



ACCU-FLO WELLHEAD
Installation and
Operation Manual



Accu-Flo Wellhead Table of Contents

INTRODUCTION	2
ACCU-FLO™ WELLHEAD INFORMATION	3
Before You Begin	4

PROCEDURE FOR INSTALLING ACCU-FLO WELLHEADS

Overall Summary.....	5
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Beginning the Installation

Step 1A. Installing the Accu-Flo™ Wellhead to a Vertical Well Casing	6
Step 1B. Installing the Accu-Flo™ Wellhead on a Horizontal Pipe.....	9
Step 2. Attach the Flex Hose to the Gate Valve Assembly	12
Step 2A: Cementing the PVC Flex Hose to the Valve Assembly.....	12
Step 2B: Attaching the PVC Reinforced Corrugated Flex Hose to the Valve Assembly.....	12
Step 2C: Attaching the Composition Rubber Flex Hose to Valve Assembly	13
Step 3. Install the flex hose to the header or lateral.	14
Step 3A: Cement the PVC Flex Hose to the Header or Lateral.....	15
Step 3B: Attaching the PVC Reinforced Corrugated Flex Hose to the Header or Lateral	16
Step 3C: Attaching the Composition Rubber Flex Hose to the Header or Lateral	19

ACCU-FLO WELLHEAD MAINTENANCE PROCEDURES

Tube Cap, Impact Tube and Pressure Ports Assembly.....	20
Flow Control Gate Valve & Gas Sample Port.....	22

Accu-Flo Wellhead Table of Contents - Continued

PVC Flex Hose	23
Measurement Tube Assembly and PVC Pipe Fittings.....	23

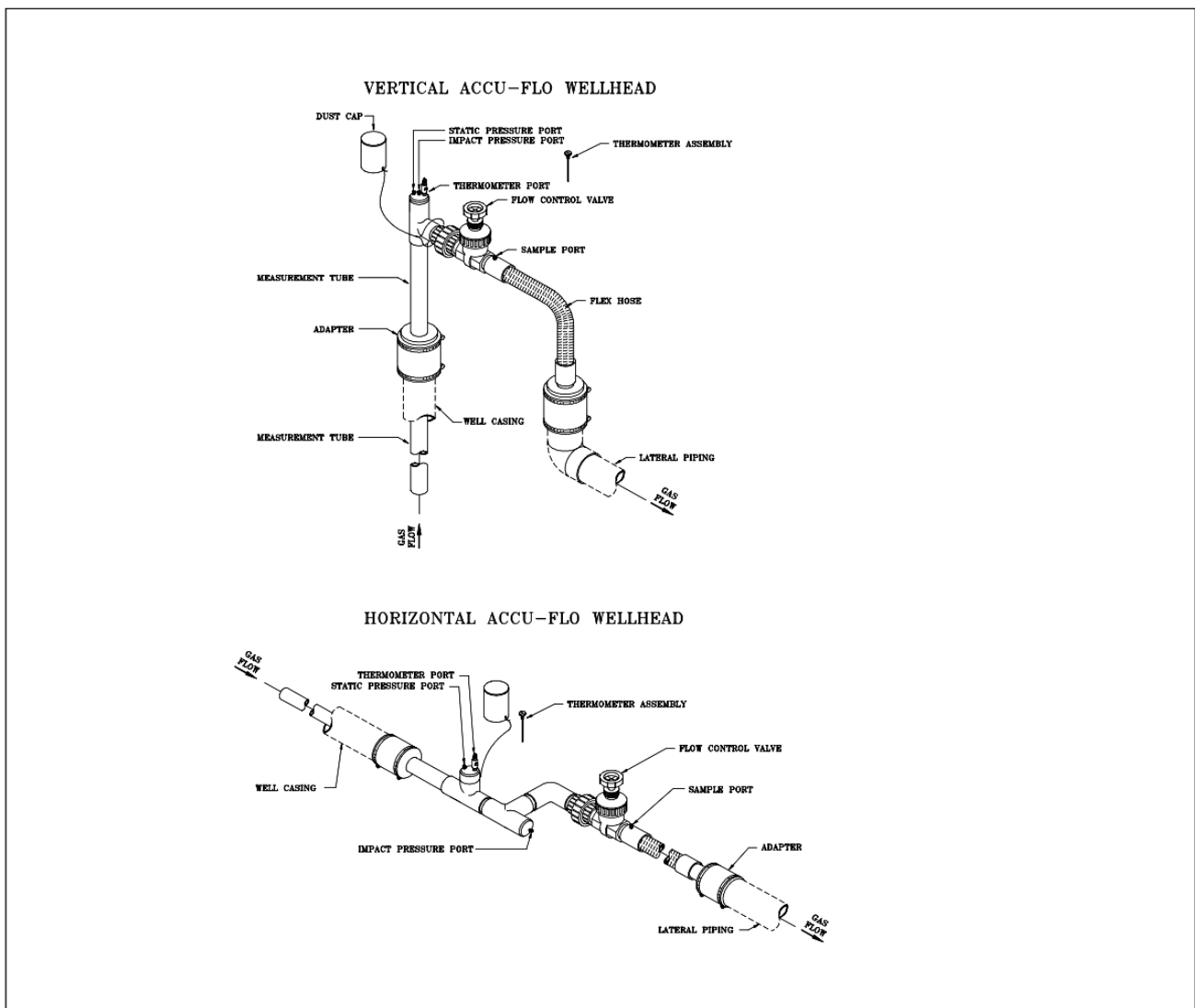
APPENDIX A SCHEDULE 80 PVC SOLVENT CEMENT INSTRUCTIONS

How It Works	24
The Gluing Environment.....	24
Primers/Cleaners.....	24
Step 1 – Apply Primer	25
PVC Solvent Cement	25
Step 2 – Apply Cement	26
Applicator and Other Material Requirements.....	26
Final Warnings – Handling Solvent Cements and Primers.....	27

Notes:

Introduction

This manual provides installation instructions and operation and maintenance procedures for QED Accu-Flo™ Wellheads. Accu-Flo™ Wellheads are designed specifically for installation in landfill gas (LFG) extraction systems. The wellheads are available in two configurations -- vertical and horizontal which are shown in the drawing below:



Accu-Flo™ Wellhead Information

This section provides supplemental information for Accu-Flo™ wellheads. Specific procedures for installing your Accu-Flo™ wellhead will vary depending upon the model, the size and type of the well casing and header/lateral piping comprising the LFG extraction system. Before beginning installation, read through this entire section.

Additional parts and supplies are necessary to properly install the Accu-Flo™ wellhead. Make sure you have the necessary supplies, parts, tools and equipment before installing.

Before You Begin

Review your landfill permits for special restrictions or procedures that must be observed if excavation, trenching or other work is required for installation of Accu-Flo™ wellheads.

Read the introductory statements of each step to determine which instructions apply to your particular Accu-Flo™ wellhead model and LFG extraction system.

Obtain the following items:

- Appropriate coupling/flange and reducer fittings for your well casing.
- Any additional piping and/or fittings necessary to connect the wellhead flex hose to the extraction system.
- PVC Primer and PVC solvent cement for PVC pipe, adapter fittings and flexible PVC hose as necessary. Several types of PVC cement are available and the proper type should be used depending on the type and size of the materials being cemented together. See Appendix A for additional PVC primer/gluing information and instructions.
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- High-grade vacuum grease is recommended for installation of vertical Accu-Flo™ wellheads. Dow Corning High Vacuum Grease is a silicone lubricant for glass stopcocks, joints, and glass-rubber connections. It resists most chemicals, is heat stable and inert. It is available in several sizes.
- Tools -- including screw drivers, pliers, wrenches, emery cloth, saws, rags, glue rollers or brushes, etc. which can facilitate installation.
- Safety equipment as required by site conditions.
- Measurement equipment -- to take data after installation.
- Paint or marker for well identification.
- As a general safety rule, QED recommends that two persons be used to install Accu-Flo™ wellheads if extensive use of power equipment to reexcavation is required. Also, during hot weather installations (above 90°F), two persons are required to insure that the solvent cement is applied quickly, before the solvents begin to dry and set-up.

CAUTION: Review your company's landfill gas(LFG) health and safety policies and procedures prior to attempting any work at a landfill gas site. Federal, state and local regulations establish health and safety standards that regulate work at LFG sites.

Procedure for Installing Accu-Flo™ Wellheads

Overall Summary

The installation procedure is divided into three sections as follows:

STEP 1: Install the Accu-Flo™ Wellhead onto the well casing, header or lateral.

STEP 1A: Installing The Accu-Flo™ wellhead to a vertical well casing.

- Slip or plain end well casing, header or lateral.
- Flanged well casing, header or lateral.

STEP 1B: Installing the Accu-Flo™ well head to a horizontal well casing, header or lateral.

