
SUBMITTAL FOR:

SINGLE WALL FSK DUCT

Spunstrand
Green duct that works

620 North Post Street · Post Falls, ID 83854 · 208.777.7444 ph 208.777.7445 fax · www.spunstrand.com

SUBMITTAL FOR SINGLE WALL FSK DUCT

Part 2 - Products

2.01 GENERAL

- A. Underground ductwork, including fittings, shall be constructed of fiberglass reinforced plastic manufactured by Spunstrand® Inc., 620 North Post Street, Post Falls, ID 83854. 208.777.7444 ph, 208.777.7445 fax. All duct and fittings shall be designed and constructed to meet the applicable requirements of Uniform Mechanical Code, Chapter 6 and be listed with ICC-ES for direct burial application. All ductwork and fittings shall include labels certifying the actual code listings and report number, and shall be installed in strict accordance with the manufacturer's instructions.

2.02 MATERIALS

- A. Resin - The resin used shall be high grade polyester, tested to meet the requirements of Uniform Mechanical Code, Chapter 6 and suitable for corrosion against all normal soil and moisture conditions. Resin systems with fillers exceeding 5% shall not be approved.
- B. Inner Lining - All duct and fittings shall have a UL listed Class 1 inner liner for both flame spread and smoke developed ratings.
- C. Structural Layer - The structural layer shall be filament wound of resin and glass to meet the specified working pressures and depth of burial requirements.

2.03 ACCESSORIES

- A. Fittings - Fittings shall be fabricated from straight duct and have the same working pressure and shall also be corrosion and moisture resistant. Reducers shall be filament wound as specified for the duct.
- B. Joints - Field joints are to be watertight by using an internal galvanized sheet metal sleeve secured with sheet metal screws. The joints shall then be of the wet lay-up type in strict accordance with the manufacturer's instructions. This includes thoroughly cleaning and sanding areas to be joined and using manufacturer supplied polyester resin and fiberglass mat.
See Field Wet Joint Installation Instructions for Underslab Air Duct on page 3.
- C. Register Boots - Register boots, if constructed of galvanized sheet metal with a flange secured to the duct with sheet metal screws, must be encased in concrete covering well around the joint.
Preferred Option: Underground supply and / or return air plenums shall be made of the same material as the duct. They shall be of one-piece construction including the stub outs for connecting to the ductwork.

2.04 SILENCERS

1. Fiberglass Reinforced Plastic Silencers shall be manufactured by **Spunstrand® Inc. and David P. Wilson, FiberSonic Model FS-00-00-00**, or pre-approved equal. Silencer shall be tested for insertion loss, self-noise, and pressure drop in an independent NVLAP accredited laboratory in full accordance with ASTM E477. Testing shall be completed and data available for review, 72 hours prior to bid date. Test data for insertion losses to meet or exceed the acoustical data published in the specification tables.
2. Silencers above ground to installed per manufacturer's recommendations.
3. Silencers installed below ground should either be accessible inside a watertight concrete vault, or fitted with a schedule 80 PVC drain at the lowest point for piping back to plenum. Water entering the duct by any means will find a low point in the silencer, and must have a provision for draining. See Fibersonic Silencer™.
4. Construction Specification and details available in the Industrial Section of this catalog.

INSTALLATION INSTRUCTIONS FOR UNDERSLAB AIR DUCT

Part 3 - INSTALLATION

3.01 GENERAL

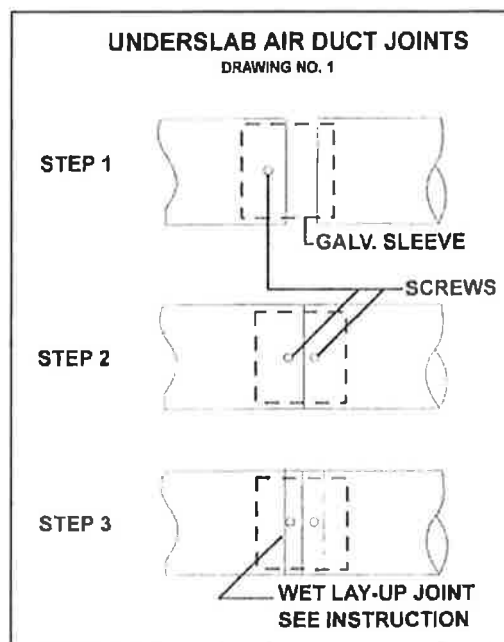
- A. Spunstrand® Inc. duct is a semi-rigid reinforced thermosetting resin product designed to deflect approximately 5% under external load without structural damage. The performance of the duct is affected by the amount of strain introduced into the duct wall from internal pressure, external loads and the resulting deflection of the duct with respect to its wall thickness.
- B. It is important to recognize the need for care in handling the duct during the installation process and to properly provide uniform support for the duct by carefully placing the backfill material under and around the duct. Large diameter duct will usually require internal support during the backfilling process and until all external soil loads have stabilized. When installed underground, the load of the soil above the duct tends to flatten the duct and make it wider. As the duct tries to widen, the walls push into the soil at the sides developing a resistance that helps support the vertical load. The higher the soil resistance the less the duct will deflect. Proper installation techniques are necessary to prevent excessive deflections and potential duct buckling.

3.02 TRENCH CONSTRUCTION

- A. The surface at the bottom of the trench should be continuous, smooth, and free of rocks to avoid point loading on the duct. Where this cannot be accomplished the trench bottom should be over excavated to allow a minimum of 4 inches of bedding material under the duct.
- B. Trench width should not be greater than necessary to provide adequate room for joining the duct in the trench and for compacting the backfill in the bedding zone and at the sides of the duct. The minimum distance between the duct and the trench is four (4) inches; maximum recommended trench width is twice the diameter of the duct.
- C. Dewatering should be provided when there is a risk of flooding the trench during installation. Dewatering shall continue from the time the duct is first placed in the trench, until backfill or encasement is completed. Damage can occur when the duct is floated during a water uplift event.

3.03 JOINING THE DUCT

- A. Because of its relatively low weight per foot, Spunstrand® Inc. duct can be joined before lowering into the trench thus minimizing the number of in-trench joints required during installation. Field joints require an internal galvanized sheet metal sleeve furnished by installing contractor (See Physical Data chart on page 10). Field joints to be of the wet lay-up type in strict accordance with the manufacturer's instructions. This includes thoroughly cleaning and sanding areas to be joined. (See Drawing No. 1. on page 8.)



3.04 INSTALLATION

- A. Installation shall be in strict accordance with the manufacturer's instructions including but not limited to the following: duct to be installed in a trench with provision for good drainage and an allowance for a minimum of 4" pea gravel or *dry* silica sand to completely encase the duct. The top of the duct shall be at least 2 1/2" below the top of the concrete slab.
- A. Store and handle the duct so as to prevent damage. Carefully inspect each length before installation. If long sections are to be assembled alongside the trench then lowered into position, the duct run should be supported along its length to avoid strain and potential overstress or buckling of the duct or damage to the joints. Lay the duct in the trench so that it bears evenly on the bedding or bottom of the trench throughout its entire length. Arrows on the duct clearly mark the direction of airflow. A minimum thickness of 2 1/2" of concrete is recommended where duct protrudes through the concrete. The maximum depth of burial for standard Spunstrand® Inc. underslab air duct allows for 5 feet of backfill cover. Deeper burial is possible; however, your Spunstrand® Inc. representative must be contacted for special recommendations that may be required. If the duct is not underslab it should be below the frost line. If the duct must pass directly under a load / weight bearing wall or under a road, reinforcement over the duct may be required. Again, please contact your Spunstrand® Inc. representative for specific requirements if your application meets these referenced, or any other custom considerations. (See Drawing No. 2 on page 14.)

DIRECT BURIAL UNDERSLAB DUCT

Standard Installation Defined

Spunstrand® Inc. FSK and R-5 underslab duct products are versatile in many ways, and can accommodate a variety of field conditions with appropriate engineering and design. This document is intended to provide a snapshot of a standard installation, and jobsite conditions that require a factory or engineering review prior to installation. If Spunstrand® Inc. duct is installed with materials or methods outside of the parameters of a standard installation without factory approval, the factory warranty will be null and void. This document applies to both our insulated and non-insulated underslab round ductwork.

Spunstrand® Inc. is designed to be direct buried underneath a concrete slab. The duct is not considered structural, and the concrete slab must be designed to span the width of the duct trench if the slab is expected to bear significant loads, otherwise the slab may crack.

The standard depth of burial allows for up to 5 feet of cover over the top of the duct. As our installation instructions state, fill material should be carefully dispersed into the trench around the duct, and dumping full loads of sand or gravel directly onto the duct may result in damage or collapse.

A normal trench will accommodate one run of duct. If two runs of duct are going to occupy the same trench area, or if duct runs will cross over each other, the manufacturer must be notified, and special instructions will be provided if necessary. Trenches should have vertical sidewalls of engineered soil to provide support for the backfill material and stabilizing the duct. In some cases, this is not possible, and the manufacturer should be notified. Special instructions will be provided if necessary.

Approved Backfill Material

Approved backfill materials are pea gravel or dry silica sand. These materials will achieve 95% compaction without the use of mechanical compaction. Rodding and hand tamping are the only approved compaction methods over the top of the duct. A minimum of 4" of pea gravel or dry silica sand must completely encase the ductwork.

Spunstrand® Inc. duct is designed to handle hydrostatic loading if all of the above criteria are met. If ground water or high water table may occur in the area the duct is installed, wet joint material must be used as the joining system. Hydrostatic pressure could cause some movement of the duct and use of this joining method will help ensure a rigid system that can withstand these forces. Other non-rigid sealing systems may be water-tight, but could tear if the duct were to move. It is also recommended that the duct be anchored to the slab if the possibility of soil erosion exists. If soil erosion occurs and the duct or the slab is damaged, this is outside the scope of our warranty. Provisions should be made by the engineer or contractor to keep a water table from threatening the building, slab, and ductwork.

Concrete Encasement

Concrete encasement is not a standard method of installation, but can be accommodated with special provisions. If concrete encasement is being considered, it must be done in two to three lifts depending on diameter and trench conditions, with provisions to prevent floating. Please contact the manufacturer for specific instruction on how to do this without damaging the duct. Duct hold down system for encasement should be designed by a mechanical engineer and confirmed with Spunstrand® Inc. for potential pounds of float / uplift per lineal foot per diameter.

Rectangular Plenums, Register Boots and Transitions

Rectangular ducts, plenums, register boots and transitions are often provided as part of a system. These items are not approved for direct burial unless special design considerations have been made to withstand the loading. Spunstrand® Inc. assumes these items will all be concrete encased and properly braced during pouring to withstand the loads imposed. If clarification is needed, please consult Spunstrand® Inc.

No trucks or equipment may pass over the buried duct without steel plates to bridge the trench area. Equipment driving over the duct may cause cracks or potentially collapse the duct, and will result in a voided warranty. Any installation variations that are not approved by Spunstrand® Inc. will result in a voided warranty for the duct system. Not all installation considerations can be covered in this document, if there are any questions or concerns about the installation, please contact Spunstrand® Inc. for verification.

Foundation Wall Penetrations

Precautions need to be reviewed by the engineer on record or contact your Spunstrand® Inc. representative.

FIELD WET JOINT INSTALLATION INSTRUCTIONS FOR FSK UNDERSLAB AIR DUCT

Tools and Supplies

The following items are required to be on hand before attempting the field assembly of duct joints: metal or plastic lamination roller, rubber gloves, paint brushes, measuring container and plastic pails for mixing resin and catalyst, goggles or other protective eyewear, utility knife or scissors, disc sander with 24-grit abrasive discs, heat gun, wax paper or mylar and acetone for use as a solvent for equipment clean up.

Precautions

Although polyester resins are quite stable, extended storage at elevated temperatures above 80 deg. F can decrease the reactivity of the resin. Be sure and read the MSDS sheets included in your starter kit. Temperature extremes must be avoided to ensure proper curing of the resin. See table 1 for mixing ratios at varying temperatures. Work must be done in a dry, well-ventilated area. A wide flat surface should be available to "wet-out" the glass mat strips. This surface should be covered with a disposable covering. Anyone coming into contact with resin or catalyst must wear rubber gloves and protective eyewear.

Joining Procedures

Cut the duct to the desired length using a circular saw with carbide grit, metal cutting or masonry blade, making sure that the cut ends are cut squarely to butt closely as per the tolerances specified in S.M.A.C.N.A. Std. 7.26.3.

Using a disc sander with 24-grit disc, abrade the ends of the duct to be joined removing the resin rich surface. The width of abraded surface for each duct end is 1 to 2 inches more than half the width of the mat that will be used to join the duct. The width & number of layers of stitch mat used shall be in accordance with Spunstrand® Inc. Standard Specifications, located in the Physical Data chart on page 9 of this underslab section.

Join the duct and / or fittings with a sheet metal sleeve as shown in drawing no. 1 on page 7 in the installation instructions. NOTE: the sleeve should not be pre-formed as the duct I.D. can vary slightly. Insert one half of the sleeve into one end of the duct and secure it with sheet metal screws. Slide the other end of the duct or fitting over the remaining part of the sleeve and attach it with sheet metal screws. The recommended sheet metal sleeve is:

Duct Diameter 4" - 12" = 26 Gauge, 4" Wide
Duct Diameter 14" - 24" = 24 Gauge, 4" Wide
Duct Diameter 26" - 72" = 22 Gauge, 6" Wide

Cut the composite glass mat to length using number of plies and widths as indicated. Each mat length should be 3.2 times the normal duct diameter plus 2". This will allow for a slight overlap.

Where two layers of mat are used, stagger the two layers so that the overall width of the joint is about 1/2" to 1" wider than the mat layers used. On larger diameters where the length of stitchmat is impractical to work with, it can be cut in half or thirds (adding extra for overlap) and then laid up in sequence, (Refer to Physical Data chart on page 10.)

Mix resin with catalyst in a disposable plastic container using only as much as you can work with in 15 to 20 minutes.

Lay-Up Procedures

On a flat surface covered with release film (such as wax paper, butcher paper or Mylar®), lay the first and widest section of fiberglass mat, chop strand side up and wet out with catalyzed resin mix (see fig's 1 & 2 on pages 8 and 9). Work the resin up through the dry fiberglass mat to minimize air entrapment. Once completed, place the second mat for the joint onto the coated mat with the woven side down and wet it out also.

