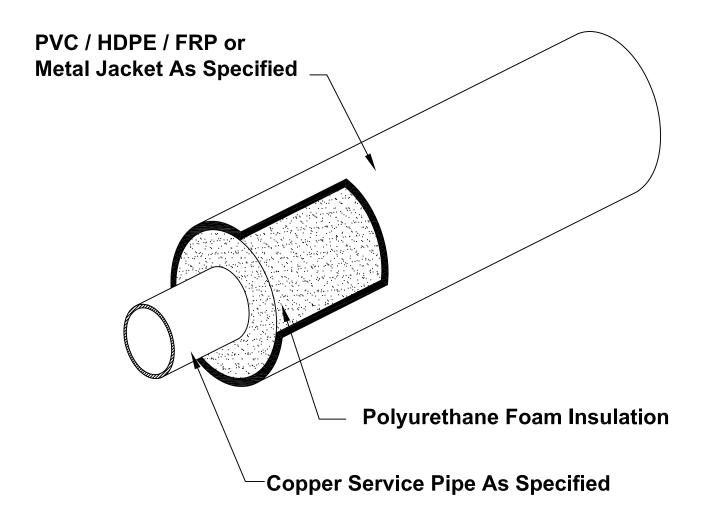
TRICON COPPER PIPE SYSTEM

For Applications Up To 250° F Below And Above Ground

- □ Chilled Water
- □ Condensate
- □ Condenser Water

- □ Domestic Hot Water
- □ Heating Hot Water
- □ Potable Water
- □ Process Piping





P.O. Box 361, Canastota, New York 13032 Tel: 315.697.8787 Fax: 315.697.8788

TABLE 1

Pipe	Minimum	PVC	PVC
Size	Insulation	Jacket	Jacket
	Thickness	O.D.	Wall
1/2"	1.88"	4.50"	.070"
3/4"	1.74"	4.50"	.070"
1"	1.62"	4.50"	.070"
11/4"	1.50"	4.50"	.070"
11/2"	1.37"	4.50"	.070"
2"	1.94"	6.14"	.070"
21/2"	1.69"	6.14"	.070"
3"	1.44"	6.14"	.070"
4"	1.94"	8.16"	.080"
6"	1.94"	10.20"	.100"

Service Pipe:

The service pipe shall be Type "K", or Type "L" hard drawn seamless copper tubing to ASTM B-88 and WWT-799. Refrigerant piping shall meet ASTM B-280, Type ACR and ASME 31.5 Straight lengths of piping will be supplied in 20 ft. lengths with 6" of piping exposed at each end for field joint fabrication.

Insulation:

The insulation shall be a foamed in place closed cell polyurethane which completely fills the annular space between the carrier pipe and the exterior casing. The insulation shall have the following physical properties:

Minimum Density (lb./cu. ft.) 2.0

ASTM D-1621,
90-95 % Closed Cell

K" Factor BTU/Hr. sq. ft. °F/in. 147

ASTM C-177

Exterior Casing:*

The exterior casing shall be

(1) Seamless, extruded white PVC Type 1, Grade 1,

Class 12454-B per ASTM D-1784 or

(2) High Density Polyethylene (H.D.P.E.) with the following physical properties:

ASTM D-3350...Resin Type III, Grade P34

ASTM D-633...Ultimate Elongation 850%

ASTM D-633...Tensile Yield Strength 3300 psi

ASTM D-790... Tangent Flexural Modules 175.000 psi

No polyethylene tape casings will be allowed.

Sub-Assemblies:

All fittings, anchors, end seals, other sub-assemblies shall be prefabricated or field fabricated dependant upon engineer's option and/or site conditions.

Field Joints:

After soldering and hydrostatic testing, PVC jacketed straight field joints shall be insulated with polyurethane foam to the thickness specified, PVC sleeve and pressure sensitive tape. HDPE jackets will use polyurethane foam and a heat shrinkable sleeve.

Expansion/Contraction Compensation:

Expansion and contraction within the piping system shall be accommodated with factory prefabricated internal expansion elbows, z-bends, expansion loops, and anchors specifically designed for each application. External expansion

TABLE 2

Pipe	Minimum	HDPE	HDPE
Size	Insulation	Jacket	Jacket
	Thickness	O.D.	Wall
1/2"	1.79"	4.50"	.150"
3/4"	1.66"	4.50"	.150"
1"	1.54"	4.50"	.150"
1¼"	1.41"	4.50"	.150"
1½"	1.29"	4.50"	.150"
2"	2.12"	6.63"	.150"
21/2"	1.87"	6.63"	.150"
3"	1.62"	6.63"	.150"
4"	1.76"	8.00"	.150"
6"	1.76"	10.00"	.175"

compensation can be provided with the use of flexible foam bolsters.

Installation:

No Piping shall be installed in standing water. Trenches shall be maintained dry until final field closure is complete. The installing contractor shall handle the piping system in accordance with the directions furnished by the manufacturer and as approved by the architect and engineer. The carrier piping shall be hydrostatically tested to 1-1/2 times the operating pressure, or as specified in the contract documents. The test shall be maintained for a minimum time of 1 hour. EXERCISE DUE CARE WHEN INSTALLING AND TESTING THE PIPING SYSTEM.

Backfill:

A 4-inch layer of sand or fine gravel, less than ½" in diameter, shall be placed and tamped in the trench to provide uniform bedding for the **Copper** system. Once the system is in place, the trenches shall be carefully backfilled with similar material and hand tamped in 6" layers until a minimum of 12" above the top of the preinsulated pipe has been achieved. The remainder of the backfill shall be void of rocks, frozen earth and foreign material. The trench shall be compacted to comply with H-20 Highway loading.

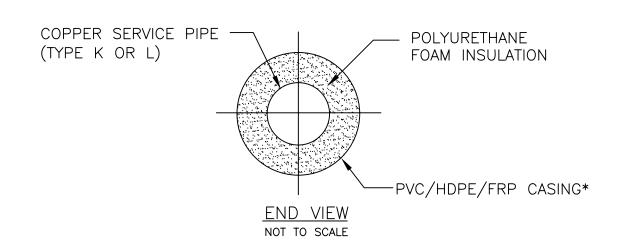
Accessories: Heat Tracing

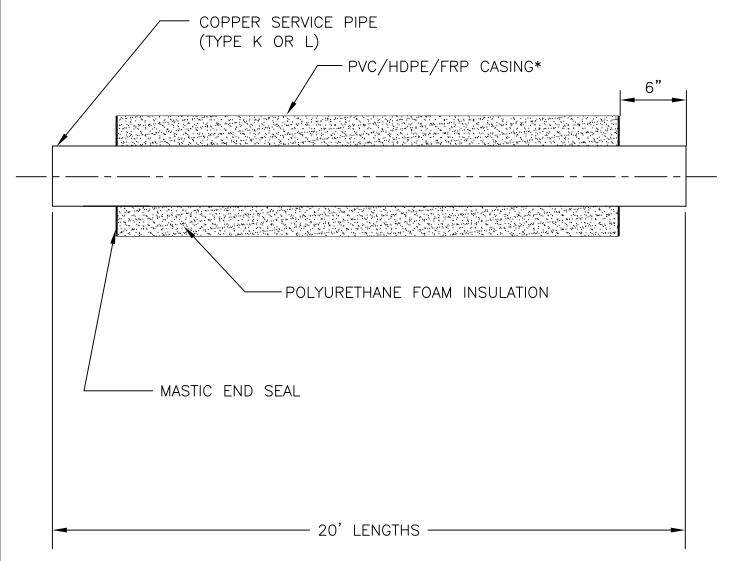
System Options:

- Optional metallic casings for above ground applications include, Spiral Lockseam in Galvanized, Aluminum or Stainless Steel.
- * Optional non-metallic casings for below grade offered include, Filament Wound FRP.
- * Insulation thickness will vary depending on the type of insulation specified and the operating temperature.

