



# Operator's Manual

Model # SF-3W



Arch Chemicals, Inc.  
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1-800-4-PULSAR

09/5/03

Rev. 1

**Dealer Contact:**

**Product Stewardship**  
**MAKING THE WORLD A BETTER PLACE**



Arch is committed to maintaining and improving our leadership in Product Stewardship. One of the six initiatives outlined under the Chemical Manufacturers Association (CMA) Responsible Care<sup>®</sup> Program, its purpose 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.

Successful implementation is therefore, a shared responsibility. 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, and all who use and handle products must follow safe and environmentally sound practices.

For more information about our Product Stewardship Program, contact your Arch Representative.

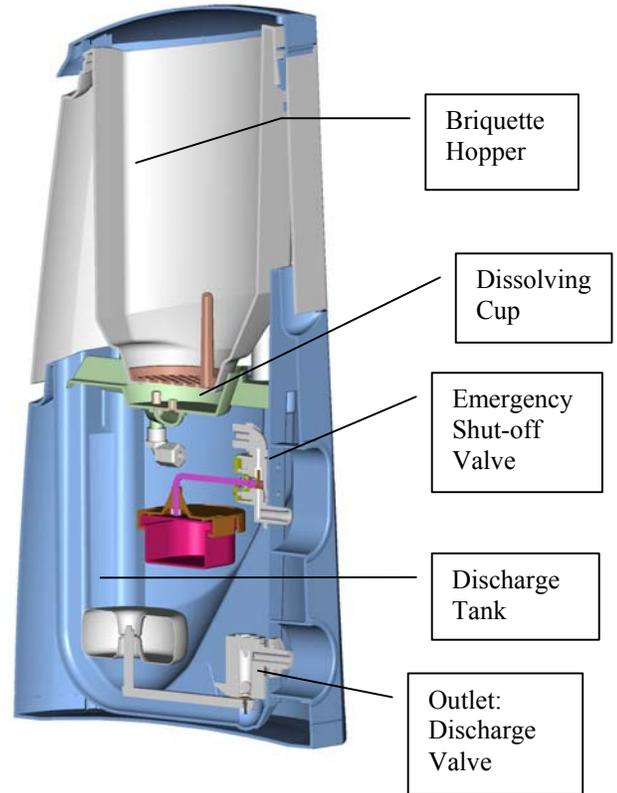
# THE MAJOR COMPONENTS - HOW THEY WORK

## General Principles of Operation

The three main components of the Pulsar® 1 Chlorinator are (from top to bottom) the briquette Hopper, the Dissolving Cup section and the Discharge Tank. The water from the pool enters the Pulsar® 1 Chlorinator via the emergency shutoff valve. The water then enters the base of the Dissolving Cup where it splits to feed the nozzles for generating the wave to penetrate into the Briquette bed and the solids removal system. The chlorinated solution is directed by a single outlet spout to a channel that directs the solids and chlorinated solution into the discharge tank where it is discharged into the pool recirculation system. The amount of chlorine discharged is determined by the flow rate into the chlorinator. An ORP controller can be used to regulate chlorinator output by installing a solenoid on the inlet flow line.

Inlet water pressure of 2 to 20 psi will provide sufficient flow into the Pulsar® 1. These pressures will result in an inlet flow rate of 0.2-1.05 gpm. The Pulsar® 1 feed rate settings referred to in the Pulsar System Owners manual are calibrated for these flow rates.

Flow out of the Pulsar® 1 feeder requires vacuum to properly evacuate the discharge tank. A minimum outlet flow-rate of 1.1 gallons/minute ensures that the flow outlet flow of the Pulsar® 1 exceeds the flow in. Once the Pulsar® 1 has been installed the outlet flow can be measured by watching the level in the Discharge tank. If the level is rising as the feeder is running, there is insufficient flow out.