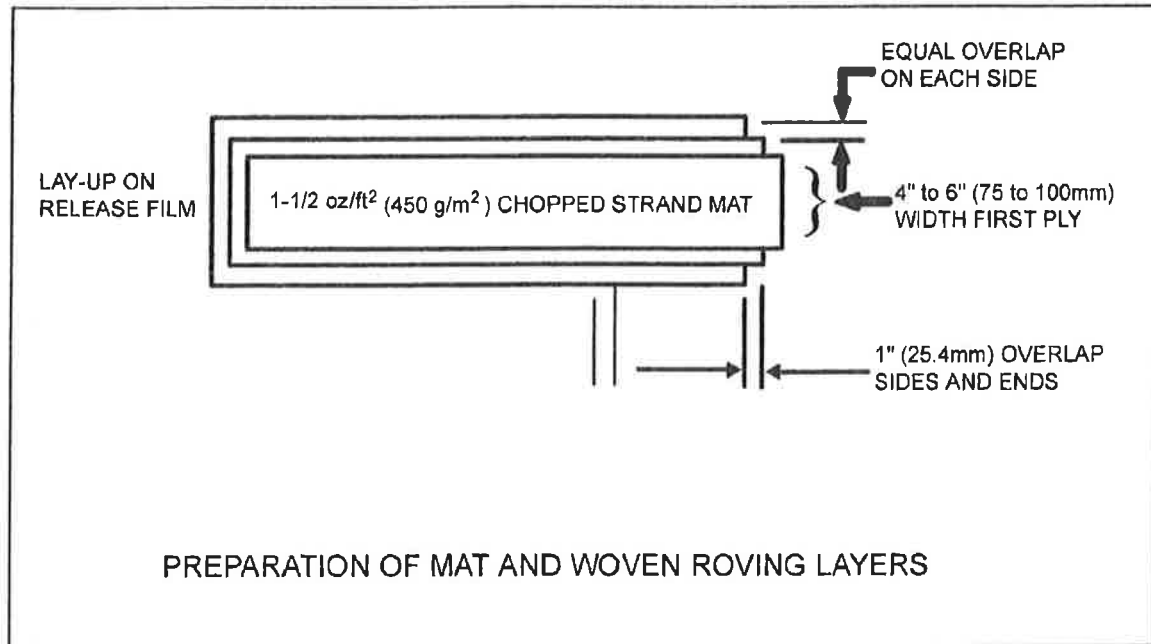


FIGURE 1

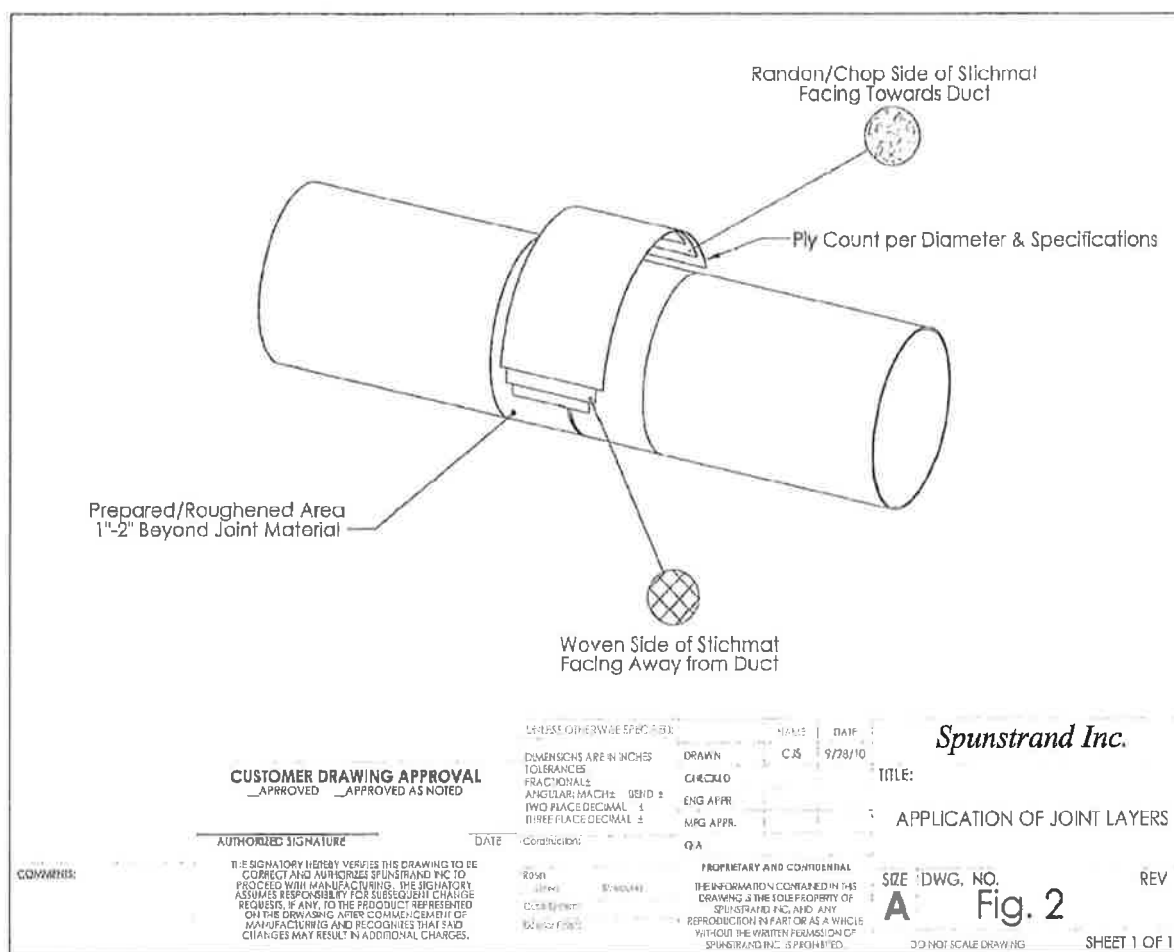
Begin the lay-up of the joint wrap by placing the chop strand side of the mat down against the duct. Use a 3" to 4" wide brush and laminating roller to work the resin in. Continue working the joint by rolling the resin from the center of the joint to the outer edges. Use moderate force with the roller to expel trapped air out of the laminate. Be careful not to remove too much resin. Each layer of fiberglass should overlap the ply beneath it (1/2 to 1in.) and bond directly to the duct in order to achieve secondary bonding. Note: if the joint looks dry, use additional mixed catalyzed resin during rolling. Place the rollers and paint brushes in acetone after each use, swirl them around to ensure the resin is dissolved.

Note

All acetone must be collected in a DOT Approved metal container at the end of each day and properly stored. After the job is completed, the collected solvent should be disposed of through a licensed hazardous waste treatment storage and disposal facility.

Saddle Taps

FRP saddle taps are attached using the same wet joint procedure as described above. First cut a hole in the duct where the saddle tap is to be attached. The hole should be slightly smaller than the saddle tap opening. Use a carbide chip or a metal cutting blade on a jigsaw, taking care to remove the piece that is being cut out. Center the saddle tap as required and pop rivet or screw attach each corner. Abrade the tap flange and 2" of the duct around the hole. Place a 6" wide section of mat that has been saturated with resin so it is centered half way on the flange and the duct. Use brushes and laminating rollers to work out any air bubbles until mat is in total contact with the flange and duct surfaces.



PHYSICAL DATA FOR WET JOINT SYSTEM

Sheetmetal sleeve to be furnished by installing contractor.

NOMINAL DIAMTER - INCHES	SHEET METAL SLEEVE RECOMMENDED GAUGE / WIDTH	WET LAY-UP JOINT WRAPS
4"	26 / 4"	6" Stitch Mat / 2 Layers
5"	26 / 4"	6" Stitch Mat / 2 Layers
6"	26 / 4"	6" Stitch Mat / 2 Layers
7"	26 / 4"	6" Stitch Mat / 2 Layers
8"	26 / 4"	6" Stitch Mat / 2 Layers
9"	26 / 4"	6" Stitch Mat / 2 Layers
10"	26 / 4"	6" Stitch Mat / 2 Layers
12"	26 / 4"	6" Stitch Mat / 2 Layers
14"	24 / 4"	6" Stitch Mat / 2 Layers
16"	24 / 4"	6" Stitch Mat / 2 Layers
18"	24 / 4"	6" Stitch Mat / 2 Layers
20"	24 / 4"	6" Stitch Mat / 2 Layers
22"	24 / 4"	6" Stitch Mat / 2 Layers
24"	24 / 4"	6" Stitch Mat / 2 Layers
26"	22 / 6"	6" Stitch Mat / 2 Layers
28"	22 / 6"	6" Stitch Mat / 2 Layers
30"	22 / 6"	6" & 8"Stitch Mat / 1 Layer Ea.
32"	22 / 6"	6" & 8"Stitch Mat / 1 Layer Ea.
36"	22 / 6"	6" & 8"Stitch Mat / 1 Layer Ea.
42"	22 / 6"	6" & 8"Stitch Mat / 1 Layer Ea.
48"	22 / 6"	6", 8"& 10"Stitch Mat / 1 Layer Ea.
54"	22 / 6"	6", 8"& 10"Stitch Mat / 1 Layer Ea.
60"	22 / 6"	6", 8"& 10"Stitch Mat / 1 Layer Ea.
*72"	22 / 6"	6", 8"& 10"Stitch Mat / 1 Layer Ea.
<i>*72" and larger diameter ductwork is not included in the ICC-ES listing.</i>		

TABLE 1: GUIDE TO MIXING RATIOS

RESIN	CATALYST	AMBIENT TEMPERATURE
NOT RECOMMENDED BELOW 50° F (10° C) WITHOUT AN EXTERNAL HEAT SOURCE		
1 Pint (472 cc)	0.41 oz (12 cc)	*50-60° F (10-16° C)
1 Pint (472 cc)	0.32 oz (9.5 cc)	60-70° F (16-21° C)
1 Pint (472 cc)	0.20 oz (6 cc)	70-80° F (21-27° C)
1 Pint (472 cc)	0.19 oz (5.5 cc)	80-90° F (27-32° C)
1 Pint (472 cc)	0.17 oz (5 cc)	90+° F (32 +° C)

Mix resin thoroughly before adding catalyst into the mixing container.
The above catalyzation table will allow for a pot life of about 20 minutes.

****Call Spunstrand® Inc. for special recommendations - a heat gun or external heat source may be necessary.***

WET JOINT MATERIAL

Jobsite Hazards and Precautions

While the materials provided to complete this project are all very stable and simple to use, there are some precautions that must be taken to assure that hazardous conditions do not develop on the jobsite. This information is all in the MSDS information provided, but this is for clarifications of crucial parts of these data sheets. Always follow OSHA and jobsite regulations with joint lay-up materials.

Please be sure to read all MSDS information for the chemicals being used and adhere to all personal protective equipment recommendations and storage information.

Storage

Temperature: Resin should be stored in a cool to warm environment with a recommended maximum temperature of 77 degrees. Excessive temperatures can cause the resin to harden even without the addition of the catalyst. Catalyst must also be kept at a recommended temperature below 77 degrees. Excessive temperature can cause hazardous conditions with the catalyst including hazardous polymerization and combustion. When storing resin, MEKP (catalyst), acetone or any chemicals indoors, make certain the lids or caps are on tight and no spills or fumes can be detected. Make certain that adequate ventilation is provided in occupied space or any space that product is stored and could allow for a buildup of fumes due to leaks or spills.

Material Usage and Cleanup

When the resin and catalyst are mixed together, the reaction is exothermic, meaning it will create heat to help the curing process. When the material is mixed, the proper mixing ratios should be followed. While the ratios must be considerably out of compliance in order to cause a hazardous condition, it is a possibility. The more mass of mixed resin that is left in a container, the more heat will be generated. An improper mixing ratio and a large mass of mixed resin left in a container could create enough heat to cause a fire. Any amount of unused mixed resin must be moved out of any enclosed structure and should be placed in an area where high temperature cannot cause any other hazardous conditions. It must also be isolated from any electrical exposure or other flammable materials or rags. Mark your buckets and measuring devices to maintain consistent performance and a record of your mixing history.

Acetone is the only acceptable solvent for cleanup of resin-saturated brushes, rollers or other necessary cleanup. Once the acetone has been used, it is classified as a hazardous material and must be disposed of in accordance with the law. Acetone is extremely flammable, and should always be stored in accordance with local and state regulations and used away from any potential source of ignition. Note that fiberglass is a very hard plastic and while grinding fiberglass does not produce a visible spark, sparks do occur. Make sure that all resin in buckets, brushes, wax paper (release films) or rollers is completely cured prior to dumping into jobsite waste dumpsters.

Moisture and water must be kept away from all materials during storage. If the fiberglass cloth material becomes wet or moist, it will inhibit that material from absorbing resin. It will also inhibit the cure of the resin, resulting in a potentially leaky joint. These materials must be kept completely dry. If they do get wet, the time for this material to dry out enough to use is extremely long. The material should be replaced if this occurs.

Boot Takeouts (Boot Registers)

Detail drawing on page 8 indicates the use of a sheet metal rectangular to round transition mounted vertically in the slab floor. A connection is made by inserting the round portion of the sheet metal register into the fiberglass elbow (45 or 90 depending on situation). Use duct sealer with a scrim reinforcement on the outside of the round portion of the transition where it inserts into the mating Spunstrand® Inc. fiberglass fitting. Encase the sheet metal transition completely in concrete, covering well around and below the joint to the fiberglass elbow. This is normally done at the same time the slab is poured.

Field Duct Cutting

Spunstrand® Inc. underslab air duct is readily cut in the field with conventional tools, such as a saber saw, band saw or circular saw. A metal cutting blade or reinforced abrasive wheel is preferable. It is recommended that O.S.H.A. approved fine particle dust masks and / or other protective gear is worn when cutting the duct.

Backfilling

When backfilling and pouring the concrete slab, care shall be exercised to avoid shock loads. Uniform backfilling is required to maintain the duct in a round configuration at all times. A minimum of 4" pea gravel or dry silica sand should be used as backfill under, around, and over the duct. The backfill around the duct should be placed in layers on each side of the duct. Take care to compact the material under the haunches of the duct and bring the backfill up in roughly even lifts to avoid uneven loading on the duct walls.

Mechanical compaction is not recommended due to the extreme care required to avoid damage to the duct. Water settling of the backfill is unsatisfactory because floatation of the duct is the usual result. Hand tamping is the recommended method. Pea gravel as dumped from a wheelbarrow is approximately 85% compacted, with the addition of hand tamping or rodding, pea gravel backfill compaction will approach 95%.

Space parallel ducting systems sufficiently far apart to allow compaction equipment to compact the soil between the ducts. Compact the soil between the ducts in the same manner as recommended for a single duct with particular attention to the compaction around and under the haunches of the ductwork.

Stake / mark underground ductwork as backfilling is being completed. Note: It is not recommended that an engineered fill be brought up around the duct due to the potential for damage from the compaction equipment and potential for uneven loading which could result in collapse. Rather, the engineered fill should be completed to the designed elevation and then the desired trench dug and the duct installed per manufacturer's recommendation.

