Manual No. F6015
April 15, 1997

INSTALLATION DATA

Two-piece Secondary Containment Pipe & Fittings

IMPORTANT • READ THIS FIRST

Before beginning actual assembly procedures, read and make sure all individuals involved in the installation thoroughly understand the following suggestions and precautions:

You must use Manual No. F6000 (or F6010 with CHEM THREAD® product) with these instructions.

In all cases, the bonding surfaces must be clean and dry before applying adhesive. All bonding surfaces must be factory fresh in appearance. When machined ends have been stored in direct sunlight, surfaces will weather and result in loss of bond strength. When surfaces are weathered, sand or re-scarf spigots and sand sockets to achieve a factory fresh appearance.

Fiberglass fillers are required for all adhesive kits when installing two-piece fittings. Each adhesive kit size (standard or large) has a corresponding filler kit.

Use of approved field scarfing tools is recommended to obtain a uniform scarf dimension and a snug fit. During set up of the scarfing tools, dry fit to make sure the two halves of the fittings close together completely on both sides (see Fig. 6). Hand sanding to obtain a scarf may result in the removal of either too much or too little material.

Do not move secondary containment joints prior to adhesive cure.

Joint strength is essentially controlled by the adhesive thickness in the socket joints. Socket joints behave entirely differently than tapered bell and spigot joints in relation to weather conditions. The adhesive in socket joints may try to "run out" during the hot summer months. The adhesive needs to be thick (filled) and viscous during assembly of socket joints. (Note: This is exactly opposite the requirement for a thin layer of adhesive for the tapered joints used in the primary piping.) While applying adhesive, use pressure on the brush to "wet out" machined surfaces before applying a thick layer of adhesive.

The instructions for assembling the primary piping are shown in Manual No. F6000 (or F6010 for CHEM THREAD product), which must be used with these instructions for containment systems.

INTRODUCTION

These instructions cover only the assembly of the secondary system. Manual No. F6000 (or F6010 for CHEM THREAD product) must be used with these instructions. Procedures common to both systems, such as cutting, handling, adhesive mixing, etc., are presented in Manual No. F6000 and F6010.

These installation instructions are for low pressure (drain) secondary containment systems. All references to secondary containment systems in these instructions are related only to low pressure, gravity drain systems. (Note: A KwiKey® mechanical joint secondary containment product line is available for higher pressure secondary containment systems. These higher pressure systems require separate installation procedures that are not referenced in these instructions.)

The secondary containment system is designed for use with **RED THREAD® II**, **GREEN THREAD®**, **POLY THREAD®** and **CHEM THREAD** primary (product) pipe.

The secondary containment piping system consists of the next larger pipe size (as a minimum) and special two-piece fittings. The standard secondary containment pipe is RED THREAD II, a filament wound epoxy resin pipe. **Note: Other types of containment pipe are available on special order; however, the joint fit for standard containment fittings must be checked for the various types of pipe.** Fittings are manufactured with vinyl ester resin and randomly oriented glass fibers. Fitting manufacturing process is by either the compression molding process, or the contact molding process. Contact molding includes spray-up and/or hand lay-up process.

SMITH FIBERGLASS PRODUCTS INC. • A SUBSIDIARY OF A. O. SMITH CORPORATION
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The washer head bolts and threaded inserts required for assembling the fittings are supplied, with the inserts mounted in the fittings. One exception: laterals are supplied with nuts, bolts, and washers, because the parts are not mirror-image. Two types of adhesive are available for assembly. Both types of adhesive require filler kits containing pre-weighed amounts of filler to increase the viscosity of the mixed adhesive when used with two-piece fittings. Systems joined with DS-7014 or DS-7069 adhesive are rated to 150˚F maximum operating temperature. Systems joined with DS-8014 or DS-8069 adhesive are rated to 200˚F. Note: When standard primary fittings, such as sleeve couplings, are used in the containment piping, do not use filler. Refer to Manual No. F6000 for primary systems when installing joints with matching tapers.

These piping systems are recommended for corrosion services over a broad pH range. Consider the chemical recommendations for both RED THREAD II (epoxy pipe) and POLY THREAD (vinyl ester fittings) for a conservative evaluation. Refer to Bulletin No. E5615 for chemical resistance/operating temperature recommendations. Contact Smith Fiberglass Products Inc. when necessary for a more detailed recommendation.

SECTION 1
Secondary Containment Piping Components

A. Containment Piping–Secondary containment piping sizes are as follows:

Primary Piping Size (In.)	Minimum Containment Piping Size (In.) RT II, GT, PT	Minimum Containment Piping Size (In.) CT
2	3*	3*
3	4*	4*
4	6*	6*
6	8	10
8	10	12
10	12	14
12	14	16
14	16	-

RT II = RED THREAD II PT = POLY THREAD
GT = GREEN THREAD CT = CHEM THREAD

B. Containment Fittings–Secondary containment fittings and components are as follows:

Component	Use
45˚ elbow	contain primary 45˚ elbow
90˚ elbow	contain primary 90˚ elbow
tee	contain primary tee
coupling	contain primary coupling
lateral	contain primary lateral
concentric reducer	contain primary concentric reducer
termination fitting	terminate containment on primary pipe
anchor assembly	anchor primary to containment pipe
centralizer	support primary pipe in containment

Table 1 Number of Bolt(1) Holes in Containment Fittings

Size (In.)	45˚ Elbow	90˚ Elbow	Tee	Lateral	Concentric Reducer	Coupling	Short Coupling
3	9	10	11	13	–	10	6
4	9	10	11	13	6	10	6
6	9	10	11	14	8	10	8
8	15	17	19	16	10	14	8
10	19	21	27	32	8	12	8
12	25	29	38	42	10	12	8
14	26	30	39	50	18	14	8
16	26	31	39	54	18	14	8

Note: Some standard primary fittings such as saddles, tapered sleeve couplings, etc., may be used with containment piping systems.

Refer to Tables 1 and 2 for bolt hole and dimensional data.

