Installation Manual

PULSAR®

Model # SF-4W

rev.4 (02/28/14)

pulsar 1 system

Lonza

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1-800-4-PULSAR

Product Stewardship

MAKING THE WORLD A BETTER PLACE

Lonza is committed to maintaining and improving our leadership in the stewardship of our products. One of our initiatives is to make health, safety, and environmental protection an integral part of a product's life cycle – from manufacture, marketing, and distribution to use, recycling, and disposal.

Everyone involved with the product has responsibilities to address society's interest in a healthy environment and in products that can be used safely. We are each responsible for providing a safe workplace. All who use and handle products must follow safe and environmentally sound practices.

For more information about the stewardship of our products, contact your Lonza Representative.

General Principles of Installation

The **Pulsar® 1 Chlorinator** is an open to atmosphere system designed for pools and spas ranging from 500 gallons to 60,000 gallons. There are two different installation methods. The location of the pool circulation pump (above grade or below grade) will determine the proper installation method.

Selecting a location for the Pulsar® 1

Choose a location in the pump room that will allow easy access and service. Always try to minimize the length of the outlet tubing when locating the **Pulsar® 1**. The **Pulsar® 1** comes with 20 feet of 1/2" OD polyethylene tubing.

Tools & Equipment Required for Chlorinator Installation:

- Drill – Cordless Recommended
- 1/2" NPT Tap and 11/16" Drill Bit
- Teflon Tape or Pipe Sealant
- Tube Cutters or Utility Knife
- Gas Pliers (Channel Locks)
- Vacuum Gauge (Inches of Hg)
- 1/2" MNPT x 1/4" FNPT reducer
- Hacksaw *(optional)*
  (required for venturi)

Tools & Fittings Required for Venturi Installation:

- 1 1/2" PVC Pipe and Fittings *(elbows, tees etc.)*
- Ball or Gate Valve Sized for Pool Return Line
- 1 1/2" NPT Tap and 1 3/4" Hole Saw *(optional)*
- Saddle Clamps *(optional)*
- (2) 1 1/2" Ball Valves for Below Grade Venturi Installations.

Parts Included with the Pulsar® 1 Chlorinator:

A (20 ft.) 1/2” OD Polyethylene Tubing

B (2) 1/2” FNPT x 1/2” FNPT PVC Ball Valves

C (2) 1/2” MNPT x 1/2” OD Tubing Connector *(w8mc8)* installed in ball valves

D (2) 1/2” PVC Closed Nipples

E (1) 1/2” OD Tube x 1/4” MNPT Tubing Connector *(w8mc4)*

F (3) 1/2” OD Tube x 1/2” FNPT Connector *(w8fc8)*

G (1) 0 - 1.05 gpm acrylic Flow Indicator

H (1) **Pulsar® 1** Venturi 1 1/2” x 1 1/2” PVC

I (2) 1 1/2” Slip x Slip PVC Unions

J (1) 1/2” FNPT PVC Coupling

K (1) Plastic Pail for Grid Cleaning

L (1) Packet of Manuals and Warranty Card

Before Starting Installation

Determine if the Standard Pulsar® 1 Venturi Will Operate on This System

Ask the pool operator what the flow rate (minimum) of the pool is with a dirty filter. Backwash or clean the filter and measure the effluent pressure of the pool system after the filter at "P1" in the Installation Schematic. If this pressure is 17 psi or less and the minimum flow rate of the pool is greater than 45 gpm the **Pulsar® 1** venturi will provide adequate suction to operate the **Pulsar® 1**. The chart on page 5 lists the suction flow generated by the **Pulsar® 1** venturi at various pressure differentials.

The **Pulsar® 1** Venturi is designed to work properly on typical pool and spa circulation systems. Should you encounter a unique situation, the **Pulsar®** engineering staff can assist you in selecting an alternate venturi appropriate for your site requirements.