Water Table Procedure

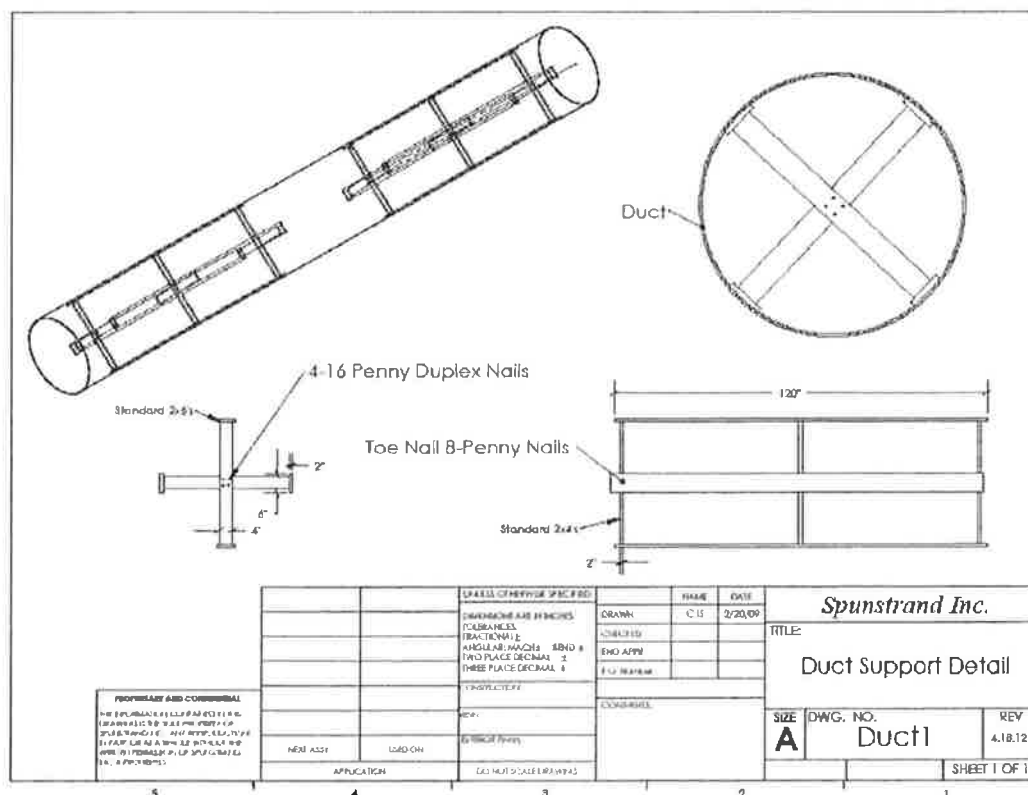
Where water is encountered within the trench zone it should be removed by suitable means and the trench maintained in a reasonable dry condition until the duct has been installed and enough backfill placed to prevent any floatation. The gradation of the backfill in the duct trench shall be such that the fines from the surrounding soils will not migrate into the backfill and cause lack of sidewall or foundation support. As an alternative the use of filtration fabric can be considered for this purpose. In either case, the assistance of a soils engineer should be sought.

Heavy Equipment Procedure

Heavy equipment shall not be allowed to pass over the duct without proper bridging. Where heavy floor loads are anticipated, the floor slab should be reinforced over the duct area or a crown of concrete poured over the duct in lieu of the backfill material. Where ducts are parallel to a wall or foundation, it should be spaced to provide a minimum of 4" for the backfill material. Where the duct must pass directly under a load bearing wall, reinforcement over the duct may be required.

For large diameter duct (36" and over) movable internal support braces including lateral runners are recommended during backfill. They are to be relocated as backfilling is continued and removed upon completion. (See Drawing No. 5 on page 14.)

CAUTION: Installations requiring variation from these instructions should be approved by Spunstrand® Inc.



PRODUCT INFORMATION CONCERNING SHIPPING and HANDLING

RECEIVING:

Regardless the mode of transportation, upon receiving, each piece should be inspected and checked against the Packing Slip / Bill of Lading.

INSPECTION:

Note damaged or missing items on the Bill of Lading and notify the carrier's agent (*truck driver*). Obtain a signed acknowledgement of the damage or shortage at the time of unloading. **DO NOT** dispose of or return damaged items. Replacement materials must be re-ordered on a separate Purchase Order. Shipments are FOB factory – *Wallace, Idaho*. Once materials are loaded and leave the Spunstrand® Inc. factory, title of materials pass to the consignee – *customer*. If you do not note the damage and assist in filing a freight claim, any warranty work or replacement parts will be charged to the customer.

UNLOADING:

Small parts may be unloaded by hand but not thrown off the truck. Handle parts carefully, being sure not to scratch the interior surface or damage the ends.

- **DO NOT** push or roll duct off the truck with a fork lift.
- **DO NOT** use hooks to lift duct.
- **DO NOT** use wire rope or chains as a sling to lift large duct.

If slings are to be used, they must be a minimum of 4" wide webbed nylon or canvas. On 20 foot lengths of large duct, two slings should be placed approximately 7 feet in from each end, and the load lifted evenly. On 40 foot lengths, three slings placed at 10 foot intervals should be used.

STORAGE:

It is important that the resin and glass materials be stored out of the weather in a clean, dry location within a maximum temperature of 77°F. Cover all product (glass, duct) with a protective tarp. The glass materials and product should be covered to protect them from rain and snow. Keep resin out of the sun and store in an area where the temperature will not fall below 60°F. Read the labels on all containers, the labels contain information about health and safety considerations as well as storage.

DIMENSIONAL DATA

FSK COMMERCIAL

Spunstrand
Green duct that works

620 North Post Street · Post Falls, ID 83854 · 208.777.7444 ph 208.777.7445 fax · www.spunstrand.com

**FSK (Non-Insulated) Duct and Fittings –
Shipping Weights OUTSIDE DIAMETER FOR FSK DUCT
Tolerance +/- 1/4"**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
NOMINAL DIAM. (IN)	STRAIGHT DUCT / FT (lbs)	45 ° ELBOW (lbs)	90 ° ELBOW (lbs)	CON. REDUCER (lbs)	ECC. REDUCER (lbs)	END CAP (lbs)	TEE (lbs)	SINGLE 45 ° y (lbs)	SINGLE 90 ° y (lbs)	CROSS (lbs)	DOUBLE 45 ° Y (lbs)	DOUBLE 90 ° Y (lbs)	TRUE Y (lbs)	SADDLE TAP (lbs)	TRANSITION (lbs)	FLANGE (lbs)
4	0.9	1	2	-	-	1	1	1	2	1	2	4	1	1	3	2
5	1.1	1	2	1	1	1	2	2	3	3	3	5	2	1	4	2
6	1.2	2	3	2	3	2	2	3	4	3	4	6	2	1	4	3
7	1.4	2	3	2	3	2	2	3	4	3	4	6	2	1	5	3
8	1.6	2	4	2	3	2	3	4	5	4	5	7	3	1	6	4
9	1.7	3	5	3	4	3	4	5	7	5	7	11	4	2	6	4
10	1.9	3	5	3	4	3	4	6	8	5	8	12	4	2	7	5
12	2.2	4	7	3	4	4	6	8	10	7	10	16	7	3	9	6
14	2.5	5	9	4	5	5	7	10	13	8	13	19	8	4	10	6
16	3.8	8	14	5	7	6	10	14	18	12	18	28	11	4	12	7
18	4.2	9	16	5	7	8	12	18	23	14	23	35	14	6	16	8
20	4.6	11	18	6	8	9	14	21	27	16	27	41	16	6	18	9
22	6.2	13	23	8	10	11	19	29	37	22	37	53	21	8	30	15
24	6.7	15	26	8	10	12	22	33	42	25	42	60	24	8	34	16
26	7.2	18	32	10	13	15	27	42	53	30	54	76	31	11	40	18
28	9.2	21	37	11	14	17	33	52	65	37	66	92	37	12	45	19
30	9.8	23	40	12	16	19	36	58	72	41	74	102	41	13	52	21
32	10.4	25	45	13	17	21	41	65	80	46	83	113	47	15	58	22
36	13.6	32	58	16	21	27	55	89	108	61	113	151	63	19	65	25
42	20.3	64	115	29	38	50	110	183	221	121	233	309	127	35	88	38
48	25.6	76	139	34	44	55	141	239	283	154	302	391	162	39	110	43
54	31.7	101	184	42	55	74	190	327	386	206	414	531	222	52	125	49
60	37.8	131	240	50	65	95	246	426	504	265	542	693	287	67	141	54
*72	58.9	213	398	78	102	118	493	768	890	463	970	1212	507	82	206	81

**72" and larger diameter ductwork is not included in the ICC-ES listing.*

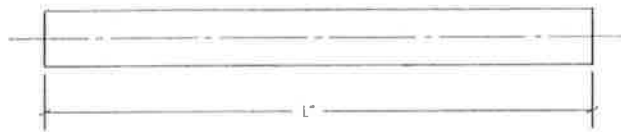
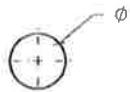
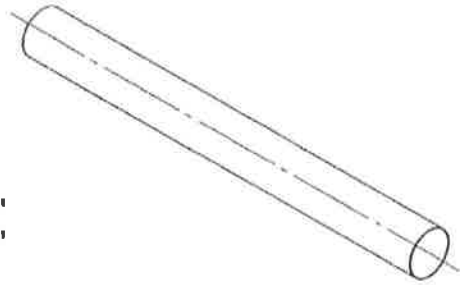
OUTSIDE DIAMETER FOR FSK DUCT

Tolerance +/- 1/4"

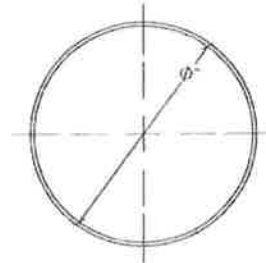
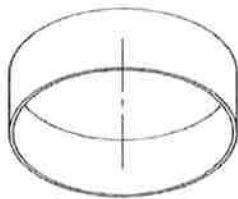
INSIDE DIAMETER (Inches)	INNER WALL		FSK OUTSIDE DIAMETER
	# of PLIES	WALL THICKNESS	
4	3	0.0675	4.14
5	3	0.0675	5.14
6	3	0.0675	6.14
7	3	0.0675	7.14
8	3	0.0675	8.14
9	3	0.0675	9.14
10	3	0.0675	10.14
12	3	0.0675	12.14
14	3	0.0675	14.14
16	4	0.0900	16.18
18	4	0.0900	18.18
20	4	0.0900	20.18
22	5	0.1125	22.23
24	5	0.1125	24.23
26	5	0.1125	26.23
28	6	0.1350	28.27
30	6	0.1350	30.27
32	6	0.1350	32.27
36	8	0.1800	36.36
42	9	0.2025	42.41
48	10	0.2250	48.45
54	12	0.2700	54.54
60	13	0.2925	60.59
70	15	0.3375	70.68
*72	15	0.3375	72.68
<i>*72" and larger diameter ductwork is not included in the ICC-ES listing.</i>			

Straight Duct

4" ϕ - 48" ϕ L = 20'-0"
 52" ϕ - 72" ϕ L = 10'-0"



End Cap



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		DIMENSIONS ARE IN INCHES. FRACTIONAL: ANGULAR: RACHET BEND: TWO PLACE DECIMAL: THREE PLACE DECIMAL:
		MATERIAL
		FINISH
NEXT ASSY	USED ON	
APPLICATION		DO NOT SCALE DRAWING

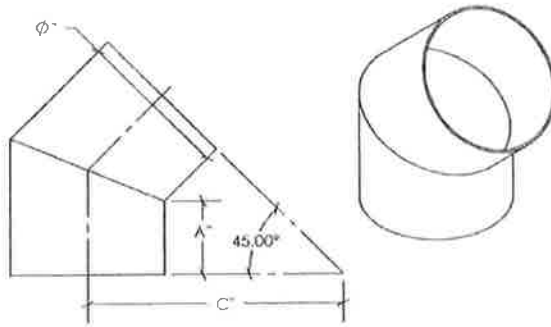
	NAME	DATE
DRAWN	CJS	2009
CHECKED		
ENG APPR		
MFG APPR		
QA		
COMMENTS		

Spunstrand Inc.

Duct

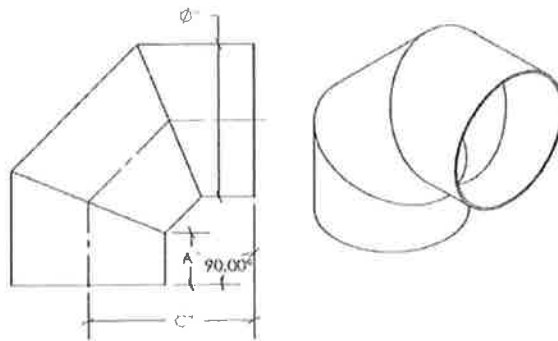
SIZE	DWG. NO.	Underslab FRP	REV
A			

45° Elbows



Diameter (In)	90° Elbows		45° Elbows
	A (In)	C (In)	C (In)
4	6	12 3/8	16 5/8
5	6	12 7/8	17 1/8
6	6	13 3/8	17 5/8
7	6	13 7/8	18 1/8
8	6	14 3/8	18 5/8
9	6	14 7/8	19 1/8
10	6	15 3/8	19 5/8
12	6	16 3/8	20 5/8
14	6	17 3/8	21 5/8
16	6	18 3/8	22 5/8
18	6	19 3/8	23 5/8
20	6	20 3/8	24 5/8
22	6	21 3/8	25 5/8
24	6	22 3/8	26 5/8
26	6	23 3/8	27 5/8
28	6	24 3/8	28 5/8
30	6	25 3/8	29 5/8
32	6	26 3/8	30 5/8
34	6	27 3/8	31 5/8
36	6	28 3/8	32 5/8
38	6	29 3/8	33 5/8
40	6	30 3/8	34 5/8
42	6	31 3/8	35 5/8
44	6	32 3/8	36 5/8
48	6	34 3/8	38 5/8
52	6	36 3/8	40 5/8
54	6	37 3/8	41 5/8
60	6	40 3/8	44 5/8
72	6	46 3/8	50 5/8

90° Elbows



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		DIMENSIONS ARE IN INCHES TOLERANCES FRACTIONAL ± ANGULAR: MACHINE BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±
		MATERIAL
NEXT ASSY	USED ON	Finish
APPLICATION		DO NOT SCALE DRAWING

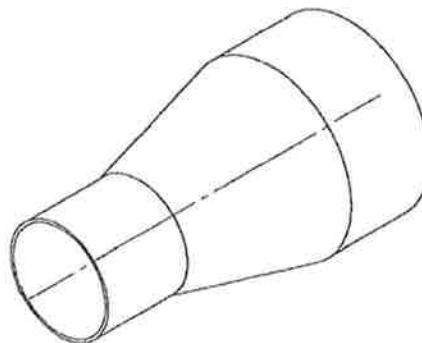
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DRAWN	C.S.	2/09
CHECKED		
ENG APPR		
MFG APPR		
QA		
COMMENTS		

Spunstrand Inc.