C. Adhesive for Secondary Containment Piping–For systems rated to 200˚F, use DS-8014 or DS-8069 adhesive and filler. For systems rated to 150˚F, use DS-7014 or DS-7069 adhesive and filler. Secondary containment fitting and pipe joints require filler, which must be obtained from Smith Fiberglass Products Inc. Because of the quantity of adhesive required for secondary containment fittings, fillers are supplied for the standard (DS-8014 and DS-7014) and large (DS-8069 and DS-7069) size adhesive kits only.

* When using 2", 3", or 4" sweep fittings, use containment pipe and fittings that are two diameter sizes larger than the primary.

(1) Bolt sizes: 3"-6" Secondary Containment = 1/4 - 20 x 3/4"
8"-16" Secondary Containment = 5/16 - 18 x 1-1/4"

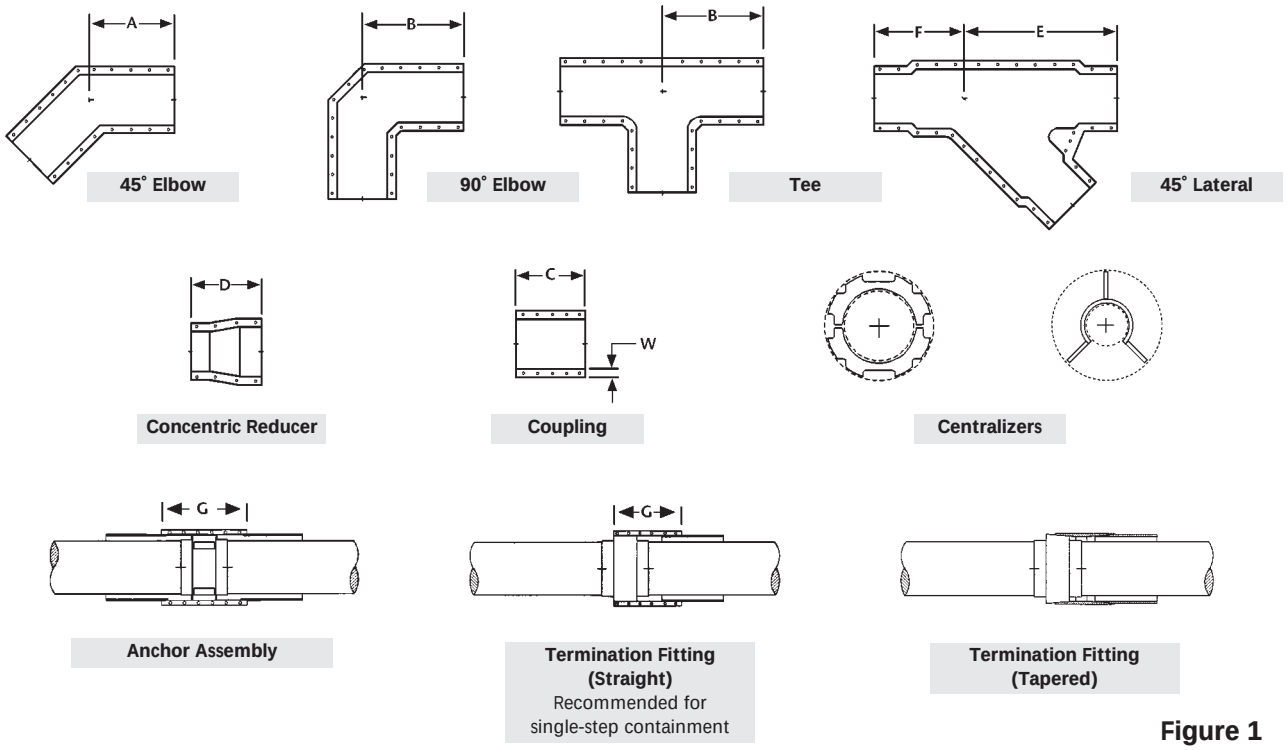

Figure 1

Table 2 - Dimensional Data for Containment Fittings

(Inches)

Containment Size (In.)	A	B	C	D	E	F	G	W
3	6	7	14	–	11	7	8¼	1½
4	7½	8	14	6	13	7	8⅝	1½
6	8	9	16	11	15	8	9⅜	1½
8	11	13	20	12	17	11	11	1½
10	18	21½	24	15	32½	19	12½	1¾
12	21½	26	24	17	37½	22½	14	1¾
14	22½	27	28	29	43½	28½	16	1¾
16	22½	29	28	31½	47½	31	16	1¾

(mm)

Containment Size (mm)	A	B	C	D	E	F	G	W
80	152	178	356	–	279	178	210	38
100	191	203	356	152	330	178	219	38
150	203	229	406	279	381	203	238	38
200	279	330	508	305	432	279	279	38
250	457	546	610	381	826	483	318	44
300	546	660	610	432	953	572	356	44
350	572	686	711	737	1105	724	406	44
400	572	737	711	800	1207	787	406	44

SECTION 2
System Layout

A. Primary Piping–Assemble primary piping according to the installation instructions in Manual No. F6000 (F6010 for CHEM THREAD product).

B. Containment Piping–In some cases, the procedures for tapered joints from Manual No. F6000 are required for assembling secondary containment joints. Shown in Figs. 2, 3, and 4 are coupling joints that may be either standard tapered couplings or two-piece containment couplings. Pipe ends joined to containment fittings must be scarfed, while pipe ends joined to tapered couplings must be tapered spigots.

Containment pipe is placed over the primary pipe during assembly of the primary joints. As the primary pipe is assembled, centralizers are bonded to or snapped on the primary pipe depending on size. Smith Fiberglass supplies two types of centralizers (see Fig. 1). Thermoplastic snap-on centralizers are used for smaller sizes—up to 6" primary. Bond-on centralizers are used on larger sizes. Use 1/16" thick double-sided foam tape inside the thermoplastic centralizers to hold them in place. Sand the primary pipe O.D. before attaching bond-on centralizers.

Note: Thermoplastic centralizers will be much stiffer in cold weather. Treat similar to adhesive; prewarm in cold weather before attempting installation.

