Spunstrand®

SUBMITTAL FOR:

INSULATED UNDERSLAB DUCT

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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. The use of resin additives to achieve Class 1 ratings is not acceptable.
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 **INSULATION**

A. Underground ductwork shall be factory pre-insulated including all fittings. The duct shall be ICC-ES listed and installed in strict accordance with the manufacturer's instructions. The insulation value of the duct shall be R-4, R-6, R-8, R-10 or R-12 as selected. Insulation values shall be tested per ASTM C-518 in an independent lab with a minimum of five years experience performing testing to this standard.

2.04 **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 12.
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.

2.05 **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.

Part 3 - **INSTALLATION**

3.01 **GENERAL**

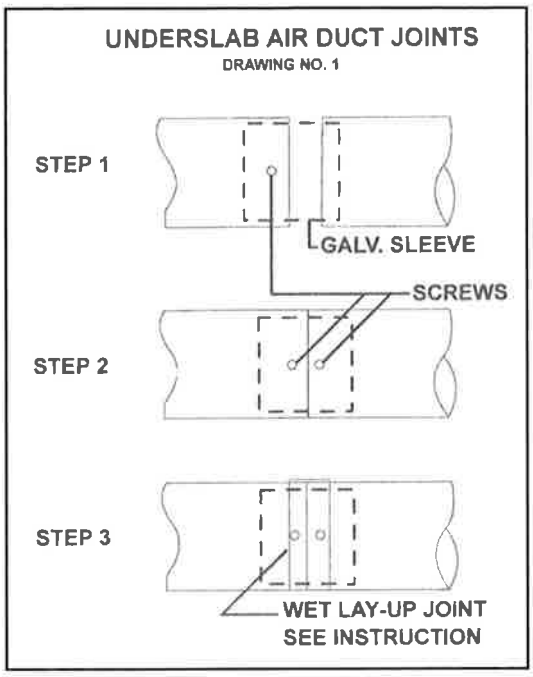
A. Spunstrand® Inc. duct is a semi-rigid reinforced thermosetting resin product designed to deflect approximately 5% under external load without structural damage. The performance of the duct is affected by the amount of strain introduced into the duct wall from internal pressure, external loads and 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 9). 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 9)



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.

B. 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 ½" 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 15)

DIRECT BURIAL UNDERSLAB DUCT

Standard Installation Defined

Spunstrand® Inc. 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 contactor 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 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 9.)

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 13 and 14). 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.