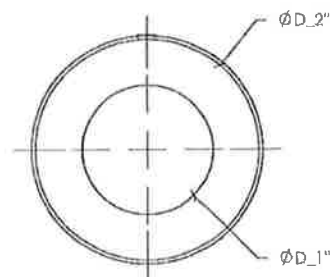
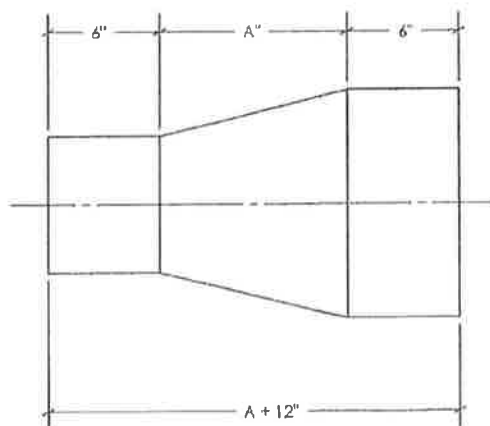
Elbows

100 A DWG. NO. Underslab FRP REV

Inches of Reduction	A
1"	2 1/8"
2"	4
3"	5 7/8"
4"	7 3/4"
5"	9 5/8"
6"	11 1/2"
7"	13 3/8"
8"	15 1/8"
9"	17"
10"	18 7/8"
11"	20 3/4"
12"	22 5/8"
13"	24 1/2"
14"	26 3/8"
15"	28 5/8"
16"	32"
17"	33 7/8"
18"	35 3/4"
19"	36 5/8"
20"	37 5/8"

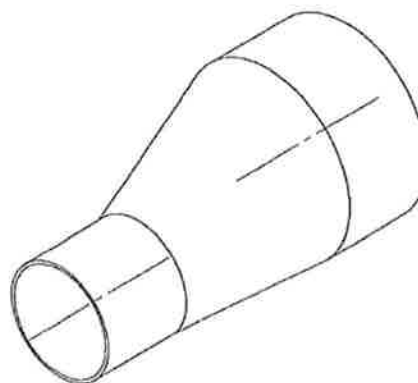


$$\text{Inches of Reduction} = D_2 - D_1$$

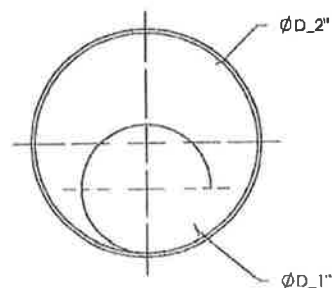
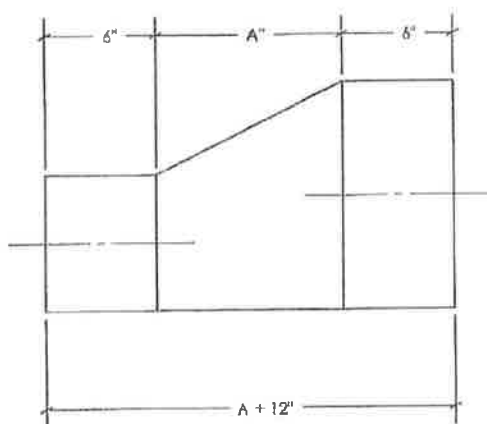


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				DRAWN	CJS		2009
				CHECKED			
				ENG APPR			
				MFG APPR			
NEXT ASSY		USED ON	COMMENTS:				
APPLICATION		DO NOT SCALE DRAWING					

Inches of Reduction	A
1"	4 1/4"
2"	8"
3"	11 3/4"
4"	15 1/2"
5"	19 1/4"
6"	23"
7"	26 3/4"
8"	30 1/4"
9"	34"
10"	37 3/4"
11"	41 1/2"
12"	45 1/4"
13"	49"
14"	52 3/4"
15"	57 1/4"
16"	64"
17"	67 3/4"
18"	69 1/4"
19"	71 1/2"
20"	75 1/4"



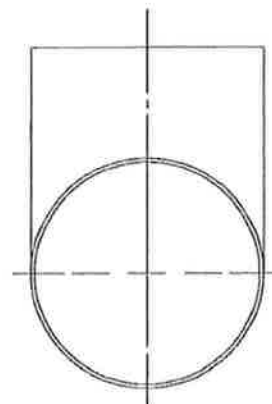
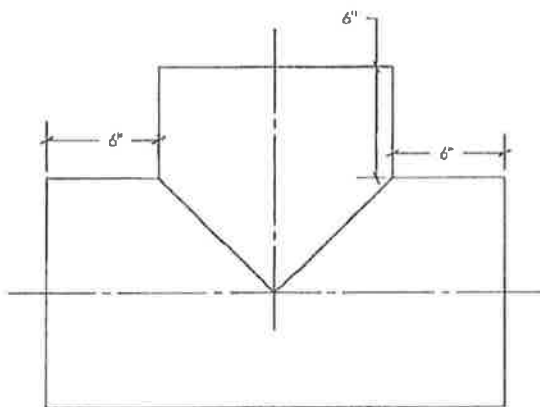
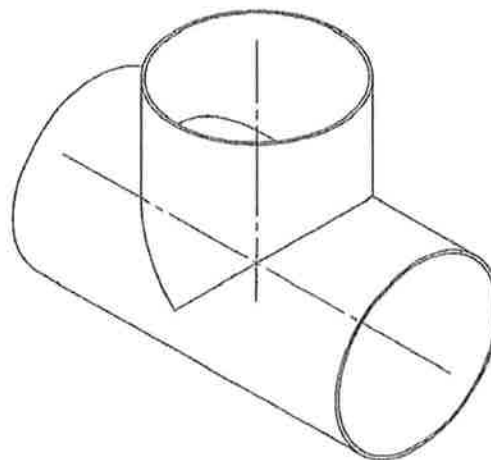
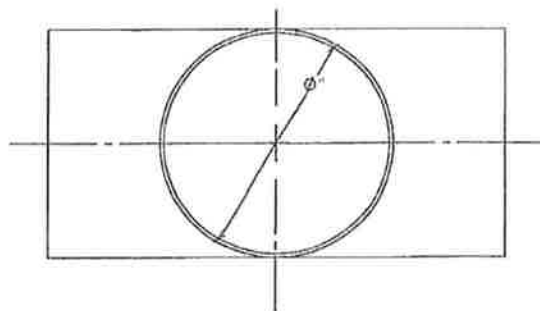
$$\text{Inches of Reduction} = D_2 - D_1$$



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		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±		NAME	DATE	Spunstrand Inc. Eccentric Reducer	
				DRAWN	CJS		2009
				CHECKED			
				ENG APPR.			
				MFG APPR.			
		MATERIAL:		D.A.			
		FINISH:		COMMENTS:			
NEXT ASSY	USED ON						
APPLICATION		DO NOT SCALE DRAWING					

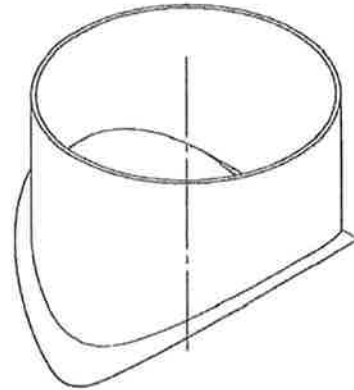
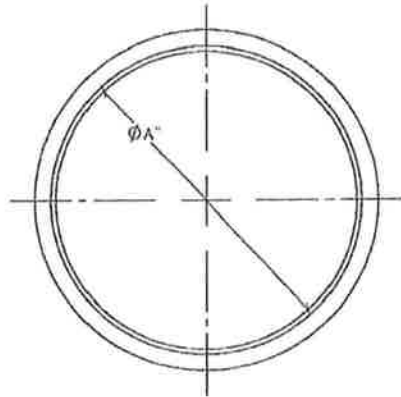
SIZE	DWG. NO.	Underlab FRP	REV.
A			



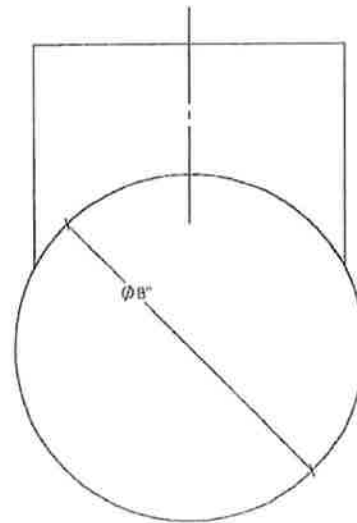
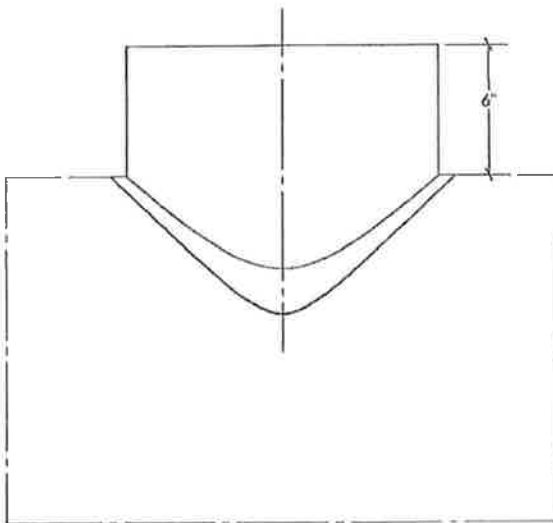
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		DIMENSIONS ARE IN INCHES		NAME	DATE	Spunstrand Inc. TEE	
		TOLERANCES:		DRAWN	CJS		2007
		FRACTIONAL ±		CHECKED			
		ANGULAR: MACH ± BEND ±		ENG APPR			
		TWO PLACE DECIMAL ±		MFG APPR			
		THREE PLACE DECIMAL ±		Q.A.			
		MATERIAL		COMMENTS:			
		FINISH					
NEXT ASSY	USED ON						
APPLICATION		DO NOT SCALE DRAWING					

SIZE **A** DWG. NO. Underlab FRP REV.



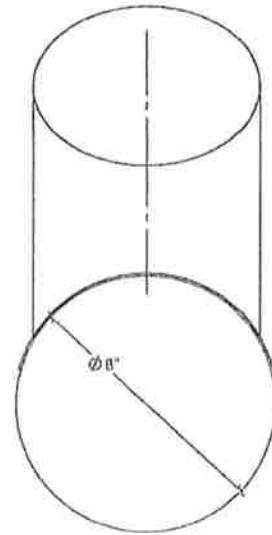
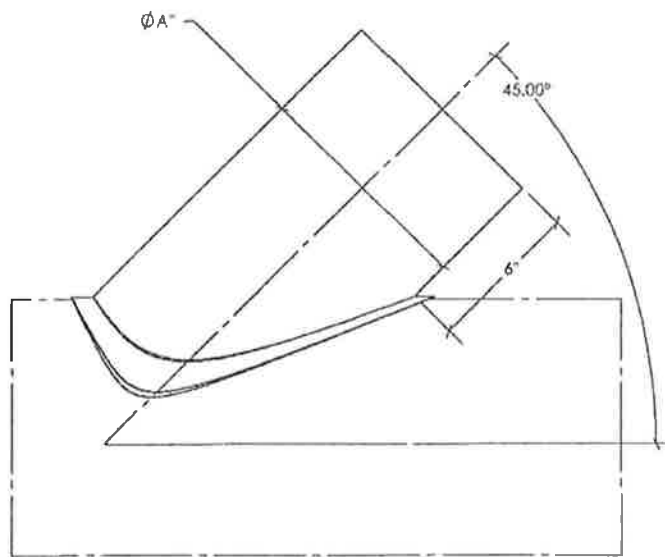
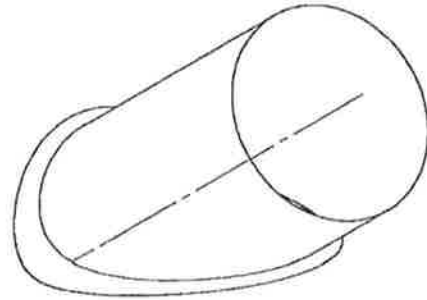
A onto B



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		DIMENSIONS ARE IN INCHES		NAME	DATE	Spunstrand Inc.	
		TOLERANCES:		DRAWN	CJS		2009
		FRACTIONAL: ±		CHECKED			
		ANGULAR: MACH 1: ±		ENG APPR.			
		TWO PLACE DECIMAL: ±		MFG APPR.			
		THREE PLACE DECIMAL: ±		QA			
		MATERIAL		COMMENTS:		90deg Saddle Tap	
NEXT ASSY	USED ON	FINISH					
APPLICATION		DO NOT SCALE DRAWING					
				SEE	DWG. NO.	REV.	
				A	Underslab FRP		

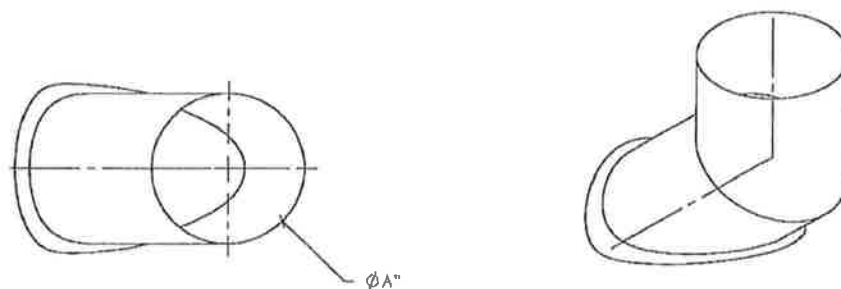
A onto B



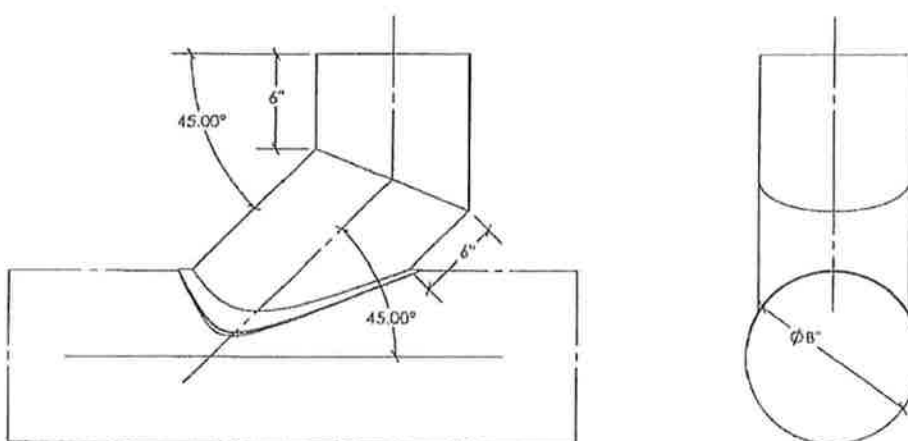
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		DIMENSIONS ARE IN INCHES		NAME	DATE	Spunstrand Inc. 45deg Saddle Tap	
		TOLERANCES:		DRAWN	CJS		2009
		FRACTIONAL ±		CHECKED			
		ANGULAR: HATCH ±		ENG APPR.			
		TWO PLACE DECIMAL ±		MTG APPR.			
		THREE PLACE DECIMAL ±		Q.A.			
		MATERIAL		COMMENTS:			
		FINISH					
NEXT ASSY	USED ON						
APPLICATION		DO NOT SCALE DRAWING					