Careful planning of the pipe layout will allow inspection of the primary joints by moving the secondary containment pipe along the primary pipe (see Figs. 5 and 6). During the layout planning, it may be necessary to include a two-piece secondary containment coupling in the layout to allow additional clearance for inspecting the primary joints. It is a good practice to obtain a few extra two-piece couplings for the containment system in case it is necessary to provide clearance for inspecting the inner pipe.

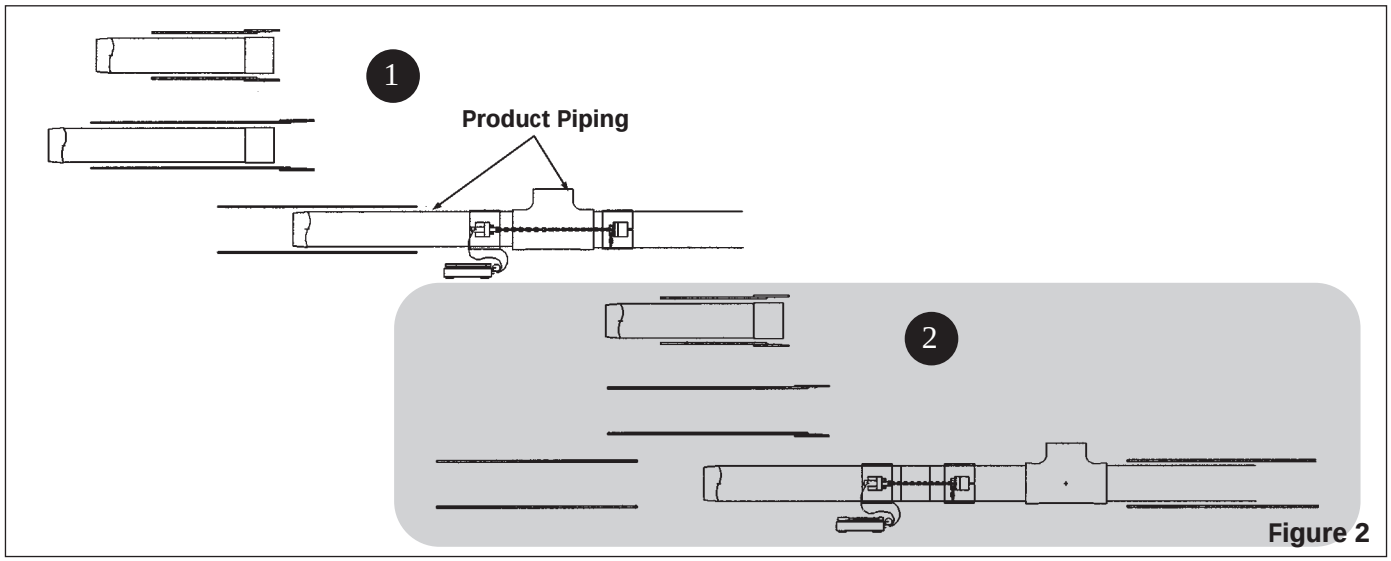

Figure 2

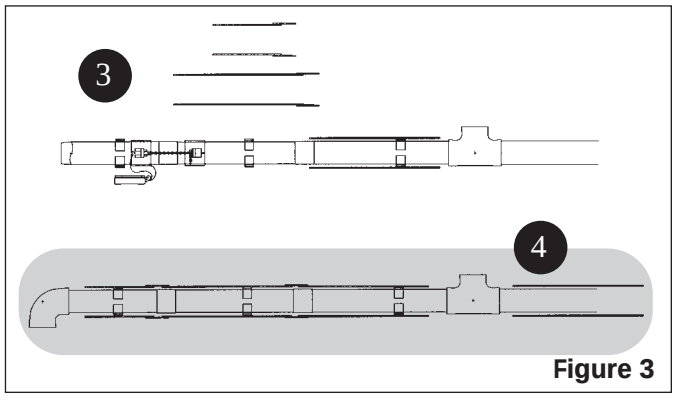

Figure 3

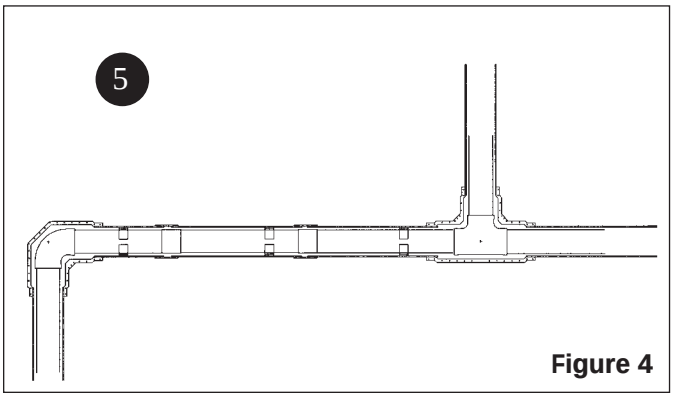

Figure 4

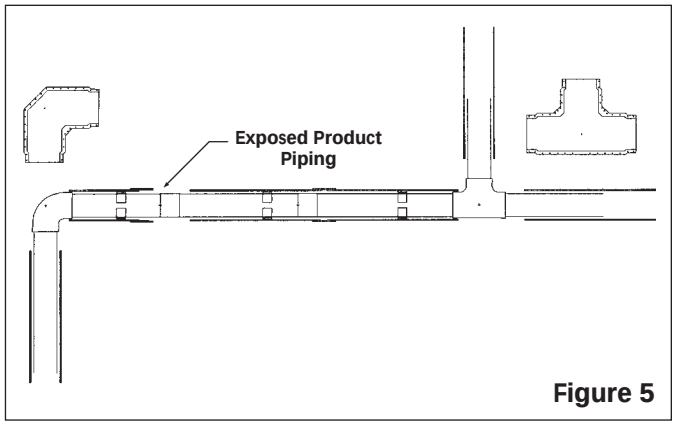

Figure 5

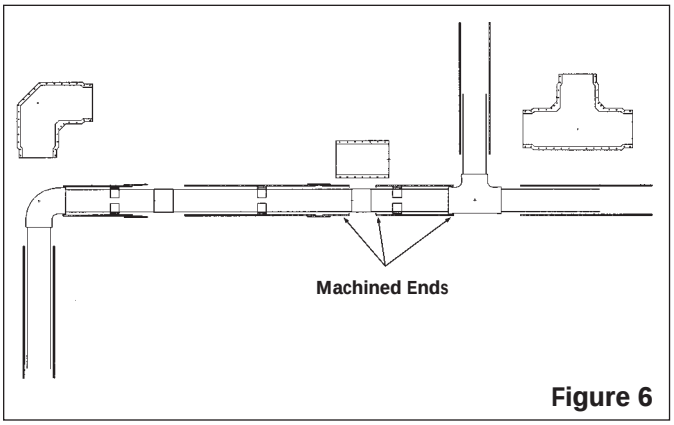

Figure 6

NOTE: Coupling placement must be planned before positioning of containment pipe, because the pipe must have scarfed ends. Additional consideration may be necessary for various types of leak detection systems.

C. Calculating Lengths for Containment Piping–To determine the length of the containment piping, you must first dry fit the primary joints. Make sure that the tapered primary joints are fit tightly together, and place the bottom half of the containment fittings under the primary fittings.

Use a tape measure to determine the distance from the edge of the two containment halves placed under the primary fittings. Check Table 3 to determine the insertion depth of the containment pipe (minimum bond length).

Refer to Section 10 on Close Tolerance Piping in Manual No. F6000 to determine the "make up" dimension for the primary piping. The adhesive acts as a lubricant during insertion of the spigot when bonding the primary system. This results in additional insertion length ("make up") when bonding the joints. Make allowances for the "make up" length when calculating the length of the containment pipe. The calculation procedure is as follows:

a. Determine the distance from the edges of the containment fittings.

b. Add the minimum bond lengths for both containment joints (shown in Table 3). This will provide pipe for insertion into the sockets of the containment fittings.

c. Subtract the "make up" dimensions for the primary joints (from Section 10 of Manual No. F6000). This will allow for the decrease in overall length of the primary piping when assembled.

In equation form:

$L_P = X + 2L_B - 2M$

Where:

L_P = Containment pipe length, ft.
X = Distance from edge of one containment fitting to the edge of the next containment fitting
L_B = Minimum bond length for containment joints
M = Make up dimension for primary joints from Manual No. F6000

Sample problem:

Given: 16" containment pipe over 14" primary pipe. When laid out, the distance from the edges of the containment fittings is 12' 3".

