Operator's Manual

PULSAR®

Model # SF-4W

rev.7 (3/13/15)

pulsar 1 system

Lonza

1200 Lower River Road, P.O. Box 800
Charleston, TN 37310-0800
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.

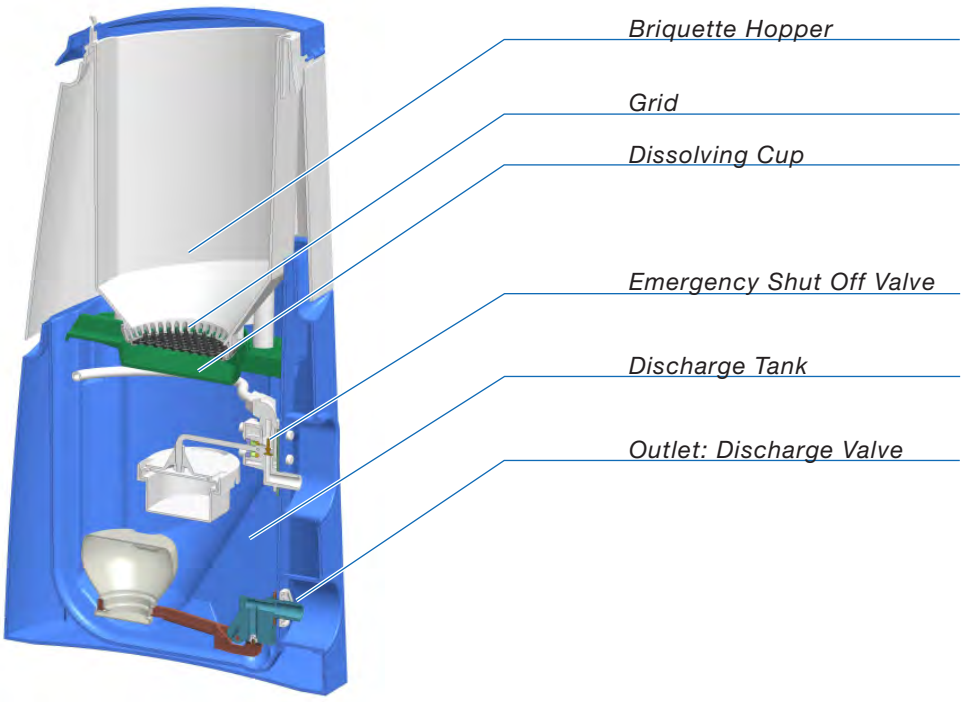
The Major Components - How They Work

General Principles of Installation

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 Shut Off Valve. The water then enters the base of the Dissolving Cup and is then directed out of the flat horizontal nozzle along the floor of the Dissolving Cup. 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 and the type of grid used. Increasing the inlet flow will cause the water level to rise in the Dissolving Cup which will result in more briquettes coming in contact with the water as it flows through the Dissolving Cup. There are two different grid configurations that yield a total of four different output rates. Each grid can be rotated 180° to provide a different output rate range. An ORP controller can be used to regulate Chlorinator output by installing a solenoid on the inlet flow line.

Inlet water pressure of 5 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® 1** System Owner's 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 outlet flow of the **Pulsar® 1** exceeds the flow in. Once the **Pulsar® 1** has been installed the outlet flow is measured by watching the level in the Discharge Tank. If the water level is rising as the feeder is running, the outlet flow out is insufficient.



SPECIFICATIONS – Model SF-4W

Operational Requirements:

Inlet pressure (Range)	5-20 psi
Ideal	12 psi
Outlet vacuum	3-29” Hg.
Operating Temperature	40-130ºF

Operational Characteristics:

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

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

Dimensions:

Tubing	1/2” O.D.
Chlorinator dimensions	W13 1/2” x D15 1/2”
Chlorinator height	31”
Chlorinator weight (full)	46 lbs
Chlorinator weight (empty)	17 lbs

Hopper Capacity:

28 lbs. Pulsar® Plus Briquettes

Feed Rate:

0.5-20 lbs. of Available Chlorine per day

Recommended Pool Size[1]:

1,000-30,000 gallon un-stabilized[1]
1,000-60,000 gallon stabilized[1]
Commercial Spa Size 1,000-10,000 gal[1]