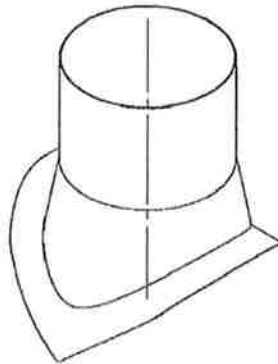
SIZE A	DWG NO.	Underlab FRP	REV.
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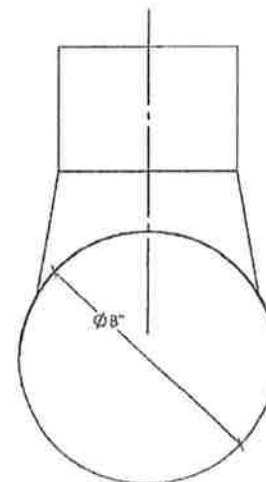
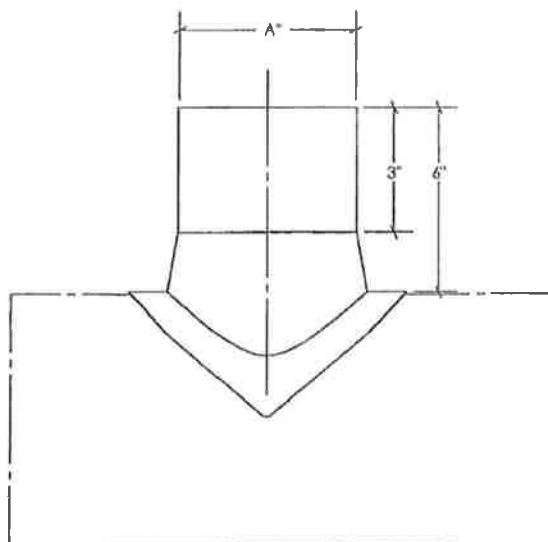
A onto B



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				MATERIAL		CHECKED				90deg Lateral Saddle Tap	
				FINISH		ENG APPR.					
						QA					
				NEXT ASSY		USED ON		COMMENTS:			
		APPLICATION		DO NOT SCALE DRAWING							



A onto B



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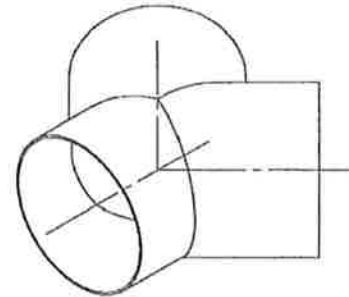
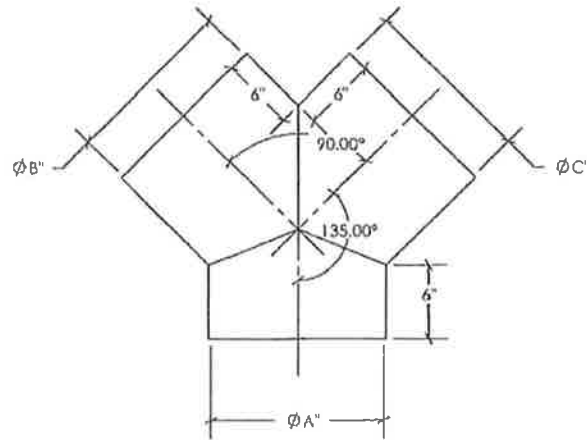
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		TOLERANCES:
		FRACTIONAL ±
		ANGULAR: MATCH BEND ±
		TWO PLACE DECIMAL ±
		THREE PLACE DECIMAL ±
		MATERIAL
NEXT ASSY	USED ON	FINISH
APPLICATION	DO NOT SCALE DRAWING	

	NAME	DATE
DRAWN	CJS	2009
CHECKED		
ENG APPR		
MFG APPR		
QA		
COMMENTS:		

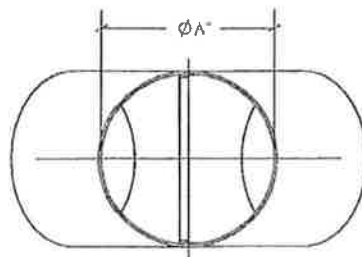
Spunstrand Inc.

Conical Tap

SIZE	DWG. NO.	Underlab FRP	REV.
A			

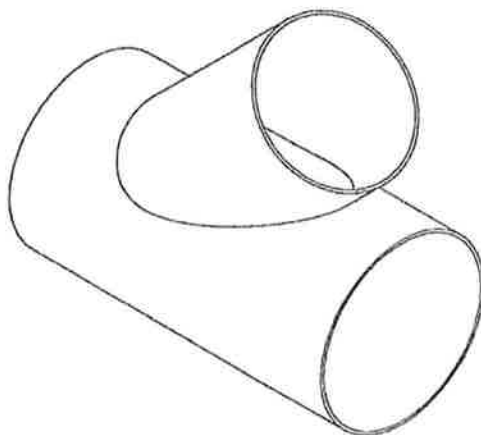


A x B x C



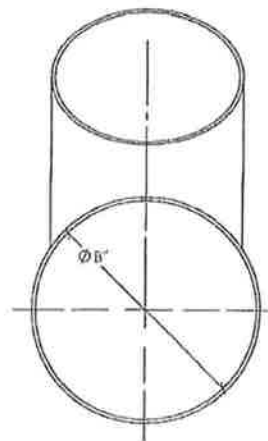
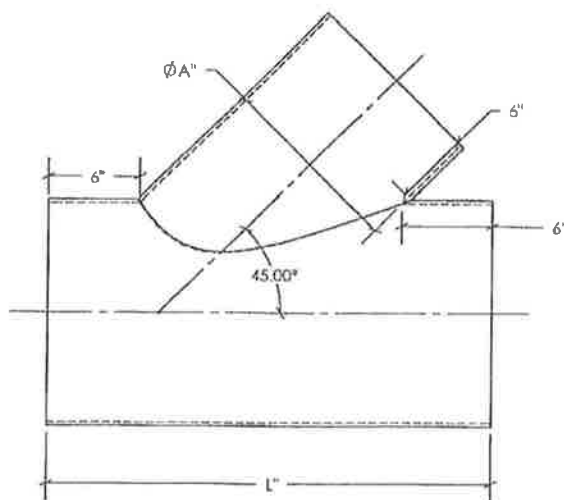
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			DRAWN	CJS			2007
			CHECKED			True Wye	
			ENG APPR.				
			MFG APPR.				
		MATERIAL	D.A.				
		FINISH	COMMENTS:				
NEXT ASSY	USED ON						
APPLICATION		DO NOT SCALE DRAWING	SIZE A		DWG NO.		

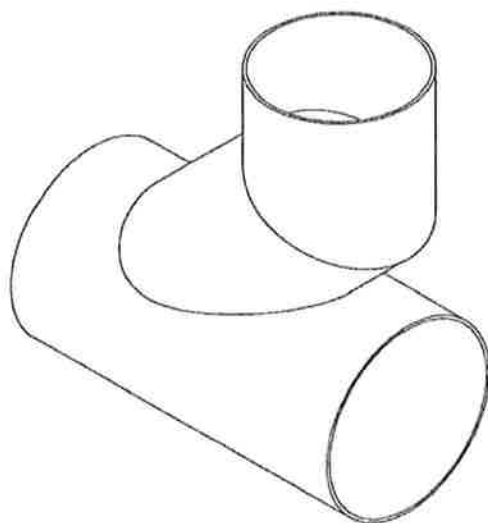


A x B

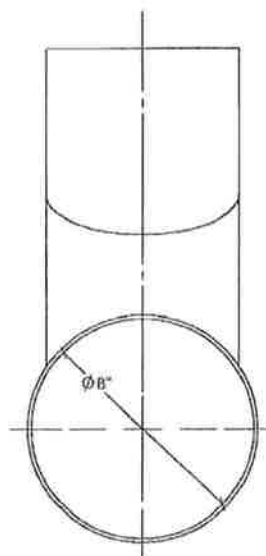
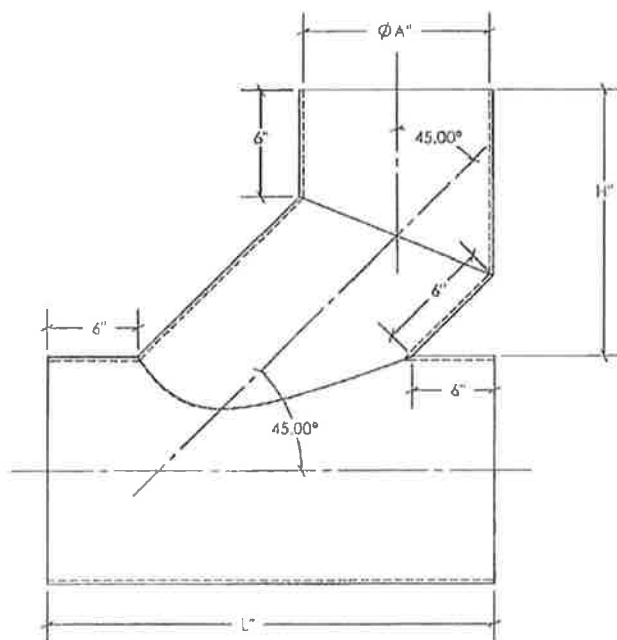
45 DEGREE LATERAL	
"A" DIAMETER	L
4	17 2/3
5	19
6	20 1/2
7	21 8/9
8	23 1/3
9	24 3/4
10	26 1/7
12	29
14	31 7/8
16	34 5/8
18	37 1/2
20	40 1/4
22	43 1/8
24	46
26	48 3/4
28	51 5/8
30	54 1/2
32	57 1/4
34	60
36	63
38	65 3/4
40	68 5/8
42	71 1/4
44	74 1/4
48	79.872
52	85 1/2
54	88 3/8
60	96 7/8
72	113 7/8



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				MATERIAL: FINISH		CHECKED ENG APPR Q.A. COMMENTS		45deg Lateral SEE DWG. NO. A Underslab FRP	
		NEXT ASSY		USED ON					
		APPLICATION		DO NOT SCALE DRAWING					



90 DEGREE LATERAL		
"A" DIAMETER	L	H
4	17 2/3	12
5	19	12 1/3
6	20 1/2	12 3/4
7	21 8/9	13 1/7
8	23 1/3	13 4/7
9	24 3/4	14
10	26 1/7	14 2/5
12	29	15 2/9
14	31 7/8	16
16	34 5/8	16 7/8
18	37 1/2	17 5/7
20	40 1/4	18 1/2
22	43 1/8	19 1/3
24	46	20 1/5
26	48 3/4	21
28	51 5/8	21 6/7
30	54 1/2	22 2/3
32	57 1/4	23 1/2
34	60	24 1/3
36	63	25 1/5
38	65 3/4	26
40	68 5/8	26 5/6
42	71 1/4	27 2/3
44	74 1/4	28 1/2
48	79.872	30 1/8
52	85 1/2	31 4/5
54	88 3/8	32 5/8
60	96 7/8	35 1/9
72	113 7/8	40



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		DIMENSIONS ARE IN INCHES	
		TOLERANCES:	
		FRACTIONAL: \pm	
		ANGULAR: MACH: BEND \pm	
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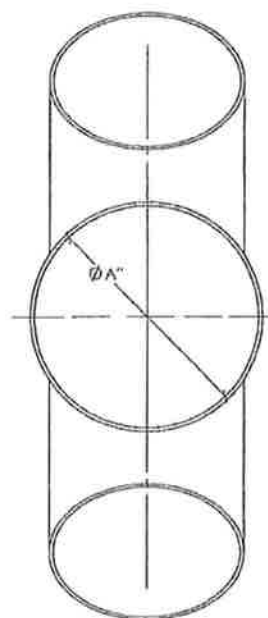
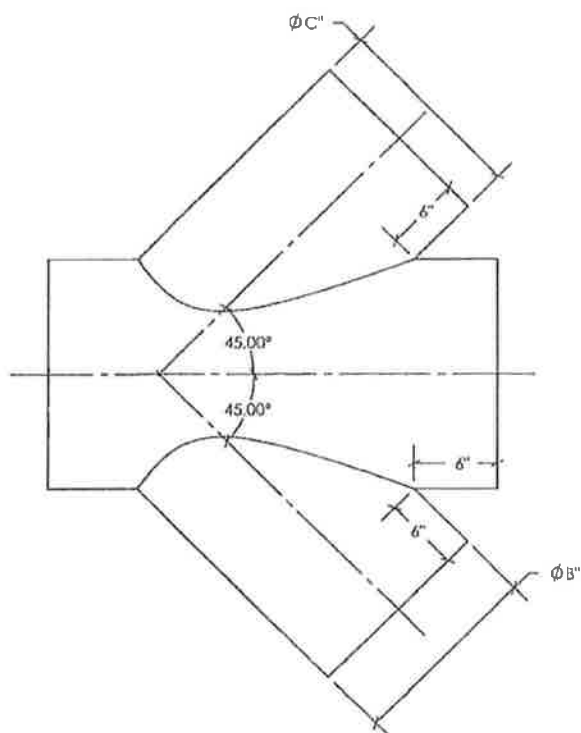
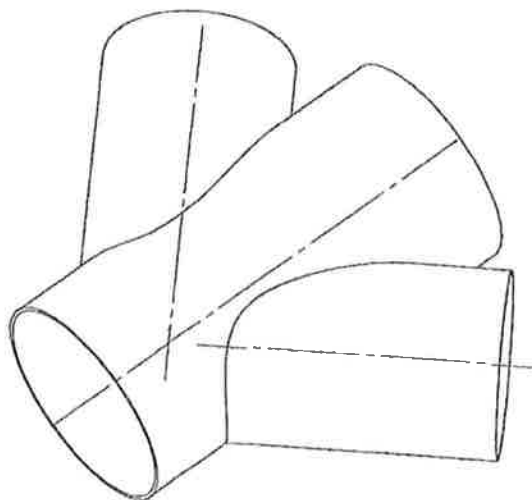
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CHECKED		
ENG APPR		
MFG APPR		
Q.A.		
COMMENTS:		

Spunstrand Inc.