Contact your Tricon representative for available sizes and system options.

Tricon Piping Systems, Inc. Tel: 315-697-8787 P.O. Box 361 Fax: 315-697-8788 Canastota, NY 13032 www.triconpiping.com





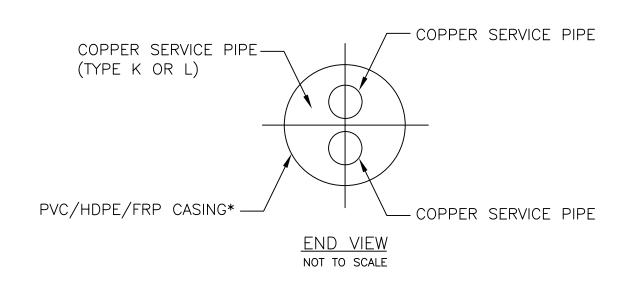
Rev.:

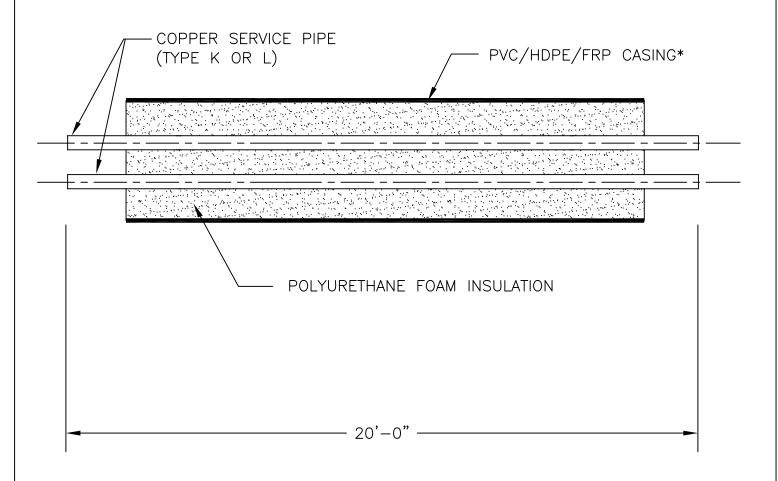
COPPER STRAIGHT LENGTH DETAIL

TRICON COPPER

Date: 03/09/06 Dwg. No.:Cu-1







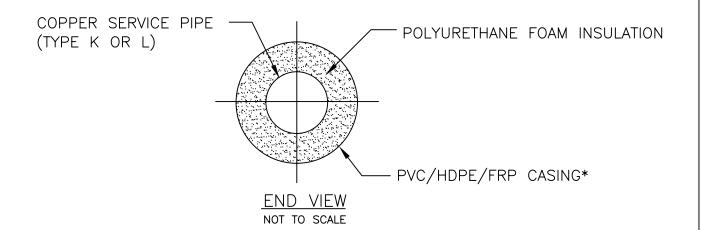
DOUBLE COPPER STRAIGHT LENGTH DETAIL

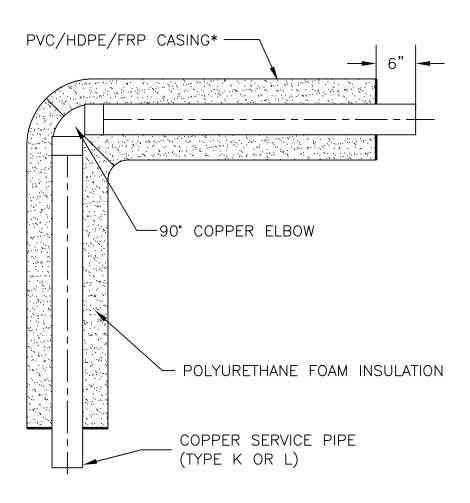
Rev.:

TRICON COPPER

Date: 03/09/06 Dwg. No.:Cu-1A







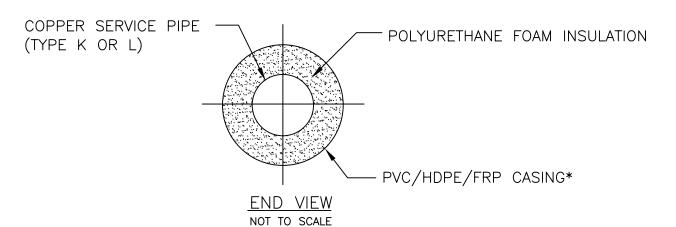
COPPER PREFABRICATED 90° ELBOW DETAIL

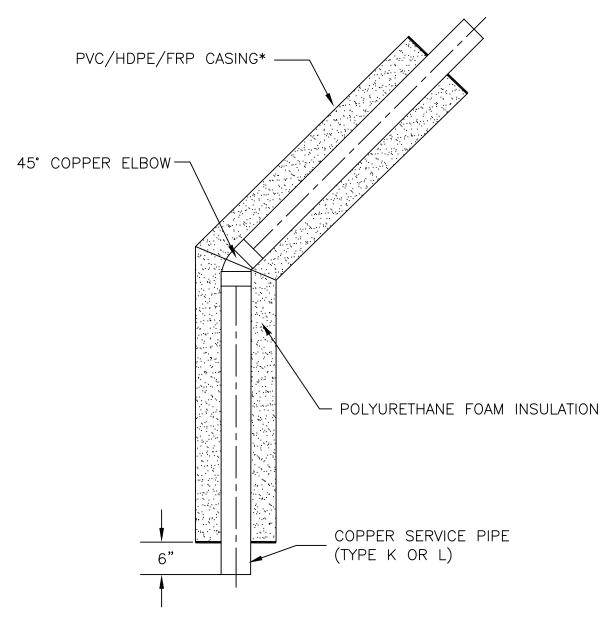
Rev.:

TRICON COPPER

Date: 03/09/06 Dwg. No.: Cu-2



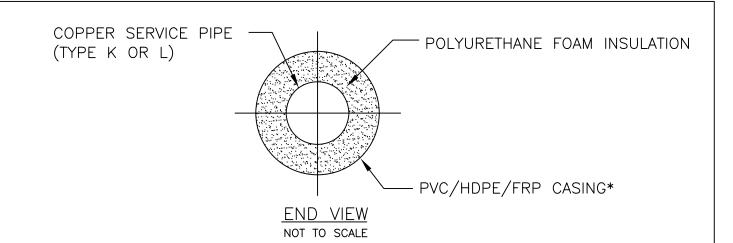


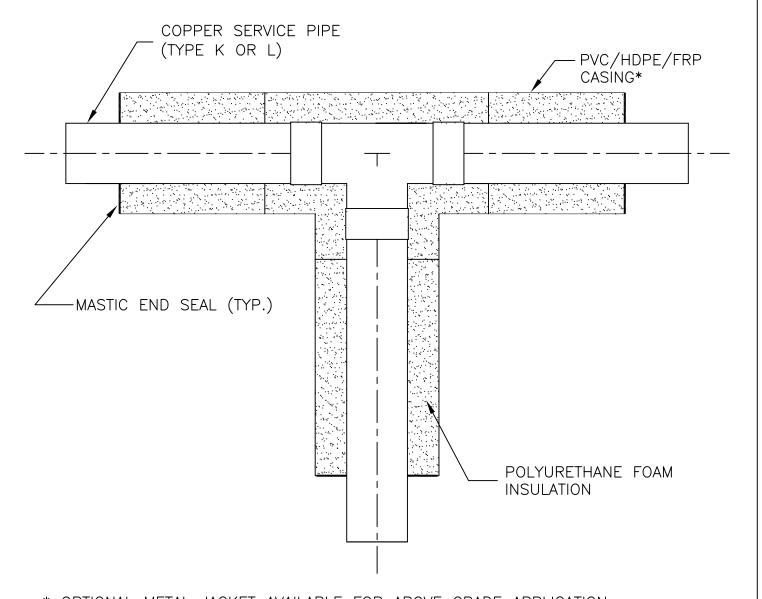


COPPER PREFABRICATED 45° ELBOW DETAIL

TRICON COPPER | Date: 03/09/06 | Dwg. No.: Cu-3 | Rev.:







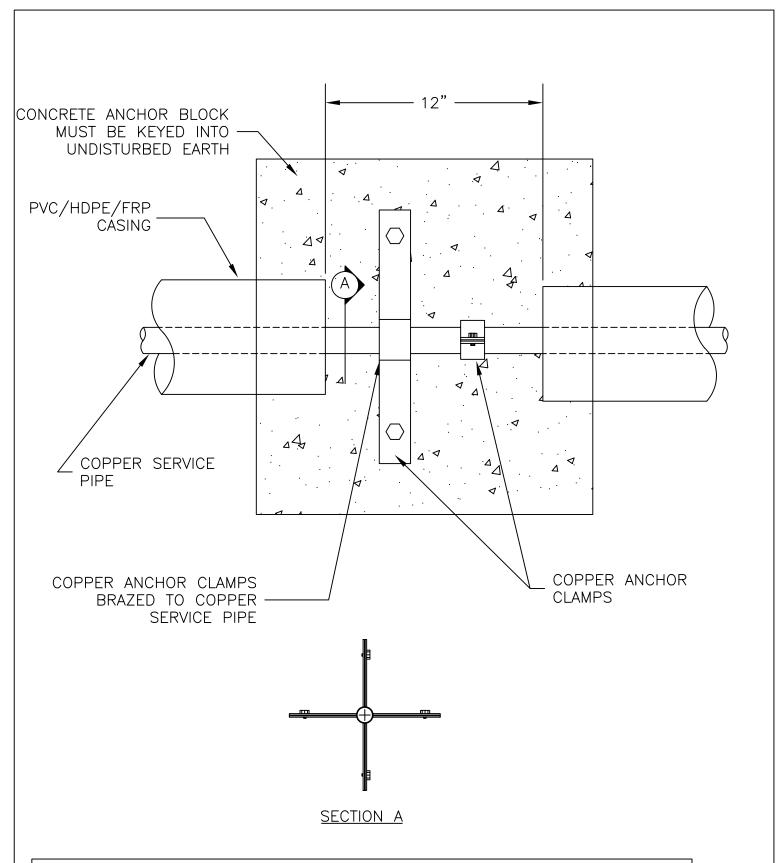
Rev.:

COPPER TEE DETAIL

TRICON COPPER

Date: 03/09/06 Dwg. No.: Cu-4





NOTE: CONCRETE ANCHOR BLOCK MUST BE KEYED INTO UNDISTURBED EARTH. AMOUNT OF CONCRETE BELOW ANCHOR MAY CHANGE ACCORDING TO PIPE SIZE.

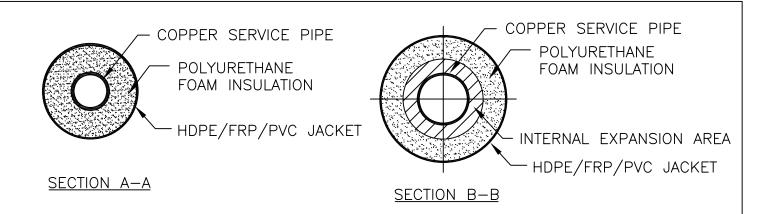
COPPER AND	HOR I	DETAIL
------------	-------	--------

