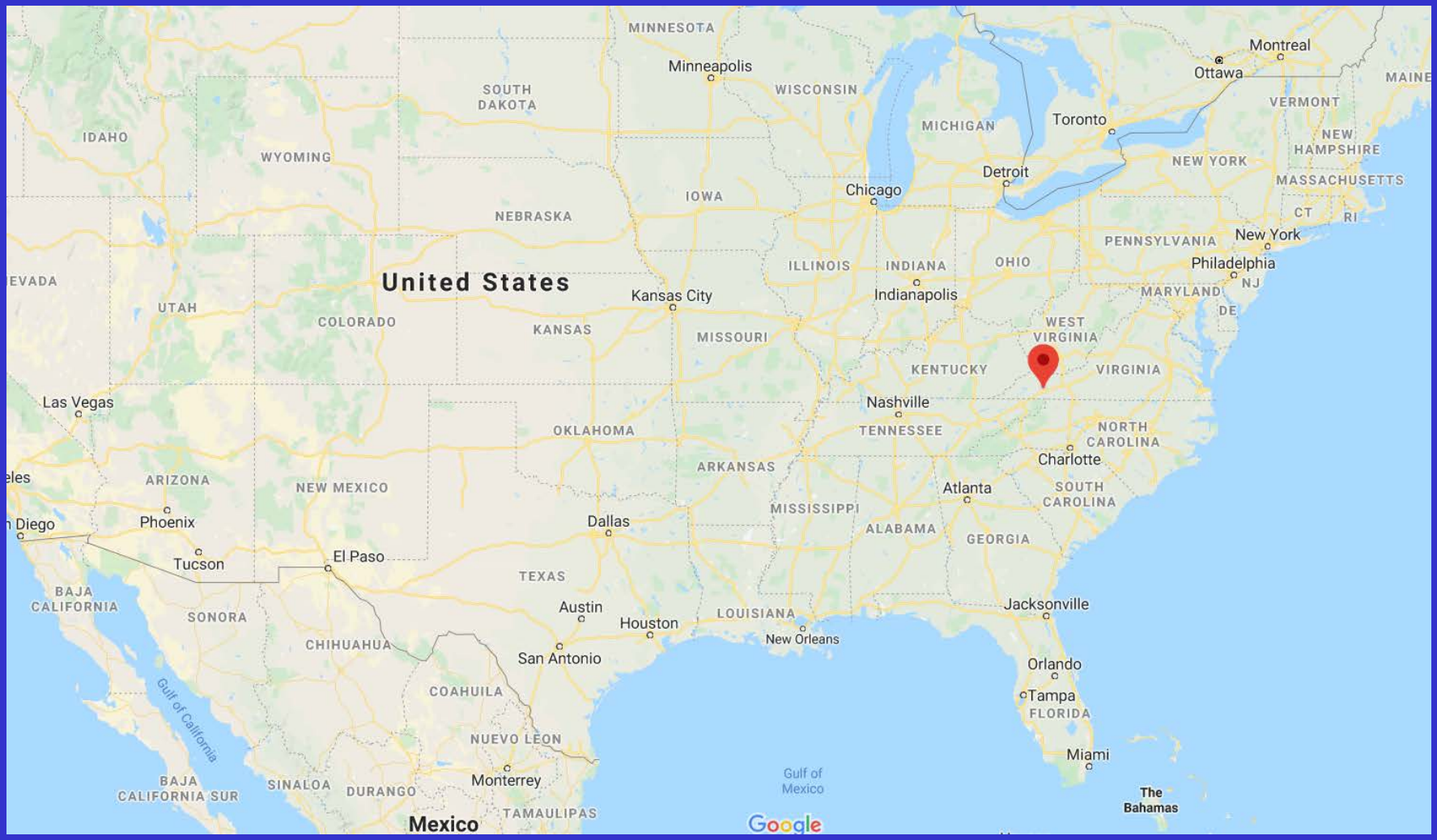
O'Dell Associates 2020 FRP Product Training Session

FRP Solutions by Monoxivent®

O'DELL ASSOCIATES INC.

FRP Manufacturing Facility in Glade Spring, VA



110,000 Square Foot FRP Factory

The Team!

Jim Wischhusen
FRP Division Manager

Sam Stelzner
Engineer/Production Manager
Drafting

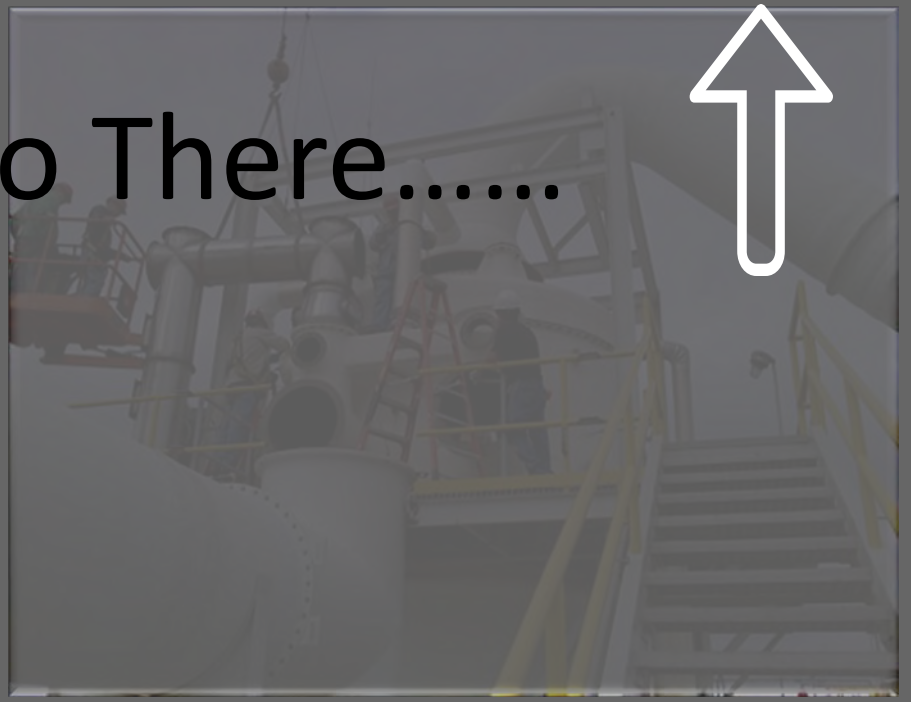
Craig Czarnetzki
HVAC/Industrial Project Estimator

Strong, Versatile Solutions: Corrosion Resistant FRP Products

Monoxivent is your source for corrosion resistant Fiberglass Fabrication Services.

Monoxivent assists with design, engineering, drawing, manufacturing, inspection, and installation. For many HVAC, Industrial, Water, and Wastewater applications where corrosion is a problem, fiberglass is the material of choice.

Before we go There……



FRP Basics

……..We have to go here

What is FRP?

A specific definition of FRP composites for our purposes is: “A combination of fiber-reinforcement and a polymer matrix.”

And the Matrix is……

The polymer matrix is a thermoset resin with acrylic, polyester, vinyl ester and epoxy resins most often being the matrix of choice.

Why Thermoset?

Composites typically use *thermoset* resins, which begin as liquid polymers and are converted to solids during the molding process. Because this is irreversible , these polymers are known as thermosets and cannot be melted and reshaped.

Resins

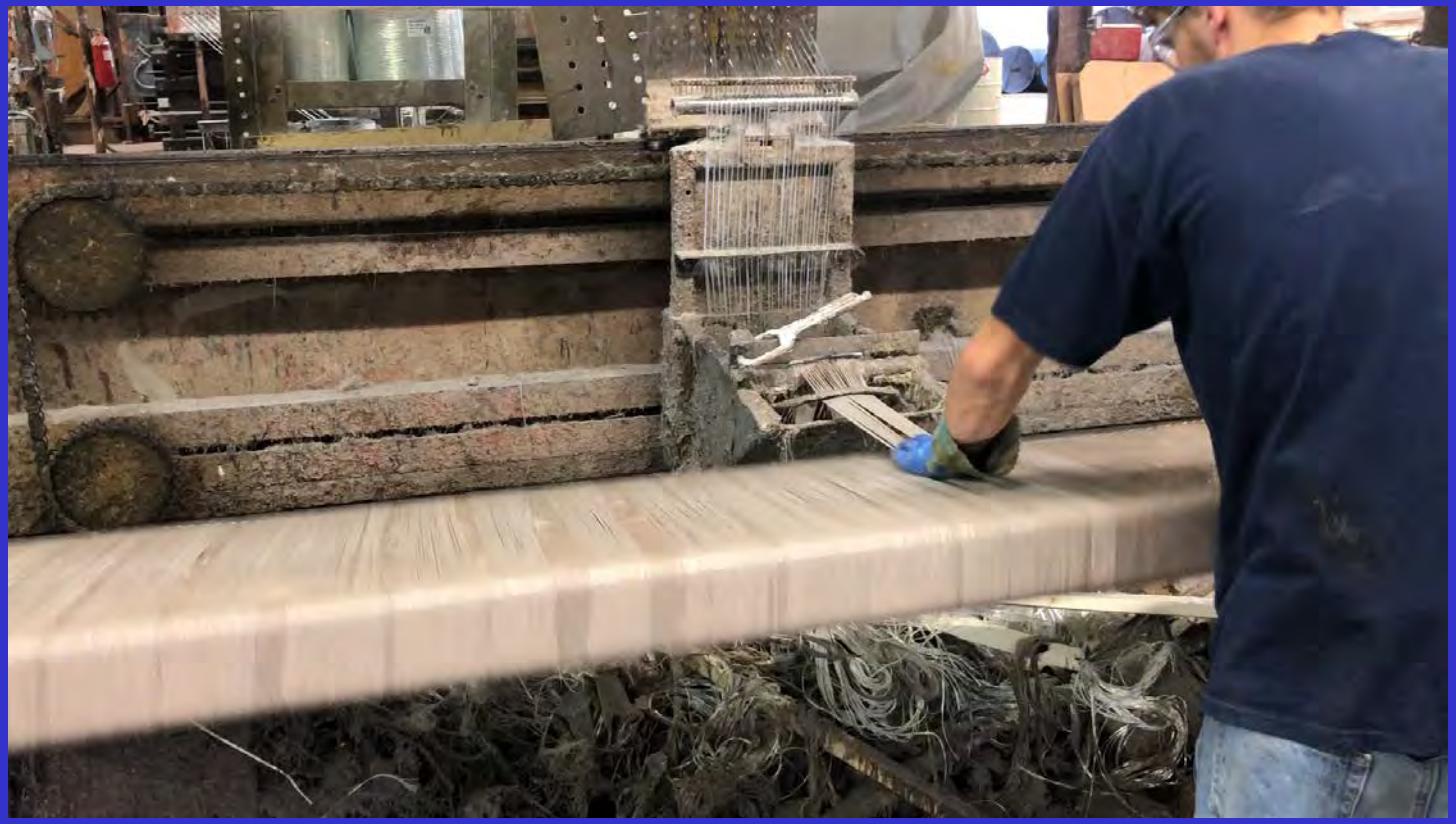
- Matrix
- Chemical Resistance
- Impact Resistance
- Strong in Compression
- Vinylester
- Polyester
- Acrylic

Glass

- Reinforcement
- Strong in Tension
- Surfacing Veil
- Chop Strand Mat
- Woven Roving
- Winding Glass

Filament Wound

- Resin and Glass wound on mandrel
- Great for common simple profiles such as duct
- Reusable mandrel replaces mold
- Shop Fabricated Ductwork



Hand Lay-Up

- Resin and Glass applied by hand
- Great for odd shapes and custom projects
- Mold required for each project
- Field Joints
- Field “Modifications”

FRP Configurations:

SHAPE

Round, rectangular, and oval are the typical filament wound construction shapes. Upon requests, shapes such as triangular and others are available.