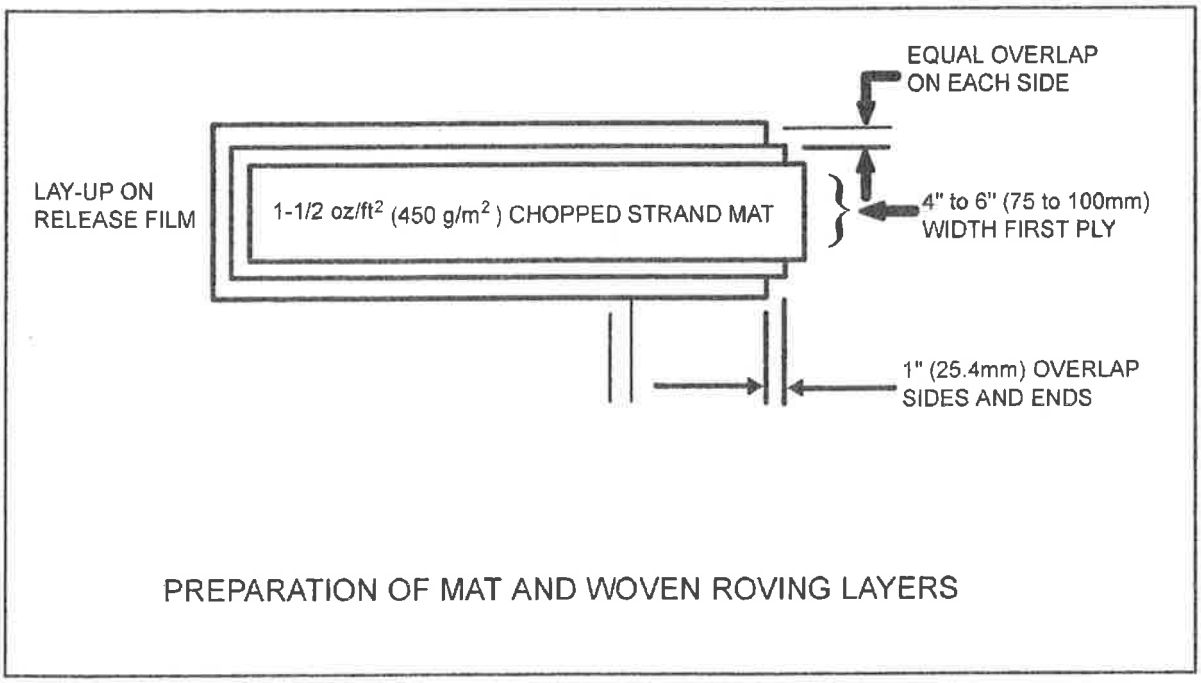


FIGURE 1

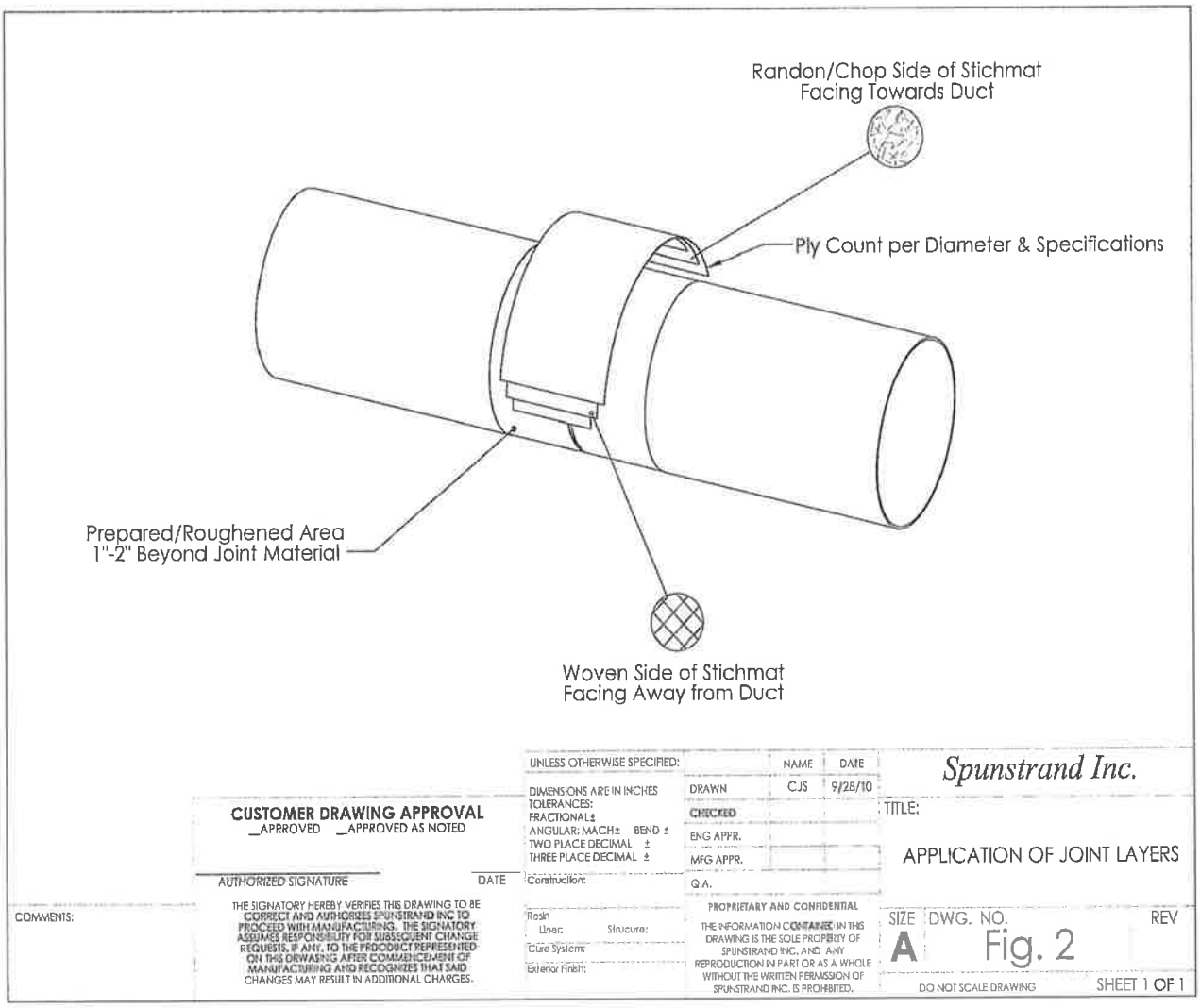
Begin the lay-up of the joint wrap by placing the chop strand side of the mat down against the duct. Use a 3" to 4" wide brush and laminating roller to work the resin in. Continue working the joint by rolling the resin from the center of the joint to the outer edges. Use moderate force with the roller 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 GUAGE / 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.
*72" and larger diameter ductwork is not included in the ICC-ES listing.		