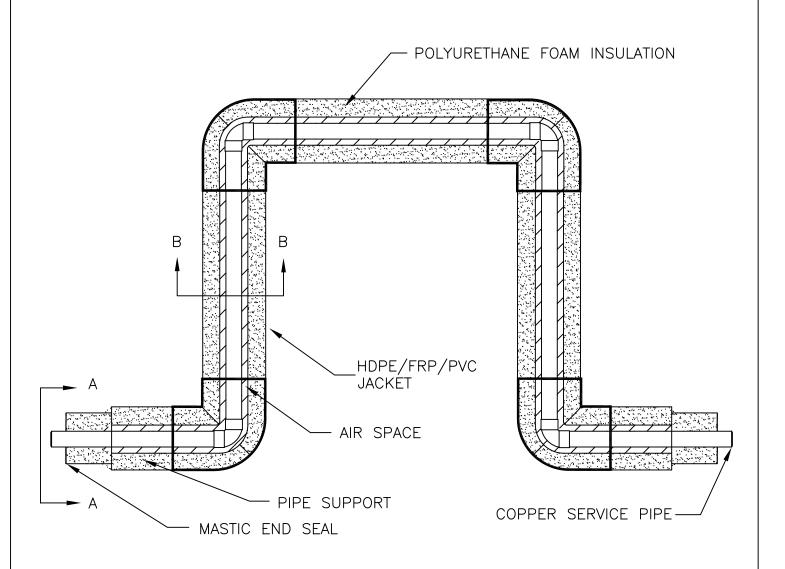
TRICON COPPER

Date: 03/09/06 Dwg. No. Cu-5



Tel: 315.697.8787 Fax: 315.697.8788



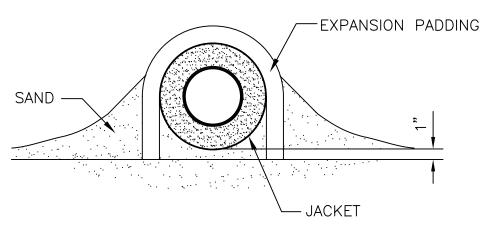


TRICON COPPER

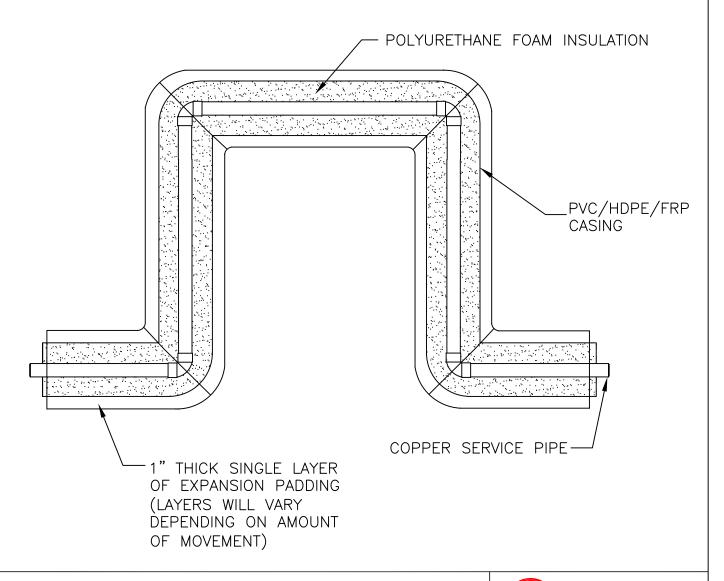
Date: 03/09/06 Dwg. No. Cu-6

Rev.:





- 1. EXPANSION PADDING MATERIAL IS SUPPLIED IN PRECUT LENGTHS AND WIDTHS.
- 2. WRAP PADDING AROUND THE JACKET FOR A SNUG FIT. HOLD IN PLACE WITH BEDDING SAND.



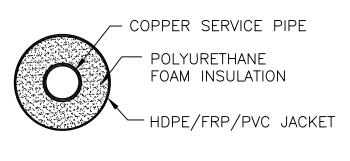
COPPER LOOP DETAIL WITH EXTERNAL EXPANSION PADDING

Rev.:

TRICON COPPER

Date: 03/09/06 Dwg. No. Cu-6A

TRICON
Piping Systems, Inc. ®
P.O. Box 361, Canastota, New York 13032
Tel: 315.697.8787 Fax: 315.697.8788



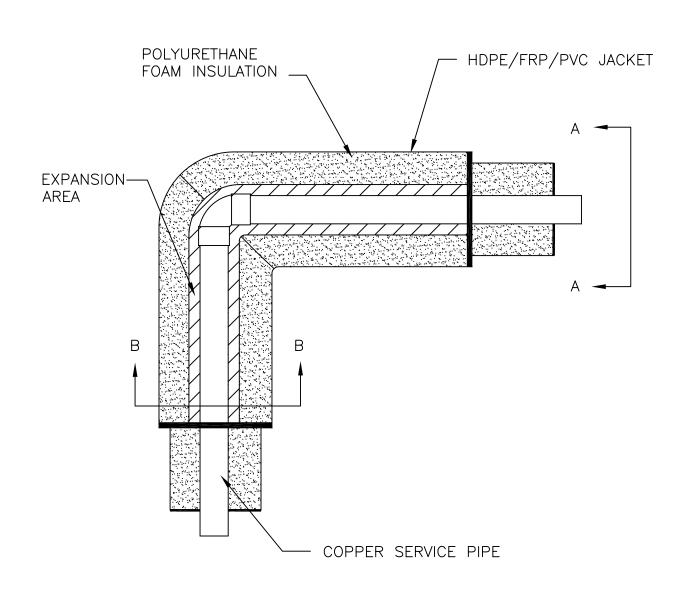
POLYURETHANE FOAM INSULATION

EXPANSION AREA

HDPE/FRP/PVC JACKET

SECTION A-A

SECTION B-B

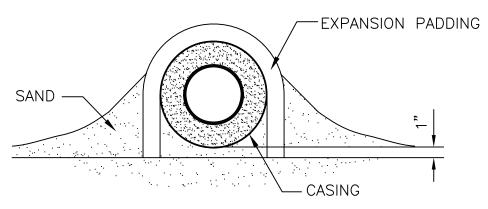


COPPER EXPANSION 90° ELBOW DETAIL WITH INTERNAL EXPANSION

TRICON COPPER

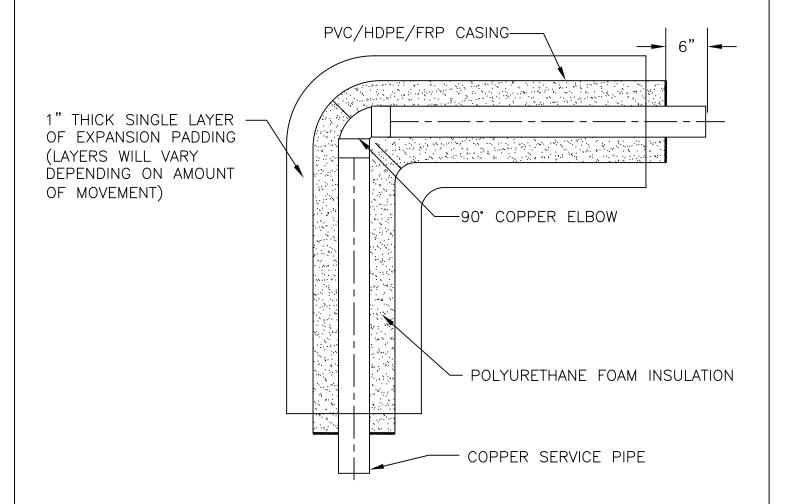
Date: 03/09/06 Dwg. No. Cu-7





- 1. EXPANSION PADDING MATERIAL IS SUPPLIED IN PRECUT LENGTHS AND WIDTHS.
- 2. WRAP PADDING AROUND THE JACKET FOR A SNUG FIT. HOLD IN PLACE WITH BEDDING SAND.

NOTE: MAKE SURE TO COVER THE 90° ELBOW COMPLETELY.