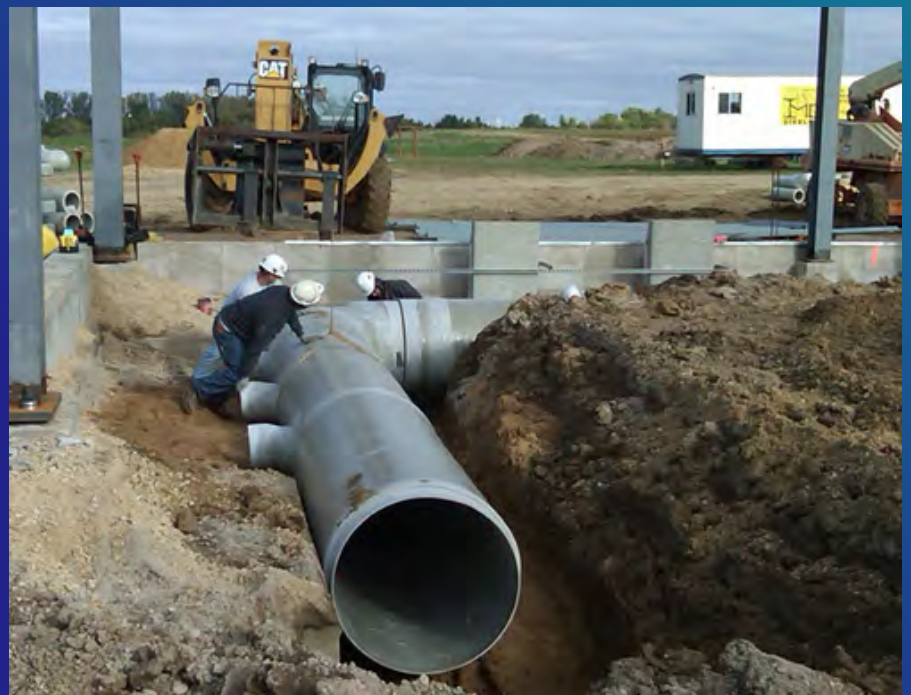
DIAMETER

Duct diameters are available from 2”-14’, and any rectangular sizes that are required for your projects.

WALL THICKNESS

Duct wall thickness ranges from 1/8” to 1” (increasing in increments of 1/16”). Wall thicknesses are available for abnormal burial depths or other special loading requirements. Standard ductwork is furnished with the minimum wall thickness as set forth in ASTM D 3982,PS 15-69 and SMACNA Fiberglass standard

Now we can go there!



Types of FRP & Markets

- Corrosion Composites
- UnderDuct
- UnderDuct VE
- Hybrid Lab Duct
- Industrial FRP

Types of FRP Applications

- Corrosion
- HVAC
- Vehicle Exhaust
- Laboratory
- Industrial

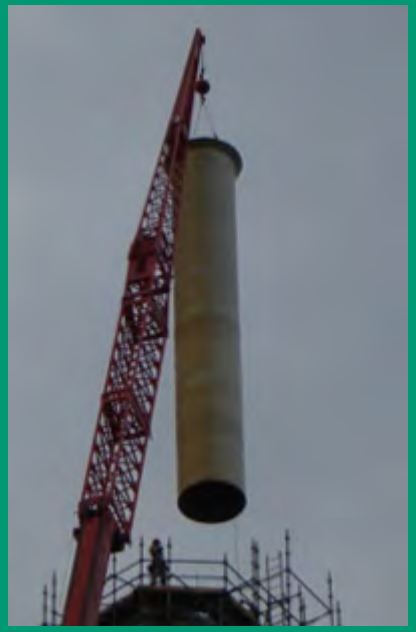
Corrosion Composites

- Chemical Exhaust Ductwork
- Odor Control Duct
- Extensive Custom Applications
- Extreme Corrosion Resistance
- Typically **VINYLESTER RESIN**
- **Low flame rating ONLY**

Products:

- Duct
- Stacks
- Tanks
- Scrubbers
  - Flumes
  - Hoods
  - Dampers
  - Manholes
    - Troughs
    - Tank Covers
    - Stack Liners
    - Baffles
    - Weirs
      - Trenches
      - Ladders
      - Platforms
      - Pressure Vessels

And More!

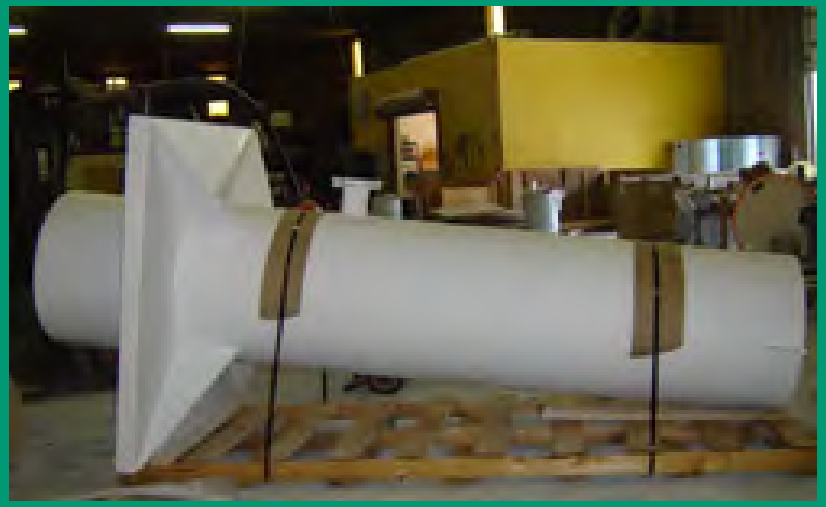


Stack liner, 6’ diameter x 40’ section of 200’ stack

FRP Odor Control Hoods and Ducting

Dampers
Butterfly shown, other types available

Odor Control FRP Duct – Des Moines Wastewater Treatment Plant



Stack with integral curb cover

Box Scrubber

RI Arsenal
Plating FRP Exhaust
Stacks

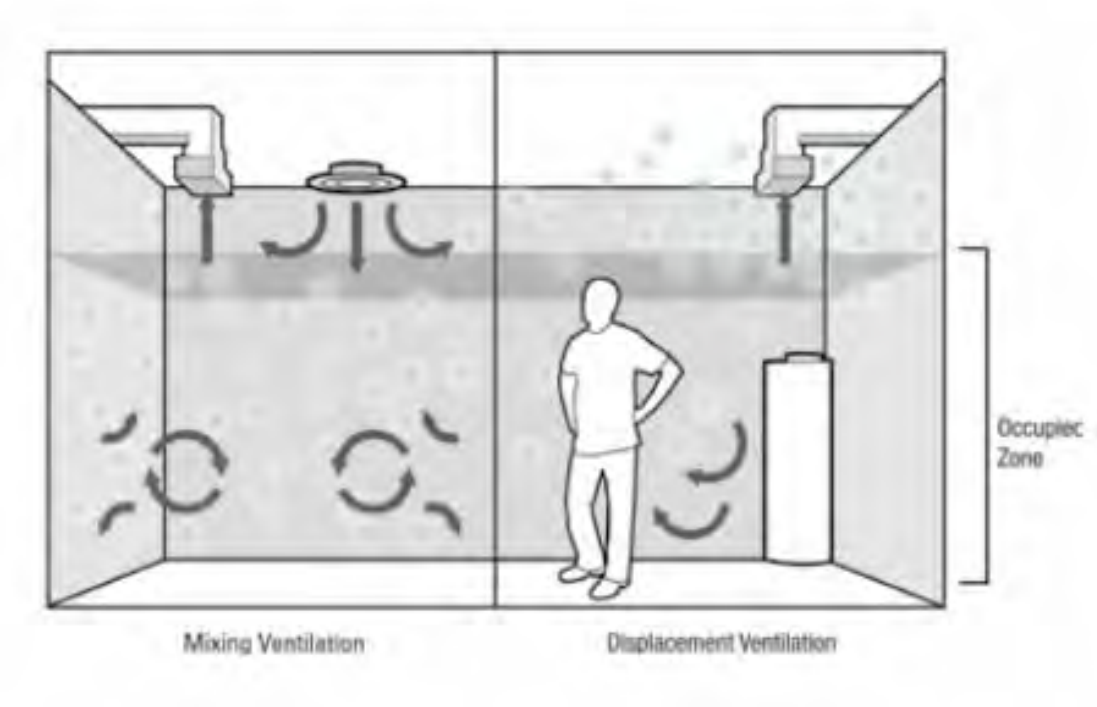
Types of FRP Applications

- Corrosion
- HVAC
- Vehicle Exhaust
- Laboratory
- Industrial

UnderDuct is filament wound with an external layer of resin rich surfacing veil. UnderDuct is offered both as single wall and pre-insulated double wall duct to meet any ventilation needs. Monoxivent 824 Low Smoke Class 1 duct for HVAC and Vehicle Exhaust applications has been approved for direct burial

Why Is More & More Duct Going Underground?