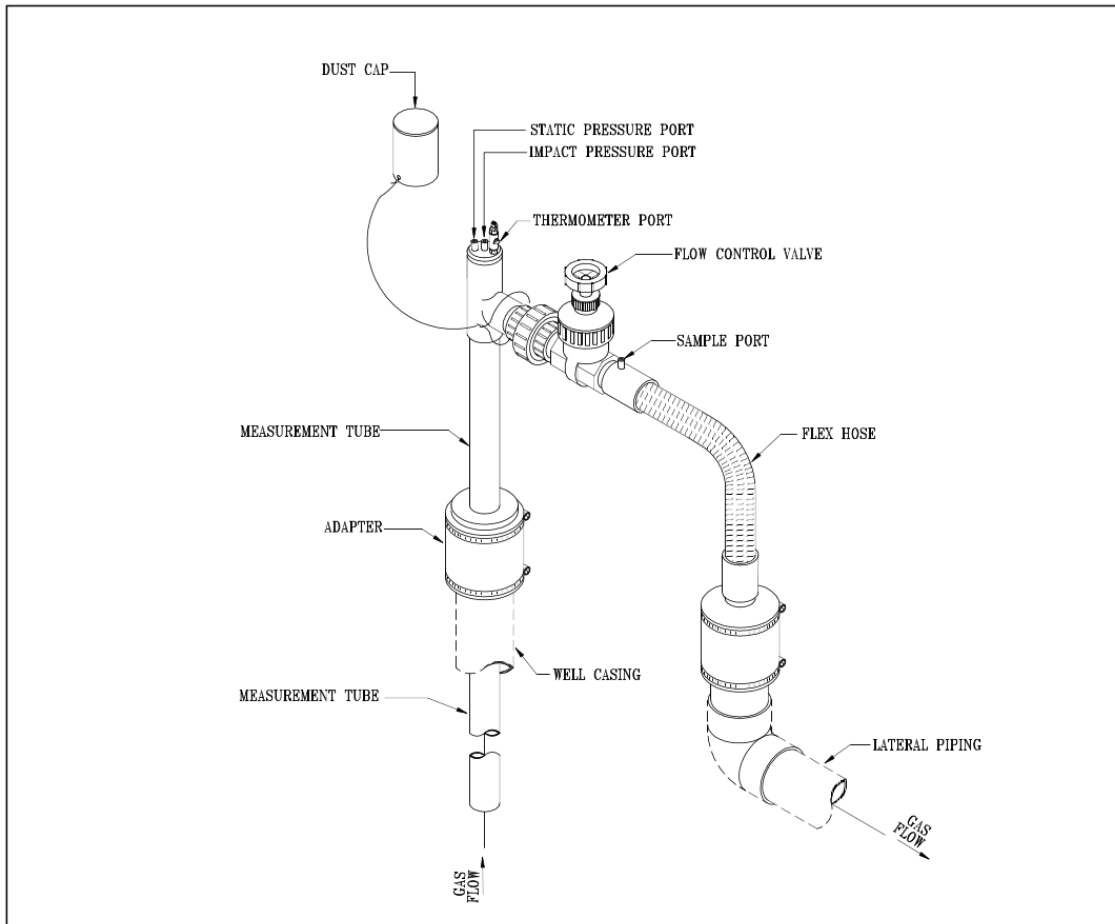
- Slip or plain end well casing, header or lateral.
- Flanged well casing, header or lateral.

STEP 2: Attach the flex hose to the valve assembly of the Accu-Flo™ wellhead.

STEP 3: Attach the flex hose to the header or lateral pipe.

Warning: NEVER CUT THE MEASUREMENT TUBE ASSEMBLY OF ANY ACCU-FLO™ WELLHEAD. The length of the measurement tube assembly has been designed and tested at its current length. Any alterations to the measurement tube assembly will alter the differential pressure data taken at the wellhead and can compromise flow accuracy.

Beginning the Installation



Drawing 1A-1 (Slip or plain end connection)

Step 1A. Installing the Accu-Flo™ Wellhead to a Vertical Well Casing

This section gives the instructions for installing the Accu-Flo™ wellhead to a slip or flanged well casing. Go to Step 1B for horizontal installation. Proceed to the proper section below depending on the well casing connection slip or flanged.

Slip or Plain End Vertical Well Casing

This procedure is for Vertical Slip Well Casings. See drawing 1A-1

1. Measure the outer diameter(O.D.)of the vertical well casing.
2. Determine the necessary adapter kit to fit the casing diameter.

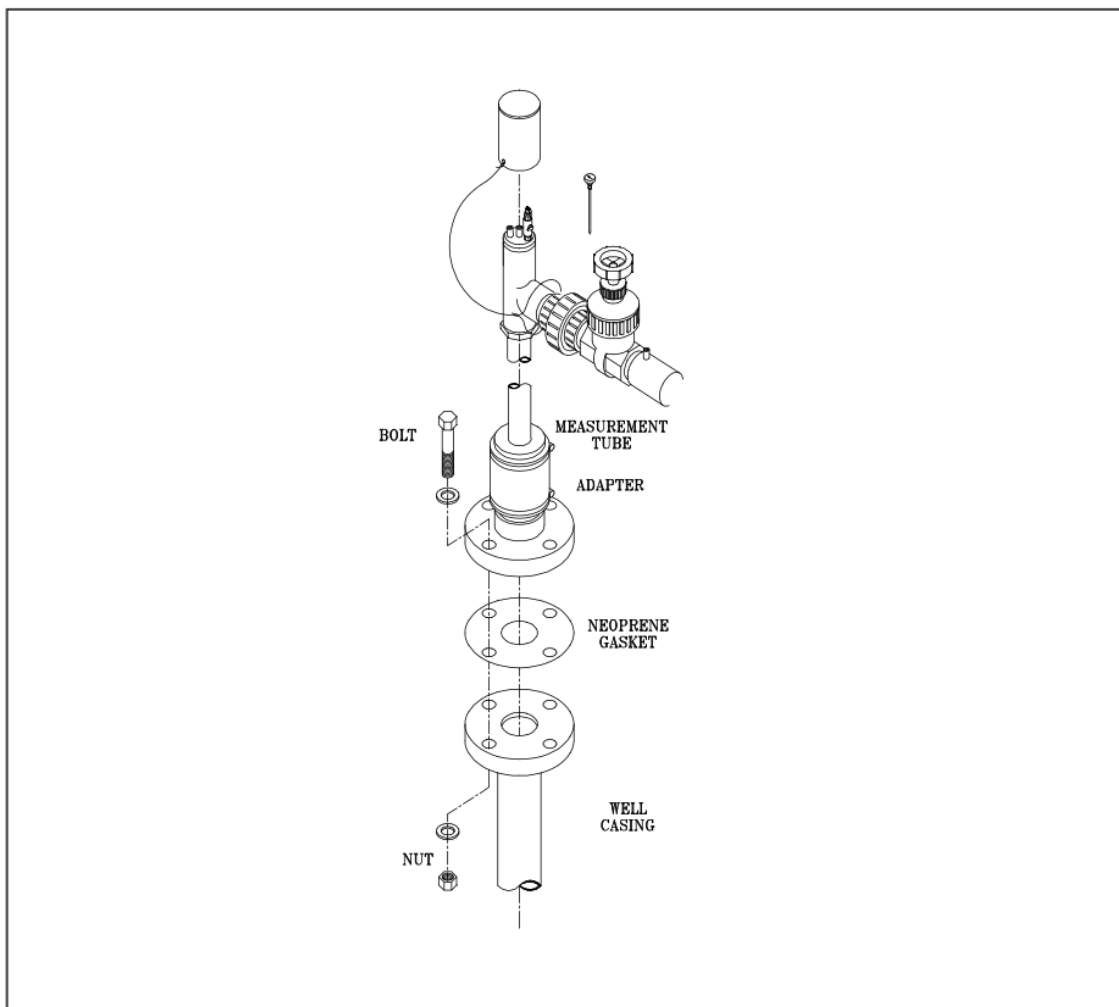
3. Combine the coupling, reducer bushing and the Accu-Flo™ wellhead to determine that they fit together for the given well casing size. See Drawing 1A-1.
4. Loosen the stainless steel clamps on the adapter kit coupling. Do not remove clamps from coupling.
5. Slide coupling over the plain end of the well casing.
6. Determine the desired location of the reducer bushing on the Accu-Flo™ wellhead measurement tube. Apply a light coating of vacuum grease to the inside surface of the reducer and slide the bushing on to the Accu-Flo™ wellhead measurement tube.
7. Place the wellhead assembly into the well casing. Determine the desired orientation of the wellhead and slide adapter kit bushing into coupling on the top of the well casing. Tighten stainless steel clamps to 60 inch-lbs. torque.
8. Turn the Accu-Flo™ Wellhead valve handle clockwise to shut the valve and stop landfill gas from escaping from the wellhead.
9. Proceed to Step 2 for attaching the flexhose.