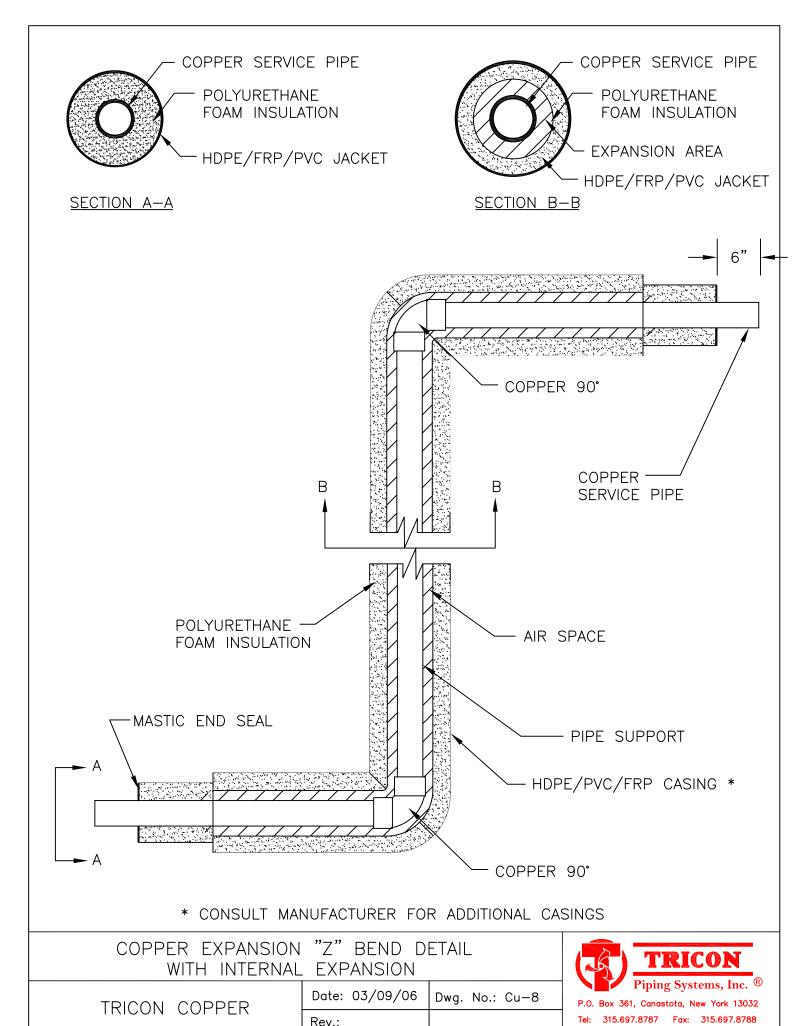


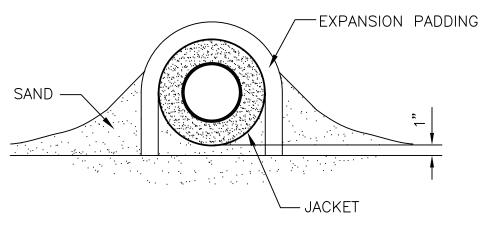
COPPER EXPANSION 90° ELBOW DETAIL WITH EXTERNAL PADDING

TRICON COPPER

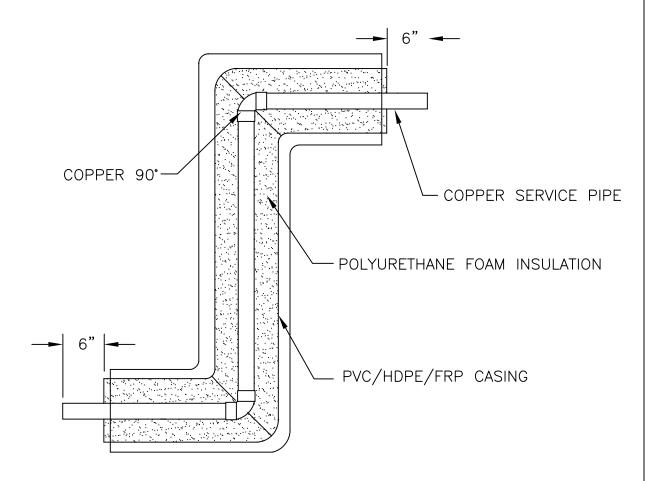
Date: 03/09/06 Dwg. No.: Cu-7A







- 1. EXPANSION PADDING MATERIAL IS SUPPLIED IN PRECUT LENGTHS AND WIDTHS.
- 2. WRAP PADDING AROUND THE JACKET FOR A SNUG FIT. HOLD IN PLACE WITH BEDDING SAND.



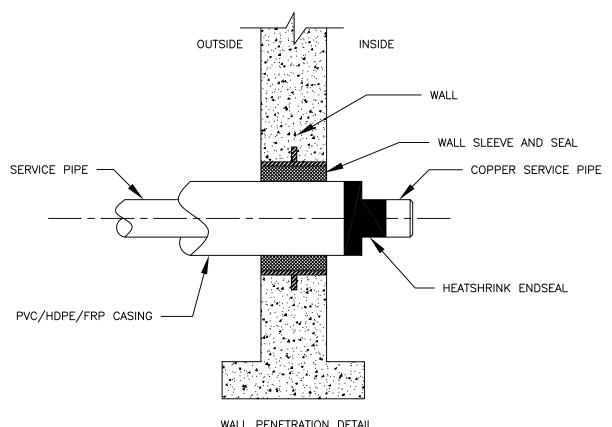
COPPER E	XPANSION	"Z"	BEND	DETAIL
WITH	EXTERNAL	PA[DDING	

Rev.:

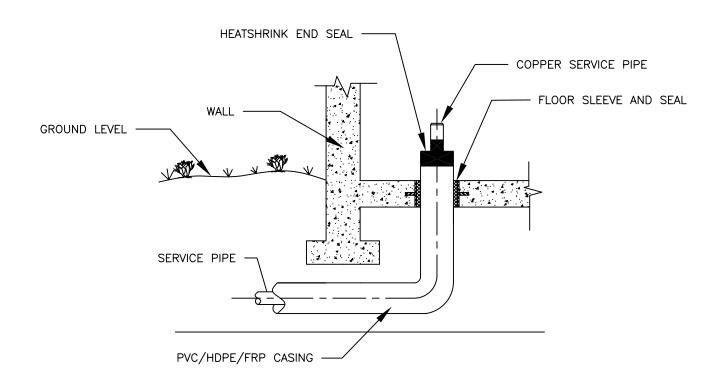
TRICON COPPER

Date: 03/09/06 Dwg. No.: Cu-8A









BUILDING RISER DETAIL

HEATSH	END	

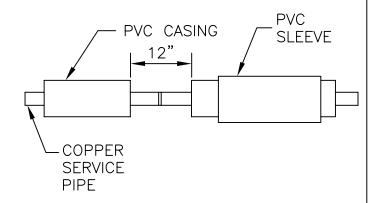
Rev.:

TRICON COPPER

Date: 03/09/06 Dwg. No.: Cu-9

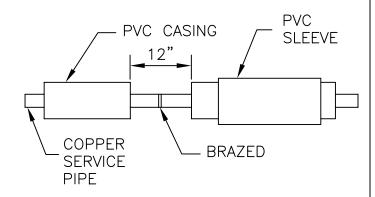


PHASE 1



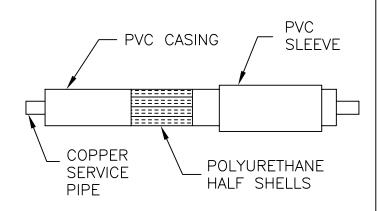
PRIOR TO BRAZING COPPER PIPE, SLIDE PVC SLEEVE OVER PVC CASING AND MOVE AWAY FROM BRAZE POINT TO PREVENT DAMAGE.

PHASE 2



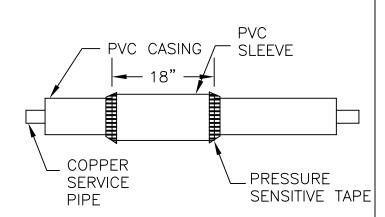
TEST ALL BRAZED JOINTS AS REQUIRED.

PHASE 2



FIT POLYURETHANE FOAM HALF SHELLS OVER SERVICE PIPE AND SECURE IN PLACE.