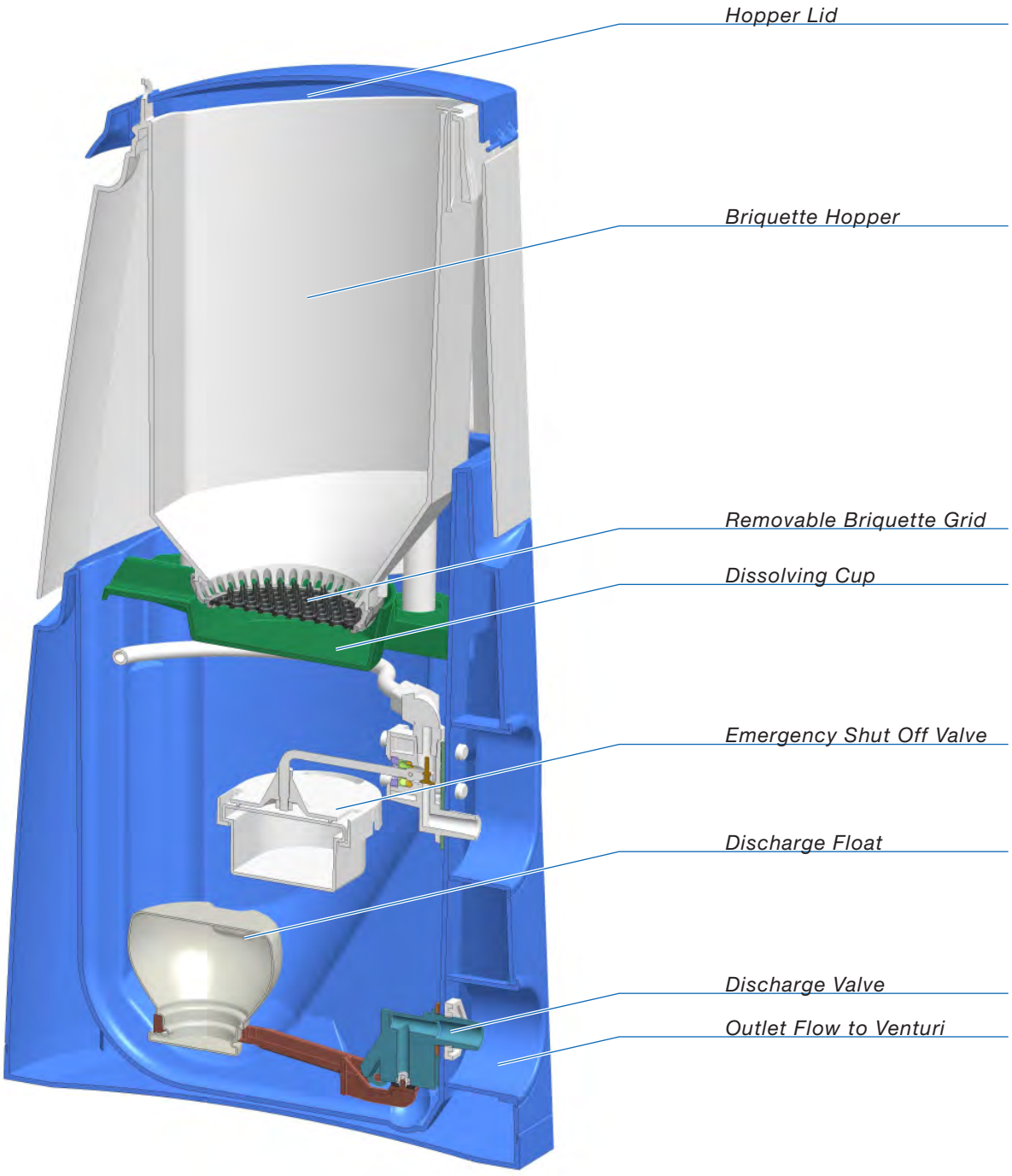
[1]Subject to local health codes

Pre-Startup 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.



Pre-Startup Checklist

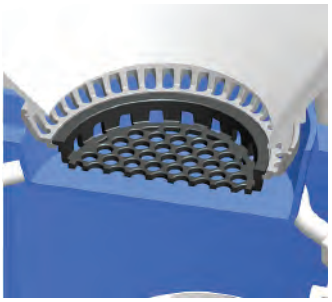
Selecting The Proper Grid

There are two different reversible grids that yield four different options for feed rate control. Reference the pictures at right to select which grid is best for your feed rate needs. Feed rate charts are found on Page 9-10 of this manual.