Flanged Vertical Well Casing

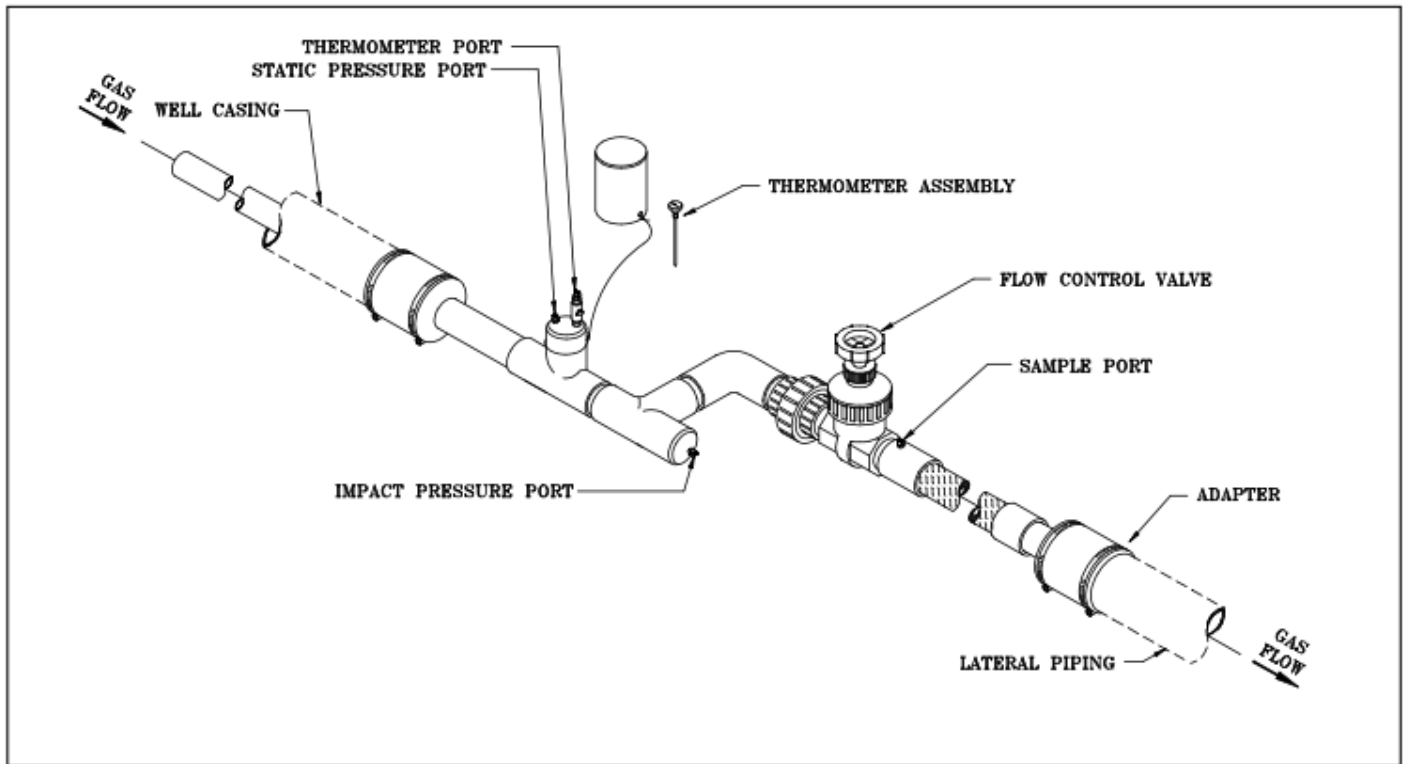
This procedure is for Vertical Flanged Well Casings. (See drawing 1A-2)

1. Measure the outer diameter (O.D.) of the vertical well casing.
2. Determine the necessary flanged adapter kit to fit the casing diameter. (See Accu-Flo™ Adapter Kit Chart on page five for the necessary adapter kit.)
3. Combine the flange, couplings, reducer bushing and the Accu-Flo™ Wellhead to determine that they fit together for the given well casing size. (See Drawing 1A-2.)
4. Put the neoprene flange gasket, provided with the adapter kit onto the well casing flange.
5. Use two open-ended wrenches to bolt the Van Stone spigot flange to the well casing flange with the bolts provided. Make sure the gasket is properly positioned between the two flanges and do not overtighten. (See drawing 1A-2)
6. Loosen the stainless steel clamps on the adapter kit coupling. Do not remove clamps from coupling.

7. Slide coupling over the plain end of the flange spigot.
8. Determine the desired location of the adapter kit bushing on the Accu-Flo™ wellhead measurement tube. Apply a light coating of vacuum grease to the inside surface of the reducer and slide the bushing on to the Accu-Flo™ wellhead measurement tube.
9. Place the wellhead assembly into the well casing. Determine the desired orientation of the wellhead and slide adapter kit bushing into coupling on the top of the well casing. Tighten stainless steel clamps to 60 inch-lbs torque.
10. Turn the Accu-Flo™ Wellhead valve handle clockwise to shut the valve and stop landfill gas from escaping from the wellhead.



Drawing 1A f-2 (Flanged Connection)



Drawing 1 B (Slip or Plain end connection)

Step 1B. Installing the Accu-Flo™ Wellhead on a Horizontal Pipe

This section gives the instructions for installing the Accu-Flo™ wellhead on a horizontal pipe. The horizontal pipe should be sloped away from the wellhead so that gas condensate does not drain into or through the flow measurement tube. Proceed to the proper section below depending on the type of connection.

Slip or Plain End Horizontal Pipe

1. This procedure is for a slip or plain end horizontal well casing. If flanged, go to the next section.
2. If the installation requires it, cut the pipe at the point where the horizontal Accu-Flo™ wellhead is to be installed. Clean the cut pipe of any plastic burrs as necessary.
3. Measure the outside diameter (O.D.) of the horizontal pipe to which the wellhead will be attached.
4. Note the direction of gas flow in the horizontal pipe. The Measurement Tube Assembly of the Accu-Flo™ wellhead will be inserted towards the source of the flow. If installed backwards, flow measurement will not be possible.
5. Determine the necessary adapter kit to fit the casing diameter. It is possible that the horizontal pipe is larger than 8" in diameter. If so, contact QED for the necessary adapter kit.
6. Combine the coupling, reducer bushing, and the Accu-Flo™ Wellhead to determine that they all do fit together for the given flange size.
7. Loosen the stainless steel clamps on the adapter kit coupling. Do not remove clamps from coupling.
8. Slide coupling over the plain end of the well casing.
9. Determine the desired location of the reducer bushing on the Accu-Flo™ well head measurement tube. Apply a light coating of vacuum grease to the inside surface of the reducer and slide the bushing on to the Accu-Flo™ wellhead measurement tube.
10. Place the wellhead assembly into the well casing. Determine the desired orientation of the wellhead and slide adapter kit bushing into coupling on the end of the well casing. Tighten stainless steel clamps to 60 inch-lbs. torque.
11. Turn the Accu-Flo™ Wellhead valve handle clockwise to shut the valve and stop landfill gas from escaping from the wellhead.
12. Proceed to Step 2 for attaching the flex hose.

Flanged Horizontal Pipe

This procedure is for a flanged end horizontal well casing.

1. If the installation requires it, cut the pipe at the point where the horizontal Accu-Flo™ wellhead is to be installed. Clean the cut pipe of any plastic burrs as necessary.
2. Measure the outside diameter (O.D.) of the horizontal pipe to which the wellhead will be attached.
3. Note the direction of gas flow in the horizontal pipe. The Measurement Tube Assembly of the Accu-Flo™ wellhead will be inserted towards the source of the flow. If installed backwards, flow measurement will not be possible.
4. Determine the necessary adapter kit to fit the casing diameter. It is possible that the horizontal pipe is larger than 8" in diameter. If so, contact QED for the necessary adapter kit.
5. Combine the flange, couplings, reducer bushing and the Accu-Flo™ Wellhead to determine that they fit together for the given flange size. See Drawing 1A-2.
6. Put the neoprene flange gasket, provided with the adapter kit onto the well casing flange.
7. Use two open-ended wrenches to bolt the Van Stone spigot flange to the well casing flange with the bolts provided. Make sure the gasket is properly positioned between the two flanges and do not overtighten. (See drawing 1A-2)
8. Loosen the stainless steel clamps on the adapter kit coupling. Do not remove clamps from coupling.
9. Slide coupling over the plain end of the flange spigot.
10. Determine the desired location of the adapter kit bushing on the Accu-Flo™ well head measurement tube. Apply a light coating of vacuum grease to the inside surface of the reducer and slide the bushing on to the Accu-Flo™ wellhead measurement tube.
11. Place the wellhead assembly into the well casing or pipe. Determine the desired orientation of the wellhead and slide adapter kit bushing into coupling on the end of the well casing. Tighten stainless steel clamps to 60 inch-lbs. torque.
12. Turn the Accu-Flo™ Wellhead valve handle clockwise to shut the valve and stop landfill gas from escaping from the wellhead.
13. Proceed to Step 2 for attaching the flex hose.