## **SPECIFICATIONS – Model SF-3W**

### Operational Requirements:

Inlet pressure (Range)	2-20 psi
Ideal	12 psi
Outlet vacuum	3-29" Hg.
Operating Temperature	40-130°F

### Operational Characteristics

Inlet flow (gpm)	0.2-1.05
Outlet flow (Min)	1.1 gpm

**Note: To Maintain NSF approval a flow indicator must be installed.**

### Dimensions:

Tubing	1/2" O.D. Polyethylene
Chlorinator dimensions	W13"xD15"
Chlorinator height	31"
Chlorinator weight (full)	42 lbs
Chlorinator weight (empty)	17 lbs

Hopper Capacity  
28 lbs. Pulsar® Plus Briquettes

### Feed Rate:

Pulsar® Plus Briquettes: 0.5-28 lbs. of Available Chlorine per day
Recommended Pool Size <sup>1</sup>
500-35,000 gallon un-stabilized
1,000-70,000 gallon stabilized

<sup>1</sup> Subject to local health codes

## PRE-START-UP CHECKLIST

Following the procedure outlined below will ensure a smooth start-up of the Pulsar 1 Chlorinator. For seasonal operation, perform this procedure each spring.

### IMPORTANT!!

Do **NOT** put Pulsar® Plus Briquettes in the chlorinator during the start-up operation.

#### INLET WATER FLOW

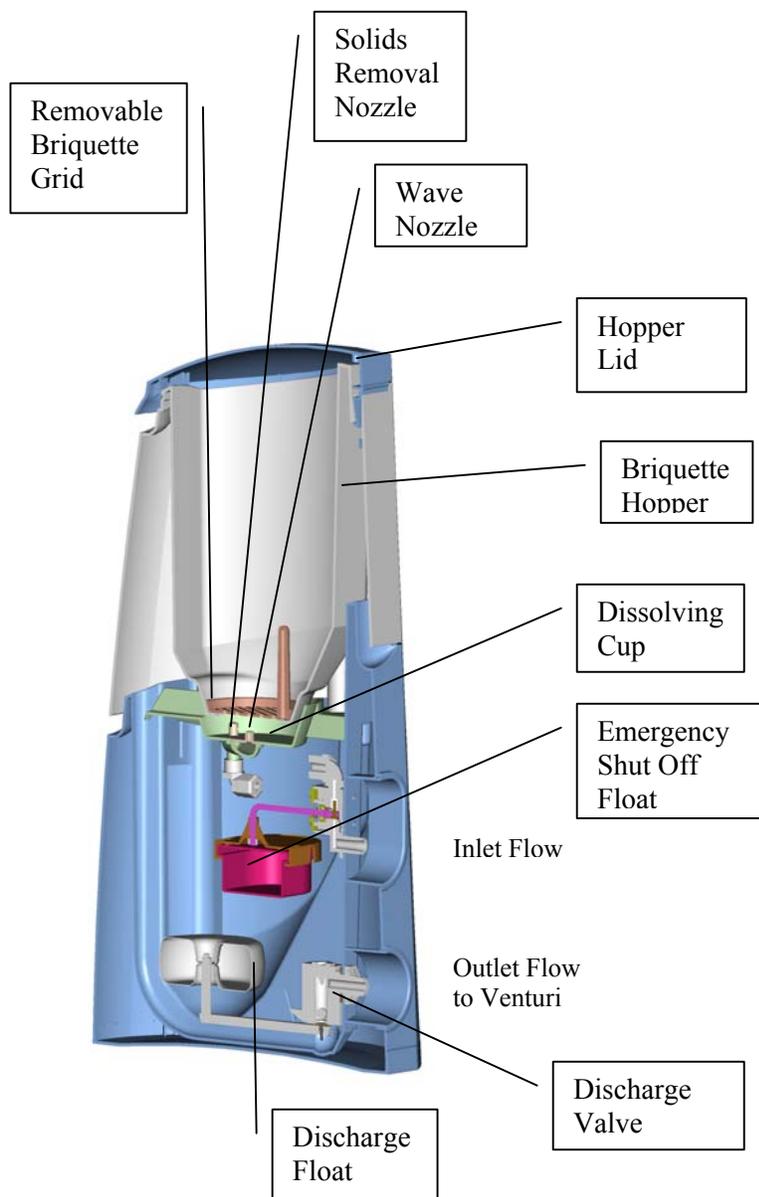
The inlet water flow system is designed to provide a steady side-stream of clean filtered pool water to the chlorinator.

1. Switch on the pool recirculation system, and open all valves to the chlorinator. Leave lid closed.
2. Adjust Inlet flow on flow indicator to 0.4 gpm. Wait 10 seconds and open lid slowly.
3. Check to see that the wave nozzle is making a wave that rises into the Briquette grid. Remove the grid to see if water is flowing from the Solids Removal Nozzle.
4. Check all lines leading to the Chlorinator for leaks. Hand tighten all fittings if any leaks are found.