PHASE 4



SLIDE PVC SLEEVE ONTO CENTER OF JOINT OVER INSULATION. APPLY A WRAP OF PRESSURE SENSITIVE TAPE AROUND THE AREA WHERE THE CASING AND SLEEVE MEET. ALLOW A 2" OVERLAP OF TAPE ONTO BOTH SURFACES.

IN COLDER WEATHER, TAPE MUST BE KEPT WARM UNTIL TIME OF USE.

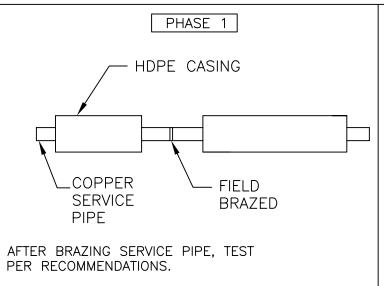
COPPER FIELD JOINT KIT DETAIL WITH RIGID POLYURETHANE FOAM & PVC CASING.

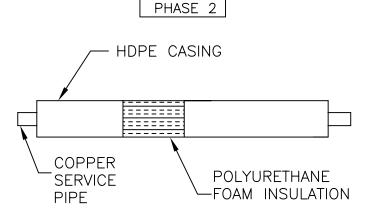
Rev.:

TRICON COPPER

Date: 03/09/06 Dwg. No.:Cu-10A





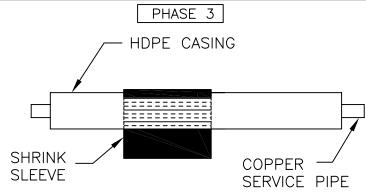


INSTALL RIGID URETHANE INSULATION TO PIPE. SECURE IN PLACE TO HDPE CASING

PHASE 4

HDPE CASING

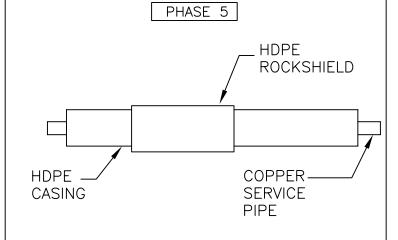
-CLOSURE

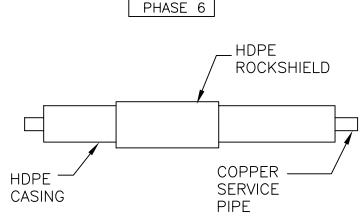


SHRINK COPPER **SLEEVE SERVICE** (HEATED) PIPE REMOVE RELEASE LINER AND PLACE SHRINK SLEEVE

AROUND JOINT AND PIPE INSULATION. OVERLAP SLEEVE AT THE 10 TO 12 O'CLOCK POSITION. GENTLY HEAT BACKING OF SLEEVE AND CLOSURE. PRESS THE CLOSURE FIRMLY INTO PLACE. GENTLY HEAT CLOSURE AND PAT DOWN WITH HAND.

WITH LOW YELLOW FLAME, HEAT THE SHRINK SLEEVE FROM THE MIDDLE TOWARD EACH SIDE OF THE SLEEVE UNTIL RECOVERY IS COMPLETE. SHRINKING IS COMPLETED WHEN ADHESIVE OOZES FROM SIDES. AVOID EXCESSIVE HEAT TO OVERLAP AREA.





SECURE HDPE ROCKSHIELD IN PLACE. FIELD JOINT IS NOW COMPLETE.

SLIDE HDPE CASING OVER JOINT SO THAT SHRINK SLEEVE IS COMPLETELY COVERED

> COPPER FIELD JOINT KIT DETAIL WITH RIGID POLYURETHANE FOAM & HDPE CASING.

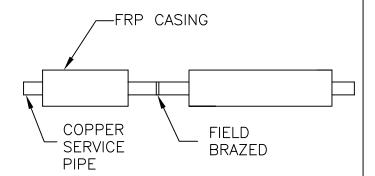
> > Rev.:

TRICON COPPER

Date: 03/09/06 Dwg. No.:Cu-10B

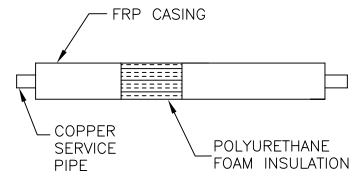
P.O. Box 361, Canastota, New York 13032 Tel: 315.697.8787 Fax: 315.697.8788

PHASE 1



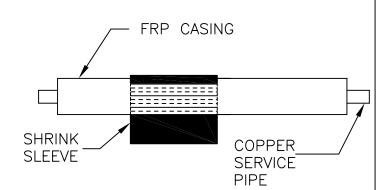
AFTER SILVER BRAZING SERVICE PIPE, TEST PER RECOMMENDATIONS.

PHASE 2



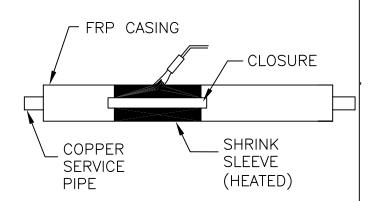
INSTALL RIGID URETHANE INSULATION TO PIPE. SECURE IN PLACE TO FRP CASING

PHASE 3



REMOVE RELEASE LINER AND PLACE SHRINK SLEEVE AROUND JOINT AND PIPE INSULATION. OVERLAP SLEEVE AT THE 10 TO 12 O'CLOCK POSITION. GENTLY HEAT BACKING OF SLEEVE AND CLOSURE. PRESS THE CLOSURE FIRMLY INTO PLACE. GENTLY HEAT CLOSURE AND PAT DOWN WITH HAND.

PHASE 4



WITH LOW YELLOW FLAME, HEAT SHRINK SLEEVE USING CIRCUMFERENTIAL STROKES. AVOID EXCESSIVE HEAT TO OVERLAP AREA. DO NOT BACKFILL UNTIL SHRINK SLEEVE IS COOL TO THE TOUCH.

COPPER FIELD JOINT KIT DETAIL WITH RIGID POLYURETHANE FOAM & FRP CASING.

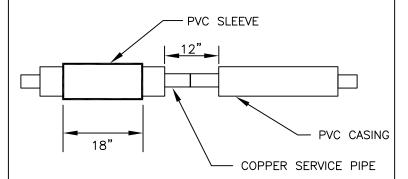
Rev.:

TRICON COPPER

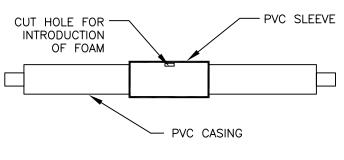
Date: 03/09/06 Dwg. No.:Cu-10C





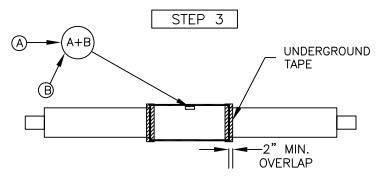


SLIDE SPLIT PVC SLEEVE OVER END OF PIPE CASING. TEST ALL SILVER BRAZED JOINTS AS REQUIRED.