Step 2. Attach the flex hose to the assembly.

The flex hose is attached using one of two methods.

STEP 2A: Cementing the PVC hose to valve assembly.

1. Using primer and appropriate PVC solvent cement, cement the flex hose to the valve assembly. (See PVC gluing instructions in Appendix A.) Apply primer and solvent cement to both the PVC flex hose and inside of the coupling extending from the valve assembly.
2. Firmly hold the flex hose into the valve coupling while the glue dries and sets for several minutes.
3. Proceed to Step 3--Installing the Flex Hose to the Header or Lateral.

STEP 2B: Attaching the PVC reinforced corrugated flex hose to valve assembly.

The PVC reinforced corrugated flex hose is attached to the valve assembly one of two ways. A permanent connection can be made by gluing, or a removable connection can be made utilizing clamps.

If using a removable connection with clamps.

1. Unless the Accu-Flo™ Wellhead has been special ordered with plain end pipe on the outlet of the wellhead valve, it is necessary to cut PVC nipples that are glued into the couplings attached to the valves. The 1 1/2" and 2" wellheads require a 4" long nipple. The 3" wellhead requires a 5" nipple.
2. Clamps specifically made to fit over the corrugations on the flex hose will be needed to retain the flex hose on the plastic pipe.
3. Slip one of the power clamps over the PVC reinforced corrugated flex hose.
4. Next slip the flex hose over the PVC pipe extension from the valve assembly (see drawing 3C).
5. Using a wrench, tighten the hose clamp and do not overtighten. This should secure the flex hose to the valve assembly.
6. Proceed to Step 3--"Installing the Flex Hose to the Header or Lateral."

If using a permanent connection by gluing.

1. Unless the Accu-Flo™ Wellhead has been special ordered with plain end pipe on the outlet of the wellhead valve, It is necessary to cut PVC nipples that are glued into the couplings attached to the valves. The 1 1/2" and 2" wellheads require a 3 1/2" long nipple. The 3" wellhead requires a 4" nipple.
2. Using primer and appropriate PVC solvent cement, cement the flex hose to the valve assembly. (See PVC gluing instructions in Appendix A.) Apply primer and solvent cement to both the PVC reinforced corrugated flex hose and the outside of the nipple described in step 1 above (see drawing 3B).
3. Firmly hold the flex hose on the nipple while the glue dries and sets for several minutes. This should secure the flex hose to the valve assembly.
4. Proceed to Step 3--"Installing the Flex Hose to the Header or Lateral."

STEP 2C: Attaching the composition rubber flex hose to valve assembly.

1. Unless the Accu-Flo™ Wellhead has been special ordered with plain end pipe on the outlet of the wellhead valve, it is necessary to cut PVC nipples that are glued into the couplings attached to the valves. The 1 1/2" and 2" wellheads require a 3 1/2" long nipple. The 3" wellhead requires a 4" nipple.
2. Two plastic collar rings can be purchased to aid in the installation of the composition rubber flex hose. The purpose of the plastic collar ring is to provide a positive seal under the clamp between the flex hose on the plastic pipe. The long sloping ramp side of the ring is positioned towards the end of the pipe.
3. Prime the inside of the collar ring and the outside of PVC extension from the Accu-Flo™ Wellhead with PVC primer.
4. Put a thin band of PVC cement over the area on the PVC extension from the Accu-Flo™ wellhead that was primed in step 3 above and position the collar ring over the glued pipe extension about 1 1/2" from the end of the pipe. Allow to properly set before proceeding.
5. Slip one of the stainless steel hose clamps over the rubber flex hose.
6. Next slip the flex hose over the PVC pipe extension from the valve assembly and over the collar ring that was glued on in step 4 above.
7. Using a flathead screwdriver (or hex nut driver), tighten the hose clamp after positioning it behind the collar ring installed in step 4. This should secure the flex hose to the valve assembly.

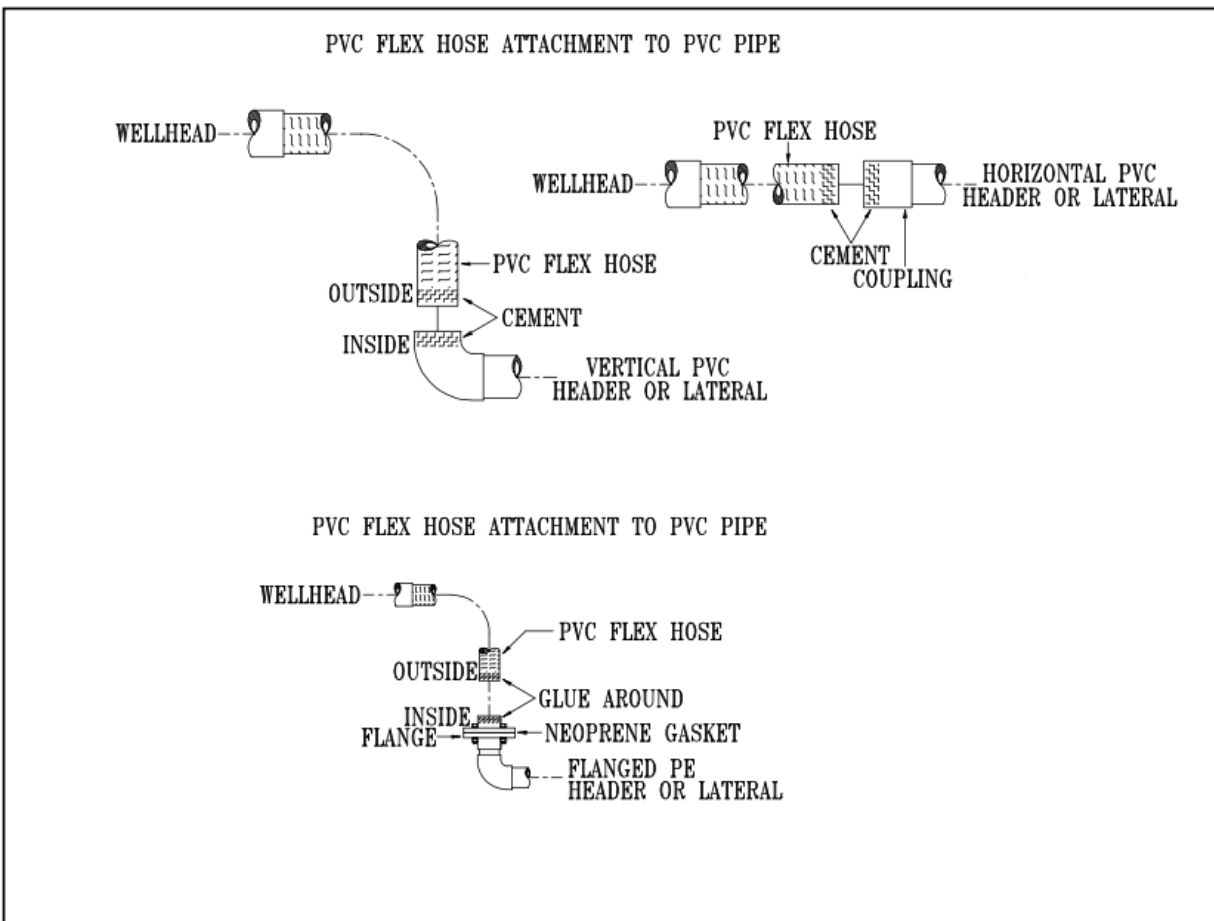
8. Proceed to Step 3--"Installing the Flex Hose to the Header or Lateral."

Step 3. Install The flex hose to the header or lateral.

The flex hose is attached to a header or lateral using one of two methods.

For the standard PVC flex hose go to section 3A for gluing the PVC flex hose to the header or lateral.