90deg Lateral

SUB	DWG. NO	REV.
A	Underslab FRP	

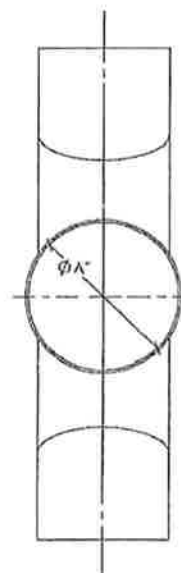
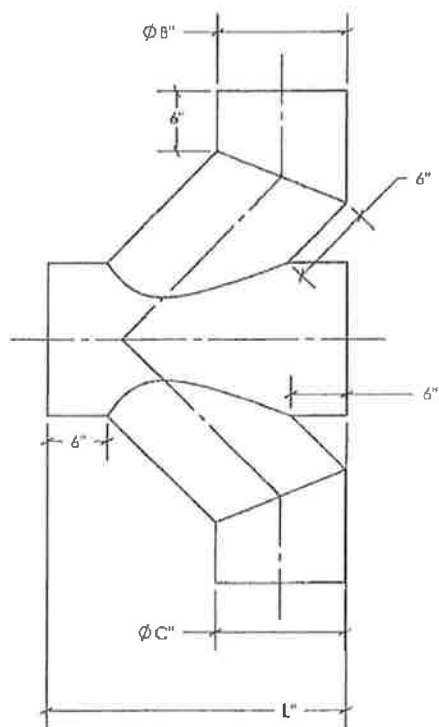
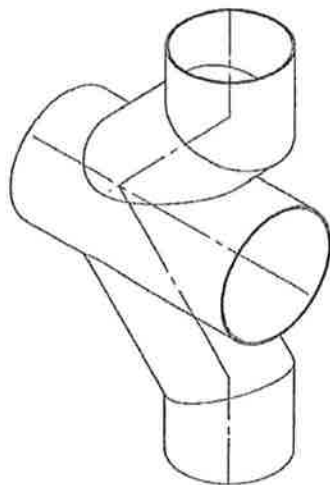
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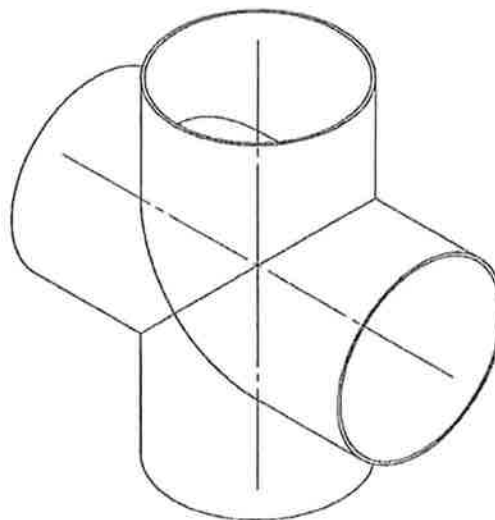
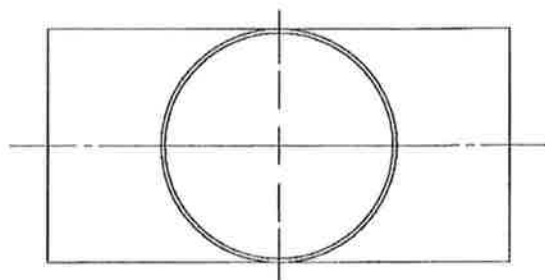
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SIZE **A** DWG. NO. Underslab FRP REV.



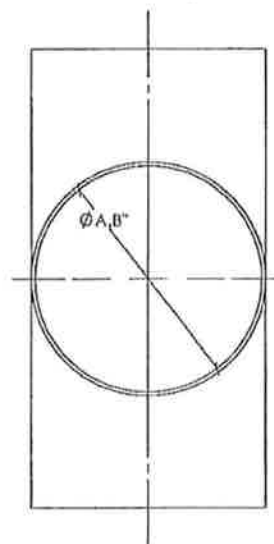
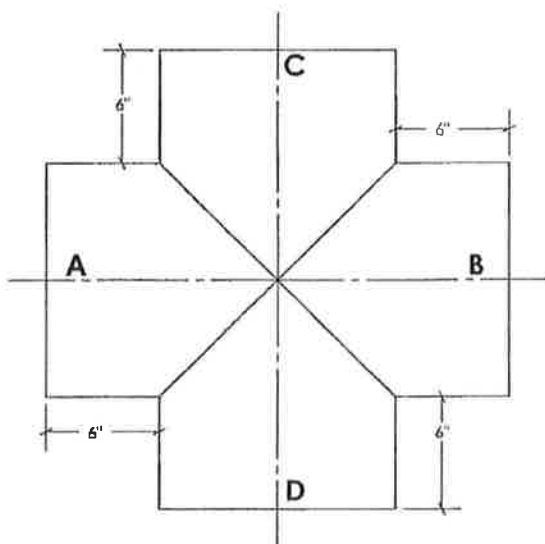
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APPLICATION	DO NOT SCALE DRAWING						



A x B x C x D

A & B must be equal diameter (Primary Air Flow)
C diameter must be equal to or less than A,B
D diameter must be equal to or less than A,B



Reducing Crosses Available by Request

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MSDS SHEETS

Fiberglass Reinforced Plastic Ductwork
Aropol™ Q 6490 Resin
Woven Rovings and Fabrics
NOROX® MEKP-9H Catalyst



MATERIAL SAFETY DATA SHEET

Product Name: **Fiberglass Reinforced Plastic Ductwork**

SECTION 1:

Manufacturer: Spunstrand Incorporated
Address: 60662 N. Frontage Road, Wallace, ID 83873
Ph # / Fax #: 208.752.1157 ph / 208.556.0133 fax
MSDS Date Revised: March 20, 2002
Product Name: Fiberglass Reinforced Plastic Ductwork
Chemical Name: N/A
CAS NO.: None

SECTION 2:

Ingredient Information

Contains: Fibrous glass 55-65%
Epoxy-acrylate resin 45-55% (cured)
Antimony trioxide 3% or none (mixed with resin)
Methyl ethyl keton peroxide 1.5-2% (catalyst/cured)

SECTION 3:

Physical Data:
Physical State: Solid
Boiling Point: Unknown
Melting Point: Unknown
Vapor Density: None
Specific Gravity: Unknown
Percent Volatile: Not volatile
Evaporation: None
Appearance: Gray colored plastic containing fibrous material.
Will be greenish and translucent if it does not contain antimony.

SECTION 4:

Fire and Explosion Data:

Flash Point: Will not flash off
Flammable Limits: Self extinguishing. Class 1 flame spread with antimony trioxide.
Explosive Limit: Not explosive

Hazardous Decomposition:

Products: May form toxic materials such as carbon dioxide, carbon monoxide, various hydrocarbons, etc.
Extinguishing Media: Regular foam or water fog, or carbon dioxide, or

dry chemical.

Firefighting Procedures: Wear self-contained breathing apparatus with a full face piece operated in the positive pressure demand mode when fighting fires.

SECTION 5:

Health Hazard Data: Grinding Dust
Threshold Limit Value: Not established for this product

Effects of Acute:

Overexposure (Eyes): Can cause irritation, redness, tearing, blurred vision.

Overexposure (Skin): Prolonged or repeated contact with skin can cause moderate irritation.

Overexposure (Respiratory): Excessive inhalation of dust can cause nasal and respiratory irritation.

Primary Routes of Entry: Inhalation, eye and skin contact.

First Aid Procedures:

Inhalation: Remove from exposure. Get medical help if irritation persists.

Eye Contact: Flush well with running water for at least 15 minutes. Get medical help if irritation persists.

Skin Contact: Cleanse with soap and water. Get medical help if irritation persists.

Ingestion: Unlikely. Consult physician if unusual reaction is noted.

Fires: Remove to fresh air. Administer oxygen and get medical help.

SECTION 6:

Reactivity Data:

Stability: Chemically stable

Corrosivity: Not corrosive

Reactivity: Not reactive

Reactivity with Water: Not reactive

Incompatible Substances: None known

SECTION 7:

Spill, Leak, Shipping, Storage and Disposal Procedures:

Spills / Leaks: Vacuum or sweep up dust deposits.

Accidental or Unplanned Releases: Clean area with vacuum, broom or wet methods.

Storage: Care should be taken to prevent crushing. Care should also be taken to prevent scratches of the internal surface of the duct. Product should be stored away from open flame or other sources of ignition.

Waste Disposal Information: Scrap material should be disposed of in a sanitary

landfill in accordance with federal, state and local regulations. Waste is not hazardous.

SECTION 8:

Protective Equipment to Be Used:

- Respiratory Protection:** When grinding fiberglass duct, an MSHA or NIOSH approved dust mask should be worn to prevent inhalation of dust. This should be sufficient unless the workplace exposure limit of the product or any component thereof is exceeded. In this case, a NIOSH / MSHA approved respirator is advised in absence of proper environmental control (see your safety equipment supplier). Engineering or administrative controls should be implemented to reduce exposure.
- Ventilation:** Provide sufficient mechanical ventilation to maintain exposure below threshold limit values.
- Protective Gloves:** Wear resistant gloves to prevent slivers, scratches and scrapes.
- Eye Protection:** OSHA approved safety glasses should be worn (consult your safety equipment supplier).
- Other Protective Clothing:** Clothing or coveralls that cover exposed skin.

SECTION 9:

Special Precautions or Other Comments:

None

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Version: 1.2

AROPOL™ Q 6490 RESIN
120737

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Ashland	Regulatory Information Number	1-800-325-3751
P.O. Box 2219	Telephone	614-790-3333
Columbus, OH 43216	Emergency telephone	1-800-ASHLAND (1-800-274-5263)

Product name	AROPOL™ Q 6490 RESIN
Product code	120737
Product Use Description	No data

2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance: liquid,

WARNING! FLAMMABLE LIQUID AND VAPOR. MAY AFFECT THE CENTRAL NERVOUS SYSTEM CAUSING DIZZINESS, HEADACHE OR NAUSEA. MAY BE HARMFUL IF INHALED OR SWALLOWED. MAY CAUSE EYE, SKIN AND RESPIRATORY TRACT IRRITATION. PROLONGED OR REPEATED CONTACT MAY DRY SKIN, CAUSE IRRITATION AND BURNS.

Potential Health Effects

Routes of exposure

Inhalation, Skin absorption, Skin contact, Eye Contact, Ingestion

Eye contact

Can cause eye irritation. Symptoms include stinging, tearing, redness, and swelling of eyes.

Skin contact

Can cause skin irritation. Prolonged or repeated contact may dry the skin. Symptoms may include redness, burning, and drying and cracking of skin, burns and other skin damage. Passage of this material into the body through the skin is possible, but it is unlikely that this would result in harmful effects during safe handling and use.

Ingestion

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Swallowing small amounts of this material during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful. This material can get into the lungs during swallowing or vomiting. This results in lung inflammation and other lung injury.

Inhalation

Breathing aerosol and/or mist is possible when material is sprayed. Aerosol and mist may present a greater risk of injury because more material may be present in the air than from vapor alone. Breathing small amounts of this material during normal handling is not likely to cause harmful effects. Breathing large amounts may be harmful. Symptoms are not expected at air concentrations below the recommended exposure limits, if applicable (see Section 8.).

Aggravated Medical Condition

Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material: respiratory tract, skin, lung (for example, asthma-like conditions), liver, male reproductive system, auditory system

Symptoms

Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include: metallic taste, stomach or intestinal upset (nausea, vomiting, diarrhea), irritation (nose, throat, airways), central nervous system depression (dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness) and other central nervous system effects, loss of coordination, confusion, liver damage

Target Organs

Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals: mild, reversible kidney effects, effects on hearing, respiratory tract damage (nose, throat, and airways), testis damage, liver damage. Overexposure to this material (or its components) has been suggested as a cause of the following effects in humans: mild effects on color vision, effects on hearing, respiratory tract damage (nose, throat, and airways), central nervous system effects

Carcinogenicity

There was no increase in cancer in rats exposed to styrene by inhalation. However, there was an increase in lung cancer in styrene-exposed mice. The relevance of the mouse lung cancer to humans is uncertain. Styrene did not cause cancer in mice in studies in which the chemical was placed in the stomachs through a feeding tube, or in a study in which styrene was given by injection. Epidemiological studies do not provide a

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basis for concluding that styrene causes cancer. Styrene is listed as a possible human carcinogen by the International Agency for Research on Cancer (IARC).

Reproductive hazard

This material (or a component) has been shown to cause harm to the fetus in laboratory animal studies. Harm to the fetus occurs only at exposure levels that harm the pregnant animal. The relevance of these findings to humans is uncertain.

Other information

Styrene readily reacts with low concentrations of halogens (for example, fluorine, chlorine, bromine, or iodine) to form a tear-producing substance.

3. COMPOSITION/INFORMATION ON INGREDIENTS
--

Components	CAS-No.	Concentration
STYRENE	100-42-5	>=30-<40%

4. FIRST AID MEASURES

Eyes

If symptoms develop, immediately move individual away from exposure and into fresh air. Flush eyes gently with water for at least 15 minutes while holding eyelids apart; seek immediate medical attention.

Skin

Remove contaminated clothing. Flush exposed area with large amounts of water. If skin is damaged, seek immediate medical attention. If skin is not damaged and symptoms persist, seek medical attention. Launder clothing before reuse.

Ingestion

Seek medical attention. If individual is drowsy or unconscious, do not give anything by mouth; place individual on the left side with the head down. Contact a physician, medical facility, or poison control center for advice about whether to induce vomiting. If possible, do not leave individual unattended.

Inhalation

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If symptoms develop, move individual away from exposure and into fresh air. If symptoms persist, seek medical attention. If breathing is difficult, administer oxygen. Keep person warm and quiet; seek immediate medical attention.

Notes to physician

Hazards: This material is an aspiration hazard. Potential danger from aspiration must be weighed against possible oral toxicity (See Section 2 - Swallowing) when deciding whether to induce vomiting.

Treatment: No information available.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Water, Foam, Carbon dioxide (CO2), Dry chemical

Hazardous combustion products

May form: carbon dioxide and carbon monoxide, toxic fumes, various hydrocarbons

Precautions for fire-fighting

Material is volatile and readily gives off vapors which may travel along the ground or be moved by ventilation and ignited by pilot lights, flames, sparks, heaters, smoking, electric motors, static discharge or other ignition sources at locations near the material handling point. Never use welding or cutting torch on or near drum (even empty) because product (even just residue) can ignite explosively. During a fire, irritating or toxic decomposition products may be generated. Wear full firefighting turn-out gear (full Bunker gear), and respiratory protection (SCBA). Polymerization will take place under fire conditions. If polymerization occurs in a closed container, there is a possibility it will rupture violently. Cool storage container with water, if exposed to fire.

Flammability Class for Flammable Liquids

Flammable Liquid Class IC

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

For personal protection see section 8. Eliminate all ignition sources (flares, flames including pilot lights, electrical sparks). Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Stop spill at

AROPOL™ Q 6490 RESIN
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source. Prevent from entering drains, sewers, streams or other bodies of water. Prevent from spreading. If runoff occurs, notify authorities as required. Pump or vacuum transfer spilled product to clean containers for recovery. Absorb unrecoverable product. Transfer contaminated absorbent, soil and other materials to containers for disposal.

Environmental precautions

Prevent run-off to sewers, streams or other bodies of water. If run-off occurs, notify proper authorities as required, that a spill has occurred.

Methods for cleaning up

Absorb liquid on vermiculite, floor absorbent or other absorbent material.

7. HANDLING AND STORAGE

Handling

Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed. Avoid prolonged or frequently repeated skin contact with this material. Skin contact can be minimized by wearing impervious protective gloves. As with all products of this nature, good personal hygiene is essential. Hands and other exposed areas should be washed thoroughly with soap and water after contact, especially before eating and/or smoking. Regular laundering of contaminated clothing is essential to reduce indirect skin contact with this material. Static ignition hazard can result from handling and use. Electrically bond and ground all containers, personnel and equipment before transfer or use of material. Special precautions may be necessary to dissipate static electricity for non-conductive containers. Use proper bonding and grounding during product transfer as described in National Fire Protection Association document NFPA 77.

Storage

Store in closed containers in a dry, well-ventilated area. Do not store near extreme heat, open flame, or sources of ignition.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

STYRENE		100-42-5
ACGIH	time weighted average	20 ppm
ACGIH	Short term exposure limit	40 ppm

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NIOSH	Recommended exposure limit (REL):	50 ppm
NIOSH	Recommended exposure limit (REL):	215 mg/m3
NIOSH	Short term exposure limit	100 ppm
NIOSH	Short term exposure limit	425 mg/m3
OSHA Z2	time weighted average	100 ppm
OSHA Z2	Ceiling Limit Value:	200 ppm
OSHA Z2	Maximum concentration:	600 ppm

General advice

These recommendations provide general guidance for handling this product. Personal protective equipment should be selected for individual applications and should consider factors which affect exposure potential, such as handling practices, chemical concentrations and ventilation. It is ultimately the responsibility of the employer to follow regulatory guidelines established by local authorities.