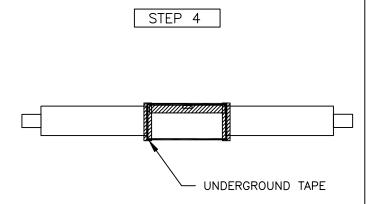


STEP 2

CENTER PVC SLEEVE OVER JOINT AND SECURE IN PLACE. CUT HOLE IN TOP OF PVC SLEEVE FOR INTRODUCTION OF POLYURETHANE FOAM MIXTURE.



APPLY UNDERGROUND TAPE WHERE PVC SLEEVE AND CASING MEET. PROVIDE FOR A MINIMUM OVERLAP OF 2". REFER TO CHART BELOW FOR FOAM AMOUNT BASED ON JACKET SIZE. POUR FOAM INTO OPENING. WHEN FOAM REACTS, TEMPORARILY SEAL THE OPENING WITH DUCT TAPE TO MAXIMIZE INSULATION IN CAVITY.



TRIM OFF EXCESS MATERIAL AFTER CURING IS COMPLETE. APPLY ADDITIONAL UNDERGROUND TAPE TO HOLE IN PVC SLEEVE.

POLYURETHANE FOAM MIXTURE CHART

JACKET SIZE	FIELD JOINT		
3	3		
4	4		
5	5		
6	6		
8	8		
10	10		
12	12		
14	14		
16	16		

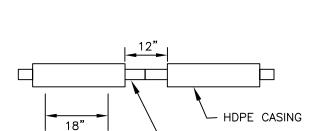
CHART INDICATES PROPORTIONS OF EACH COMPONENT (NAMELY "A" & "B") TO BE MIXED PRIOR TO INTRODUCTION INTO PIPE CAVITY. A NOMINAL INSULATION THICKNESS OF 1-1/2" IS ASSUMED FOR PURPOSES OF THIS CHART. FOR THICKNESS OTHER THAN 1-1/2", CONTACT TRICON FOR QUANTITIES. EXAMPLE: FOR AN 8 INCH JACKET, 8 OUNCES OF "A" AND 8 OUNCES OF "B" ARE REQUIRED. REQUIRED PROPORTIONS MAY VARY AS A RESULT OF CHANGES IN WEATHER CONDITIONS. NOTE THAT CHEMICAL REACTION WILL TAKE LONGER IN COLDER WEATHER. CONTACT TRICON FOR ADVICE DURING INCLEMENT WEATHER. IN COLDER WEATHER, TAPE MUST BE KEPT WARM UNTIL TIME OF USE.

COPPER STANDARD POUR IN PLACE FIELD JOINT KIT DETAIL WITH PVC CASING.

TRICON COPPER

Date: 03/09/06 Dwg. No.: Cu-10D

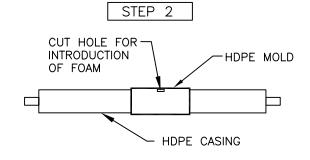




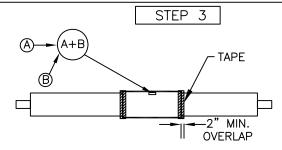
COPPER SERVICE PIPE

STEP 1

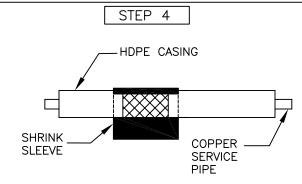
TEST ALL BRAZED JOINTS AS REQUIRED.



CENTER HDPE MOLD OVER JOINT AND SECURE IN PLACE. CUT HOLE IN TOP OF HDPE MOLD FOR INTRODUCTION OF POLYURETHANE FOAM MIXTURE.

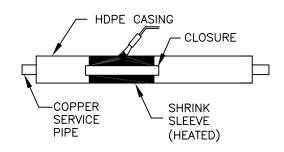


APPLY UNDERGROUND TAPE WHERE HDPE MOLD AND CASING MEET. PROVIDE FOR A MINIMUM OVERLAP OF 2". REFER TO CHART BELOW FOR FOAM AMOUNT BASED ON JACKET SIZE. POUR FOAM INTO OPENING. WHEN FOAM REACTS, TEMPORARILY SEAL THE OPENING WITH DUCT TAPE TO MAXIMIZE INSULATION IN CAVITY.

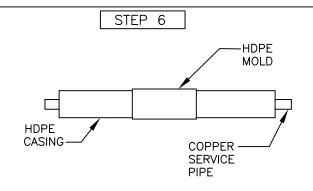


AFTER FOAM HAS REACTED, TRIM OFF ANY EXCESS AND REMOVE MOLD. PLACE SHRINK SLEEVE AROUND JOINT AND URETHANE. OVERLAP SLEEVE BETWEEN 10 & 12 O'CLOCK POSITION.





WITH LOW YELLOW FLAME, HEAT SHRINK SLEEVE USING CIRCUMFERENTIAL STROKES. AVOID EXCESSIVE HEAT TO OVERLAP AREA.



WHEN SHRINK SLEEVE HAS COOLED DOWN, APPLY HDPE MOLD AND SECURE IN PLACE. FIELD JOINT IS NOW COMPLETE.

POLYURETHANE FOAM MIXTURE CHART

JACKET	FIELD	JACKET	FIELD
SIZE	JOINT	SIZE	JOINT
3	3	10	10
4	4	12	12
5	5	14	14
6	6	16	16
8	8		

CHART INDICATES THE PROPORTIONS OF EACH COMPONENT ("A" & "B") TO BE MIXED PRIOR TO INTRODUCTION INTO PIPE CAVITY. INSULATION THICKNESS OF 1-1/2" IS ASSUMED FOR THE PURPOSES OF THIS CHART. EXAMPLE: FOR AN 8 INCH JACKET, 8 OUNCES OF "A" AND 8 OUNCES OF "B" ARE REQUIRED. PROPORTIONS MAY VARY AS A RESULT OF CHANGES IN WEATHER CONDITIONS. NOTE: CHEMICAL REACTION WILL TAKE LONGER IN COLDER WEATHER. CONTACT TRICON FOR ADVICE DURING INCLEMENT WEATHER.

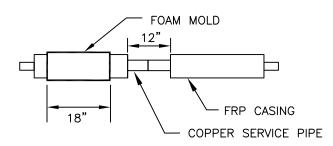
COPPER STANDARD POUR IN PLACE FIELD JOINT KIT DETAIL WITH HDPE CASING.

TRICON COPPER

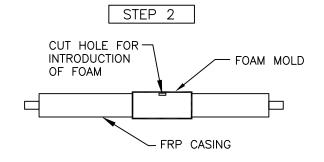
Date:	03/09/06	Dwg.	No.:	Cu-10E
Rev ·				



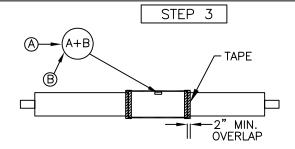
STEP 1



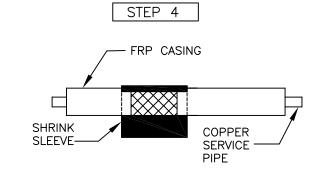
TEST ALL BRAZED JOINTS AS REQUIRED. SLIDE FOAM MOLD OVER JOINT.