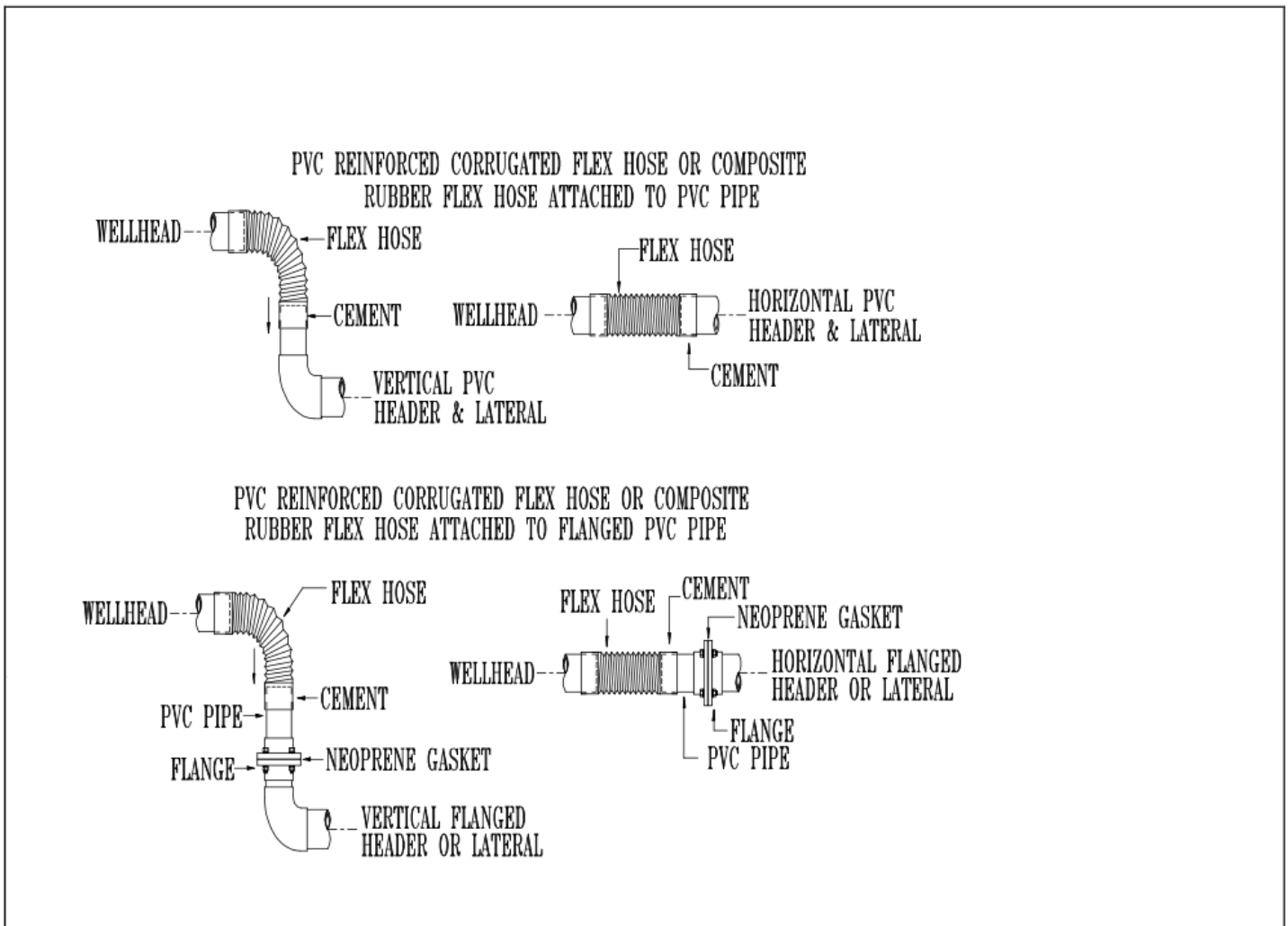
For the optional PVC reinforced corrugated flex hose or composition rubber flex hose go to section 3B and 3C.



Drawing 3A (Cement connection)

STEP 3A: Cement the flex hose to the header or lateral. See Drawing 3A above.

1. Check to make sure that the PVC flex hose previously attached in step 2A has set enough before proceeding.
2. Take the flex hose to be attached to the lateral or header and confirm that it does reach. The PVC hose is usually glued into a slip fitting or adapter bushing that fits the required pipe diameter. As QED does not know the size or the material of the lateral or header pipe, it is up to the installer to provide the required adapter fittings and or bushings. The required fittings might be very similar to those furnished in QED adapter kit. If the pipe is larger than 8" in diameter multiple reducer bushings may be required.
3. If several fittings are required, test them for proper fit prior to cementing them into position in the lateral or header pipe.
4. It is recommended that the bushings necessary to fit the pipe diameter be installed with PVC glue first and allowed to set. (See PVC gluing instructions in Appendix A.)
5. Install the flex hose onto the header or lateral. Apply PVC primer and solvent cement to the flex hose and fitting on the header or lateral. Firmly insert the PVC flex hose into the header or lateral fitting and hold it in position until it is set.
6. You have completed the installation of the Accu-Flo™ wellhead. It is recommended that the newly installed wellhead be marked with an identification number for reference purposes. It is also suggested that the wellfield log and related well files be updated to reflect the changes made. Please review further sections of this manual to learn how to use the Accu-Flo's features.



Drawing 3B (Cement connection)

STEP 3B: Attaching the PVC reinforced corrugated flex hose to header or lateral.

The PVC reinforced corrugated flex hose is attached to the header or lateral one of two ways (See Drawing 3B and 3C). A permanent connection can be made by gluing, or a removable connection can be made utilizing clamps.

If using a removable connection with clamps.

1. Check to make sure that the flex hose attached in step 2 can reach the desired connection fitting.
2. As QED does not know the size or composition (PVC or PE) of the lateral or header pipe, it is up to the installer to provide the required adapter fittings and or bushings. The required fittings might be very similar to those furnished in QED'S adapter kits. If the pipe is larger than 8" in diameter multiple reducer bushings may be required.

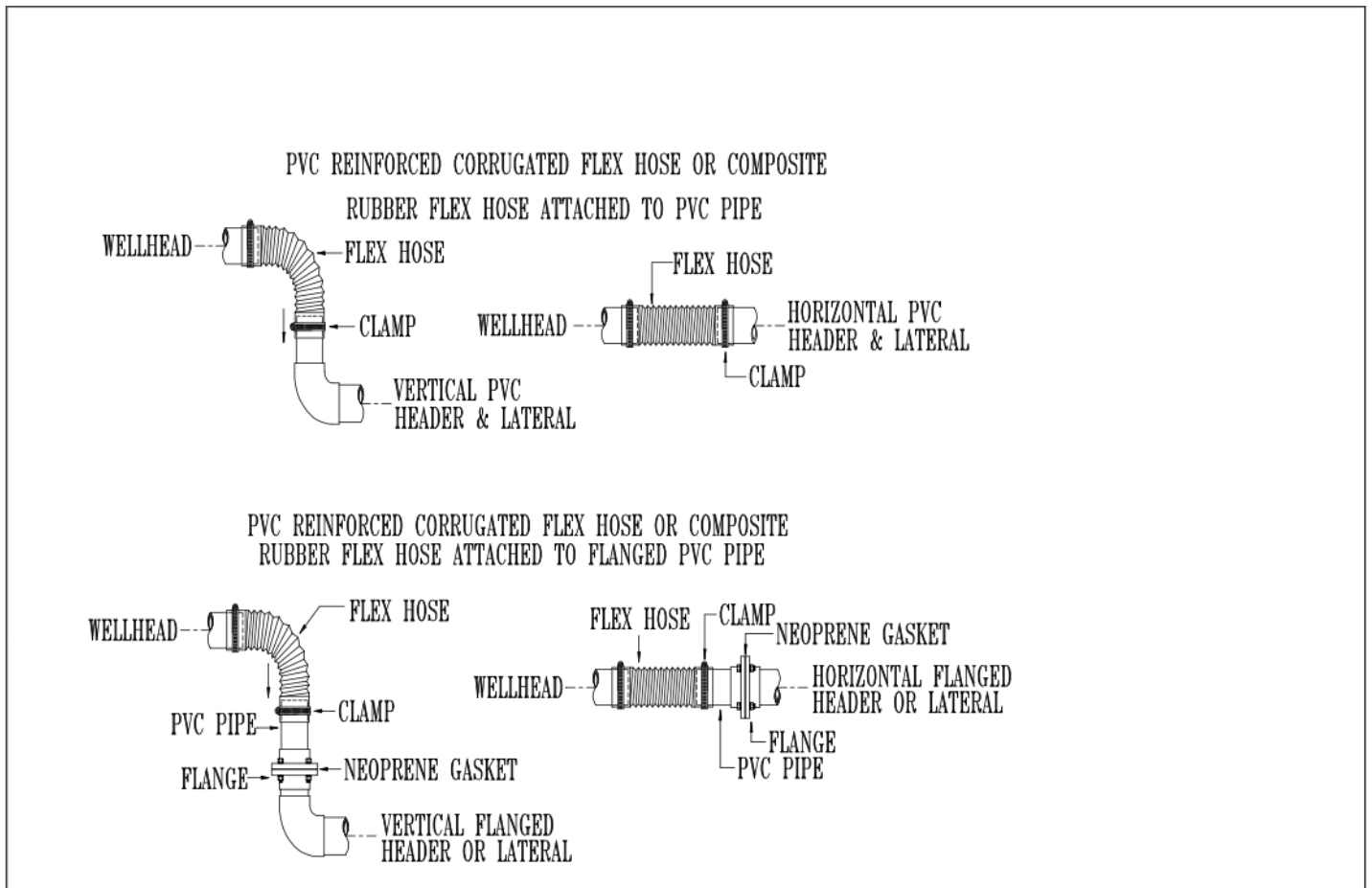
3. If several fittings are required, test them for proper fit prior to cementing them into position in the lateral or header pipe.
4. The bushings necessary to fit the pipe diameter should be installed with PVC glue first and allowed to set. (See PVC gluing instructions in Appendix A.)
5. A PVC pipe nipple will need to come out of any reducer bushing so the flex hose can be clamped to the pipe. The installer is responsible for providing this extension piece of PVC pipe. The pipe extension should be properly primed and glued into the reducer bushing or Van Stone flange determined and installed in Steps 2-4 above.
6. Clamps specifically made to fit over the corrugations on the flex hose will be needed to retain the flex hose on the plastic pipe.
7. Slip one of the clamps over the PVC reinforced corrugated flex hose.
8. Next slip the flex hose over the PVC pipe extension installed in step 5 above (see drawing 3C).
9. Using a wrench tighten the hose clamp and do not overtighten. This should secure the flex hose to the header or lateral.
10. You have completed the installation of the Accu-Flo™ wellhead. It is recommended that the newly installed wellhead be marked with an identification number for reference purposes. It is also suggested that the wellfield log and related well files be updated to reflect the changes made. Please review further sections of this manual to learn how to utilize its features.