Displacement Ventilation



Displacement Ventilation with Underground Duct

Displacement Ventilation Application Examples

Best Applications = Big Spaces

- Room Height > 9.0 feet
- Churches
- Open Plan Offices
- Atriums and Lobbies
- Restaurants and Casinos
- Theaters and Auditoriums
- Classrooms and Meeting Rooms
- Airports and Train Stations
- Museums and Public Spaces

SMOKE CONTROL DUCT

Smoke Control Duct in Spears School of Business at OSU

So the
SOLUTION is,

Fiberglass Reinforced Plastic (FRP)

Double Wall Construction

Finished Foam

Foam must cure before being used

ICC-ES PMG Product Certificate

PMG-1171

Effective Date: November 2019

This listing is subject to re-examination in one year.

www.icc-es-pmg.org | (800) 423-6587 | (562) 699-0543 *A Subsidiary of the International Code Council®*

CSI: DIVISION: 23 00 00—HEATING, VENTILATION AND AIR CONDITIONING (HVAC)
Section: 23 31 00—HVAC Ducts and Casings

Product certification system:

The ICC-ES product certification system includes testing samples taken from the market or supplier's stock, or a combination of both, to verify compliance with applicable codes and standards. The system also involves factory inspections, and assessment and surveillance of the supplier's quality system.

Product: Underground Single Wall & Double Wall Insulated Duct for HVAC Direct Burial Applications
Underground Single Wall Duct for Under Ground Vehicle Exhaust Direct Burial Applications

Listee: Monoxivent
1306 Mill Street
Rock Island, IL 61201
www.monoxivent.com

Additional Listee:

Appalachian Plastics Inc.
34001 Glove Road
Glade Spring, VA 24340

Compliance with the following codes:

2018, 2015, 2012 and 2009 *International Mechanical Code®* (IMC)
2018, 2015, 2012 and 2009 *International Residential Code®* (IRC)
2018, 2015, 2012 and 2009 *Uniform Mechanical Code®* (UMC)*
2016, 2013, 2010 and 2007 *California Mechanical Code®* (CMC)
2015, 2010 National Building Code of Canada® (NBC)**

**Uniform Mechanical Code is a copyrighted publication of the International Association of Plumbing and Mechanical Officials.*
*** National Building Code of Canada is a copyrighted publication of the National Research Council Canada*

Compliance with the following standards:

ICC-ES LC1014-2016, PMG Listing Criteria for Underground Plastic Air Ducts
ICC-ES EG290, Evaluation Guideline for Underground Plastic Air Ducts
ASTM D2412-2011(2018), Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
ASTM E84-2019b, Standard Test Method for Surface Burning Characteristics of Building Materials
UL 723 10th Edition Sept 2008, Test for Surface Burning Characteristics of Building Materials
ASTM C518-2017, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
NSF Protocol P374-2010, Air Duct Thermal Efficiency Performance

APPROVED

for both HVAC and Vehicle Exhaust Applications

COMPLIANCE

with IMC, IRC, UMC, CMC AND NBC (Canada)

Laboratory Report

UL
85 John Road
Canton, MA 02021
Phone: 781-821-2200
Fax: 781-821-9266
www.UL.com

Folder # 1408681 **Project #** 4786337200		**Supplier**	UL- Northbrook
Report Date: 7/23/14		**Client Reference**	N/A
UL-Northbrook Attn: Janet Burton 333 Pfingsten Rd. Northbrook, IL 60062		**Inventory ID**	428990
		Client Sample ID	#1850090-6 4"x4" Coated Plaques File# SV29 ﾌﾌﾌ
		Lot #	N/A
		UPC	N/A

Test	Method	Results
Microbiological		
Mold Growth & Humidity Test Overall	UL 181	Pass
Evidence of Joint Opening or Separation	UL 181	No
Evidence of Deformation or Delamination	UL 181	No
Significant Mold Growth	UL 181	No
Spread of Mold Beyond Inoculated Area	UL 181	No

Monoxivent UnderDuct has successfully passed UL 181 testing for Mold Growth

UnderDuct
Originally designed for underground, has been used ABOVE!

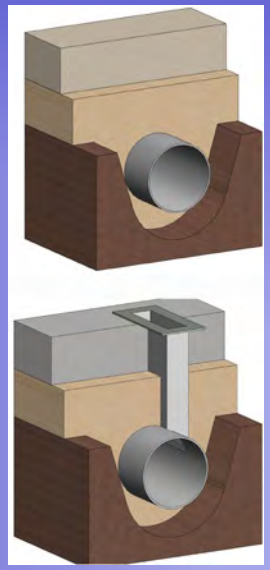
- Auditoriums
- Auto Exhaust
- Aquatic Centers
- Banks
- Botanical Gardens
- Churches
- High Rise Office
- Hospitals
- Laboratories
- Libraries
- Parking Garages
- Residences
- Restaurants
- Schools
- Super Markets
- Swimming Pools
- Water Parks
- Zoos

Corrosion Above Ground Too!

Kansas City Zoo Penguin Exhibit

UnderDuct Installation:

Under slab installation is typically started on a 4” bed of pea gravel or sand in a graded trench with good drainage. With duct sections and the register boots bonded in place the system can be covered with sand or pea gravel, and the floor slab may be poured without delay. Register Boots and Transitions may also be specified with FRP construction.



Underduct is manufactured with a resin rich veil on the OD and ID assuring a water tight duct. The field joints should be made using the wet lay-up method as described in the installation instructions in order to assure a leak proof system.

Green Building with UnderDuct

Underground FRP Duct is Environmentally Sound
Due to the 'green' aspects of our fiberglass reinforced plastic under slab duct, FRP duct is a key component of sustainable building. The quality and strength of our FRP duct means a longer life, which saves resources, and maximized airflow uses energy more efficiently.

UnderDuct's "Green" Benefits:

- Smooth and Efficient Air Flow means less horsepower needed
- Energy Savings with Insulated FRP Duct means less heating and cooling capacity required
- Resistance to Mold, Corrosion, Leakage, Moisture Damage
- 824 Low Smoke and Flame Class 1 Rating
- Long-life Duct
- Allows for "Open Concept" Design in Buildings
- Under slab supply duct shortens building height, using less materials
- Duct is custom made for each job which minimizes material waste
- Installation is quicker, requiring less energy to install

Speaking of Green…

FRP is the perfect material choice for use in Grow House Applications of any kind

Types of FRP Applications

- Corrosion
- HVAC
- Vehicle Exhaust
- Laboratory
- Industrial

VE Duct – A Better Idea

Monoxivent started with vehicle exhaust equipment in the 1950's. Crawford Company, our parent company, acquired Monoxivent in 2000 and expanded the line to include all "source capture" applications including: Vehicle Exhaust, Welding fume exhaust, Dust Collection, etc.. Monoxivent's in floor vehicle exhaust system has long been used in car dealerships and maintenance shops. In the past galvanized or PVC duct was used. PVC cannot take the heat and galvanized corrodes and leaks

Kent-Moore **MONOXIVENT** JR.

Gets Rid of Exhaust Fumes

WITHOUT WASTING HEAT!

Introducing MONOXIVENT, JR. . . . . newest member of Kent-Moore's Monoxivent Family . . . designed expressly for the Gasoline Service Station. An inexpensive . . . practical . . . efficient means of removing harmful automobile exhaust gases from the service area.

Monoxivent, Jr. eliminates exhaust gases through closed doors . . . SAVES attendants' time . . . no more hours wasted "airing out" service stalls . . . SAVES heat . . . by allowing you to perform service operations throughout the winter behind closed doors. Improved working conditions will increase productivity and service profits.

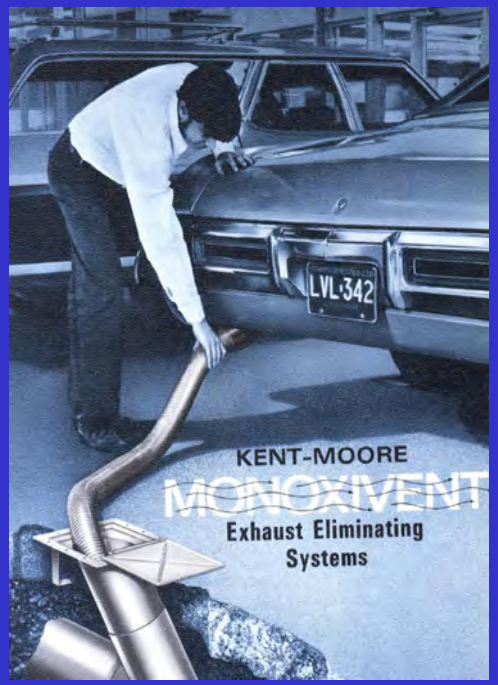
For many years, Kent-Moore has been a leader in the development of exhaust eliminating fixtures for the automotive service industry. Thousands of Monoxivent units are being used in exhaust removal systems throughout the world.

HEALTH Health authorities have recognized the importance of maintaining clean fume-free air in service departments to provide better working conditions for service attendants. Programs have been instituted in many states to install exhaust eliminating fixtures in non-ventilated areas to protect the health of all employees.

SAFETY Carbon Monoxide, a by-product of combustion, is a poisonous gas that has caused many fatalities. Its presence in service areas can be deadly if not properly vented. Heavier than air, this colorless, noxious vapor remains near the floor, the invisible enemy of all who breathe its toxic fumes. Protect your attendants by properly eliminating exhaust gases from your service department.

EFFICIENCY Exposure to automobile exhaust gas causes headaches, nausea, drowsiness and a general feeling of fatigue, which will seriously affect the efficiency of your service personnel. Healthy, alert attendants do more and better work.

You'll find that Kent-Moore's Monoxivent, Jr. will pay for itself many times in increased attendant efficiency.



VE Duct is the only duct that meets the specific needs for underground vehicle exhaust systems:

- Corrosion Resistance to exhaust gas and condensate
- Corrosion Resistance to ground conditions
- Heat tested to 500 F
- Approved for direct burial – no concrete encasement required.
- VE duct is the only ICC listed Vehicle Exhaust duct, certified to meet building codes.

Minnesota State Univ., Winona, MN

ICC-ES PMG Product Certificate

PMG-1171

Effective Date: November 2019

This listing is subject to re-examination in one year.