#### OUTLET WATER FLOW

The float on the Discharge Valve rises with the water level and allows the venturi suction to draw the chlorinated water into the pool's recirculation system as the Discharge Tank fills with water. When the water level drops, the float falls, shutting off the valve. The Discharge Valve also contains a check valve to prevent pool water from backing up into the Discharge Tank. Use the following procedure to ensure that the outlet water flow system is operating properly.

1. With the briquette hopper and dissolving cup of the chlorinator temporarily out of the way, fill the Discharge Tank with sufficient water to open the Discharge Valve – use a hose or pail.
2. The float should rise, opening the Discharge Valve, allowing water to be drawn out by the Pulsar® venturi system.
3. Check the system for leaks. If small air bubbles are visibly moving, there may be an air leak. Tighten the connectors and make sure that the tubing was properly installed in the fittings. (NOTE: Air bubbles near the Pulsar® 1 Chlorinator body that do not move are normal and do not indicate leaks.)
4. Check for air leaks after the Discharge Valve closes.



## START-UP PROCEDURES

After completing the PRE-START-UP CHECKLIST, and establishing that all components of the chlorinator are operating properly, your PULSAR® 1 Chlorinator is ready for start-up.

Routine maintenance of the PULSAR® 1 Chlorinator is minimized when proper pool water balance is maintained. Maintain pool water chemistry as follows:

Total Alkalinity	60-80ppm
Calcium Hardness	200-1800ppm
pH	7.2-7.6

Adherence to these recommendations at all times will ensure the most effective and economical performance from the PULSAR® 1 Chlorinator.

**NOTE:** The use of CO<sub>2</sub> to lower pH will raise Total Alkalinity. High total alkalinity (over 80 ppm) will increase scale and solids buildup in chlorinator.

### WARNING

Use **ONLY** Pulsar® Plus Briquettes in the Chlorinator. The use of any other treatment chemicals will void the warranty and NSF listing. **DANGER:** Under no circumstances mix calcium hypochlorite with other forms of concentrated chlorine or other chemicals. Fire and/or explosion may result. Caution must be used when refilling dispenser.

**KEEP OUT OF REACH OF CHILDREN**

1. Fill the Briquette Tank with Pulsar® Plus Briquettes. The Briquette Tank holds 28 pounds of briquettes.
2. Open all valves to the pool and the outlet ball valve of the chlorinator.
3. Check the chart below to determine an approximate start-up Inlet Flow setting for your pool (or be certain that the ORP Controller is calibrated and the set-points are correct). Set the Flow Indicator at the recommended setting using the inlet ball valve. Note: For best chlorinator performance with an ORP controller, set the flow indicator for a pool 30% larger than the one at your facility. This will assist in maintaining desired Free Available chlorine level in pool without overshooting ORP set point.
4. Monitor the water flow to the chlorinator daily to ensure that a proper flow is being maintained.
5. During the first few days of operation, check chlorine level in the pool frequently to establish the best Inlet Flow setting (or ORP Controller setting) for your pool. Adjust the chlorine output either up or down according to the table, or adjust the ORP setpoint.

### Output Rate and Start-up Settings for Commercial Pools and Spas Vs. Inlet Flow Rates

Inlet Flow Rate (gpm)	Av Cl lbs/day	Stabilized Pool (Gal)	Un-Stabilized Pool (Gal)	Comm. Spa (Gal)
0.2	0.5	5000	1250	500
0.25	1.6	16000	4000	1600
0.3	2.2	22000	5500	2200
0.35	3.3	33000	8000	3300
0.4	4.5	45000	11000	4500
0.45	5.5	55000	14000	5500
0.5	8.9	89000	22000	8900
0.55	10.8	108000	27000	10800
0.6	12.6	126000	31000	
0.65	13.3	133000	33000	
0.7	14	140000	35000	
0.75	15.5	155000	39000	
0.8	17	170000	42500	
0.85	19	190000	47500	
0.9	21	210000	52500	
0.95	23	230000	57500	
1	25	250000	62500	
1.05	28	280000	70000	

# PULSAR® 1 CHLORINATOR INSPECTION AND MAINTENANCE

Calcium Hypochlorite by the nature of its manufacture, contains a small amount of calcium carbonate. Proper water balance will minimize the buildup of calcium carbonate solids in the Pulsar® 1 Chlorinator, however, periodic cleaning of chlorinator components is normal and recommended. The following is a list of the parts to be cleaned and the proper procedures to do so.