Install the venturi loop as shown in the appropriate Installation Schematic for either an above or below grade filtration system. The primary difference between the two is the use of ball valves on the below grade installation to allow the loop to be isolated from the pool system for service. Once the loop has been installed using the step by step instructions in the Installation Manual, adjust the pressure differential ball valve to achieve a vacuum reading of 13" Hg. See page 14 for proper procedure.

Pulsar® 1 System Venturi Installation: Theory

Flow to the venturi is taken from the pressure side of the pool recirculation pump after the filter and heater loop (if present). Flow from the venturi is returned downstream of the venturi inlet. A partially closed valve in between the venturi inlet and outlet provides the pressure drop needed to power the venturi. The three critical parameters in choosing a venturi are the inlet and outlet pressures and the suction lift. The Venturi must be capable of evacuating 1.0 gpm from the discharge tank when the filter is dirty. Suction flow will decrease with an increase in filter pressure as less water will flow through the venturi.

Always minimize the backpressure when installing a venturi. **This includes eliminating / minimizing any elbows on the outlet side of the venturi**. In addition, if the venturi is located more than 3 feet above the chlorinator outlet, it will be necessary to calculate the effect of the suction lift loss on outlet flow. Follow instructions on page 6 to perform the Suction Lift calculation if required.

Pulsar® 1 System Venturi Installation: Theory (continued)

After the evacuation system has been laid out, measure the height differential (in feet) between the venturi and discharge valve of the **Pulsar® 1**. Use this height differential to calculate the Suction Lift Factor in the formula that follows.

Suction Lift Factor = (34 – X) / 34

Where X is the height differential, in feet

(Example) Height differential is 6 feet, therefore:

Suction Lift Factor = (34-6) / 34

= 28 / 34

= 0.82

Take the suction flow (F1) and multiply it by the Suction Lift Factor to get the Actual Outlet Flow.

The formula is:

F1 x Suction Lift Factor = Actual Outlet Flow

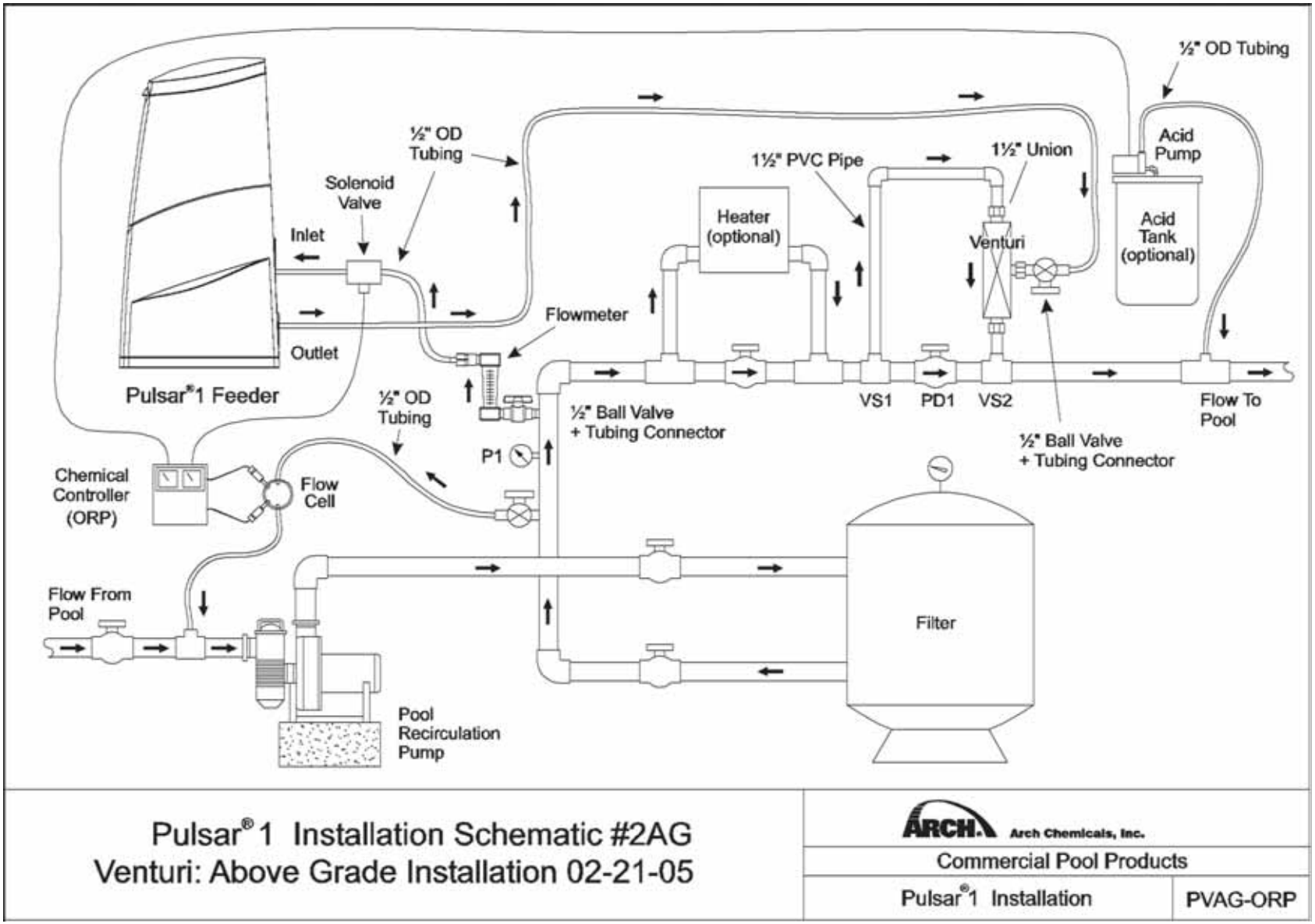
Note: After installation, it is important to check the evacuation cycle of the **Pulsar® 1** to ensure that the drain time of the discharge tank is adequate. The maximum recommended elapsed time to drain a 1 gallon bottle (positioned at the same height as the discharge valve) of water is 1 minute. This corresponds to an outlet flow-rate of approximately 1.0 gpm.

Suction Flow Chart

Inlet Pressure (psi)	Outlet Pressure (psi)	Flow Through Venturi (gpm)	Suction Flow (gpm)
5.5	5	23	1.0
6.0	5	28	1.6
6.5	6	24	1.0
7.5	6	28	1.5
7.5	7	26	1.0
8.0	7	28	1.3
12.0	10	32	1.0
12.5	10	34	1.3
15.5	12	37	1.0
17.5	15	38	1.0
18.0	15	39	1.3
21.5	17	41	1.0
22.0	17	42	1.3