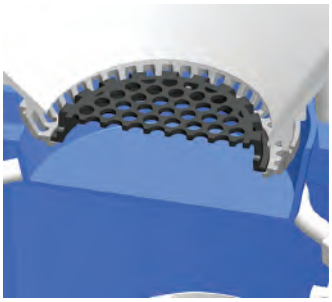
Note: It is recommended that you select a grid that allows for the most water flow through the unit to minimize solids build-up in the Dissolving Cup. This will lengthen intervals between cleaning the feeder.

Note: Use of the High feed rate grid on small pools/spas may result in temporarily high chlorine readings at the pool return line if the unit is shut down for an extended period of time.

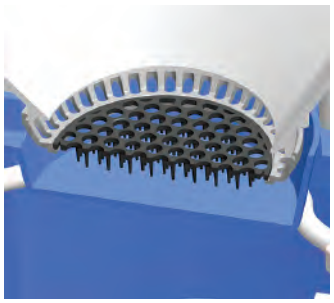
Below is a chart to be used for selecting the proper grid based on estimated chlorine use per day.



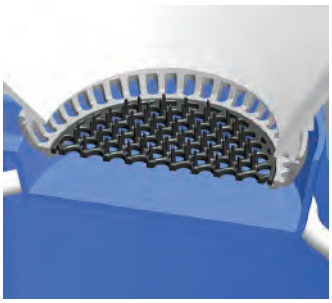
Highest Feed Rate Range



Lowest Feed Rate Range

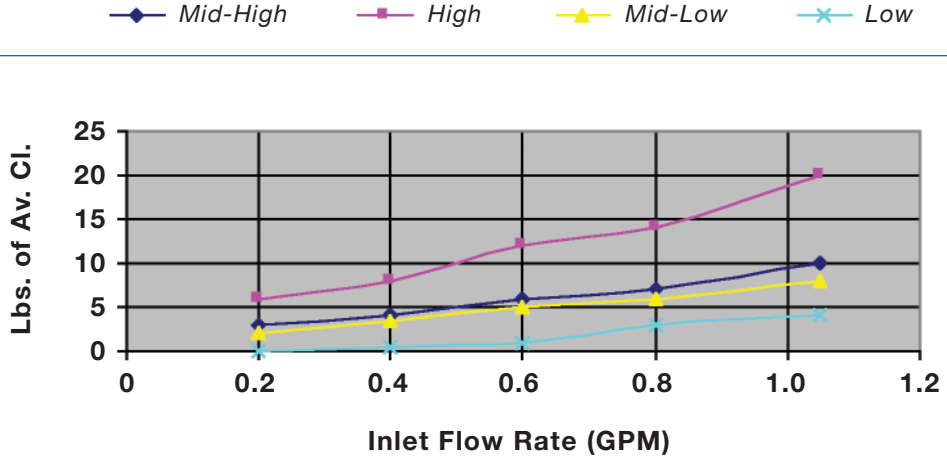


Mid-High Feed Rate Range



Mid-Low Feed Rate Range

Selecting A Grid: Output Range



Pre-Startup Checklist

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.

2. Adjust Inlet flow on flow indicator to 0.8 gpm.

   Open lid.

3. Check to see that the water rises into the Briquette Grid.

   Note: This may take 10 seconds or so for the Dissolving Cup to fill initially.

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.

   Note: It is not possible to perform steps # 3 & 4 if the Chlorinator is supplied with UV absorbing black tubing. Look for air bubbles at the pool returns instead and tighten connections until the air bubbles disappear.

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.

Startup 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 Carbon Dioxide gas (CO2) to lower pH will raise the Total Alkalinity significantly. 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 should you 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

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

1. Fill the Briquette Hopper 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 set-point.

   Note: Indoor pool feed rate is typically 1/2 that of an outdoor stabilized pool, therefore divide indoor pool size by two.