If using a permanent connection by gluing.

1. Check to make sure that the flex hose attached in step 2 can reach the desired connection fitting.
2. As QED does not know the size or composition (PVC or PE) of the lateral or header pipe, it is up to the installer to provide the required adapter fittings and or bushings. The required fittings might be very similar to those furnished in QED's adapter kits. If the pipe is larger than 8" in diameter multiple reducer bushings may be required.
3. If several fittings are required, test them for proper fit prior to cementing them into position in the lateral or header pipe.
4. The bushings necessary to fit the pipe diameter should be installed with PVC glue first and allowed to set. (See PVC gluing instructions in Appendix A.)
5. A PVC pipe nipple will need to come out of any reducer bushing so the flex hose can

be clamped to the pipe. The installer is responsible for providing this extension piece of PVC pipe. The pipe extension should be properly primed and glued into the reducer bushing or Van Stone flange determined and installed in Steps 2-4 above.

6. Using primer and appropriate PVC solvent cement, cement the flex hose to the header or lateral. (See PVC gluing instructions in Appendix A.) Apply primer and solvent cement to both the PVC reinforced corrugated flex hose and the outside of the nipple described in step 5 above (see drawing 3B).
7. Firmly hold the flex hose on the nipple while the glue dries and sets for several minutes. This should secure the flex hose to the header or lateral.
8. You have completed the installation of the Accu-Flo™ wellhead. It is recommended that the newly installed wellhead be marked with an identification number for reference purposes. It is also suggested that the wellfield log and related well files be updated to reflect the changes made. Please review further sections of this manual to learn how to utilize its features.



Drawing 3C (Clamped connection)

STEP 3C: Attach the composition rubber flex hose to the header or lateral.

(See Drawing 3C above.)

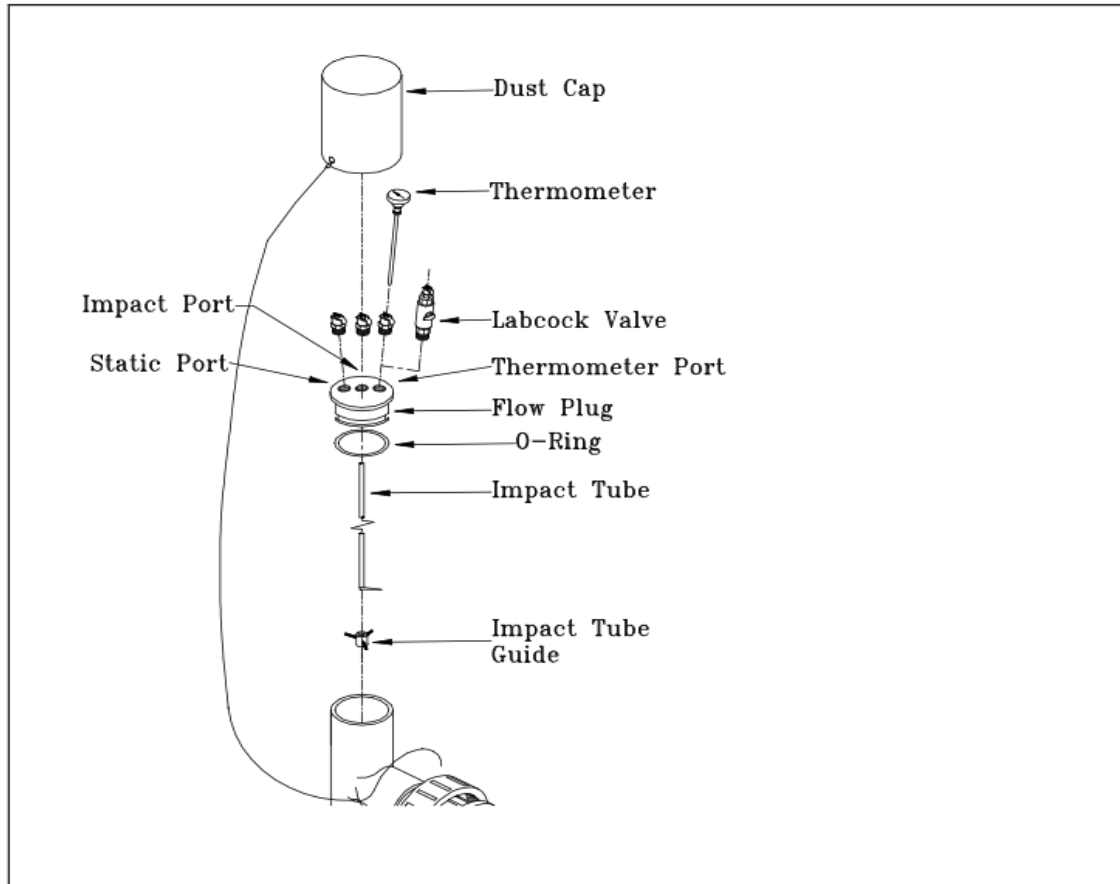
1. Check to make sure that the flex hose attached in step 2 can reach the desired connection fitting.
2. As QED does not know the size or composition (PVC or PE) of the lateral or header pipe, it is up to the installer to provide the required adapter fittings and or bushings. The required fittings might be very similar to those furnished in QED's adapter kits. If the pipe is larger than 8" in diameter multiple reducer bushings may be required.
3. If several fittings are required, test them for proper fit prior to cementing them into position in the lateral or header pipe.
4. The bushings necessary to fit the pipe diameter should be installed with PVC glue first and allowed to set. (See PVC gluing instructions in Appendix A.)
5. A PVC pipe nipple will need to come out of any reducer bushing so the flex hose can be clamped to the pipe. The installer is responsible for providing this extension piece of PVC pipe. The pipe extension should be properly primed and glued into the reducer bushing or Van Stone flange determined and installed in Steps 2-4 above.
6. Install the plastic collar ring if purchased with the composition rubber flex hose as described in step 2C 2-4
7. Slip on the stainless steel hose clamp over the flex hose.
8. Next slip the flex hose over the PVC pipe extension and over the collar ring that was glued on in Step 6 above.
9. Using a flathead screwdriver (or hex nut driver), tighten the clamp to secure the flex hose to the header or lateral.
10. You have completed the installation of the Accu-Flo™ wellhead. It is recommended that the newly installed wellhead be marked with an identification number for reference purposes. It is also suggested that the wellfield log and related well files be updated to reflect the changes made. Please review further sections of this manual to learn how to utilize its features.

Accu-Flo™ Wellhead Maintenance Procedures

Accu-Flo™ wellheads are designed to be virtually maintenance free. However, unforeseen catastrophic events, human error and extreme weather conditions can cause problems.

All Accu-Flo™ Models are virtually the same except for the diameter of the measurement tube assembly and the length of the Impact tube.

Tube Cap, Impact Tube and Pressure Ports Assembly



Drawing 4

Drawing 4 shows how the flow plug, impact tube and pressure ports can be disassembled. The following provides more details:

- 1. Static Pressure Port:** Consists of 1/8" (flow ID) quick connect coupling with automatic shutoff and latching mechanism. It is screwed into the flow plug to create the Static Pressure Port.