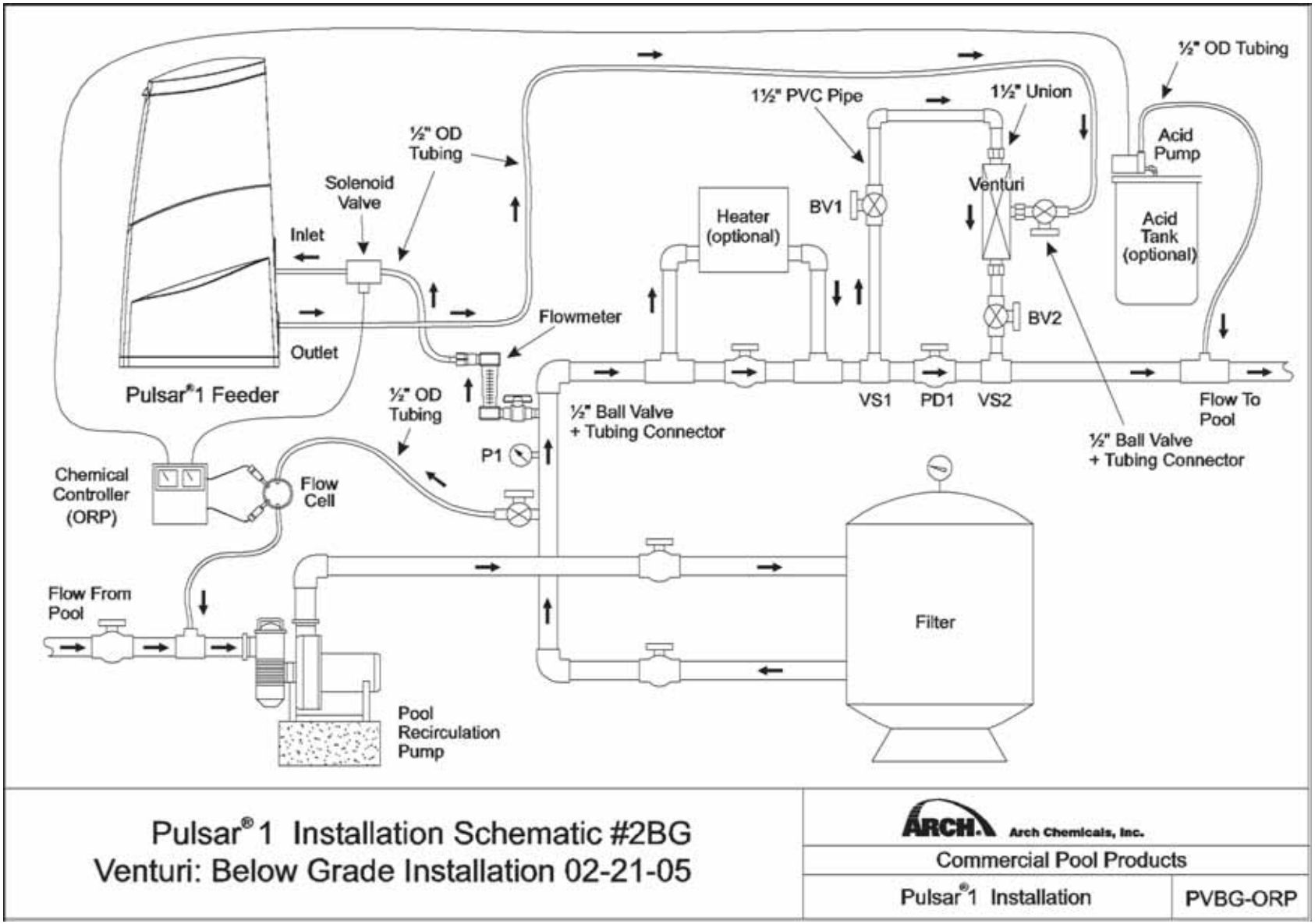
Pulsar® 1 Installation Schematic #2AG - Venturi: Above Grade Installation

(02/21/05)



Pulsar® 1 Installation Schematic #2BG - Venturi: Below Grade Installation

(02/21/05)



Pulsar® 1 Installation Schematic #2BG
Venturi: Below Grade Installation 02-21-05

Arch Chemicals, Inc.

Commercial Pool Products

Pulsar® 1 Installation | PVBG-ORP

Venturi System Installation

Refer to Schematic #2AG (page 7) for an above grade pool system installation or Schematic #2BG (page 8) for a below grade pool system installation and follow the steps below.

Background: The next steps involve creating a bypass loop on the pool return line for installation of a Venturi. This loop can be created by drilling and tapping or splicing into the return line with Tee's. We refer to using the drill and tap method. You may find it preferable to splice in Tee's to make these connections. It will also be necessary to install a ball (or gate) valve in the return line at location "PD1" in the schematic drawing. This valve when partially closed, will force water to flow through the venturi creating the suction needed to evacuate the chlorinator.