Feed Rate Grid Tables

High Feed Rate Grid

Inlet Flow Rate (gpm)	Av Cl lbs/day	Stabilized Pool (Gal)	Un-Stabilized Pool (gal)	Commercial Spa (gal)
0.2	6.0	30,000	15.000	3,000
0.25	6.5	32,500	16,250	3,250
0.30	7.0	35,000	17,500	3,500
0.35	7.5	37,500	18,750	3,750
0.40	8.0	40,000	20,000	4,000
0.45	9.0	45,000	22,500	4,500
0.50	10.0	50,000	25,000	5,000
0.55	11.0	55,000	27,500	5,500
0.60	12.0	60,000	30,000	6,000
0.65	12.5			6,250
0.70	13.0			6,500
0.75	13.5			6,750
0.80	14.0			7,000
0.85	15.0			7,500
0.90	16.0			8,000
0.95	17.0			8,500
1.00	18.0			9,000
1.05	20.0			10,000

Mid-High Feed Rate Grid

Inlet Flow Rate (gpm)	Av Cl lbs/day	Stabilized Pool (Gal)	Un-Stabilized Pool (gal)	Commercial Spa (gal)
0.2	3.0	15,000	7,500	1,500
0.25	3.25	16,250	8,125	
0.30	3.5	17,750	8,875	
0.35	3.75	18,750	9,375	
0.40	4.0	20,000	10,000	2,000
0.45	4.5	22,500	11,250	
0.50	5.0	25,000	12,500	2,500
0.55	5.5	27,500	13,750	
0.60	6.0	30,000	15,000	3,000
0.65	6.25	31,250	15,625	
0.70	6.5	32,500	16,750	
0.75	6.75	33,750	16,875	
0.80	7.0	35,000	17,500	3,500
0.85	7.5	37,500	18,750	
0.90	8.0	40,000	20,000	4,000
0.95	9.0			
1.00	9.5			
1.05	10.0			

Feed Rate Grid Tables

Mid-Low Feed Rate Grid

Inlet Flow Rate (gpm)	Av Cl lbs/day	Stabilized Pool (Gal)	Un-Stabilized Pool (gal)	Commercial Spa (gal)
0.2	2.0	10,000	5,000	1,000
0.25	2.25	11,250	5,625	
0.30	2.5	12,500	6,250	
0.35	3.0	15,000	7,500	1,500
0.40	3.5	17,500	8,750	
0.45	3.75	18,750	9,375	
0.50	4.0	20,000	10,000	2,000
0.55	4.5	22,500	11,250	
0.60	5.0	25,000	12,500	2,500
0.65	5.25	26,250	13,125	
0.70	5.5	27,500	13,750	
0.75	5.75	28,750	14,375	
0.80	6.0	30,000	15,000	3,000
0.85	6.5	32,500	16,250	
0.90	7.0	35,000	17,500	3,500
0.95	7.5			
1.00	7.75			
1.05	8.0			

Low Feed Rate Grid

Inlet Flow Rate (gpm)	Av Cl lbs/day	Stabilized Pool (Gal)	Un-Stabilized Pool (gal)	Commercial Spa (gal)
0.2				
0.25				
0.30				
0.35				
0.40	0.5	2,500	1,250	
0.45				
0.50	0.75	3,750	1,875	
0.55				
0.60	1.0	5,000	2,500	
0.65	1.5	7,500	3,750	
0.70	2.0	10,000	5000	1,000
0.75	2.5	12,500	6,250	
0.80	3.0	15,000	7,500	1,500
0.85				
0.90	3.5	17,500	8,750	
0.95				
1.00				
1.05	4.0			

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.

Table of Contents

Pulsar® 1 Chlorinator Inspection and Maintenance

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

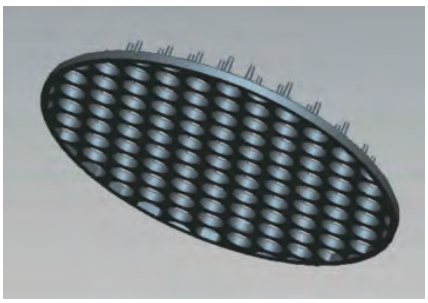
DO NOT use Muriatic Acid to perform the following procedures. Chlorine gas may evolve causing serious injury or possible death. Use proper protective equipment per MSDS when handling chemicals.

Maintenance Procedure Steps

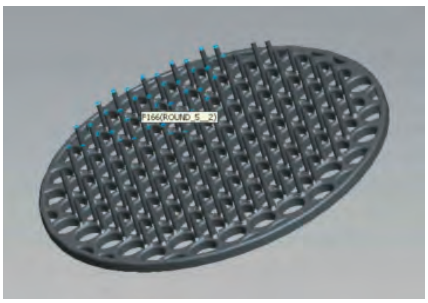
Note: Record inlet flow rate setting.