## TABLE OF CONTENTS

Suggested Inspection Frequency	Section	Contents
As Needed	Section A:	Use of PULSAR® Plus Acid Cleaner 50 to remove solids and scale from the Pulsar® 1 Chlorinator
As Needed	Section B	Troubleshooting Guide

## SECTION A

### Cleaning PULSAR® 1 Chlorinator with PULSAR® Plus Acid Cleaner 50

Inspection: The solids build-up and cleaning frequency required for the unit will depend on the amount of Briquettes used and the pool water chemistry. Described below is the easiest way to remove solids and minor scale buildup using the PULSAR® Plus Acid Cleaner 50.

#### WARNING

Do **NOT** use Muriatic Acid to perform the following procedures. Chlorine gas may evolve causing serious injury or possible death. Use proper protective equipment per MSDS when handling chemicals.

Maintenance Procedure Steps:

**Note: Record inlet flow rate setting.**

1. Close the inlet and outlet shutoff valves to the chlorinator.
2. Lift the Briquette Hopper off of the Discharge Tank and pour the contents into a clean dry bucket. Be sure to remove all pieces of briquettes. If necessary, rinse any heavy solids buildup from the hopper before proceeding.
3. Lift out Dissolving cup, pour contents into a bucket and rinse out solids.
4. Remove briquette grid and place in cup (provided with system). Fill with 8 ounces of water. Slowly pour 8 ounces of PULSAR® Plus Acid Cleaner 50 into cup. Pour 1 gallon of water and ½ quart of Acid Cleaner 50 into discharge tank. Frequent agitation may be required to dissolve solids and scale. Allow acid to dissolve solids and scale, evident by the foaming action. After 10 to 20 minutes, check for presence of scale on grid. If necessary, add additional PULSAR® Plus Acid Cleaner 50 to

dissolve any remaining scale or scrape with putty knife.

5. Replace the Dissolving Cup in Base.
6. Pour the contents from the cup with grid into dissolving cup and allow 10 minutes for scale to dissolve.
7. Put the hopper back on the base and the Briquette grid back into the bottom of the hopper. Rinse the Briquette grid thoroughly with water.
8. Pour Pulsar® Plus Briquettes from bucket back into Briquette Tank.
9. Open the outlet shut off valve to the chlorinator and adjust inlet ball valve to desired inlet flow rate.

**NOTE:** To increase the period between Grid cleanings, allow Briquette Tank to completely empty once a week.



## SECTION B

### TROUBLESHOOTER'S GUIDE

<u>PROBLEM</u>	<u>CAUSE</u>	<u>SOLUTION</u>
Insufficient water flow to chlorinator	Check water flow through nozzles. If there is scale build-up perform solution. Inlet Shutoff Valve closed Emergency Shut Off Valve in closed position Solenoid Valve not operating (ORP system only)	Rinse out dissolving cup, add 6 oz. of water and 3 oz. Pulsar Acid Cleaner 50. Let sit until scale dissolves. Open Inlet Shutoff Valve If ESV Valve is stuck, lower gently to reset Check with Dealer
Insufficient chlorine in pool	Feed rate/output too low Chlorinator empty No inlet water flow Outlet/Shutoff Valve closed Clogged Discharge Tubing Briquettes stuck together Clogged Briquette Tank Grid Clogged Venturi System  Closed valves in venturi system	Increase feed rate by increasing inlet flow. Refill Briquette Hopper with Pulsar® Plus Briquettes See insufficient water flow section Open Outlet Shutoff Valve Refer to Section A or Replace discharge tubing Tap side of Briquette Tank to loosen Refer to Section A Remove venturi – soak in tub with 50/50 mixture of water and Pulsar Plus Acid Cleaner 50 solution.  Open venturi system valves
Excess chlorine in pool	Automatic Controller Problem Feed rate/output too high	Refer to automatic controller manual Decrease feed rate by reducing inlet flow
Air leaks	Discharge Tubing not properly installed in fittings Discharge Valve seat failure Scale prevents Discharge Valve from properly seating Pinched O-rings in Tubing Connectors	Reinstall Discharge Tubing Replace Discharge Valve Arm. Remove Discharge Valve Assembly and soak in dilute Pulsar Acid Cleaner 50 to remove scale Inspect O-rings on discharge side of feeder
Chlorinator overflow	Discharge Tubing clogged Clogged venturi system Insufficient outlet suction Emergency shutoff valve failure	Refer to Section A or Replace Discharge tubing. See clogged venturi system solution Check with Dealer Check with Dealer