Step #1: Drill a 1 3/4" hole (Figure 1V) at location "VS1" found on the schematic drawing. Tap the 1 3/4" hole with a 1 1/2" NPT tap (Figure 2V). Options for this step include the use of saddle clamps instead of drilling and tapping or splice in a tee with 1 1/2" pipe size (Figure 3V) leading to Venturi System loop.

Step #2: Install a Ball or Gate valve at location "PD1" in Schematic #2AG or #2BG (Figure 4V).

Step #3: Drill a 1 3/4" hole (Figure 1V) at "VS2" on Schematic #2AG or #2BG. Tap the 1 3/4" hole with a 1 1/2" NPT tap. Options for this step include the use of saddle clamps instead of drilling and tapping or splice in a tee with 1 1/2" pipe size leading to Venturi System loop.

Note: Below grade systems will require the addition of ball valves at locations "BV1 & BV2" in Schematic #2BG (page 8). This will allow the Venturi System to be isolated for servicing.

Step #4: Take one Union for the Venturi system apart. Note that they have different halves. Glue these two halves of the union onto the Venturi (Figure 5V).

Step #5: Take the other union apart and install on the Union halves on the Venturi (Figure 6V).

Step #6: Apply Teflon tape to Tubing Connector **(Part #C - page 4)** and install on the 1/2" Ball Valve **(Part #B - page 4)**.

Figure 1V

Figure 2V

Figure 3V

Figure 4V

Figure 5V

Figure 6V

Venturi System Installation (continued)

Step #7: Install 1/2” ball valve **(Part #B - page 4)** on 1/2” MNPT vacuum port of venturi **(Part #H - page 4)** (Figure 7V).

Step #8: Close the valve (Figure 8V).

Note: When performing step #9, make sure the venturi is installed with correct direction of flow.

Step #9: Complete installation of venturi bypass loop using 1 1/2” PVC pipe and fittings. There are four methods profiled in the following figures.

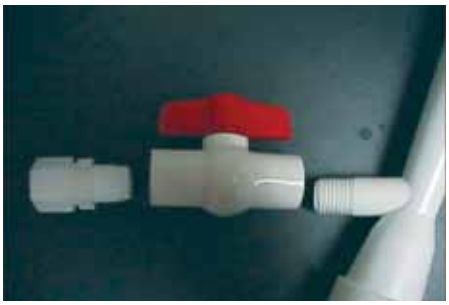


Figure 7V

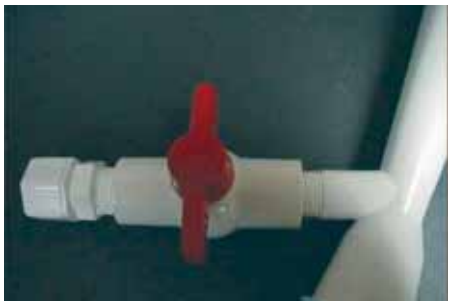


Figure 8V

Figure 9V

Drill & Tap Method

*Figure 19A - **Above Grade***

*Figure 19C - **Below Grade***

Tees Method

*Figure 19B - **Above Grade***

*Figure 19D - **Below Grade***

Allow at least 30 minutes for glue to set before restarting the pool pump.

Flow Indicator Installation

Note: Perform the following procedure while the glue is drying.

Refer to Schematic #2AG (page 7) for an above grade pool system installation or Schematic #2BG (page 8) for a below grade pool system installation and follow the steps below.

Step #1: Turn off the pool recirculation pump.

Step #2: Close valves (if any) between the pool filter system and the pool.

Note: The hole in the following step should be drilled on the side of the pipe away from the floor to provide the clearance and right angle required for Flow Indicator installation. If the Flow Indicator cannot be mounted vertically as shown in Figure 2, STOP, and use the "Alternate Flow Indicator Installation" on page 12.

Step #3: Drill an 11/16" hole after the filter (before heater if present) where "P1" is on Schematic #2AG or #2BG. Tap the 11/16" hole with a 1/2" NPT tap.