Table 3 **Minimum Bond Lengths for Secondary Containment Fittings**

Containment Size (In.)	Minimum Bond Length (L_B) (In.)
3	2¾
4	2¾
6	2¾
8	3
10	4
12	4½
14	4½
16	4½

Solution:

X = 12' 3"
L_B = 4½" (minimum for 16" containment joint)
M = ¾" (14" pipe, Manual No. F6000, Section 10)
L_P = 12' 3" + 2(4½") – 2(¾")
L_P = 12' 3" + 9" – 1½"
L_P = 13' – 1½" = 12' 10½"

SECTION 3
Pipe Preparation

A. Scarfing

a. **Pipe scarfing**–Bonding surfaces of containment fittings are sanded in the factory. The containment pipe must be scarfed before assembling with containment fittings that have a socket joint. The scarfed (machined) surface of the pipe must be uniform and free of resin-rich areas. Note: For containment pipe connections to tapered fittings, such as tapered sleeve couplings (bell x bell), refer to Manual No. F6000 and corresponding tapering tool instructions.

b. **Scarfing Tools**–Tools normally used to taper 3" through 12" pipe can be used to scarf 3" through 12" containment pipe with the addition of a scarfing adapter kit. **Scarfing kits and instructions must be specified when ordering the containment system components.** The scarfing adapter kits contain special zero degree (0˚) blade holders, special cutting (scarfing) blades, and set-up gauges for the 2"-6" tool. The 8"-12" tools will have a special blade holder, pi tape, and instructions.

Table 4 Secondary Containment Pipe Scarfing Dimensions

Cont. Size (In.)	Scarf Diameter (In.)	Min. Scarf Length (In.)	Scarf Circumference* (In.)
3	3.480 ± .010"	3	–
4	4.480 ± .010"	3	–
6	6.615 ± .010"	3	–
8	8.570 ± .020"	4	26 15/16
10	10.570 ± .020"	5	33 3/16
12	12.550 ± .020"	5	39 7/16
14	14.410 ± .020"	5	45¼
16	16.410 ± .020"	5	51 9/16

*Using regular tape measure; ± 1/16".

Containment pipe in 8" through 16" sizes can be scarfed with the 8"-16" grinding tapering tool and a special grinding drum. **The conversion kit and tool assembly instructions must be specified when ordering components for the containment system.**

Field gauges can be made from a short section of pipe (or other type of spacer) to set the depth of cut as long as the scarf dimensions match the scarf diameter and minimum scarf length shown in Table 4.

Note: Check the set up of the scarfing tools with a two-piece fitting on a regular basis. The containment fitting must be free to close around the pipe, and the flange (flat) areas of the containment fitting must fit together tightly on both sides (see Fig. 7).

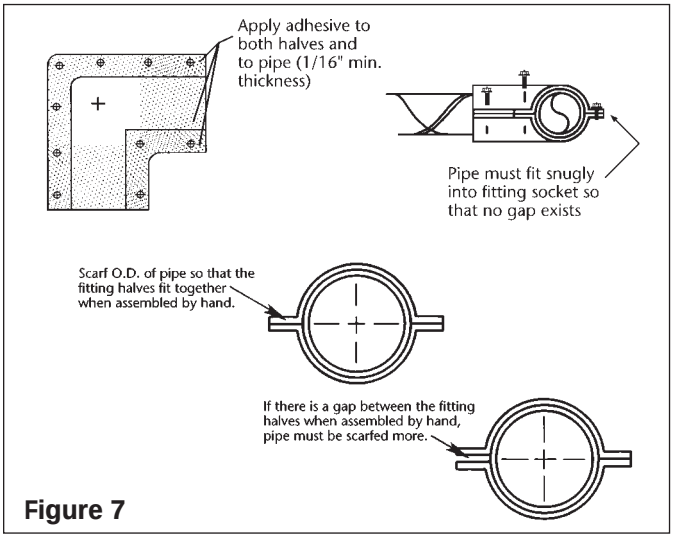

Figure 7

SECTION 4
Assembly

A. Bonding

a. **Adhesive requirements**–All bonding surfaces must be clean and dry before applying adhesive. If the surfaces have been contaminated with oil, grease, etc., they must be cleaned as described in the instructions for primary joints (Manual No. F6000 and F6010).