CENTER FOAM MOLD OVER JOINT AND SECURE IN PLACE. CUT HOLE IN TOP OF FOAM MOLD FOR INTRODUCTION OF POLYURETHANE FOAM MIXTURE.

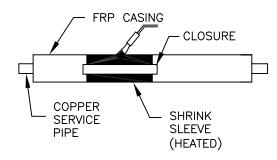


APPLY UNDERGROUND TAPE WHERE FOAM MOLD AND CASING MEET. PROVIDE FOR A MINIMUM OVERLAP OF 2". REFER TO CHART BELOW FOR FOAM AMOUNT BASED ON JACKET SIZE, POUR FOAM INTO OPENING. WHEN FOAM REACTS, TEMPORARILY SEAL THE OPENING WITH DUCT TAPE TO MAXIMIZE INSULATION IN CAVITY.



AFTER FOAM HAS REACTED, TRIM OFF ANY EXCESS AND REMOVE MOLD. PLACE SHRINK SLEEVE AROUND JOINT AND URETHANE. OVERLAP SLEEVE BETWEEN THE 10 & 12 O'CLOCK POSITION.

STEP 5



WITH YELLOW FLAME, HEAT SHRINK SLEEVE USING CIRCUMFERENTIAL STROKES. AVOID EXCESSIVE HEAT TO OVERLAP AREA. DO NOT BACKFILL UNTIL SHRINKSLEEVE IS COOL TO THE TOUCH.

POLYURETHANE FOAM MIXTURE CHART

JACKET SIZE	FIELD JOINT	JACKE SIZE	T FIELD JOINT
3	3	10	10
4	4	12	12
5	5	14	14
6	6	16	16
8	8		

CHART INDICATES THE PROPORTIONS OF EACH COMPONENT ("A" & "B") TO BE MIXED PRIOR TO INTRODUCTION INTO PIPE CAVITY. INSULATION THICKNESS OF 1-1/2" IS ASSUMED FOR THE PURPOSES OF THIS CHART. EXAMPLE: FOR AN 8 INCH JACKET, 8 OUNCES OF "A" AND 8 OUNCES OF "B" ARE REQUIRED. PROPORTIONS MAY VARY AS A RESULT OF CHANGES IN WEATHER CONDITIONS. NOTE: CHEMICAL REACTION WILL TAKE LONGER IN COLDER WEATHER. CONTACT TRICON FOR ADVICE DURING INCLEMENT WEATHER.

COPPER STANDARD POUR IN PLACE FIELD JOINT KIT DETAIL WITH FRP CASING.

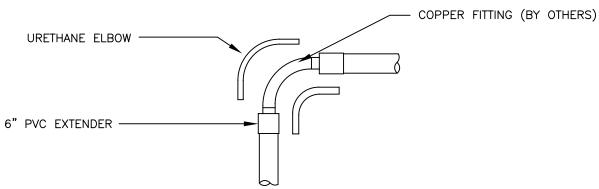
TRICON COPPER

Date:	03/09/06	Dwg.	No.:	Cu-10F
Pov.				



Tel: 315.697.8787 Fax: 315.697.8788

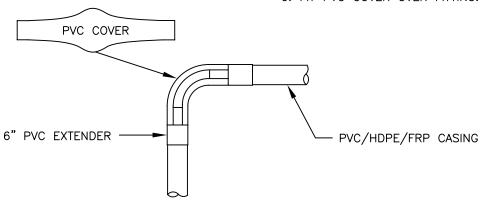




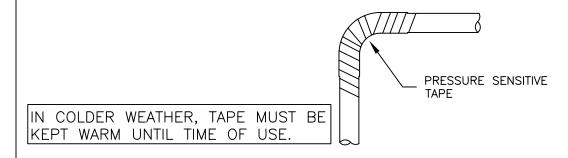
- 1. SLIDE PVC SLEEVE EXTENDERS ONTO END OF PIPE CASING BEFORE ELBOW IS BRAZED.
- 2. TEST ALL BRAZED JOINTS AS REQUIRED.
- 3. FIT POLYURETHANE FOAM INSULATION OVER FITTING AND SECURE IN PLACE.
- 4. CUT AND FIT STRAIGHT PIPE COVERING INTO PLACE THAT URETHANE ELBOW DOES NOT COVER.
- 5. SLIDE EXTENDERS IN PLACE AND SECURE WITH POLYKEN TAPE.



6. FIT PVC COVER OVER FITTING.



STEP 3



7. WRAP FITTING WITH PRESSURE SENSITIVE TAPE AS SHOWN.

COPPER STANDARD FIELD INSULATED ELBOW FITTING KIT DETAIL WITH RIGID INSULATION

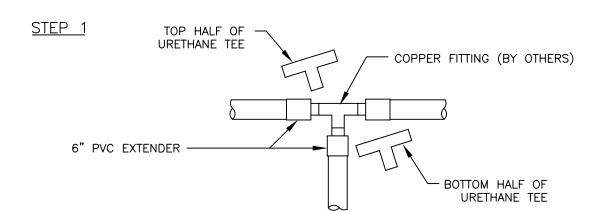
Rev.:

TRICON COPPER

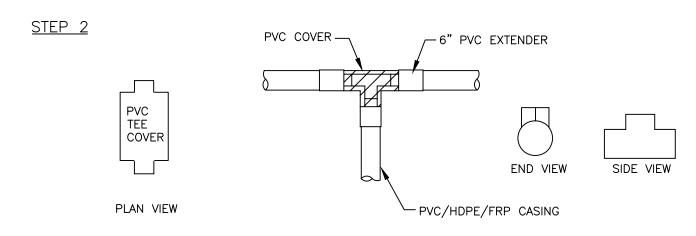
Date: 03/09/06 Dwg. No. Cu-11



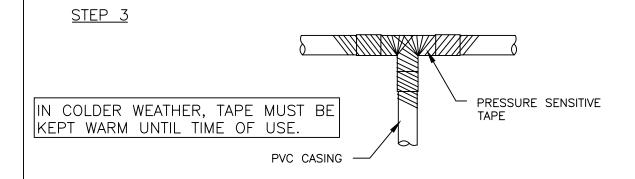
Tel: 315.697.8787 Fax: 315.697.8788



- 1. SLIDE 6" PVC SLEEVE EXTENDERS ONTO END OF PIPE BEFORE TEE IS BRAZED. 2. TEST ALL BRAZED JOINTS AS REQUIRED.
- 3. FIT POLYURETHANE FOAM INSULATION OVER FITTING AND SECURE IN PLACE.
- 4. CUT AND FIT STRAIGHT PIPE COVERING INTO PLACE THAT URETHANE TEE DOES NOT COVER.
- 5. SLIDE EXTENDERS IN PLACE AND SECURE WITH POLYKEN TAPE.



6. FIT PVC COVER OVER FITTING.



7. SPIRALLY WRAP FITTING WITH PRESSURE SENSITIVE TAPE AS SHOWN.



P.O. Box 361, Canastota, New York 13032 Tel: 315.697.8787 Fax: 315.697.8788

TRICON COPPER

Dwg. No. Cu-12