Step #4: Install Close Nipple **(Part #D - page 4)** in 1/2" Ball Valve **(Part #B - page 4)** (Figure 1). Apply Teflon tape or pipe sealant to all threads.

Step #5: Install Tubing Connector **(Part #F - page 4)** on the outlet (top) port of the Flow Indicator (**Part #G - page 4)**. Install Ball Valve into the drilled and tapped hole in step #3. Install the Flow Indicator onto the ball valve (Figure 2).

Step #6: Close the Ball Valve installed in step #5.

Figure 1

Figure 2

Alternate Flow Indicator Installation

Note: Perform the following procedure while the glue is drying.

Refer to Schematic #2AG (page 7) for an above grade pool system installation or Schematic #2BG (page 8) for a below grade pool system installation and follow the steps below.

Step #1: Turn off the pool recirculation pump.

Step #2: Close valves (if any) between the pool filter system and the pool.

Step #3: Drill an 11/16" hole after the filter (before heater if present) where "P1" is on Schematic #2AG or #2BG. Tap the 11/16" hole with a 1/2" NPT tap.

Step #4: Install Close Nipple **(Part #D - page 4)** in 1/2" Ball Valve **(Part #B - page 4)** (Figure 3). Apply Teflon tape or pipe sealant to all threads.

Step #5: Apply Teflon tape to Tubing Connector **(Part #C - page 4)** and install on the 1/2" Ball Valve **(Part #B - page 4)** (Figure 3).

Step #6: Thread the completed assembly into the tapped 1/2" hole created in step #3.

Step #7: Close the Ball Valve installed in Step #6.

Step #8: Loosen the nut on the Tubing Connector installed in the Ball Valve and push the 1/2" OD Polyethylene Tubing **(Part #A - page 4)** into the connector and hand tighten.

Step #9: Run the tubing to the location where the Flow Indicator **(Part #G - page 4)** will be mounted and cut to length. Loosen the nut on the Tubing Connector attached to the Flow Indicator (bottom position). Push the 1/2" OD Polyethylene Tubing into the connector and hand tighten. The completed assembly should look like (Figure 5).

Figure 3

Figure 4

Figure 5

Connecting the Pulsar® 1 to the Pool Recirculation System

Note: Perform the following procedure while the glue is drying.

Step #1: Place the **Pulsar® 1** chlorinator in the pump room following the recommendations in the "Selecting a location for the **Pulsar® 1**" (page 3).

Step #2: Install the Tubing Connector **(Part #E - page 4)** on the inlet to the feeder, use Teflon tape on threads. Hand tighten only.

Step #3: Loosen the nut on the Tubing Connector **(Part #E - page 4)** on the inlet to the feeder and push the 1/2" OD Polyethylene Tubing **(Part #A - page 4)** into the connector and hand tighten.

Step #4: Run the Polyethylene Tubing to the Tubing Connector installed on the Flow Indicator (upper position) in step 5 of Flow Indicator Installation above and cut to desired length. Loosen the nut on the Tubing Connector on the Flow Indicator and push the 1/2" OD Polyethylene Tubing into the connector and hand tighten.

Step #5: Install the Tubing Connector **(Part #F - page 4)** on the outlet of the feeder. Use Teflon tape on threads. Hand tighten only.

Step #6: Loosen the nut on the Tubing Connector installed in step 5 and push the 1/2" OD Polyethylene Tubing into the connector and hand tighten the nut.

Step #7: Run the tubing to the outlet Ball Valve on the Venturi and cut to desired length. Loosen the nut on the Tubing Connector attached to the Ball Valve and push the 1/2" OD Polyethylene Tubing into the connector and hand tighten the nut.

Adjusting and Testing the Outlet Flow Rate

Step #1: Install vacuum gauge with 1/2” FNPT PVC Coupling **(Part #J - page 4)** and the 1/2” MNPT x 1/4” FNPT reducer into coupling and install on the Venturi (Figure 6).

Step #2: Start pool system and open all valves on the venturi loop.