#### WARRANTY POLICY

##### **Pulsar® 1 Commercial Pool Chlorinator**

Arch Chemicals, Inc. ("Arch") warrants equipment 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 (excluding electrical components which carry a 1 year warranty) 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® 3 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 makes 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.

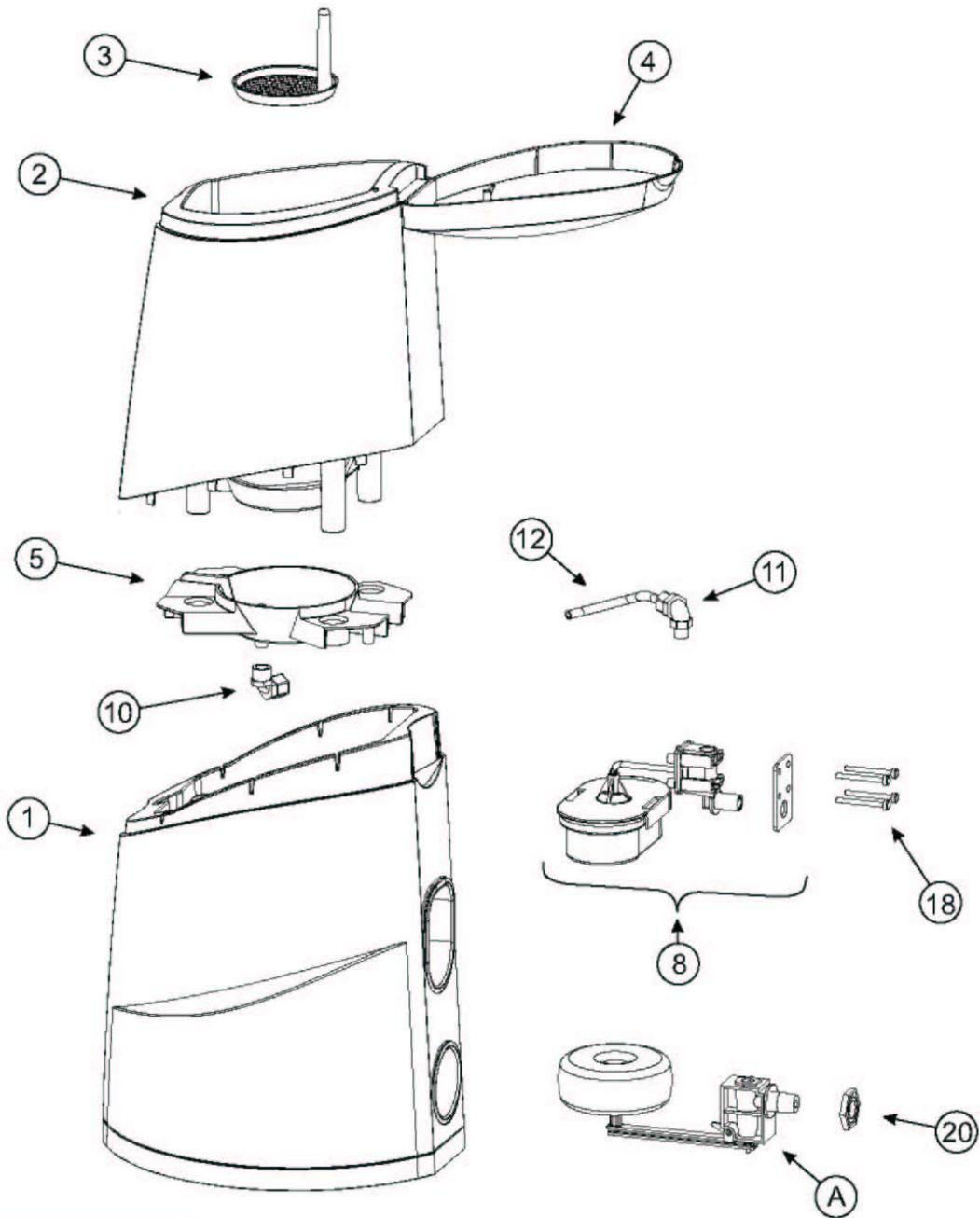
##### **Pulsar® 1 Parts**

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® 3 Chlorinator Parts purchased on a replacement basis.