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Underground Single Wall Duct for Under Ground Vehicle Exhaust Direct Burial Applications

Listee: Monoxivent
1306 Mill Street
Rock Island, IL 61201
www.monoxivent.com

Additional Listee:

Appalachian Plastics Inc.
34001 Glove Road
Glade Spring, VA 24340

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2015, 2010 National Building Code of Canada® (NBC)**

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UL 723 10th Edition Sept 2008, Test for Surface Burning Characteristics of Building Materials
ASTM C518-2017, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
NSF Protocol P374-2010, Air Duct Thermal Efficiency Performance

ICC EVALUATION SERVICE

Underground Single Wall Duct for Under Ground Vehicle Exhaust Direct Burial Applications

Identification:

The Monoxivent underground duct and fittings described in this listing are identified by a permanent label bearing the manufacturer's name (Monoxivent) and/or trademark, the product name, model number and the ICC-ES PMG listing mark.

Installation:

Installation of Monoxivent underground HVAC Duct and fittings must comply with the manufacturer's published installation instructions and the applicable codes.

Flood Plain Elevation: Product was tested to withstand a pressure equivalent to 12 feet water column pressure for 7 days with no leakage. Product may be installed right on the sub-grade of excavation without any further sub material being required except when it is bedrock then a sub soil such as sand or construction grade fill or pea gravel may be used under the duct.

Models:

Underground HVAC Duct and Fittings:
The Monoxivent underground HVAC duct and fittings are an underground air duct and fitting system for use in forced-air heating and cooling systems in accordance with Section 603.8 of the IMC, Section M1601.1.2 of the IRC, or Section 602.0 of both the CMC and the UMC, as applicable. See Table 1, below.

Single wall ducts and fittings are made of fiberglass reinforced thermoset resin. Double wall ducts and fittings are made of fiberglass reinforced thermoset resin as inner and outer layers, with closed cell polyurethane foam inserted in-between as the insulation material. Both single wall and double wall straight ducts have a minimum pipe stiffness of 8 psi (55kPa) at 5 percent deflection when tested in accordance with ASTM D2412. See Table 2, below.

Surface Burning Characteristics: Fiberglass reinforced thermoset resin has a flame spread index of 25 or less and a smoke development index of 50 or less when tested in accordance with ASTM E84. Closed cell polyurethane foam complies with section 2603.3 of the *International Building Code*® and has a flame spread index of 25 or less and a smoke development index of 450 or less when tested in accordance with ASTM E84.

Thermal Resistance: when tested in accordance with ASTM C518, single wall with a total thickness of 0.125 inch has a thermal resistance value of R1; double wall with a total thickness of 1.25 inches (1 inch polyurethane foam enclosed by a 0.125 inch of fiberglass inner and a 0.125 inch fiberglass outer layer) has a thermal resistance value of R6.

The Monoxivent underground HVAC duct and fittings are designed for use in systems with a maximum rated positive pressure equivalent to 10 inch water column and a maximum rated negative pressure of 5 inch water column in accordance with Section 603.3 of the IMC.

Underground Vehicle Exhaust Duct and Fittings
Single wall ducts and fittings made of fiberglass reinforced thermoset resin having a flame spread index of 25 or less and a smoke development index of 50 or less when tested in accordance with ASTM E84, and having a stiffness that exceeds the requirements in ICC-ES LC1014 when tested to ASTM D2412 at elevated temperatures (See Table 3 for test result.), are suitable for use to convey vehicle exhaust gases in accordance with section 510.8 of IMC. Material compatibility and suitability are subject to evaluation and approval by authority having jurisdiction.

The Monoxivent underground Vehicle Exhaust duct and fittings are designed for use in systems with a maximum rated negative pressure of 10 inch water column.

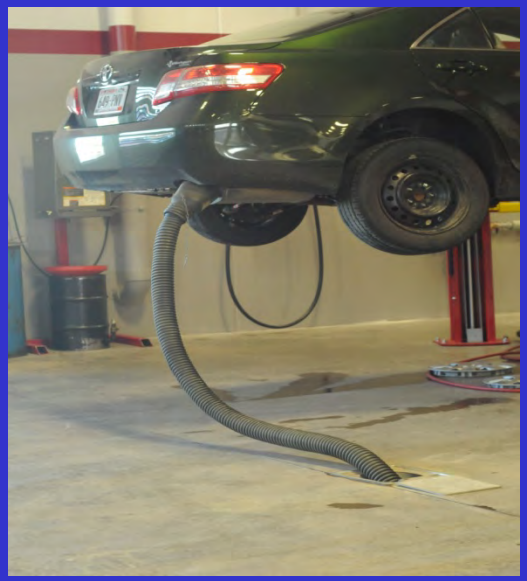
ICC EVALUATION SERVICE

Underground Vehicle Exhaust Duct and Fittings

"…and having a stiffness that exceeds the requirements in ICC-ES LC1014 when tested to ASTM D2412 at elevated temperatures (See Table 3 for test results)

IMC 510.8, Duct Construction:

“Nonmetallic ducts utilized in systems exhausting nonflammable corrosive fumes or vapors shall be listed and labeled. Nonmetallic duct shall have a flame spread rating of 25 or less and a smoke-developed rating of 50 or less, as tested in accordance with ASTM E 84. Ducts shall be approved for installation in such an exhaust system.”



Markquart Motors, Chippewa Falls, WI

MONOXIVENT

Underground Systems
Floor Outlet - Plug-in Type
Non Self Storing, 23820-P

TECHNICAL INFORMATION

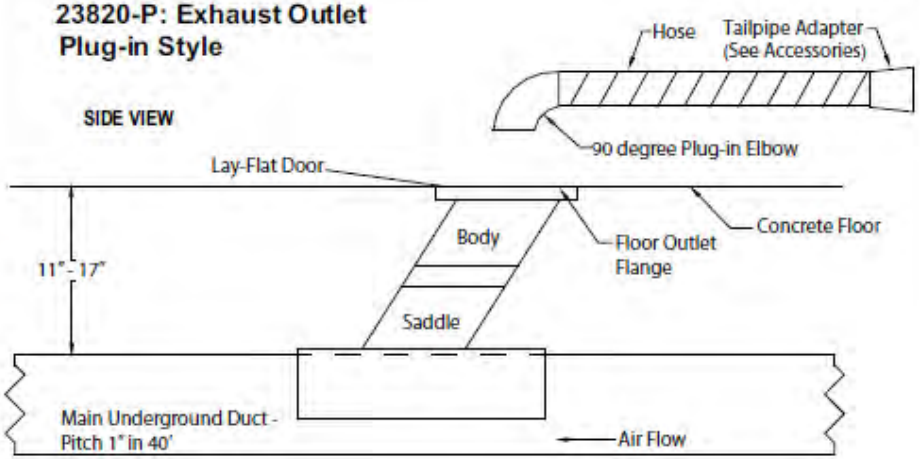
PROJECT:
LOCATION:
ARCHITECT:
ENGINEER:
SALES ENGINEER:
DATE:

UNDERGROUND EXHAUST SYSTEMS

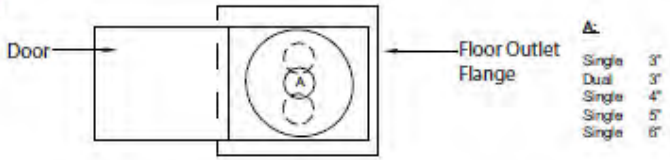
MODEL 23820-P (Plug-in Non-Self Storing) - FOR 3" SINGLE/DUAL PLUG-IN, FOR 4" PLUG-IN, FOR 5" PLUG-IN, FOR 6" PLUG-IN.

23820-P: Exhaust Outlet Plug-in Style

SIDE VIEW



TOP VIEW



A:	
Single	3"
Dual	3"
Single	4"
Single	5"
Single	6"

Lay-flat door is opened, exposing the inner plate that will have one of the combinations denoted by "A" in the top view (above).

The hose/plug-in elbow is inserted into the "A" opening, which completes the connection from the floor outlet to the vehicle.

(Hose, typically, is stored on a wall structure or column within the building.)

NOTE: Above system is used with Monoxivent's VE Duct.

UDVE is used with Both Self-Storing & Plug-In Systems

MONOXIVENT

Underground Systems
Floor Outlet - Self Storing
Assembly

TECHNICAL INFORMATION

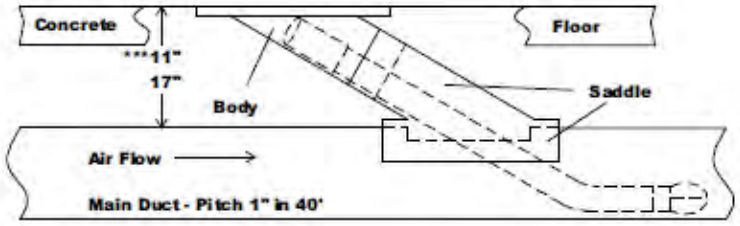
PROJECT:
LOCATION:
ARCHITECT:
ENGINEER:
SALES ENGINEER:
DATE:

www.monoxivent.com info@monoxivent.com 309-794-1000

• MODELS: 23816 - FOR 3" HOSE; 23818 - FOR DUAL 3" HOSE; 23817 - FOR 4" HOSE; 23819 - FOR 5" HOSE; 23820 - FOR 6" HOSE •

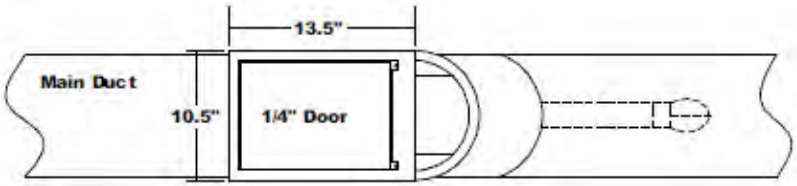
SIDE VIEW

* LAY FLAT DOOR & FLOOR FLANGE



NOTE: This dimension can be increased or decreased

TOP VIEW



PRODUCT FEATURES:

DOOR - 1/4", 4-way Structural Solid Steel Plate - 9" x 11" Zinc Coated

FLOOR FLANGE - 14-Gauge Stamped Steel Plate Zinc Coated

BODY - 20-Gauge 304 Stainless Steel

SADDLE - 20-Gauge 304 Stainless Steel

NOTE: Above system is used with Monoxivent's VE Duct.