The two-piece fittings require a greater amount of adhesive than the primary (tapered bell and

Table 5a **Quantity of Adhesive Kits Required per Containment Fitting**

Numbers in ( ) are for DS-7014 or DS-8014 Adhesive Kits. All Other Numbers are for DS-7069 or DS-8069 Adhesive Kits

Cont. Size (In.)	45° Elbow	90° Elbow	Tee	Coupling	Concentric Reducer	Lateral	Term. Fitting
3	(½) ⅓	(½) ⅓	(1) ½	(½) ⅓	– –	(1) ½	(⅓) ¼
4	(1) ½	(1) ½	(1) ½	(1) ½	(1) ½	(1) ½	(½) ⅓
6	1	1	1	1	1	1	1
8	(2)	2	2	(2)	1	2	–
10	3	3	4	3	2	4	–
12	4	4	5	3	3	5	–
14	4	4	5	3	4	6	–
16	4	4	6	4	4	7	–

Table 5b **Quantity of Adhesive Kits Required for Entire Assembly**

Numbers in ( ) are for DS-7014 or DS-8014 Adhesive Kits.
All Other Numbers are for DS-7069 or DS-8069 Adhesive Kits

Containment Size (In.)	Anchor Assembly(1)	Termination Fitting(1)
3	(1½) 1	(½)
4	(3) 1½	(1)
6	3	(1)
8	(6)	(1⅓)
10	9	1⅓
12	9	1¾
14	9	2
16	12	3

(1) The primary joint (coupling) on this fitting is a tapered bell x spigot and **does not** require filler in the adhesive. The secondary containment joint on the straight termination fitting **does** require filler in the adhesive. The secondary containment joint on the tapered termination fitting **does not** require filler.

spigot) joints. Adhesive mixing procedures for containment joints are the same as those for primary joints, except that a filler must be added to the adhesive. The adhesive and hardener must be completely mixed before adding the entire contents of the filler kit. Filler kits are available in pre-packaged quantities that correspond to the standard and large adhesive kit sizes. For example, a DS-8014 filler kit is required for a DS-8014 adhesive kit, and a DS-8069 filler kit is required for a DS-8069 adhesive kit. The filler kits must be ordered as separate items in quantities matching the number of adhesive kits required for containment joints. Quantity of adhesive kits required is as shown in Table 5.

b. **Assembly–**The thickened (filled) adhesive may be applied with either the brush or stir stick provided in the adhesive kit. Use a small amount and apply pressure to "wet out" the machined surfaces, then apply a minimum 1/16" thick layer of mixed adhesive to all machined surfaces (including the flange areas of the fitting, the socket areas of the fitting, and the scarfed areas of the spigot).

Using the bolting materials, assemble the two-piece fittings over the primary system. The bolts can be tightened with a box wrench or impact wrench. Three-inch through 6" sizes require a 3/8" socket; 8" and larger sizes require a ½" socket. Alternate from side to side and end to end while tightening. Do not tighten from one end or one side in a manner that could cock the fitting to one side. **Note: If the pipe has not been scarfed to the proper dimension, the two halves of the containment fitting will not properly seal, resulting in a weak joint.**

Make sure the scarfed pipe ends are inserted into the sockets of the fittings for a length equal to the minimum bond length shown in Table 3. Note: Be careful not to over-insert on the large end of secondary containment concentric reducers.

Do not disturb the assembled joint until the adhesive is completely cured. Cure times and curing procedures for secondary containment joints are the same as procedures for primary joints (refer to Manual No. F6000). Note: Electric heating collars will not cover secondary containment fittings completely. However, you can use several heating collars under, around, and above the containment fittings if all bonded areas are covered (see Fig. 8).

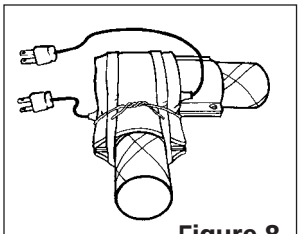

Figure 8

SECTION 5
Termination

A. Termination Procedure

Termination Fitting (Straight) –The termination fitting (straight) consists of two pieces: a special coupling with a ring bonded to the O.D. (the "termination coupling") and a special short containment coupling (see Figs. 1 and 9). The O.D. of the ring is the same as the scarf diameter of the secondary pipe. The primary pipe is bonded with the special termination coupling. After testing, the special short containment coupling is bonded (see Fig. 9). Where required, the secondary containment coupling used in the termination fitting can be supplied with a threaded outlet. Contact your Smith Fiberglass Products representative.