Recommended Maintenance: Periodically lubricate the O-ring with a light coating of vacuum grease and inspect coupling for corrosion or brittleness caused by extreme

weather conditions and UV damage. Replace O-ring or coupling as necessary.

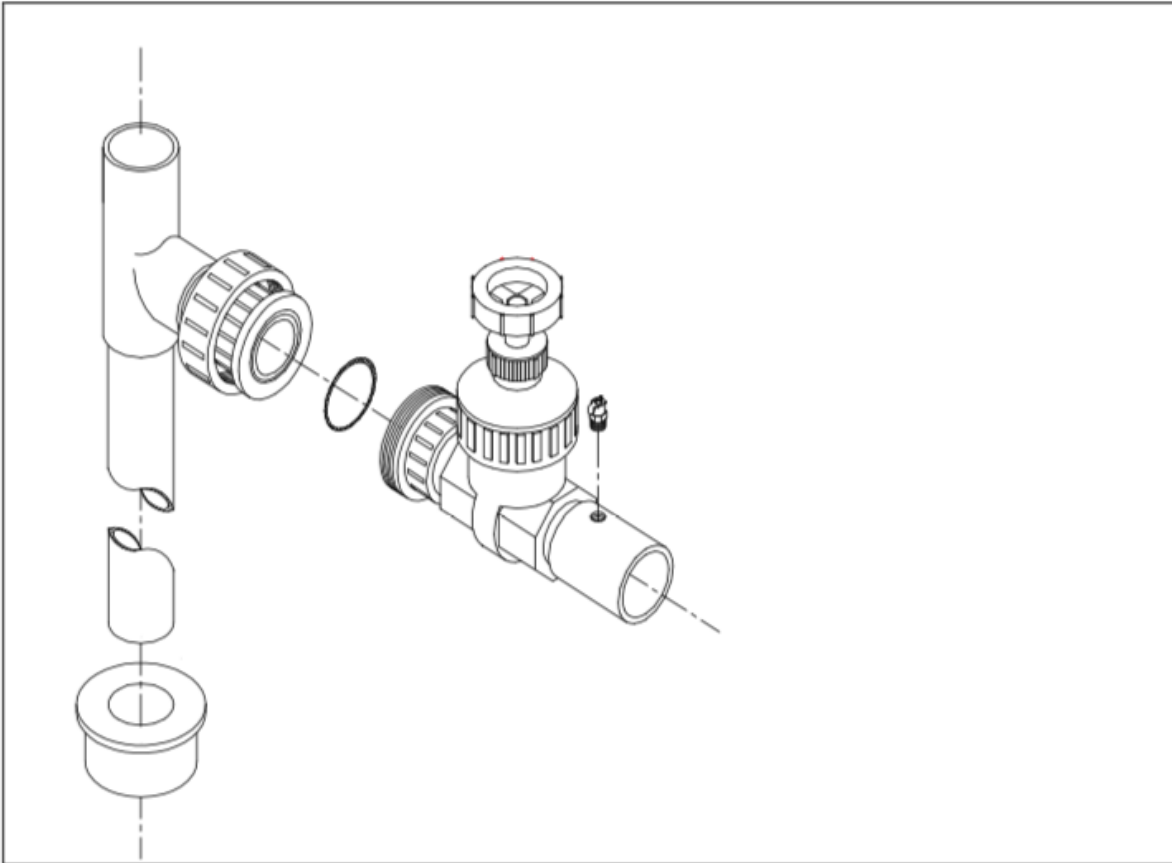
- 2. Impact Pressure Port:** This pressure port has a 1/8" (flow ID) quick connect coupling with automatic shutoff and latching mechanism. It is screwed into the center of the flow plug. The impact tube is connected to the same port on the underside of the plug. Recommended Maintenance: Periodically lubricate the O-ring with a light coating of vacuum grease and inspect coupling for corrosion or brittleness caused by extreme weather conditions and UV damage. Replace O-ring or coupling as necessary.
- 3. Thermometer Port:** The thermometer port has two configurations. Both use a 1/8" (flow ID) quick connect straight through coupling with automatic latching mechanism. The first configuration has the quick connect screwed directly into the flow plug. The port is plugged with a thermometer assembly or a blank plug. In the second configuration a labcock valve used to shutoff the port. The thermometer port is 180° from the static pressure port.
Recommended Maintenance: Periodically lubricate the o-ring with a light coating of vacuum grease and inspect coupling and labcock valve for corrosion or brittleness caused by extreme weather conditions and UV damage. Replace O-ring, coupling or labcock valve as necessary.
- 4. Thermometer Assembly:** The thermometer is mounted on a quick coupling insert. The thermometer has a range of 0 to 220 degrees Fahrenheit.
Recommended Maintenance: Verify thermometer calibration, if suspect, using a known temperature standard. The thermometer can be calibrated. Periodically lubricate the O-ring with a light coating of vacuum grease. Replace O-ring as necessary.
- 5. Flow Plug:** The plug above the measurement tube that contains the static, impact pressure and thermometer ports. The impact tube is mounted on the underside of the plug below the impact port. The horizontal wellhead has two plugs. One plug in a horizontal position that contains the impact tube and impact pressure port and a second plug in a vertical position that contains the thermometer and static pressure ports. The plug is sealed with an O-ring and retained by two screws.
Recommended Maintenance: To remove the plug and provide access to the impact tube: First mark the orientation of the plug in the tee, then remove the two retaining screws and lift the plug out of the tee using a rotating motion. Before reassembling the plug into the tee, lubricate the O-ring with a light coating of vacuum grease. Replace O-ring as necessary.
- 6. Impact Tube:** The stainless steel impact tube is housed inside of the measurement tube assembly and affixed to the underside of the flow plug with a tube fitting. A guide stabilizes and positions the tube inside the measurement tube.
Recommended Maintenance: Traces of smoke residue have been noted on impact tubes in wells that had nearby landfill fires. Otherwise there is little build up on the stainless steel tube. To disassemble the impact tube, remove the flow plug and then unscrew the retaining nut. Take care not to lose the retaining washer or the seal

behind the retaining nut. Reverse this step when replacing the impact tube. Lubricate the seal with a light coating of vacuum grease.

- DustCap:** The elastomeric PVC dust cap and wire cord are located at the top of the measurement tube assembly to protect the pressure ports from the weather, dust, and UV Exposure.

Recommended Maintenance: Periodically wipe accumulated moisture and dust from the inside of the cap. Replace dust cap if it becomes brittle or cracked.

Flow Control Gate Valve and Gas Sampling Port



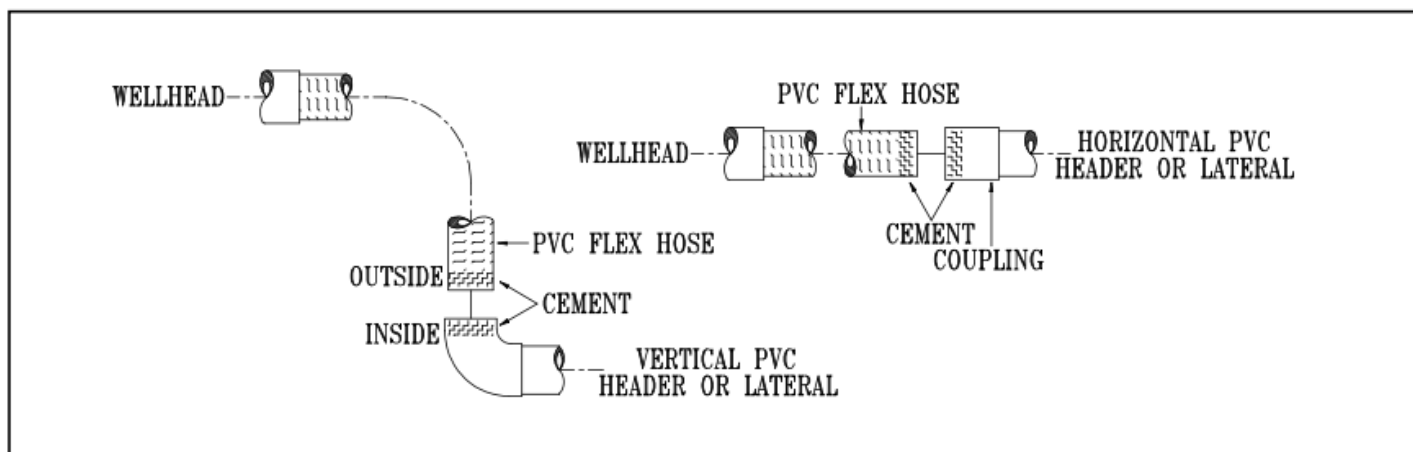
Drawing 5

- Union Disconnect Connector:** One side of the union end connector is welded onto the gate valve while the companion union end connector and union nut is welded onto the measurement tube assembly tee.
Recommended Maintenance: If necessary to disassemble for any reason inspect O-ring for damage and lubricate with a light coating of vacuum grease.
- Flow Control Gate Valve:** This non-rising stem gate valve provides controlled throttle of gas flow and positive shut-off.