UNDERGROUND SYSTEMS

Source Capture Quotes are Separate from FRP Quotes

MONOXIVENT

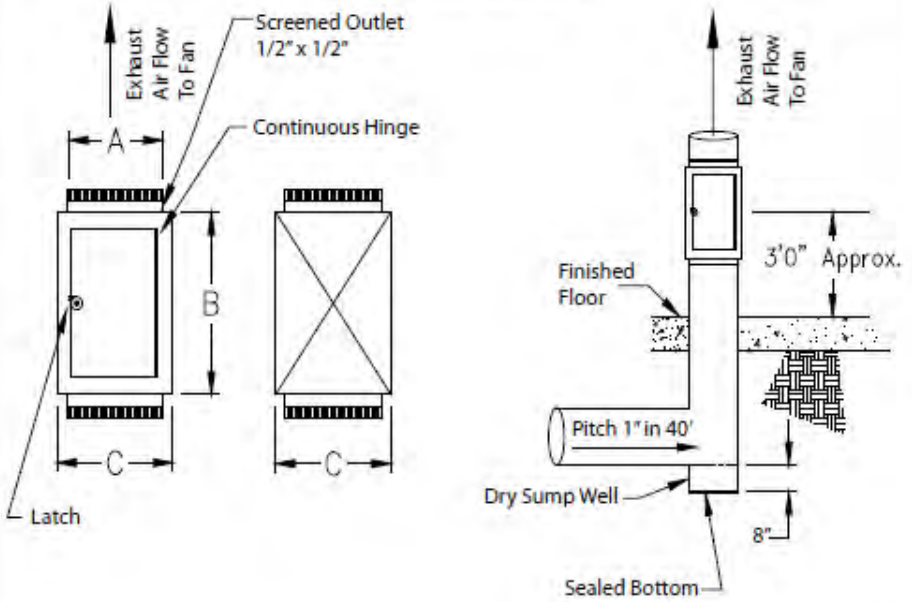
Underfloor Refuse Clean Out
Series: REFCO

TECHNICAL INFORMATION

PROJECT:
LOCATION:
ARCHITECT:
ENGINEER:
SALES ENGINEER:
DATE:

www.monoxivent.com info@monoxivent.com 309-794-1000

UNDERGROUND VEHICLE EXTRACTION SYSTEMS
REFUSE CLEAN OUT (REFCO)



Model	A	B	C
REFCO-10	10"	16"	12"
REFCO-12	12"	16"	14"
REFCO-14	14"	16"	16"
REFCO-16	16"	16"	18"
REFCO-18	18"	16"	20"

The REFCO Series offers refuse clean out plenums that are designed as a debris trap to protect the exhaust fan, while providing access to the underground ducting system through the riser duct for accumulated refuse and insertion of a sump pump to eject water should the system become flooded.

The refuse clean out shall be constructed of (minimum) 20-gauge galvanized steel with stainless steel continuous hinge, access door and latch. A screen mesh of 1/2" x 1/2" shall be provided across the outlet opening.

Note - factory reserves the right to change dimensional data without notice.

09 - 07

UNDERGROUND EXHAUST SYSTEMS

REFCO Included in Source Capture Package

Types of FRP Applications

- Corrosion
- HVAC
- Vehicle Exhaust
- Laboratory
- Industrial

Specialty Fiberglass Duct

- More often the requirements call for Corrosion Resistance and a Class 1 duct material, with a flame spread of less than 25 and a smoke development of less than 50.

- Monoxivent's design and manufacturing expertise goes back 40 + years in Corrosion and HVAC fiberglass duct.

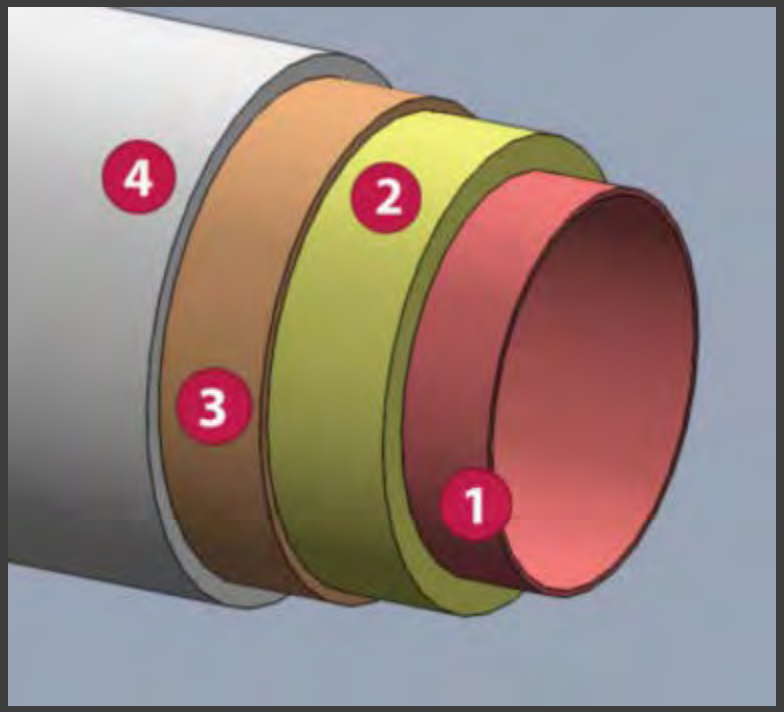
- Our Hybrid / Lab Duct has bridged the gap and is fast becoming a standard product for Monoxivent.

Northwestern University Evanston, IL

Congested Installation

Minimal Field Joints

Hybrid Duct

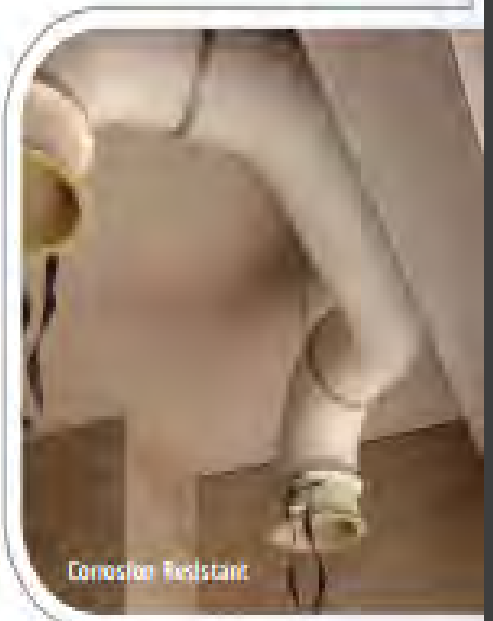


1. Vinylester Interior – Fire Retardant Corrosion Liner
2. Modified Acrylic Structural Layer – Class 1 Rated for Low Smoke & Low Flame
3. Modified Acrylic Exterior – Class 1 Rated for Low Smoke & Low Flame
4. Exterior Coating – Factory Applied Corrosion Resistant Gel Coat

The Result….

LABORATORY FUME HOOD DUCT & HYBRID CF DUCT

Lab Duct can handle a wide variety of chemical fumes, including strong acids and caustics. Condensate formed in the duct system can concentrate these chemicals due to evaporation, making them even more corrosive. Because a Lab is considered occupied space, the structural and exterior surface of the duct requires a low smoke and flame rating per UL-181, as well as low fire-gas toxicity. This product blends the interior corrosion barrier with an exterior Class 1 duct material.

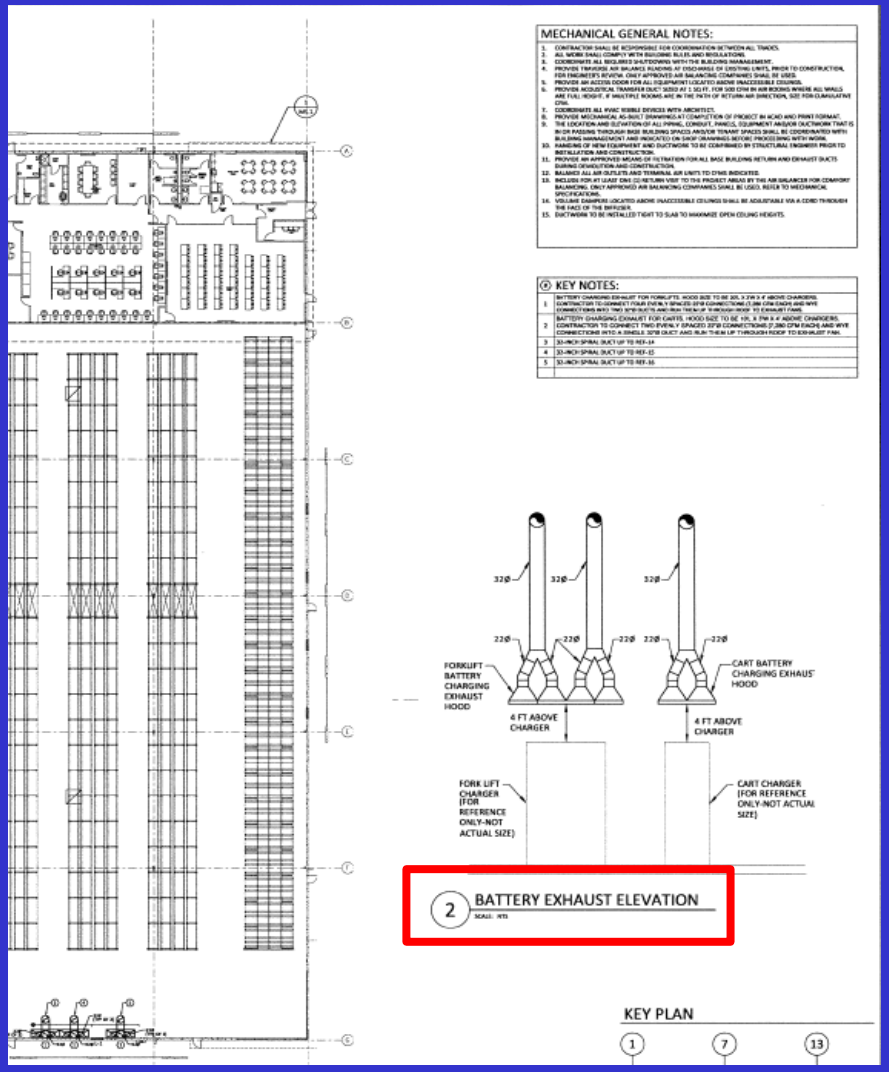


Applications:

- Hospitals
- Aquariums
- Dog kennels
- Exposed Vehicle Exhaust Duct
- Swimming pools
- Laboratories

HybridCF LabDuct

Uranium Enrichment Facility



Battery Charging Exhaust Duct

This duct was part of drawings sent as an RFQ for a diesel Source Capture project