Step #3: Slowly close “PD1” until the vacuum gauge reads 13” Hg.

Step #4: Put “Do Not Adjust” tag on “PD1”.

Step #5: Remove vacuum gauge and install outlet ball valve with fitting.

Step #6: Close the outlet ball valve.

Step #7: Connect 1/2” tubing to fitting on outlet ball valve.

Step #8: Check outlet flow with following procedure.

Step #9: Fill a 1 Gallon Bottle with water.

Step #10: Place near **Pulsar®** Discharge valve.

Step #11: Disconnect the tubing from the discharge valve and place end of tubing at bottom of gallon bottle.

Step #12: Open outlet ball valve and record time it takes to empty the bottle.

Step #13: It should take 1 minute or less to empty the bottle.

Step #14: This corresponds to an outlet flow rate of 1 gpm or greater.

Step #15: Close outlet ball valve and connect tubing to the discharge valve.

Figure 6

Figure 7

Warranty Policy

Pulsar® 1 Commercial Pool Chlorinator

Arch Chemicals, Inc. (“Arch”) warrants equipment (excluding electrical components) of its manufacture and bearing its identification to be free of defects in workmanship and material. Arch’s liability under this warranty extends for a period of two (2) years from the date of installation as performed by an Authorized Commercial Dealer Representative and registered with Arch Water Chemicals via the Arch Commercial Chlorinator Warranty Registration Card. Systems for which there is no Warranty Registration Card on file carry no warranty of any kind, expressed or implied.

In addition, each system is covered by a sixty (60) -day, 100% buy-back guarantee. If the original purchaser (“owner”) is dissatisfied with the **Pulsar® 1 Commercial Pool Chlorinator** performance for any reason, they can return it to the Authorized Commercial Pool Dealer for a full refund. The equipment must have received normal use and care, and Arch must be notified in writing before the sixty (60) days have expired. There is no reimbursement for chemicals used during the sixty (60) -days.

Arch disclaims all liability for damage during transportation, for consequential damage of whatever nature, for damage due to handling, installation or improper operation, and for determined suitability for the use intended by purchaser (“owner”). Arch make no warranties, either expressed or implied, other than those stated above. No Arch Representative or Authorized Commercial Dealer Representative has authority to change or modify this warranty in any respect.

Pulsar® 1 Parts

Arch warrants equipment parts of its manufacture and bearing its identification to be free of defects in workmanship and material. Arch’s liability under this warranty extends for a period of ninety (90) days from the date of installation as performed by an Authorized Commercial Dealer Representative. This warranty is restricted to **Pulsar® 1 Chlorinator** parts purchased on a replacement basis.

Arch Chemicals Inc.

1-800-4 PULSAR

1-800-478-5727

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Lonza

Lonza Emergency Action Network (LEAN)

The Lonza Emergency Action Network ("LEAN") is Lonza's emergency action system. Call the LEAN system at 1-800-654-6911) in North America, and at (Country Code for the United States) 423-780-2970 elsewhere in the world. The LEAN system is available 24 hours a day, 7 days a week for assistance with spills, injuries and emergencies of any kind. It uses computers and other systems to make Lonza's environmental, technical transportation, toxicological and other expertise about its products readily available to anyone needing assistance. The LEAN system also includes emergency response teams capable of providing on-site support throughout North America.

(800) 654-6911

(From outside North America, call after the country code for the US, 423-780-2970)

Additionally, in the event of an emergency, CHEMTREC (Chemical Transportation Emergency Center) should be contacted. CHEMTREC is a national center established by the Chemical Manufacturers Association (CMA) in Washington, DC, to relay pertinent emergency information concerning specific chemicals on request.

CHEMTREC has a 24-hour toll-free telephone number (800) 424-9300, intended primarily for use by those who respond to chemical transportation emergencies. CHEMTREC may also be accessed through the CMA website at www.cmahq.com.

Material Safety Data Sheets (MSDS) can be obtained by contacting (800)-511-MSDS.