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 competed. 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

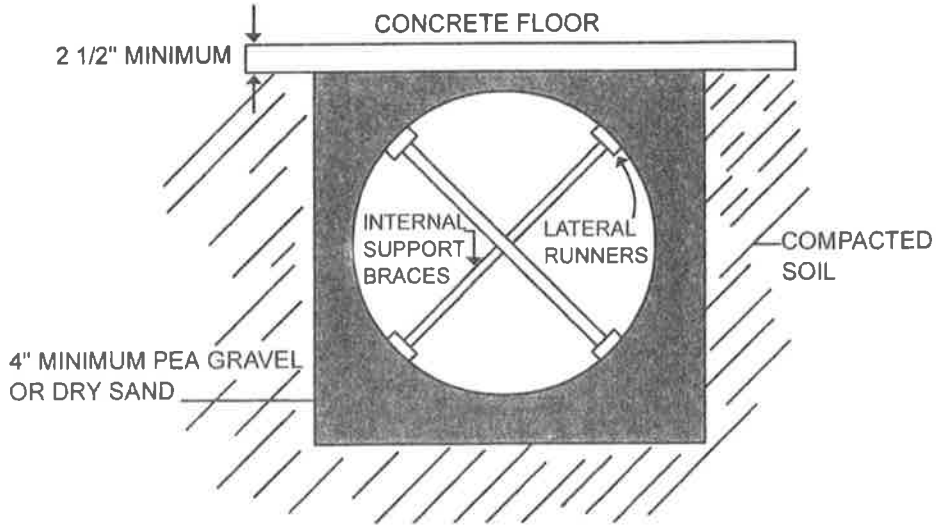
Where water is encountered within the trench zone it should be removed by suitable means and the trench maintained in a reasonable dry condition until the duct has been installed and enough backfill placed to prevent any floatation. The gradation of the backfill in the duct trench shall be such that 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

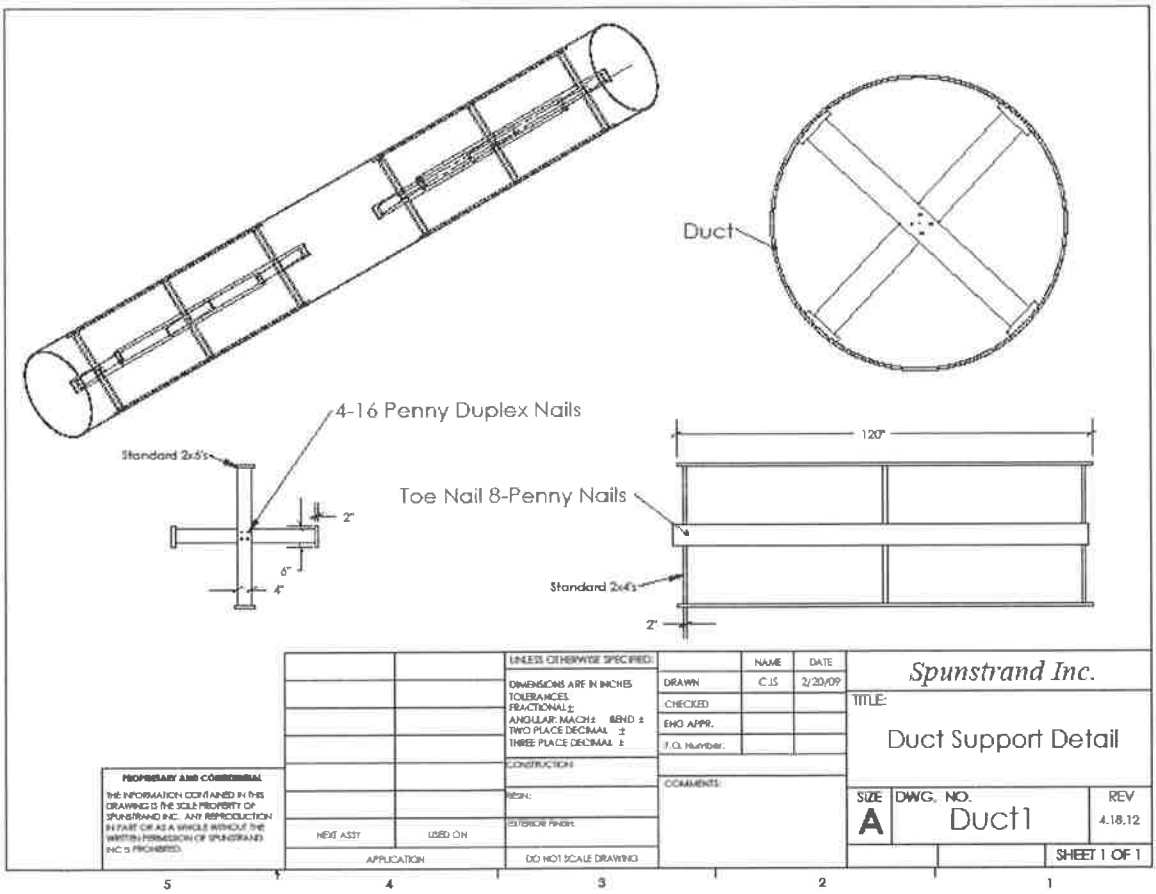
Heavy equipment shall not be allowed to pass over the duct without proper bridging. Where heavy floor loads are anticipated, the floor slab should be reinforced over the duct area or a crown of concrete poured over the duct in lieu of the backfill material. Where ducts are parallel to a wall or foundation, 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 15)

MOVABLE INTERNAL SUPPORTS FOR LARGE DIAMETER (36" and over) UNDERSLAB AIR DUCT
Drawing No. 5



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.