American Airlines Hangar O'Hare Airport Fuel Tank Exhaust Duct

Electrically Conductive Internal Veil

Stainless Steel Grounding Lugs at All Connections

University of Minnesota Tate Physics Hall

University of Minnesota Tate Physics Hall

University of Minnesota Tate Physics Hall

University of Minnesota Tate Physics Hall

Types of FRP Applications

- Corrosion
- HVAC
- Vehicle Exhaust
- Laboratory
- Industrial

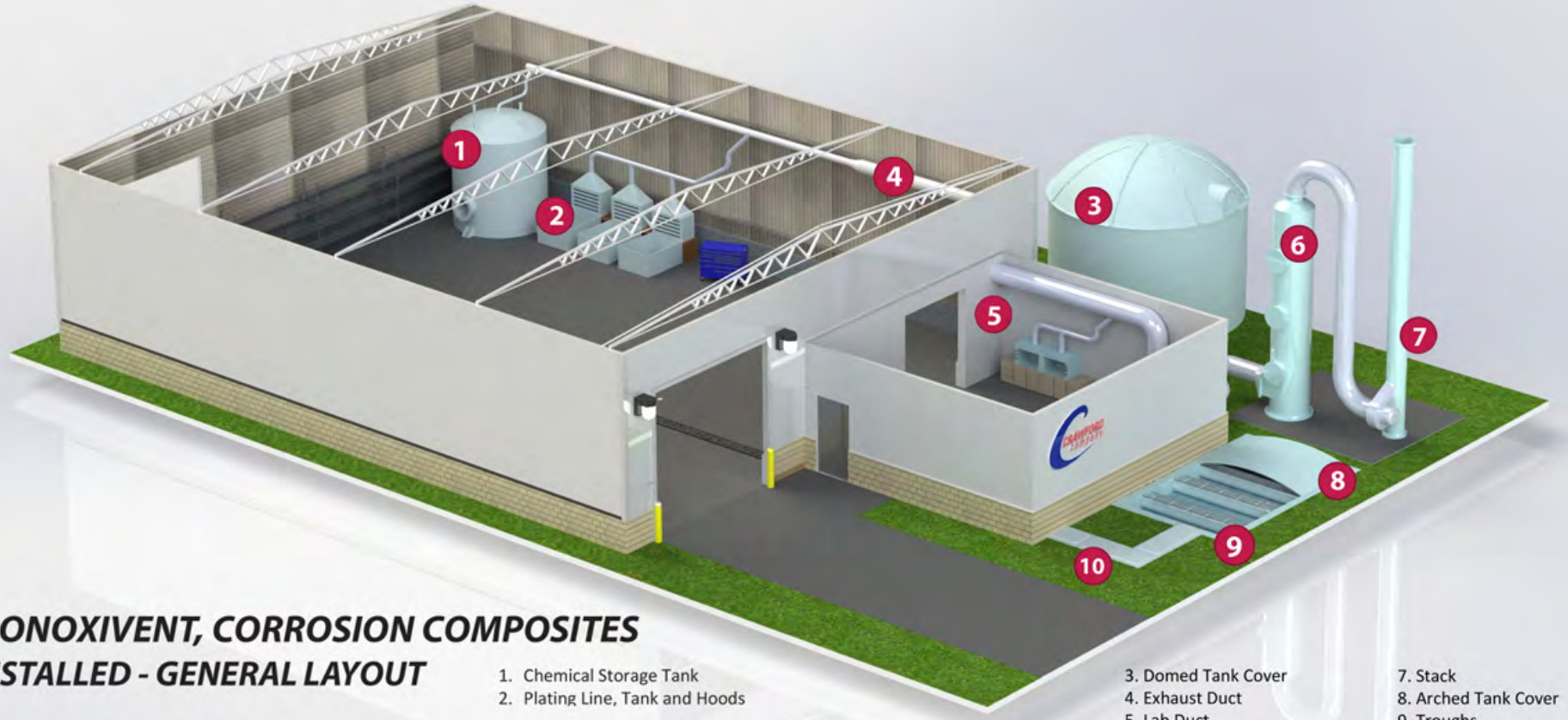
Industrial Market

MONOXIVENT®

FRP - Fiberglass Reinforced Plastic

FRP SOLUTIONS

FRP in Industry



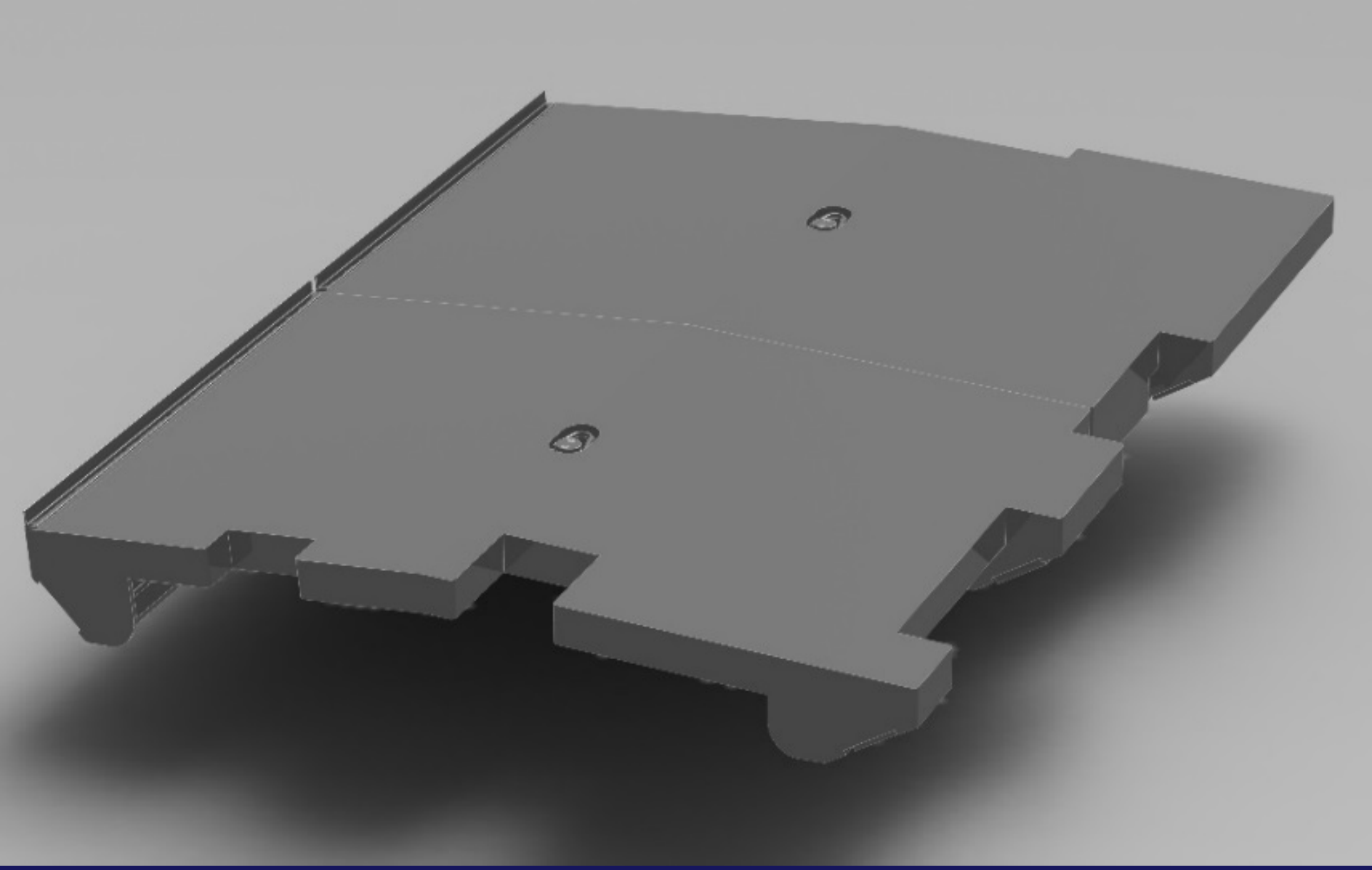
MONOXIVENT, CORROSION COMPOSITES
INSTALLED - GENERAL LAYOUT

1. Chemical Storage Tank
2. Plating Line, Tank and Hoods
3. Domed Tank Cover
4. Exhaust Duct
5. Lab Duct
6. Scrubber
7. Stack
8. Arched Tank Cover
9. Troughs
10. Flat Channel Cover

GEA Process Systems Fluid Bed Dryer Plenum

Wet Precipitator Scrubber System

Corrosion Resistant Fiberglass Tank



John Deere FRP Platform Base


AIR-LAND
HYSTER 155
FORTE

Photo Lab FRP Hoods

Rock Island Arsenal FRP Canopies

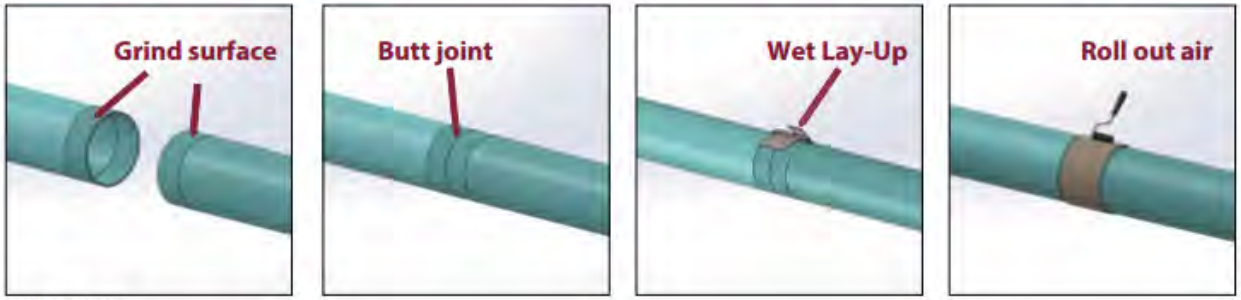
Rock Island Arsenal FRP Canopies

Monoxivent FRP offers a complete line of fiberglass fittings to complete your FRP Duct system. These quality fittings made from fiberglass composite materials are designed and manufactured to the highest standards. Field joints within the corrosion resistant product line are made using the wet lay-up method using a glass, resin wrap.

Monoxivent FRP products are factory manifolded to the greatest extent possible to save on installation cost and there are several types of field connections available depending on the application.

How do I…?