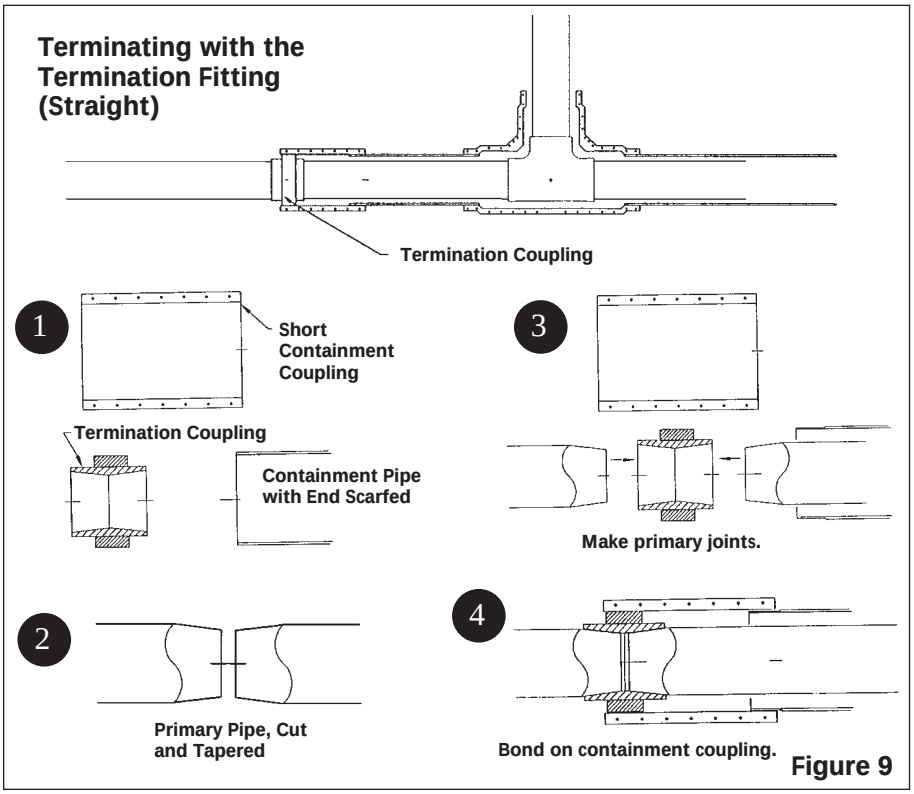

Figure 9

SECTION 6
Testing the Containment System

Note: Local codes or other engineering considerations may dictate changes.

Note: Primary pipe should be tested according to the procedures in Manual No. F6000 or F6010. Testing of the primary piping must be completed ***before the secondary containment is bonded and tested***. This is to allow inspection of the primary joints.

A. Smith Fiberglass Products recommends **hydrotesting the secondary containment piping system with water to 15 psig**. A hydrotest is a better test for finding leaks in any part of the containment piping system. Air tests show leakage only where a soap solution is applied. Wear eye protection. If a hydrotest is impractical, refer to paragraph B below.

B. Air Test–Compressed gas (air) tests can be dangerous unless the air test pressure is low. Wear eye protection during inspection of soaped areas. The following low, maximum allowable test pressures (by diameter) make this air test a safe procedure if normal safety precautions are followed:

Maximum Allowable Air Test Pressures

Pipe Diameter	3"	4"	6"	8"	10"	12"	14"	16"
psig	15	15	15	14	9	6	5	4

THESE PROCEDURES MUST BE FOLLOWED IN ORDER TO AVOID SERIOUS PERSONAL INJURY OR PROPERTY DAMAGE. FAILURE TO DO SO WILL RESULT IN LOSS OF WARRANTY, AND BUYER, INSTALLER, OR ANY EMPLOYEE, AGENT, OR REPRESENTATIVE THEREOF, ASSUMES THE RISK OF ANY DAMAGE OR INJURY TO PERSON OR PROPERTY.

Installed Smith Fiberglass Products pipe systems should be tested prior to use to assure soundness of all joints and connections. In testing, sudden pressure surges must be avoided, as in some instances, surge or hammer can produce pressures of several times the rating of the pipe and fittings.

⚠ TESTING WITH AIR OR GAS CAN BE EXTREMELY DANGEROUS. REVIEW SAFETY PRECAUTIONS BEFORE STARTING THE TEST AND FOLLOW ALL TESTING PROCEDURES.

C. Fixtures–Saddles with threaded outlets can be attached to the containment pipe to perform the air test. The installation procedures for containment saddles are the same as for primary saddles in Manual No. F6000. Leave the hose clamps in place.

D. Leakage Checks–Wear eye protection. During the air test, use soap solutions to check the joint for leaks. During the hydrotest, watch the gauge pressure and inspect the joint for leaks. Make sure the gauges are accurate.

•READ THIS CAREFULLY•
SAFETY PRECAUTIONS

As in any system where pressure is employed, adequate safety precautions should be exercised. EXERCISE DUE CARE IN INSTALLING AND TESTING THE PIPING SYSTEM. DO NOT ASSUME THE RISK OF INJURY OR PROPERTY DAMAGE.

In buried applications, it is suggested that long pipe runs be partially backfilled at various points to secure them in place. All joints and connections should be left exposed for inspection.

In exposed pipe systems, standard pipe guides and hangers will normally be sufficient to restrain the pipe during testing.

⚠ Note: The light weight, flexibility, and elasticity of fiberglass pipe create different conditions than are present with steel pipe. **If a failure should occur while testing fiberglass pipe with air or gas, the system will be subject to considerable whipping and other shock-induced conditions due to the sudden release of stored energy. The violent energy release can cause personal injury or death to personnel in the area and can also cause damage to the pipe or other property.**

⚠ SMITH FIBERGLASS PRODUCTS SHALL NOT BE LIABLE UNDER ANY WARRANTY, CONTRACT, OR IN TORT FOR ANY RESULTING INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT, PIPE, OR OTHER PERSONAL PROPERTY, FOR FAILURE TO FOLLOW THE PROCEDURES AND COMPLY WITH THE PRECAUTIONS SET FORTH.