Exposure controls

Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below TLV(s). OSHA has formally endorsed a styrene industry proposal for a voluntary 50 ppm workplace limit on styrene. Members of the Styrene Information and Research Council (SIRC), Composites Institute (CI), Composite Fabricators Association (CFA), International Cast Polymers Association (ICPA) and National Marine Manufacturers Association (NMMA) have agreed to use either engineering controls, work practices or respiratory protection to achieve this voluntary limit for styrene.

Eye protection

Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses. Consult your safety representative.

Skin and body protection

Wear resistant gloves (consult your safety equipment supplier).
To prevent repeated or prolonged skin contact, wear impervious clothing and boots.

Respiratory protection

If workplace exposure limit(s) of product or any component is exceeded (see exposure guidelines), a NIOSH-approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH respirators

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(negative pressure type) under specified conditions (see your industrial hygienist).
Engineering or administrative controls should be implemented to reduce exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	liquid
Form	No data
Colour	No data
Odour	pungent
Boiling point/boilingrange	145.00 °C / 293 °F
pH	No data
Flash point	84 °F / 29 °C, Seta closed cup
Evaporation rate	No data
Explosion limits	1.1 %(V) 6.1 %(V)
Vapour pressure	No data
Vapour density	(>) 1 (AIR=1)
Density	1.078 g/cm3 @ 77 °F / 25 °C 9 lb/gal @ 77.00 °F / 25.00 °C
Solubility	insoluble in water
Partition coefficient: n-octanol/water	No data
Autoignition temperature	No data

10. STABILITY AND REACTIVITY

Stability

This material is unstable at elevated temperatures and pressures.

Conditions to avoid

Avoid heat, open flame, and prolonged storage at elevated temperatures., Avoid contact with:, excessive heat

Incompatible products

Avoid contact with:, acids, aluminum chloride, halogens, iron chloride, metal salts, peroxides, strong alkalis, strong oxidizing agents

Hazardous decomposition products

May form:, carbon dioxide and carbon monoxide, toxic fumes, various hydrocarbons

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Hazardous reactions

Product can undergo hazardous polymerization., Avoid exposure to excessive heat, peroxides and polymerization catalysts.

Thermal decomposition

No data

11. TOXICOLOGICAL INFORMATION

Acute oral toxicity

STYRENE

LD 50 Rat: 2,650 mg/kg

Acute inhalation toxicity

STYRENE

LC 50 Rat: 2800 ppm, 4 h

Acute dermal toxicity

12. ECOLOGICAL INFORMATION

Aquatic toxicity

Acute and Prolonged Toxicity to Fish

No data

Acute Toxicity to Aquatic Invertebrates

No data

Environmental fate and pathways

No data

13. DISPOSAL CONSIDERATIONS

Waste disposal methods

Dispose of in accordance with all applicable local, state and federal regulations.
Do not discharge effluent containing this product into lakes, streams, ponds or estuaries,

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oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit, and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Ashland Distribution's Environmental Services Group at 800-637-7922.

14. TRANSPORT INFORMATION

IMDG:

UN1866, RESIN SOLUTION 3, III

IATA_P:

UN1866, Resin solution 3, III

IATA_C:

UN1866, Resin solution 3, III

CFR_ROAD:

UN1866, Resin solution 3, III

CFR_RAIL:

UN1866, Resin solution 3, III

CFR_INWTR:

UN1866, Resin solution 3, III

Dangerous goods descriptions (if indicated above) may not reflect package size, quantity, end-use or region-specific exceptions that can be applied. Consult shipping documents for descriptions that are specific to the shipment.

15. REGULATORY INFORMATION

California Prop. 65

WARNING! This product contains a chemical known in the State of California to cause cancer.

BENZENE

CATECHOL

WARNING! This product contains a chemical known in the State of California to cause birth defects or other reproductive harm.

BENZENE

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TOLUENE

SARA Hazard Classification	Fire Hazard
	Acute Health Hazard
	Chronic Health Hazard
	Reactivity Hazard

SARA 313 Component(s)		
STYRENE	100-42-5	38.8486%



	Health	Flammability	Reactivity	Other
HMIS	2*	3	2	
NFPA	2	3	2	

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This MSDS has been prepared by Ashland's Environmental Health and Safety Department (1-800-325-3751).



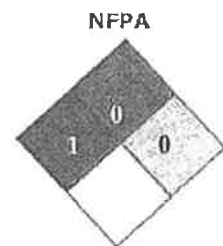
INNOVATIONS FOR LIVING™

View MSDS : 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Personal Protective Equipment   Protective Gloves Safety Glasses	WHMIS Pictograms Not Controlled	DOT Pictograms Not Regulated
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SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Product Name: **Woven Rovings and Fabrics**
MSDS Manufacturer Number: **21555-NAM**
Synonyms: **Woven Unidirectional Fiberglass Fabric (A-Style Wrap Unidirectional), Stitchbonded Fiberglass Fabric, Woven Fiberglass Fabric, Woven Roving**
Manufacturer Name: **Owens Corning Composite Materials, LLC**
Address: **One Owens Corning Parkway
Toledo, OH 43659**
Customer Service Phone Number: **1-800-GET-PINK or 1-800-438-7465**
Health Issues Information: **1-419-248-8234 (8am-5pm ET)**
Technical Product Information: **1-800-GET-PINK or 1-800-438-7465**
Emergency Phone Number: **1-419-248-5330 (after 5pm ET and weekends)**
CHEMTREC: **800-424-9300 (24 hours everyday)**
Canutec: **(613) 996-6666 (Canada 24 hours everyday)**
Website: **www.owenscorning.com**
MSDS Creation Date: **February 25, 1997**
MSDS Revision Date: **September 25, 2007**
MSDS Format: **According to ANSI Z400.1-2004**



HMIS	
Health Hazard	1
Fire Hazard	0
Reactivity	0
Personal Protection	X

* Chronic Health Effects

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Ingredient Percent
Polyester Yarn	Not Available	1 - 5 by weight
Size	Not Available	1 - 5 by weight
Fiber Glass (continuous filament, non-respirable)	65997-17-3	60 - 100 by weight

Notes :

The remaining components of this product are non-hazardous or are in a small enough quantity as to not meet regulatory thresholds for disclosure.

As manufactured continuous filament glass fibers are non-respirable. Continuous filament glass products that are chopped, crushed or severely mechanically processed during manufacturing or use may contain a very small amount of respirable particulate, some of which may be glass shards. See Section 8 for Exposure Limit Data.

SECTION 3 - HAZARDS IDENTIFICATION

Applies to Product:

Emergency Overview:	No unusual conditions are expected from this product under normal conditions of use.
Route of Exposure:	Eye contact Skin contact Inhalation.
Potential Health Effects:	
Eye:	May cause slight irritation.
Skin:	May cause slight skin irritation.
Inhalation:	May cause irritation of respiratory tract.
Ingestion:	Ingestion of this product is unlikely.
Chronic Health Effects:	There is no known chronic health effect connected with long-term use or contact with this product.
Carcinogenicity:	This material is not considered a carcinogen.
Potential Environmental Effects:	There is no known ecological information for this material.
Aggravation of Pre-Existing Conditions:	Chronic respiratory or skin conditions may temporarily worsen from exposure to this product.
OSHA Regulatory Status:	This product is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

SECTION 4 - FIRST AID MEASURES

Eye Contact:	Immediately flush eyes with plenty of water for at least 15 to 20 minutes. Ensure adequate flushing of the eyes by separating the eyelids with fingers. Do not rub or scratch eyes. If eye irritation persists, consult a specialist.
Skin Contact:	Wash off immediately with soap and cold water. DO NOT use warm water because this will open up the pores of the skin, which will cause further penetration of the fibers. Use a wash cloth to help remove fibers. DO NOT rub or scratch affected areas. Remove contaminated clothing. If irritation persists get medical attention.
Inhalation:	Move to fresh air. If symptoms persist, call a physician.
Ingestion:	Accidental ingestion of this material is unlikely. If this does occur, watch person for several days to make sure intestinal blockage does not occur. Rinse mouth with water and drink water to remove fibers from the throat. If symptoms persist, call a physician.
Note to Physicians:	Treat symptomatically.

SECTION 5 - FIRE FIGHTING MEASURES

Flammable Properties:	Non Flammable.
Flash Point:	Not available.
Auto Ignition Temperature:	Not available.
Lower Flammable/Explosive Limit:	In Air: Not available.
Upper Flammable/Explosive Limit:	Not available.
Extinguishing Media:	dry chemical foam carbon dioxide (CO2) water fog
Protective Equipment:	Wear self-contained breathing apparatus (SCBA) and full fire fighting protective gear.
Hazardous Combustion Byproducts:	Carbon monoxide. Carbon dioxide. hydrogen. Other undetermined compounds could be released in small quantities.
Universal Fire And Explosion Hazards:	Not available.

NFPA Ratings:

NFPA Flammability:	0
NFPA Health:	1
NFPA Reactivity:	0

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personnel Precautions:	Avoid contact with skin and eyes.
Environmental Precautions:	Prevent further leakage or spillage if safe to do so.
Methods for containment:	This material will settle out of the air. Prevent from spreading by covering, diking or other means.
Methods for cleanup:	Use an Industrial vacuum cleaner with a high efficiency filter to clean up dust and fiber contamination. Avoid dry sweeping. Pick up and transfer to properly labeled containers.
Other Precautions:	Does not apply.

SECTION 7 - HANDLING and STORAGE

Handling:	Avoid dust formation. Do not breathe dust. Wear personal protective equipment.
Storage:	Keep product in its packaging until use to minimize potential dust generation. Product should be kept dry and undercover.
Hygiene Practices:	Wash hands before breaks and immediately after handling the product. Remove and wash contaminated clothing before re-use.

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION - EXPOSURE GUIDELINES

Engineering Controls:	Provide local exhaust and/or general ventilation to maintain exposure below regulatory and recommended limits. Dust collection system must be used in transferring operations, cutting or machining or other dust generating processes, such as using power tools. Vacuum or wet clean-up methods should be used.
Eye/Face Protection:	Safety glasses with side-shields.
Skin Protection Description:	Protective gloves. Long sleeved shirt and long pants.
Respiratory Protection:	When workers are facing airborne particulate/dust concentrations above the exposure limit they must use appropriate certified respirators. A properly fitted NIOSH approved disposable N 95 type dust respirator or better is recommended. Consult with your company's local procedures for selection, training, inspection and maintenance of respirators. Otherwise, consult the NIOSH web site (http://www.cdc.gov/niosh/nppt/topics/respirators/disp_part) for a list of dust respirator types and approved suppliers.
General Hygiene Considerations:	Wash hands before breaks and immediately after handling the product. Remove and wash contaminated clothing before re-use.

EXPOSURE GUIDELINES

	Guideline OSHA	Guideline ACGIH	Ontario Canada	Mexico	
Fiber Glass (continuous filament, non-respirable)	PEL-TWA: 1 f/cc (Respirable)	TLV-TWA: 1 f/cc (Respirable) 5 mg/m ³ (Inhalable)	TWAEV: 1 f/cc (Respirable) 5 mg/m ³ (Inhalable)	TWA: 10 mg/m ³	

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

Color:	White to off-white.
Odor:	Odorless
Boiling Point:	No Data
Melting Point:	> 800 °C
Specific Gravity:	2.60 (Ref: water = 1).
Solubility:	Insoluble in water.
Vapor Density:	No Data
Vapor Pressure:	No Data
Evaporation Rate:	No Data
pH:	No Data
Viscosity:	No Data
Flash Point:	Not available.
Auto Ignition Temperature:	Not available.

SECTION 10 - STABILITY and REACTIVITY

Chemical Stability:	Stable under normal conditions.
Hazardous Polymerization:	Hazardous polymerization does not occur.
Conditions to Avoid:	None expected
Incompatible Materials:	No materials to be especially mentioned.
Special Decomposition Products:	See Section 5 of MSDS for hazardous decomposition products during a fire.

SECTION 11 - TOXICOLOGICAL INFORMATION

Applies to Product :

Acute Toxicity:

Dusts may cause mechanical irritation to eyes and skin. Ingestion may cause transient irritation of throat, stomach and gastrointestinal tract. Inhalation may cause coughing, nose and throat irritation, and sneezing. High exposures may cause difficulty breathing, congestion, and chest tightness.

Carcinogens:						
	ACGIH	NIOSH	OSHA	IARC	NTP	MEXICO
Fiber Glass (continuous filament, non-respirable)	A4 Not Classifiable as a Human Carcinogen	No Data	No Data	Group 3 - Not Classifiable as to its Carcinogenicity to Humans.	No Data	No Data

Applies to Product :

Sensitization:

No Information available.

Mutagenicity:

No information available.

Reproductive Toxicity:

No information available.

Teratogenicity:

No information available.

Neurological Effects:

No information available.

SECTION 12 - ECOLOGICAL INFORMATION

Applies to Product :

Ecotoxicity:

This material is not expected to cause harm to animals, plants or fish.

Bioaccumulation:

Not available.

Biodegradation:

Not available.

Mobility In Environmental Media:

Not available.

SECTION 13 - DISPOSAL CONSIDERATIONS

Applies to Product :

Waste Disposal:

Dispose of in accordance with Local, State, Federal and Provincial regulations.

Contaminated Packaging:

Empty containers should be taken for local recycling, recovery or waste disposal.

RCRA Number:

No EPA Waste Numbers are applicable for this product's components.

RCRA Characteristics:

This material is not expected to be a characteristic hazardous waste under RCRA.

SECTION 14 - TRANSPORT INFORMATION

DOT Shipping Name:	Not Regulated.
IATA Shipping Name:	Not Regulated.
Canadian Shipping Name:	Not Regulated.
IMDG Shipping Name :	Not Regulated.
ADR Shipping Name :	Not Regulated.
RID Shipping Name :	Not Regulated.
ICAO Shipping Name:	Not Regulated.
MEX Shipping Name :	Not Regulated.

SECTION 15 - REGULATORY INFORMATION

Inventory Status

	Japan ENCS	EINECS Number	PICCS	China	South Korea KECL
Fiber Glass (continuous filament, non-respirable)	Not listed	266-046-0	Listed	Listed	KE-17630

	Australia AICS	Canada DSL	TSCA Inventory Status		
Fiber Glass (continuous filament, non-respirable)	Listed	Listed	Listed		

Applies to Product :

Canada Reg. Status:

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by the Controlled Products Regulations.

Canada WHMIS:

Not controlled.

CA PROP 65:

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):
This product does not contain any Proposition 65 chemicals.

SARA:

This product does not contain any chemicals which are subject to the reporting requirements of the Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III (40CFR, Part 372).