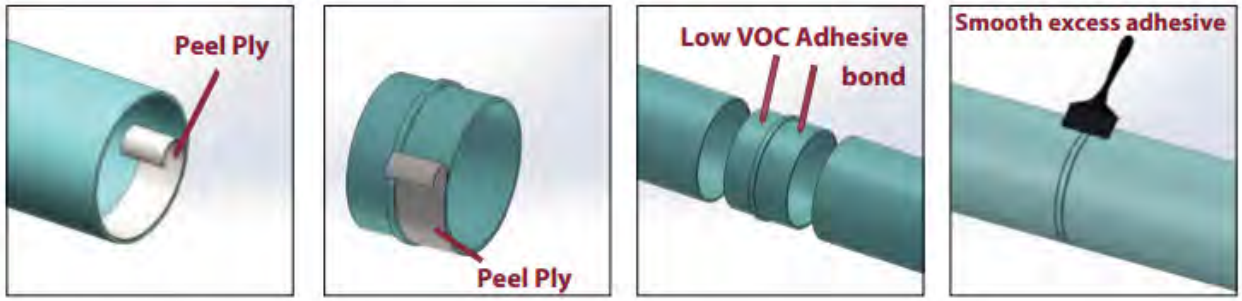
Wet Lay-Up / ASTM Standard



WET LAY-UP

The preferred method for joining Monoxivent FRP duct in the field is the ASTM D3982 Butt & Wrap Method. This method can be used on all FRP applications.

L3 Connection / Low VOC, Low Dust, LEED driven



L3 CONNECTION (LOW DUST, LOW VOC, LEED DRIVEN)

To comply with LEED requirements of dust and VOC control, Monoxivent offers the L3 Connection System. A protective strip that is removed on the job site is incorporated into the duct and fittings during the fabrication process; this eliminates dust normally associated with joining fiberglass. Simply peel the strip, apply the specially designed Low VOC adhesive and grab the extra LEED points!

L3 Benefits:

- No dust from grinding
- Low VOC in adhesive
- Tested to 15 PSI
- Meets LEED specification requirements

JP JoiningProcedures by Monoxivent

ASTM D3982 Butt & Wrap Method

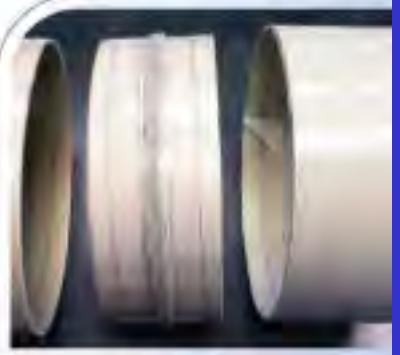
Low VOC/Low Dust LEED Driven Joint

For LEED Projects…

Low Dust | Low VOC | LEED Driven

LOW VOC COUPLING TO JOIN MONOXIVENT FRP DUCT: THE L3 CONNECTION

To comply with LEED requirements of dust and VOC control, Monoxivent offers the L3 Connection System. A protective strip that is removed on the job site is incorporated into the duct and fittings during the fabrication process; this eliminates dust normally associated with joining fiberglass. Simply peel the strip, apply the specially designed Low VOC adhesive and grab those extra LEED points!



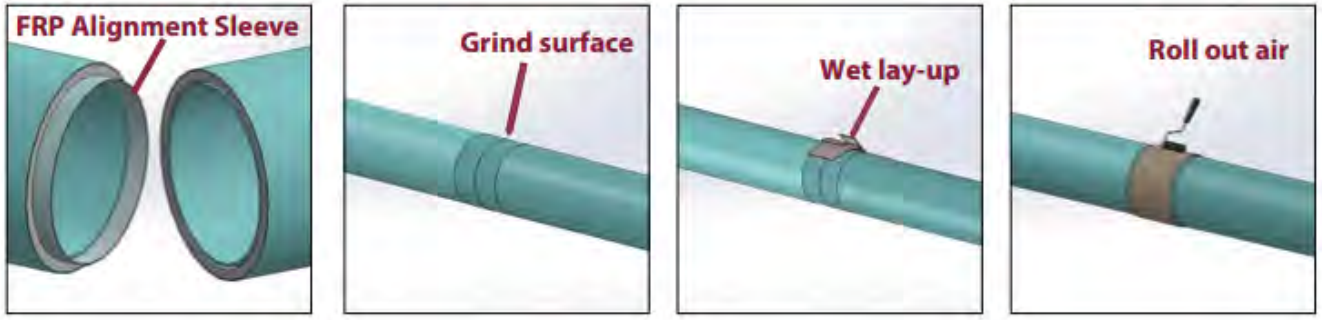
L3 Connector - Benefits:

- No dust from grinding
- Low VOC in adhesive
- Tested to 15 PSI
- Meets LEED specification requirements

L3Connection
by Monoxivent

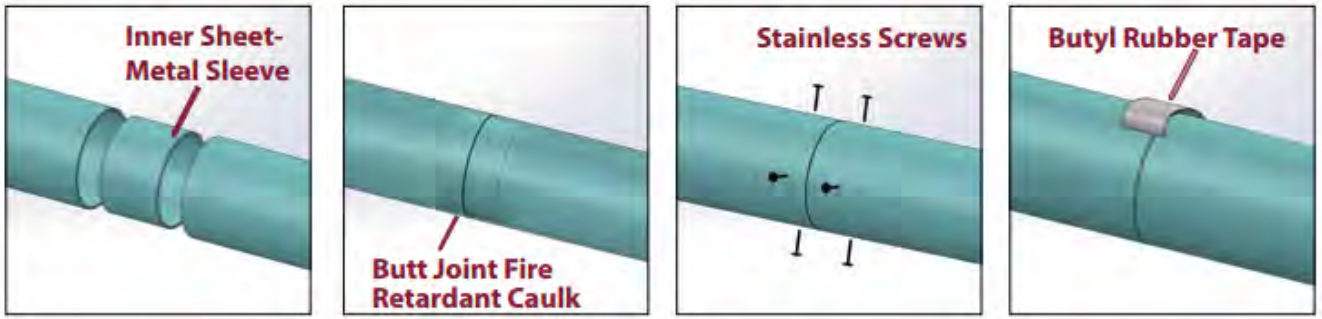
MONOXIVENT®
FRP - Fiberglass Reinforced Plastic

Double Wall Connection / with alignment sleeve



DOUBLE WALL UNDERDUCT CONNECTION
Monoxivent now supplies a standard double wall connection that incorporates an FRP alignment sleeve with every field joint. Installation is made easier with the added benefit of eliminating gaps for a higher quality finished duct system.

Dry Connection / with internal sleeve



SMACNA DRY FIT - UNDERGROUND DUCT CONNECTION OPTION
For underground installations where high water table is not an issue, a dry joining method is available as recommended by SMACNA. This joint consists of a screwed internal metal sleeve, UL Listed non-hardening waterproof duct sealant and an external polyethylene-backed butyl rubber tape.

Double Wall UnderDuct Alignment Ring

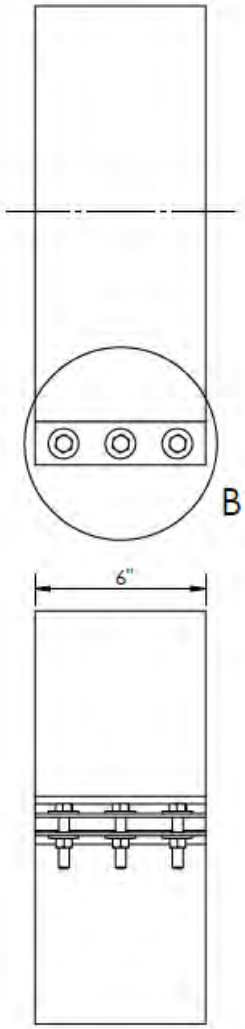
SMACNA Recommended "Dry Fit" Joint Option

Coming May 2020

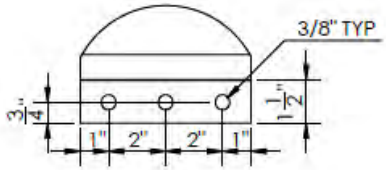
Grip Seal Clamping System for Underground Applications

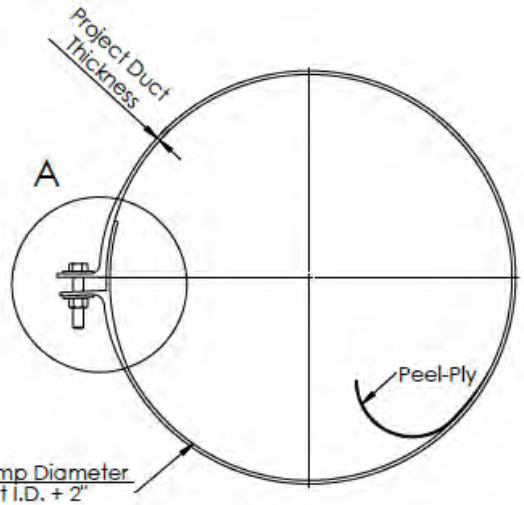
FRP Solutions by Monoxivent®

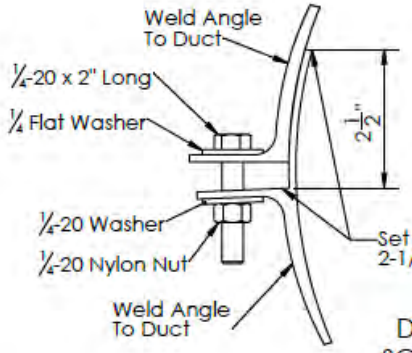
UNDERDUCT CLAMP



DETAIL B







ALL HARDWARE TO BE 316 SS

DETAIL A
SCALE 1 : 2

Notes:
1. Clamp will be filament wound
2. Resin to be Monoxivent 824 for low smoke low flame
3. Exterior to Duct System to have a Light Gray Gel Coat

	NAME	DATE
DRAWN	CC	4-29-2019
REVISION 1	CC	7-2-2019
REVISION 2		
REVISION 3		
REVISION 4		
REVISION 5		
REVISION 6		
REVISION 7		