Recommended Maintenance: To remove the bonnet, use a box end wrench. The gate valve can be taken apart like any valve and the inner parts can be inspected. Do not over tighten when reassembling as the valve cap can crack.

- 3. Gas Sampling Port:** This port consists of a 1/8" quick connect coupling which is located on the Flow Control Gate Valve Assembly; and is in an ideal location for taking a gas sample. A single cap is provided to keep this port free from dust. Recommended Maintenance: Periodically lubricate the O-ring with a light coating of vacuum grease and inspect coupling for corrosion or brittleness caused by extreme weather conditions and UV damage. Replace O-ring or coupling as necessary.

PVC Flex Hose



Drawing 6

The drawing above shows the PVC flex hose attached to the wellhead and lateral/header pipe.

Flex Hose: The flex hose is shipped separately and welded to the gate valve during installation using flexible solvent cement.

Recommended Maintenance: Repair of a damaged flex hose can be accomplished by using one or more PVC 2" slip x 2" slip coupling(s) to splice and weld two flex hose pieces together using flexible PVC Cement.

Measurement Tube Assembly and PVC Pipe Fittings

The measurement tube assembly of the Accu-Flo™ Wellhead includes a various PVC Schedule 80 pipe fittings that are factory assembled. In most cases, if these parts crack or are damaged, the wellhead should be replaced.

Remember: NEVER SHORTEN OR ALTER THE MEASUREMENT TUBE IN ANY MANNER.

APPENDIX A

SCHEDULE 80 PVC SOLVENT CEMENT INSTRUCTIONS

QED's Accu-Flo™ wellheads are made of schedule 80 PVC and adapter kits are elastomeric PVC. Solvent cement is the recommended method of welding PVC pipe and PVC flexible hose. These procedures are not meant to supersede instructions you may have received with your brand of primer and solvent cement.

In general, when given a choice, a colored primer/cleaner or PVC cement is preferred over clear products because you can see where it has been applied. There are special PVC solvent cements for different sizes of pipes and fittings, conditions and uses. The same is true for primers/cleaners. Match the correct product to the application.

A special cement is required for PVC flexible hose applications. When gluing flex hose to connectors, make sure the proper cement is selected. This glue and primer is not effective for joining other types of piping materials in kind, or to PVC; transition fittings are required.

How It Works

Detailed step by step procedures on how to make good solvent cemented joints are given below. However, we feel that knowing the principles of solvent cementing will help facilitate better quality installation of Accu-Flo™ wellheads at your landfill gas collection system.

Primer is used to wet, penetrate and soften the surface area of the pipe and fitting to be joined, followed by a generous application of cement that is applied to both surfaces. If the cement coatings on the pipe and fitting are wet and fluid, when forcibly joined, they will fuse together. As the cement dissipates, sets and cures, the cement layer and softened surfaces will harden with a corresponding increase in joint strength. A good joint will take the required pressure applicable to landfill wellhead vacuum operation long before the joint is fully dry and final strength is obtained.

The Gluing Environment

Extremes in temperatures are not conducive to good solvent cementing. Avoid solvent cementing in hot weather in excess of 110° and cold weather of 40° or below. For chronically wet conditions, such as the repair of existing piping that contains moisture from gas condensate, use PVC primer and Cement rated for application under wet conditions.

Primers/Cleaners

In general primers are typically purple in color and are for PVC and CPVC applications. The function of a primer is to penetrate and soften the bonding surfaces of pipe and

fittings to prepare them for solvent cementing. Use the primer within 3 years of the date stamped on the can. The product should meet ASTM F-656.

Before the primer is used, the pipe, and fittings should be prepared with a square cut, deburred, cleaned and checked for proper fit. Read all cautions and warnings on the can and product MSDS (Material Safety Data Sheet).

Step 1 - Apply Primer

1. Cut pipe square. Remove all burrs from both the inside and outside of the pipe.
2. Remove dirt, grease, and moisture. A thorough wipe with clean dry rag is usually sufficient.
3. Check for dry fit. For proper interference fit, pipe should go easily into fitting 1/4 to 3/4 of the way.
4. Use a suitable applicator. The dauber in some cans may not be the correct size for the application. In general the applicator should be 1/2 the diameter of the pipe. Apply primer with an adequate size applicator. (See charts below). A dauber, brush top applicator, swab or paint brush may be used. A rag is not recommended, as repeated contact with skin may cause irritation or blistering.
5. Apply primer freely to the socket keeping the surfaces wet and applicator wet and in motion until the entire joining surface is properly softened. Re-dip if necessary. Avoid puddling in socket. Take care to avoid excess primer in bell end pipe.
6. Now apply primer to pipe surface in the same manner equal to the depth of the socket.
7. Apply primer again to the fitting socket. (This second application is especially recommended for bell end pipe and fittings fabricated from pipe stock, for many of them have especially hard inside surfaces.) Avoid puddling.
8. To check penetration, you should be able to scratch or scrape a few thousandths of the primed surface away. Repeated applications to either or both surfaces may be necessary. Weather conditions do affect priming action. In cold weather more time is required for proper penetration.
9. Immediately and while the surfaces are still wet, apply appropriate PVC Solvent Cement as instructed.

PVC Solvent Cement

TYPE/SETTING	APPLICATION	COLOR
Medium body, Fast setting	All classes through 6" dia., Sch. 80 through 3"	Gray
Heavy body, Medium setting	All classes and schedules through 12" dia.,	Gray
Extra heavy body, Slow setting	All classes and schedules through 22" dia.,	Gray
Medium body, Fast setting	For all flex & flex/rigid fittings Incl. Sch. 80 through 3"	Clear

CAUTION: Cements contain highly volatile solvents that evaporate rapidly. Avoid breathing the vapors. If necessary use a fan to keep work area clear of fumes. Avoid skin or eye contact. Do not use near heat, or sparks or open flame. Do not pressure test with compressed air or gas. Severe damage or personal injury could result. Read all warnings on containers and in product MSDS (Materials Safety Data Sheet).

Make sure solvent cement selected is fit for the use intended. The length of time necessary to cure depends on temperature. If product is “jelly-like” do not use it. Use product within 3 years of date stamped on container.

Step 2 - Apply Cement

1. Use a suitable applicator for the cement. The dauber in some cans may not be the correct size for the application. In general the applicator should be 1/2 the diameter of the pipe.
2. Apply primer as directed by product label and instruction above.
3. Apply a full even layer of PVC Solvent Cement on the pipe, equal to the depth of socket. Coat the fitting socket with a medium layer, avoid puddling. On bell end pipe do not coat beyond socket depth or allow cement to run beyond bell. Put a second full even layer on the pipe. Cement layers must be without voids and sufficient to fill any gap in the joint. Larger sizes often require a two person crew.
4. Assemble without delay while cement is still wet. Use sufficient force to ensure that pipe bottoms in the socket. If possible, twist pipe 1/8 to 1/4 turn as you insert but not after cement has started to set. Hold together for about 30 seconds to make sure that pipe is not pushed out. With a rag, wipe off any excess cement. Avoid disturbing the joint. If the setting process is disturbed an improper or “bad” joint may result. Such a joint will not have the proper strength and may fail or leak.
5. Allow about 15 minutes for good handling strength. Cure time before testing depends on size, fit, temperature and pressures. For larger sizes and temperatures below 40° F, longer periods are necessary.

Applicator and Other Material Requirements

Obtain the correct solvent cement and primer applicators. For pipe sizes 2” through 6” in diameter, use a 2” diameter roller applicator or large cotton swab applicator for PVC pipes 6” or larger. The primer applicator is a small brush applicator usually included as part of the primer container cap.

TYPE APPLICATOR	USE
Dauber in small can	Is satisfactory for all pipe & fittings up to 3” in diameter.
Large Roller	For pipe up to 6” in diameter
Jumbo Roller or Swab	For pipe over 6” in diameter

A dry clean cloth will be required to clean the pipe and fitting surfaces.

Final Warnings - Handling Solvent Cements and Primers

We want to emphasize that solvent cements and primers contain highly volatile solvents, which evaporate rapidly. Utmost care must be taken to avoid personal injury and to keep solvent cements usable.

- They are always flammable.
- Avoid breathing vapors.
- Avoid skin or eye contact.
- Keep containers closed when not in use.
- Solvent cements are formulated to be used “as received” in the original containers. If cement thickens beyond its original consistency, discard it. Do not attempt to dilute it with thinner.
- Solvent cement has a limited shelf life. Discard it if the manufacturer’s date is exceeded.