SECTION 7
Supports, Anchors, & Guides

A. Centralizers, Supports, and Guides–Primary centralizers (and anchors) are required for systems with thermal expansion and/or contraction (see Para. B, Anchors). Spacing of centralizers can be determined from the support spacing information in Manual No. E5000 (Engineering & Design Guide) and E5200 (CHEM THREAD Engineering & Design information). DO NOT put centralizers next to containment fittings. As a general rule, the support spacing must be reduced so the centralizers are located at a maximum distance of three times the primary pipe diameter from the primary fitting (see Fig. 10). **Note: In all cases, centralizers must be at least 6" away from the end of the containment fitting.**

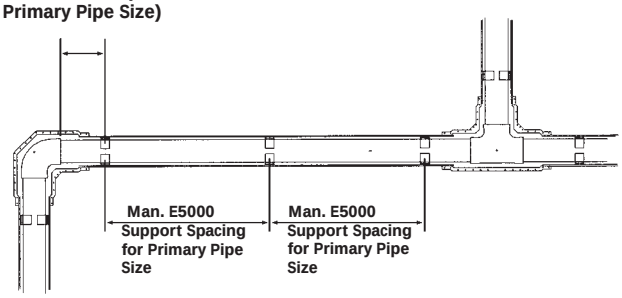

Figure 10

For above-ground installations, with or without centralizers, the support spacing for the containment pipe should be based on the larger (containment) pipe. The design temperature change should be the greater of the two pipes (primary or secondary). Use the support and guide spacing values from Manual No. E5000 or E5200.

B. Anchors–Containment anchors consist of making a positive connection between the primary and containment pipe, then anchoring the containment pipe to a rigid foundation.

Containment anchors are made up of a special primary pipe coupling with support risers machined to match the containment pipe scarf diameter. The containment pipe is joined with a special short coupling (see Fig. 11).

a. Installation Procedure–

1) Bond the coupling into the primary pipe line.

2) Apply adhesive to all machined areas.

3) Use the bottom half of the containment coupling for alignment.

4) Use bolts to assemble the top half of the containment coupling.

b. Anchor Locations–

Anchors are required for systems with a temperature change that would create length changes in the system. Systems with minimum changes at ambient temperatures do not require anchors.

Systems designed for elevated temperature services must be anchored. All directional and elevational changes must be anchored. Additional anchor locations include straight runs greater than 300 ft., pipe size changes, and connections to other material (refer to Manual No. E5000–or E5200 for CHEM THREAD product). Guides must be installed with spacing as shown in Manual No. E5000 or E5200.

Summary: Anchor the primary pipe to the containment pipe. Use the larger temperature change (primary or secondary) to determine the design conditions. Control the expansion or contraction of the containment pipe using one of the methods in Manual No. E5000.

Note: As shown in Manual No. E5000, non-contained (single pipe) systems that are buried do not require anchors. However, containment (double wall) systems that are buried and have expansion of the primary system *do* require anchors. When centralizers are used in the system, there is a very small gap between the centralizer and the outer containment pipe wall. When the difference in thermal expansion of the containment pipe and the primary pipe produces movement greater than the values in Table 6, anchors are required. Expansion for both pipe systems can be obtained from Manual No. E5000 or E5200.

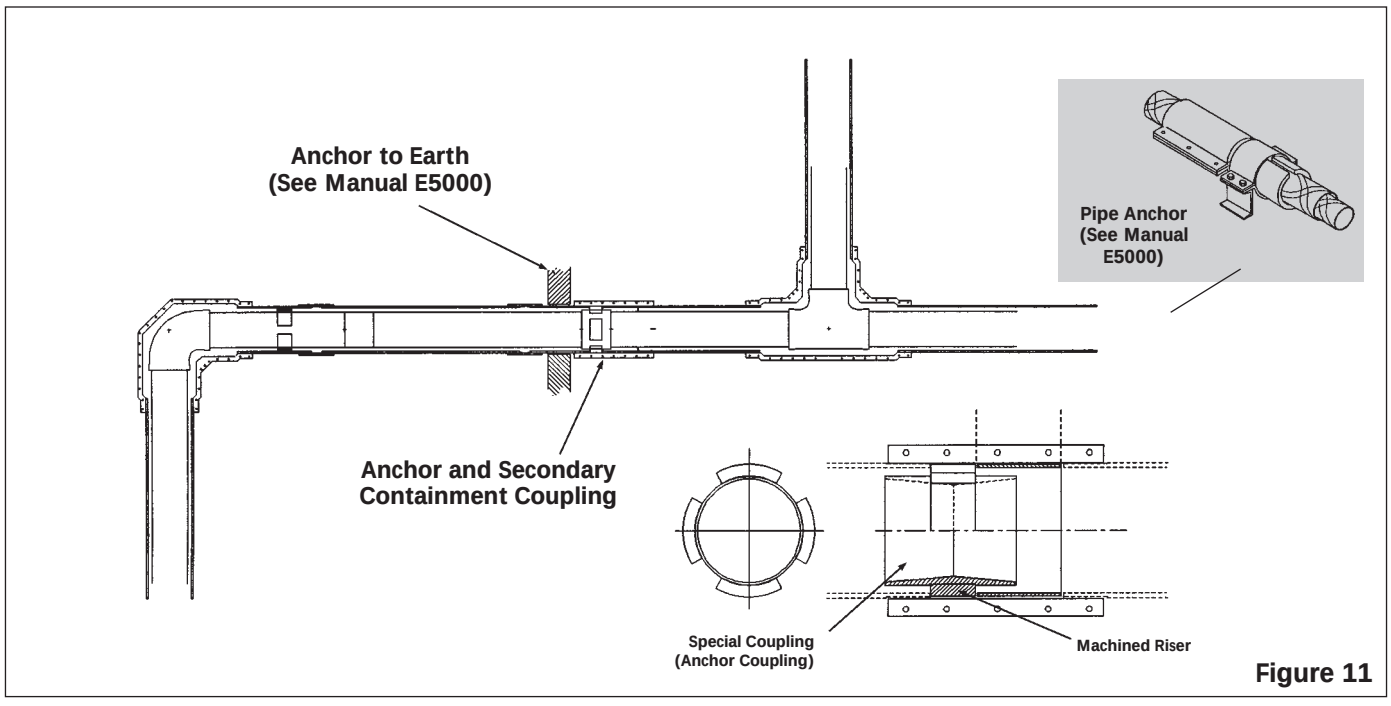

Figure 11

Table 6 **Differential Expansion and Contraction Allowance**

Containment Size (In.)	Max. Allowable Expansion/Contraction (In.)
3	0.05
4	0.05
6	0.08
8	0.10
10	0.15
12	0.20
14	0.25
16	0.30

SECTION 8
Repairs

Note: DO NOT attempt to repair damaged fittings. If the failure is through the wall of the fitting, the fitting must be replaced. Repair procedures for failed bonds or pipe wall sections are as follows.