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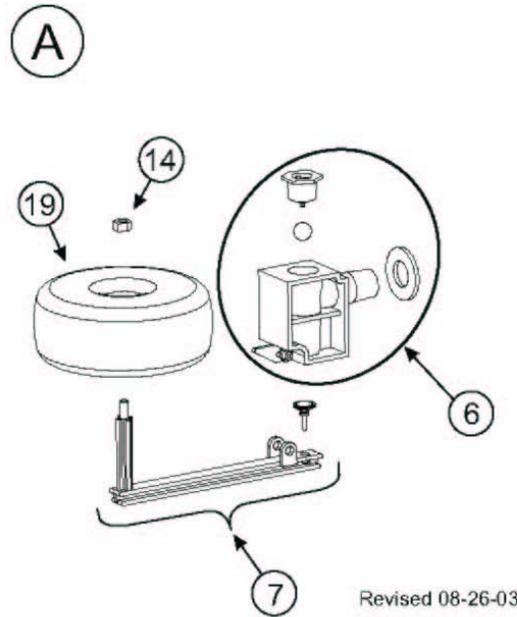
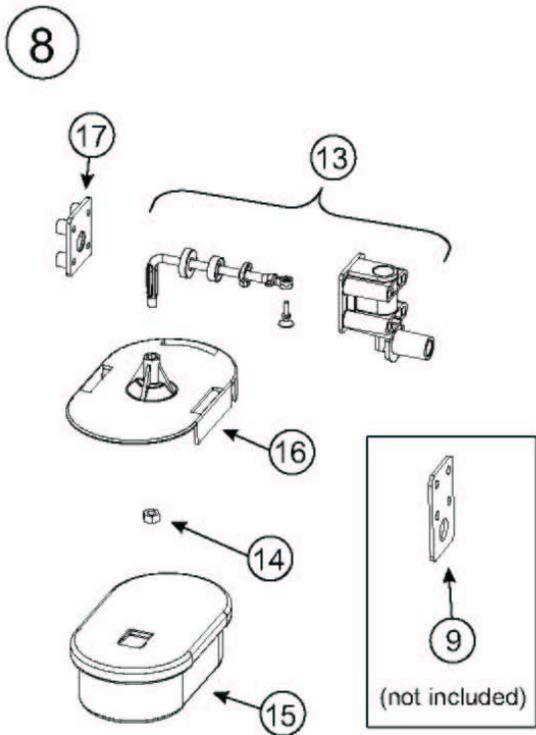
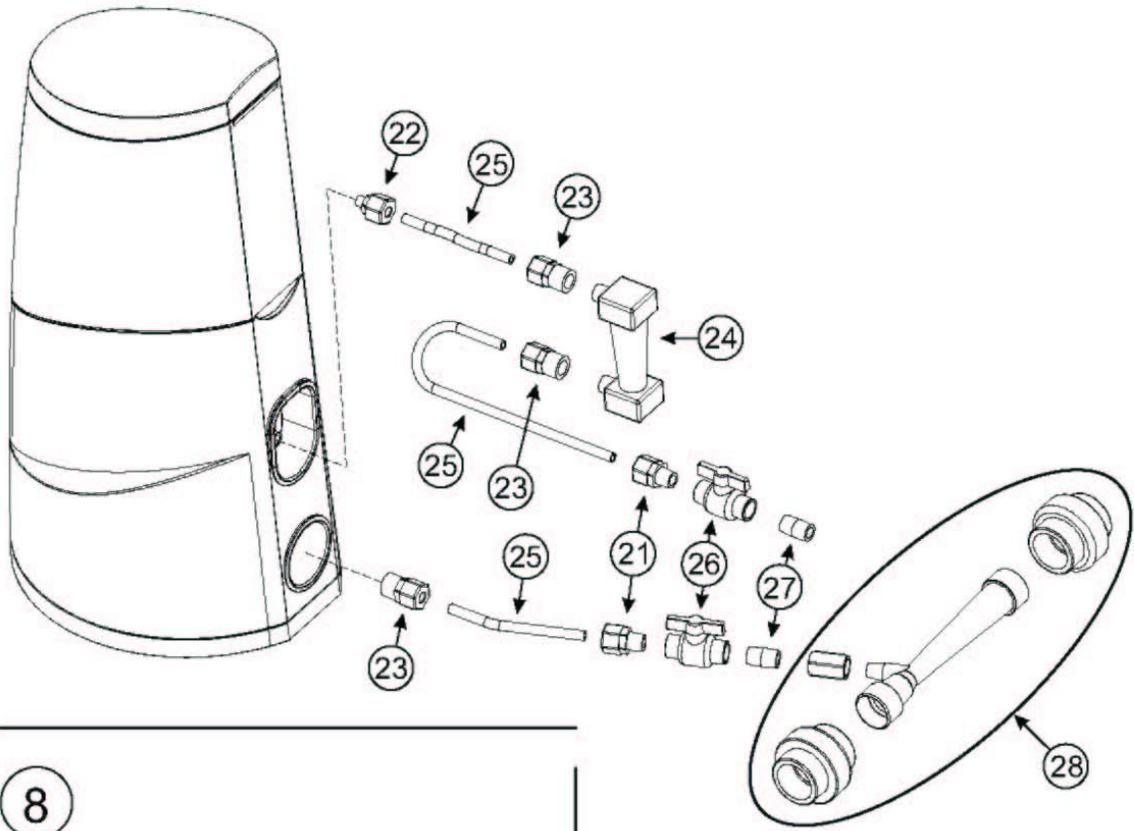
1-800-4 PULSAR