Monoxivent
1306 Mill St. Rock Island, IL 61201

TITLE: Underduct Clamp

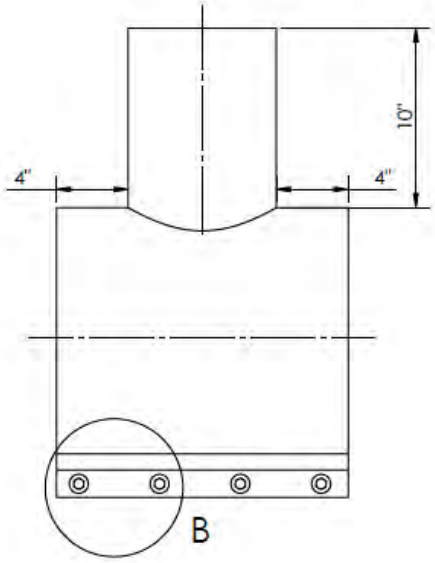
SIZE B | DWG. NO. | REV 1

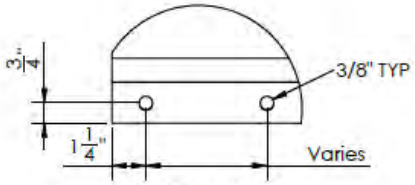
SHEET 1 OF 1


2

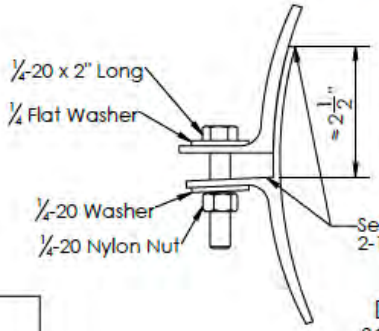
FRP Solutions by Monoxivent®

UNDERDUCT CLAMP WITH 90 DEG TAP



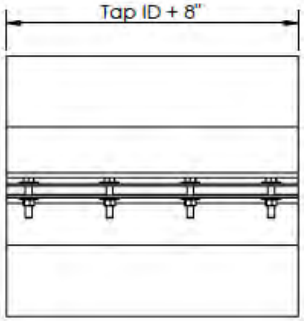


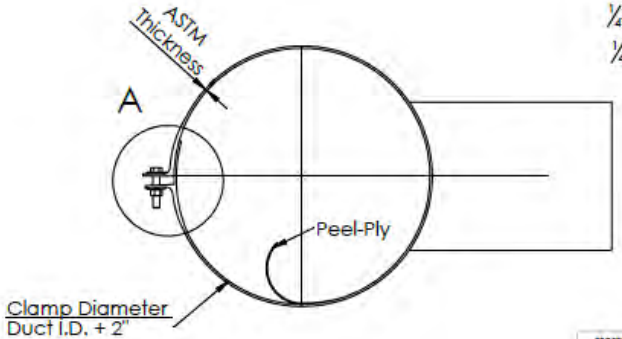
DETAIL B



ALL HARDWARE TO BE 316 SS

DETAIL A
SCALE 1 : 2





Notes:
1. Clamp will be filament wound
2. Resin to be Monoxivent 824 for low smoke low flame

	NAME	DATE
DRAWN	CC	4-29-2019
REVISION 1	CC	7-2-2019
REVISION 2		
REVISION 3		
REVISION 4		
REVISION 5		
REVISION 6		
REVISION 7		

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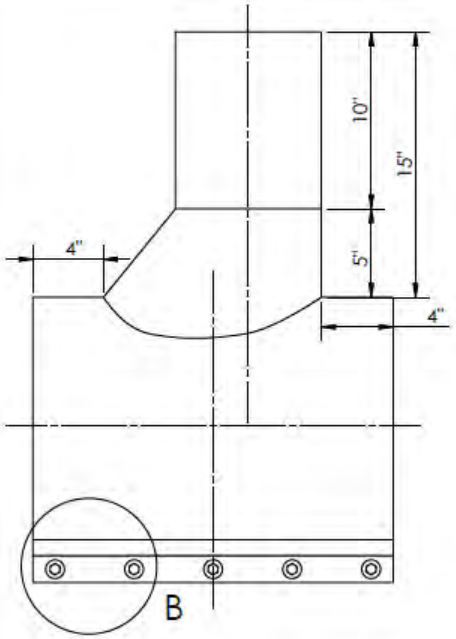
TITLE: Underduct Clamp

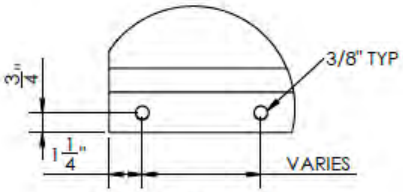
SIZE B | DWG. NO. | REV 1

SHEET 1 OF 1

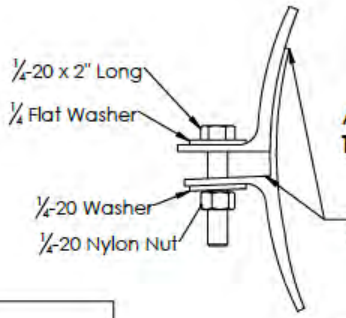
FRP Solutions by Monoxivent®

UNDERDUCT CLAMP WITH 90 DEG SHOE TAP



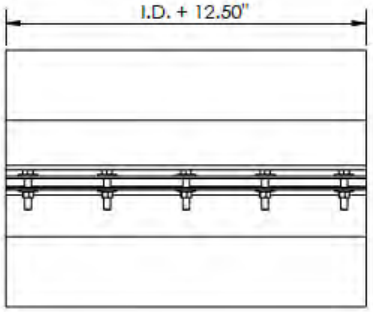


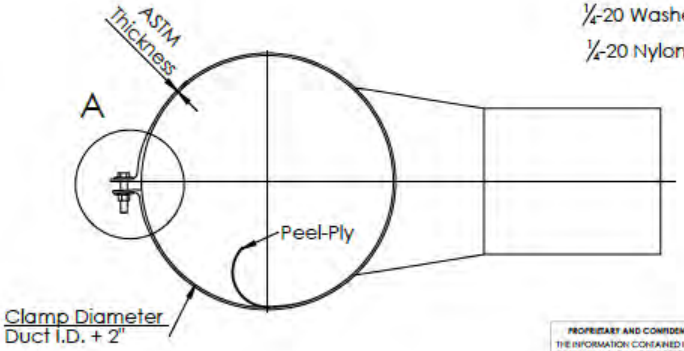
DETAIL B



ALL HARDWARE TO BE 316 SS

DETAIL A
SCALE 1 : 2





Notes:
1. Clamp will be filament wound
2. Resin to be Monoxivent 824 for low smoke low flame

	NAME	DATE
DRAWN	CC	4-29-2019
REVISION 1	CC	7-2-2019
REVISION 2		
REVISION 3		
REVISION 4		
REVISION 5		
REVISION 6		
REVISION 7		

Monoxivent
1306 Mill St. Rock Island, IL 61201

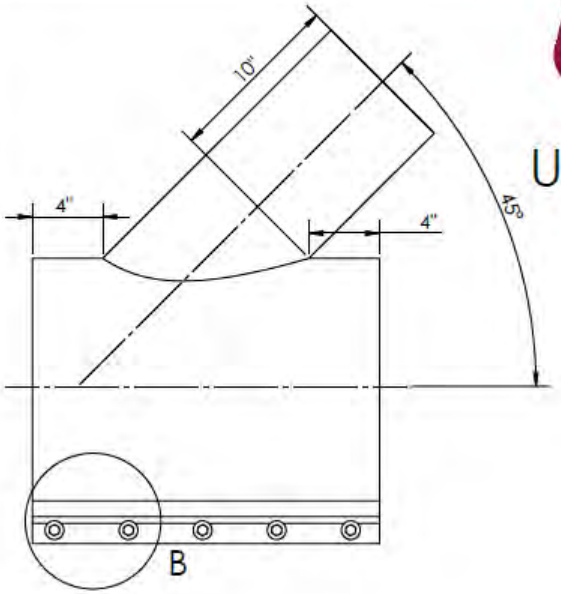
TITLE: Underduct Clamp

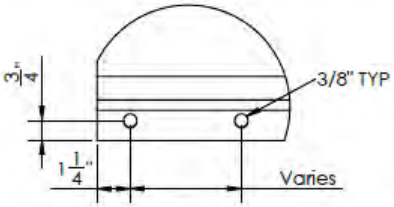
SIZE	DWG. NO.	REV
B		1

SHEET 1 OF 1

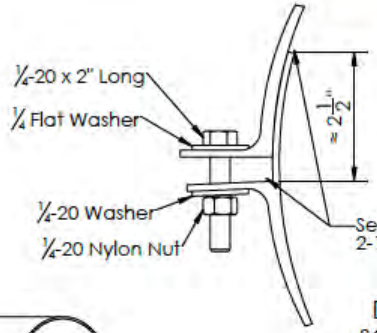
FRP Solutions by Monoxivent®

UNDERDUCT CLAMP WITH 45 DEG TAP



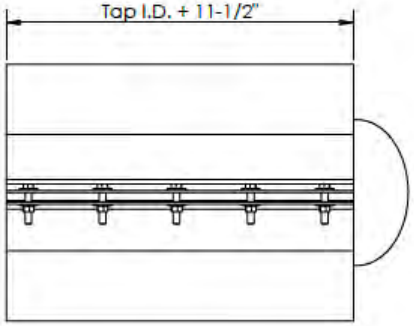


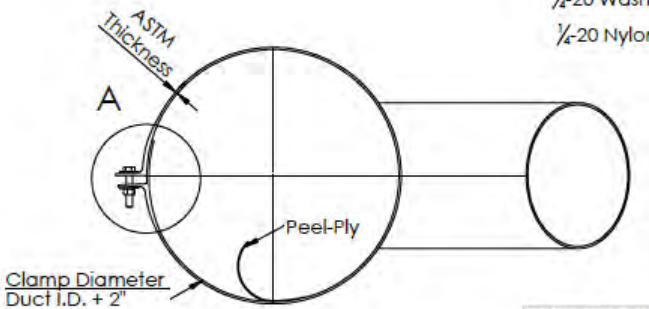
DETAIL B



ALL HARDWARE TO BE 316 SS

DETAIL A
SCALE 1 : 2





Notes:
1. Clamp will be filament wound
2. Resin to be Monoxivent 824 for low smoke low flame

	NAME	DATE
DRAWN	CC	4-29-2019
REVISION 1	CC	7-3-2019
REVISION 2		
REVISION 3		
REVISION 4		
REVISION 5		
REVISION 6		
REVISION 7		

Monoxivent
1306 Mill St. Rock Island, IL 61201

TITLE: Underduct Clamp

SIZE B | DWG. NO. | REV 1

SHEET 1 OF 1

FRP Solutions by Monoxivent®

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Phone: TF 877-608-4383, 309-794-1000

Fax: 309-794-1020

UD UDVE HD CC IC