A. Repairing Minor Pipe Damage–Follow the procedures in Manual No. F6000 for repairing pipe wall damage.

B. Repairing Extensive Pipe Damage–Containment sleeve couplings have a space in the center between the socket joints. Therefore, adding a sleeve coupling to the system will increase the total length and/or make up for removed sections of pipe. In some cases, more than one sleeve coupling may be required to replace a damaged pipe section. To prepare the scarf nipples for installing sleeve couplings, refer to the following section for replacement of fittings.

C. Replacing Failed Containment Joints–When cutting out and replacing a containment fitting, be careful not to cut the internal primary product pipe (see Fig. 12).

a. Dissect the containment fitting and the containment pipe around the circumference as shown in Fig. 12. Remove the containment elbow.

b. Create a pipe nipple at least twice the minimum scarf length on either side of the primary fitting by making another cut around the containment pipe.

c. Using a sander, coarse file, or sandpaper, remove the gloss from both ends of the containment pipe (nipples). The sanded area on either end must be equal to the minimum scarf length, and the scarf diameter must be within 0.010" of the specified value. Note: A pi tape (or other O.D. measuring device) will be required to check the scarf diameter.

Proceed slowly with the sanding operation to maintain a uniform scarf O.D.

d. Position the nipples between the new containment fitting and a containment sleeve coupling as shown in Fig. 13. It may be necessary to remove additional sections of the containment pipe to provide clearance for the coupling. Repeat the procedure for sanding nipples on the cut end of the containment piping.

e. Bond the fitting and sleeve couplings into place as shown in Fig. 13.

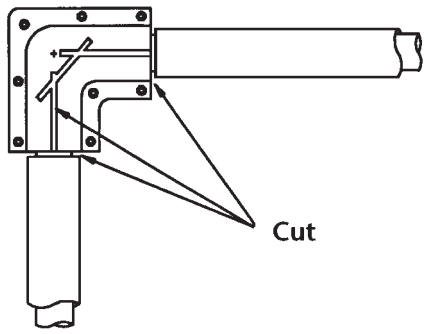

Figure 12

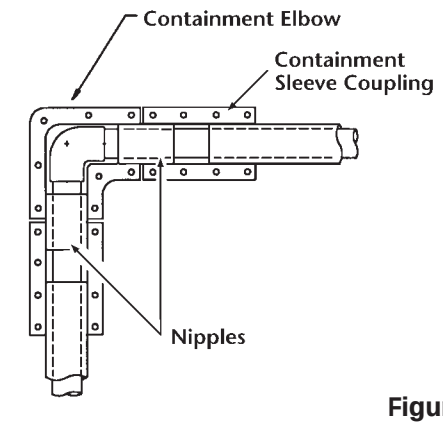

Figure 13

D. Repairing Leaking Containment Fittings–Bond leaks may be repaired by overwrapping the fitting with glass cloth and adhesives provided in the DS-8088 epoxy or DS-6088 vinyl ester adhesive maintenance kit from Smith Fiberglass Products. The overwrap procedures are similar to those for overwrapping a leaking joint as shown in Manual No. F6000. Exceptions to Manual No. F6000 are as follows:

- Overwrap for containment fittings must cover 4" beyond both edges of the fitting, i.e. overwrap starts 4" on one side of the fitting and continues to 4" on the other side.

- Overwrap **must never be made over uneven surfaces** such as the step at bell ends and tabs (flanges) on the sides of containment fittings. All tabs (flanges) must be cut off, and the sides must be sanded to form a rounded surface. Wrapping over projections will create sharp breaks in the glass pattern. This practice will create voids (weak areas) in the overwrap. For a reliable overwrap, small pen grinders with rounded cutting heads are recommended for bevels at the end of bells and for rounding of tabs.

Refer to Manual No. F6000 for glass application procedures, keeping in mind that the glass cloth must be overlapped from side to side when covering the entire fitting and pipe.

SECTION 9
Other Considerations

A. Leak Detection–Several methods of leak detection can be used with the containment system. The type of detection system may dictate the size of the containment pipe and also the types and quantities of fittings for detection wells or pull points. The decision for type of detection should be made early in the design phase, and the manufacturers of leak detection systems should be contacted for the design parameters required for their systems.

The simplest system slopes back to a low point where fluid from a leak will collect. Leaks can then be detected with a sight glass or drain valve for above ground systems. For below ground systems, wells or sumps should be constructed at the low points. Leaks to these wells can be detected visually with removable covers on the wells or electronically with detectors in the well. Several types of detectors are available. The type chosen will dictate the size and type of piping required for installing the detectors. For large systems and for ease of locating leaks, several detection points may be used.

The most sophisticated system is the continuous monitoring cable systems that can detect leaks within about 12" of the failure. Systems using monitoring cables require clearance for the cable along the bottom of the annulus. A common dimension is a minimum of ¾" clearance for cable connections. Pipe is typically assembled with pull ropes to pull the cable in after the piping is tested. Electrical fish tapes can be used as an alternate to pull the cable. This requires pull points be designed into the system.

B. Burial–Since two-piece fittings are designed to meet minimum stiffness required by AWWA C950 (American Water Works Association), burial instructions for secondary systems are the same as for primary systems.

C. Static Electricity–Refer to Manual No. E5000, Section 7, Para. E, with consideration that the primary pipe will not be in contact with the ground. When handling nonconductive fluids at high velocities, it may be necessary to ground the primary pipe by wrapping the O.D. (outside diameter) with a conductive material (wire) and installing grounded metal components (such as commercial static eliminators) that make contact with the fluid (liquid) stream. Using threaded saddles to obtain access to the grounding devices in the primary system is practical for this type of application.

D. Water Hammer–Systems with fluid (water) hammer surges significant enough to produce movement in the primary pipe must be anchored to prevent impact against the containment fittings. Refer to Manual No. E5000 for additional information concerning fluid hammer (Section 7, Para. J).