# Pulsar 1 Feeder Detailed View



Not shown: Cleaning Pan

Revised 08-26-03



Revised 08-26-03

**Pulsar 1**

Diagram Number	Part Number	Qty	Description
0	71803	1	Pulsar 1 Feeder
1	74066	1	P1 Base
2	74065	1	P1 Hopper
3	74068	2	P1 Grid
4	74067	1	P1 Lid
5	74062	1	P1 Dissolving Cup with Nozzles Assembly
6	71615	1	Discharge Valve Body with Plug, Ball & Gasket
7	71584	1	Discharge Valve Arm with Suction Cup
8	71496	1	Emergency Shut Off Valve Assembly - Part 71910 Not Included
9	71910	1	Rubber Gasket for Emergency Shut Off Valve
10	74059	1	Parker Fitting W6FE4
11	71619	1	Elbow (W6ME6) 3/8" For Feeders 30991 & P3, P1
12	71618	1	3/8" PE Tubing (2 ft)
13	71535	1	Emergency Shut Off Valve with Arm Only
14	71538	2	Emergency Shut Off Float Plate PVC Nut/Discharge Arm Nut
15	71540	1	Emergency Shut Off Overflow Float
16	71539	1	Emergency Shut Off Float Plate
17	71536	1	Emergency Shut Off Mounting Plate
18	71537	1	Emergency Shut Off Mounting PVC Screws(1/4x20x2 1/4)
19	71585	1	Discharge Valve Float
20	71583	1	Discharge Valve Locknut
21	71890	2	Parker Fitting, W8MC8 (also for solenoid)
22	71614	1	Tube Connector (P8MC4) for P3
23	71588	3	(5008) 1/2" X 1/2" Female Connector (P8FC8)
24	74060	1	Flow Indicator - P1
25	71626	1	20' 1/2" O.D. PE Tubing(P4 only need 3 inch piece)
26	74061	2	1/2" FNPT x 1/2" FNPT PVC Ball Valve
27	71611	2	1/2" X close PVC Nipple
28	71974	1	ORP/Below Grade Installation Kit for Small Feeder
29	74145	1	P1 Cleaning Pan

Number 29 not pictured

9/10/2003



## **Arch Chemicals, Inc. Emergency Action Network (ACEAN)**

The Arch Chemicals, Inc. Emergency Action Network (“ACEAN”) is Arch’s emergency action system. Call the ACEAN 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 ACEAN 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 Arch’s environmental, technical transportation, toxicological and other expertise about its products readily available to anyone needing assistance. The ACEAN 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](http://www.cmahq.com).

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

If you would like a copy of this manual in another language  
please call:

1-800-4-PULSAR