Section 311/312 Hazard Categories:

Acute Health Hazard:	Yes
Chronic Health Hazard:	No
Risk of Ignition:	No
Sudden Release of Pressure Hazard:	No
Reactive Hazard:	No

Clean Air Act:

This product does not contain any Hazardous Air Pollutants (HAPs).

State Right To Know

	RI	MN	IL	PA	MA
Fiber Glass (continuous filament, non-respirable)	No Data	Listed	No Data	No Data	No Data

	NJ				
Fiber Glass (continuous filament, non-respirable)	No Data				

SECTION 16 - ADDITIONAL INFORMATION

HMIS Health Hazard: 1
HMIS Fire Hazard: 0
HMIS Reactivity: 0
HMIS Personal Protection: X
MSDS Creation Date:
MSDS Revision Date:
MSDS Revision Notes:
MSDS Author:

February 25, 1997
September 25, 2007
Format Update
KK

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SECTION 1 - IDENTIFICATION OF THE PRODUCT AND THE COMPANY

PRODUCT NAME	NOROX® MEKP-9H	TELEPHONE	870-572-2935
MANUFACTURER	Syrgis Performance Initiators, Inc.	CHEMTREC (24hr) (USA)	800-424-9300
ADDRESS	334 Phillips 311 Rd., Helena, AR 72342	(Maritime/International)	703-527-3887
CHEMICAL NAME	Methyl Ethyl Ketone Peroxide (MEKP)	CAS NO.	See Section 2
CHEMICAL FAMILY	Organic Peroxide - Ketone Peroxide	CHEMICAL FORMULA	Mixture

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENTS	CAS NO.	%
Methyl Ethyl Ketone Peroxide	1338-23-4	32 - 35
Dimethyl Phthalate	131-11-3	35 - 60
Phlegmatizer	Proprietary	6 - 28
Hydrogen Peroxide	7722-84-1	1
Methyl Ethyl Ketone	78-93-3	0 - 2
Water	7732-18-5	1

SECTION 3 - HAZARD IDENTIFICATION OF THE PREPARATION

PHYSICAL HAZARDS	Organic Peroxide. Decomposition.
HEALTH HAZARDS	Severe Irritant.
EXPOSURE LIMITS	The ACGIH Ceiling STEL is 1.5 mg/m ³ (0.2 ppm) for Methyl Ethyl Ketone Peroxide.
ROUTES OF EXPOSURE	
Skin Contact	Severe skin irritant, causes redness, blistering, and edema.
Eye Contact	Eye contact causes severe corrosion and may cause blindness.
Ingestion	Human systemic effects by ingestion: changes in structure or function of esophagus, nausea, or vomiting, and other gastrointestinal effects.
Inhalation	Moderately toxic by inhalation.
EFFECTS OF OVER-EXPOSURE	Prolonged inhalation of vapors may cause mucous membrane irritation and vertigo. There are no known medical conditions, which are recognized as being aggravated by exposure.

SECTION 4 - FIRST-AID MEASURES

Skin	Immediately remove any contaminated clothing. Wash contaminated area thoroughly with soap and copious amounts of water for at least 15 minutes. If irritation or adverse symptoms develop, seek medical attention.
Eyes	Remove any contact lenses at once. Flush eyes with water for at least 15 minutes. Ensure adequate flushing by separating the eyelids with fingers. If irritation or adverse symptoms develop, seek medical attention.
Ingestion	Do Not induce vomiting. Drink plenty of water. Immediately call a physician. For aid to physician, suggest local Poison Control Center.
Inhalation	Remove to fresh air, if coughing, breathing becomes labored, irritation develops or other symptoms develop, seek medical attention at once, even if symptoms develop several hours after the exposure.

SECTION 5 - FIRE-FIGHTING MEASURES

FLASH POINT	>200°F (93°C) C.O.C.
FLAMMABLE LIMITS	Not established.
AUTOIGNITION POINT	Not established.
EXTINGUISHING MEDIA	Water from a safe distance - preferably with a fog nozzle. In case of very small fires, other means such as carbon dioxide, foam or dry chemical extinguishers may be effective. Dry chemical combined with MEKP formulations may re-ignite. Light water additives may be particularly effective at extinguishing MEKP fires.
SPECIAL FIRE FIGHTING PROCEDURES	Firemen should be equipped with protective clothing and SCBA's. In case of fire near storage area, cool the containers with water spray. If dry chemical is used to extinguish an MEKP fire, the extinguished area must be thoroughly wetted down with water to prevent re-ignition.

NOROX[®] MEKP-9H**UNUSUAL FIRE AND EXPLOSION HAZARDS**

The heat of decomposition of the peroxides adds to the heat of the fire. Dry chemical fire extinguishing agent may catalyze the decomposition.

SECTION 6 - ACCIDENTAL RELEASE MEASURES**STEPS TO BE TAKEN IN EVENT OF SPILL OR RELEASE**

Dike spill to prevent runoff from entering drains, sewers, streams, etc. Wet spilled material with water and absorb with an inert absorbent material such as perlite, vermiculite, or sand. Sweep up using non-sparking tools and place in a clean polyethylene drum or a polyethylene pail. **DO NOT** place into a steel container, lined or unlined, as a decomposition may occur. Treat any contaminated cardboard packaging as hazardous waste. Wet container contents with additional water prior to sealing.

SECTION 7 - HANDLING AND STORAGE**HANDLING**

Rotate stock using the oldest material first. Avoid contact with skin, eyes and clothing. Use PPE as specified in Section 8. Keep containers closed to prevent contamination. Keep away from sources of heat, sparks or flame. Do not add to hot solvents or monomers as a violent decomposition and/or reaction may result. When using spray equipment, never spray raw MEKP onto curing or into raw resin or flues. Keep MEKP in its original container. **DO NOT USE NEAR FOOD OR DRINK.** Wash thoroughly after handling.

STORAGE

The stability of MEKP formulations is directly related to the shipping and storage temperature history. Cool storage at 80°F or below is recommended for longer shelf life and stability. Prolonged storage at elevated temperatures of 100°F and higher will cause product degradation, gassing and potential container rupture which can result in a fire and/or explosion. Store out of direct sunlight in a well ventilated area away from combustible and incompatible materials. **DO NOT STORE WITH FOOD OR DRINK.** Refer to NFPA 432 Code for the Storage of Organic Peroxide Formulations from the National Fire Protection Association for additional storage information.

OTHER PRECAUTIONS

Unmixed, uncontaminated material, remaining at the end of the day, shall be returned to a proper organic peroxide storage area. Under no circumstances should material be returned to the original container.

SECTION 8 - EXPOSURE CONTROL/PERSONAL PROTECTION**VENTILATION**

Mechanical, general.

RESPIRATORY PROTECTION

If airborne concentrations are expected to exceed acceptable levels wear a NIOSH approved air-purifying respirator with an organic vapor cartridge or canister. When using respirators refer to OSHA's 29CFR 1910.134.

EYE PROTECTION

Safety goggles recommended. Permanent eyewash is highly recommended.

HAND PROTECTION

Protective gloves recommended, solvent resistant, such as butyl rubber, nitrile or neoprene.

OTHER

A safety shower and eyewash is recommended when the risk of a significant exposure exists.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES**APPEARANCE AND ODOR:**

Water white liquid with a slight odor.

BOILING POINT:

Not established.

SPECIFIC GRAVITY:

1.1

VAPOR PRESSURE:

Not established.

FLASH POINT:

>200°F (93°C) C.O.C.

VAPOR DENSITY:

> 1

FLAMMABLE LIMITS:

Not established.

EVAPORATION RATE:

Not established.

SAOT:

>60°C (140°F)

% VOLATILE BY VOLUME:

Not established.

pH:

Not applicable.

SOLUBILITY IN WATER:

Slightly soluble in water.

SECTION 10 - STABILITY AND REACTIVITY**STABILITY**

Stable when kept in original, closed container, out of direct sunlight at temperatures below 80°F (27°C).

CONDITIONS TO AVOID

Contamination. Direct sunlight. Open flames. Prolonged storage above 100°F (38°C). Storage above SAOT. Storage near flammable or combustible materials.

NOROX[®] MEKP-9H**MATERIALS TO AVOID**

Dimethylaniline, cobalt naphenate and other promoters, promoted resins, accelerators, oxidizing and reducing agents, strong acids, bases, metals, metal alloys and salts, sulfur compounds, amines or any hot material.

HAZARDOUS DECOMPOSITION PRODUCTS

Decomposition products are flammable. Acrid smoke and irritating fumes.

HAZARDOUS POLYMERIZATION

Will not occur.

SECTION 11 - TOXICOLOGICAL INFORMATION**Methyl Ethyl Ketone Peroxide****Hazard Data:**

Inhalation: Rat--LC₅₀: 200 ppm/4 hr, lung, thorax, respiration, or dyspnea; Mouse--LC₅₀: 170 ppm/4 hr, lung, thorax, respiration, or dyspnea.

Intraperitoneal: Rat--LD₅₀: 65 mg/kg, behavioral, muscle weakness behavioral, ataxia.

Oral: Rat--LD₅₀: 484 mg/kg; Mouse--LD₅₀: 470 mg/kg; Human--TD_{Lo}: 480 mg/kg, changes in structure or function of esophagus gastrointestinal, nausea or vomiting gastrointestinal.

Skin: Rabbit--LD₅₀: 500 mg.

Dimethyl Phthalate**Hazard Data:**

Inhalation: Cat--LC_{Lo}: 9300 mg/m³/6.5 hr.

Intraperitoneal: Mouse--LD₅₀: 1380 mg/kg.

Oral: Rat & Mouse--LD₅₀: 6800 mg/kg, somnolence behavioral, withdrawal nutritional and gross metabolic, weight loss or decreased weight gain; Dog--LD: >1400 mg/kg; Rabbit--LD₅₀: 4400 µL/kg.

Subcutaneous: Mouse--LD_{Lo}: 6500 mg/kg, dyspnea lung, thorax, respiration, or cyanosis.

Proprietary Phlegmatizer**Hazard Data:**

Eye: Rabbit: 93 mg, severe.

Inhalation: Human--TC_{Lo}: 50mg/kg, eye effects, nose effects, and pulmonary system effects.

Intraperitoneal: Rat--LD_{Lo}: 1500mg/kg; Mouse--LD₅₀: 1299 mg/kg.

Oral: Rat--LD₅₀: >3200 mg/kg.

Skin: Rabbit: 456 mg/24H, moderate; Rabbit--LD₅₀: 8560 mg/kg.

Hydrogen Peroxide**Hazard Data:**

Inhalation: Mouse--LC_{Lo}: 227 ppm; Rat--TC_{Lo}: 67 ppm/6hr/6W-1, dermatitis, irritative of the skin.

Intraperitoneal: Mouse--LD₅₀: 880 mg/kg.

Intravenous: Rabbit--LD₅₀: 15 gm/kg, behavioral, convulsions or effect on seizure threshold.

Oral: Rat--LD₅₀: 376 mg/kg, gastrointestinal, peritonitis blood, pigmented or nucleated red blood cells; Mouse--LD₅₀: 2 mg/kg.

Subcutaneous: Rat--LD₅₀: 620 mg/kg; Mouse--LD₅₀: 1072 mg/kg.

Skin: Rat--LD₅₀: 4060 mg/kg, lung, thorax, respiration, or pulmonary emboli; Rabbit--LD_{Lo}: 500 mg/kg, behavioral, convulsions or effect on seizure threshold.

Methyl Ethyl Ketone**Hazard Data:**

Eye: Human: 350 ppm.

Inhalation: Rat--LC₅₀: 23500 mg/m³/8hr.

Intraperitoneal: Rat--LD₅₀: 607 mg/kg; Mouse--LD₅₀: 616 mg/kg.

Oral: Rat--LD₅₀: 2737 mg/kg; Mouse--LD₅₀: 4050 mg/kg.

Skin: Rabbit--LD₅₀: 6480 mg/kg.

SECTION 12 - ECOLOGICAL INFORMATION

No data is available on the preparation itself. The product should be prevented from entering drains, sewers, streams, etc.

Ecotoxicity: Methyl ethyl ketone peroxide: EC₅₀ (Guppy), 44.2 mg/L/96 hr, EC₅₀ (alga), 42,700 µg/L/96 hr.

Environmental Fate: Methyl ethyl ketone peroxide (MEKP) was evaluated for biodegradability in a closed bottle system and was reported to be readily biodegradable. An EC₅₀ of 16mg MEKP/L activated sludge was reported in an activated sludge respiration inhibition test.

SECTION 13 - DISPOSAL CONSIDERATIONS

Prevent material from entering drains, sewers, streams, etc.

NOROX[®] MEKP-9H

Immediately dispose of waste material at a RCRA approved hazardous waste management facility in accordance with federal, state and local regulations.

SECTION 14 - TRANSPORT INFORMATION

DOT Shipping Name: ORGANIC PEROXIDE TYPE D, LIQUID
(METHYL ETHYL KETONE PEROXIDE, ≤45%)
DOT Hazard Class: 5.2
UN/NA ID No.: UN3105
DOT Packing Group: PG II
DOT RQ: RQ (if shipping container is greater than 29.4 lbs)
Labels: 5.2 (Organic Peroxide)
2004 ERG GUIDE NO.: 145

SECTION 15 - REGULATORY INFORMATION

The following chemicals are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

<u>Chemical Name</u>	<u>CAS Number</u>	<u>Percent</u>
Dimethyl Phthalate	131-11-3	35 - 60
Methyl Ethyl Ketone	78-93-3	0 - 2

Reportable Quantity
2-Butanone Peroxide (MEKP): 10 lbs (4.54 kg)

Australian Inventory of Chemical Substances (AICS)
The ingredients in this product are listed in the Australian AICS Inventory.

Canadian Domestic Substances List (DSL)
The ingredients in this product are listed in the Canadian DSL Inventory.

Chinese Inventory of Existing Chemical Substances Manufactured or Imported in China (IECSC)
The ingredients in this product are listed in the Chinese IECSC Inventory.

European Inventory of Existing Commercial Chemical Substances (EINECS)
The ingredients in this product are listed in the European EINECS Inventory.

Japanese Existing and New Chemical Substances (ENCS)
The ingredients in this product are listed in the Japanese ENCS Inventory.

Korean Existing Chemicals List (ECL)
The ingredients in this product are listed in the Korean ECL Inventory.

US Toxic Substances Control Act (TSCA)
The ingredients in this product are listed in the US TSCA Inventory.

Status of Carcinogenicity
Not recognized as a carcinogen by the IARC, NTP or OSHA.

SECTION 16 - OTHER INFORMATION

VOC Information
Using ASTM Test Method D-2369-87, but at 40°C (since MEKP decomposes rapidly above 100°C and is not a VOC), MEKP-9H contains 3.7% VOC, by weight, or 41 grams per liter. For more information call Syrgis Performance Initiators, Inc.

NFPA 432 Organic Peroxide Classification
Class II

<u>NFPA 704 Rating</u>			<u>HMS Rating</u>		
<u>Health</u>	<u>Flammability</u>	<u>Reactivity</u>	<u>Health</u>	<u>Flammability</u>	<u>Reactivity</u>
3	2	2	3	2	2

MSDS Reference: MEKP-9H MSDS 0805

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NOROX[®] MEKP-9H

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