1. Close the Inlet and Outlet Shut Off 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 plastic bucket (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 1/2 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 plastic bucket with Briquette 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 Hopper.
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 Hopper to completely empty once a week.



Briquette Grid: Med/High Feed Rate



Briquette Grid: Med/Low Feed Rate

Briquette Grid: High/Low Feed Rate

Pulsar® 1 Chlorinator Inspection and Maintenance

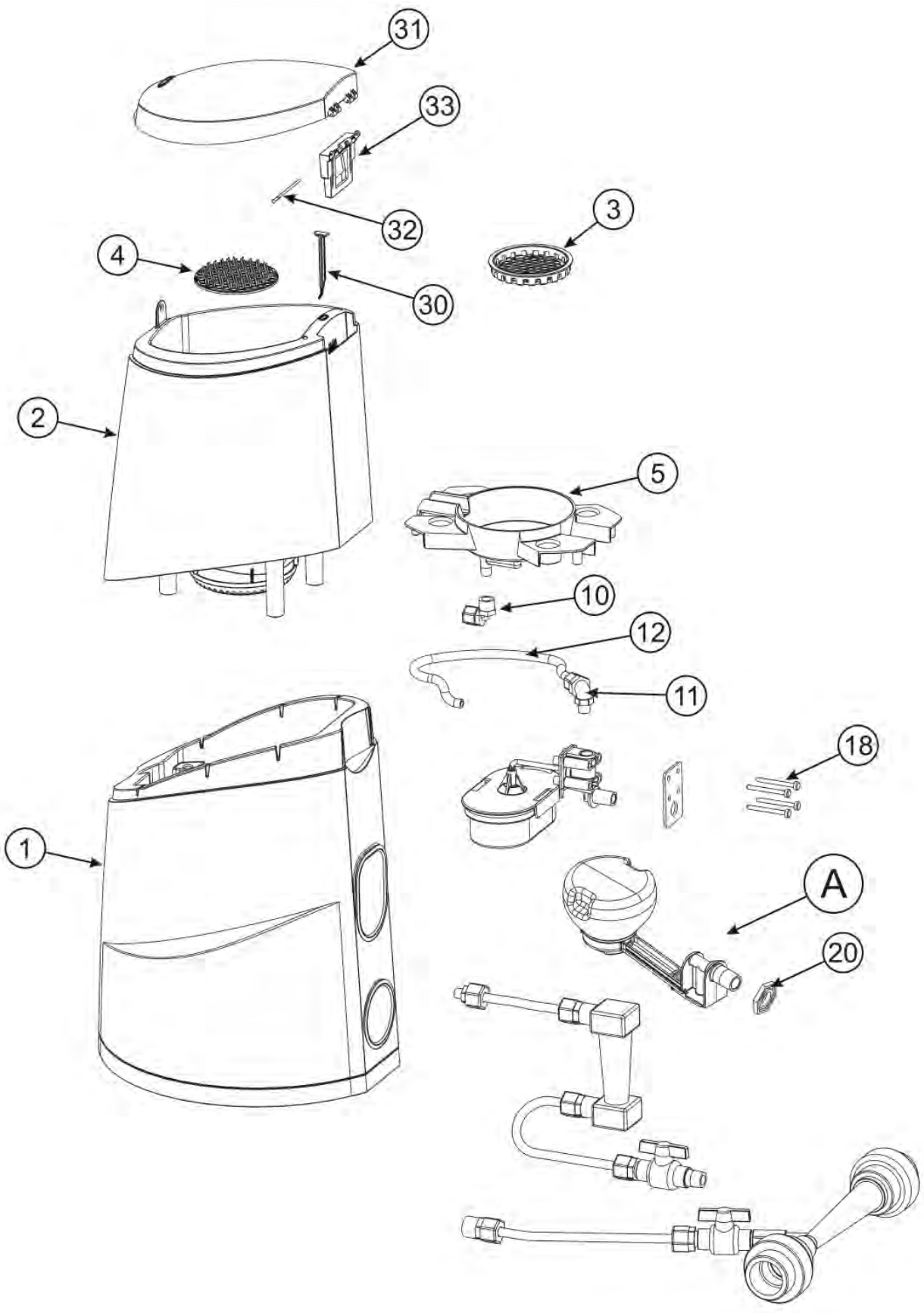
SECTION B

Troubleshooter's Guide

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

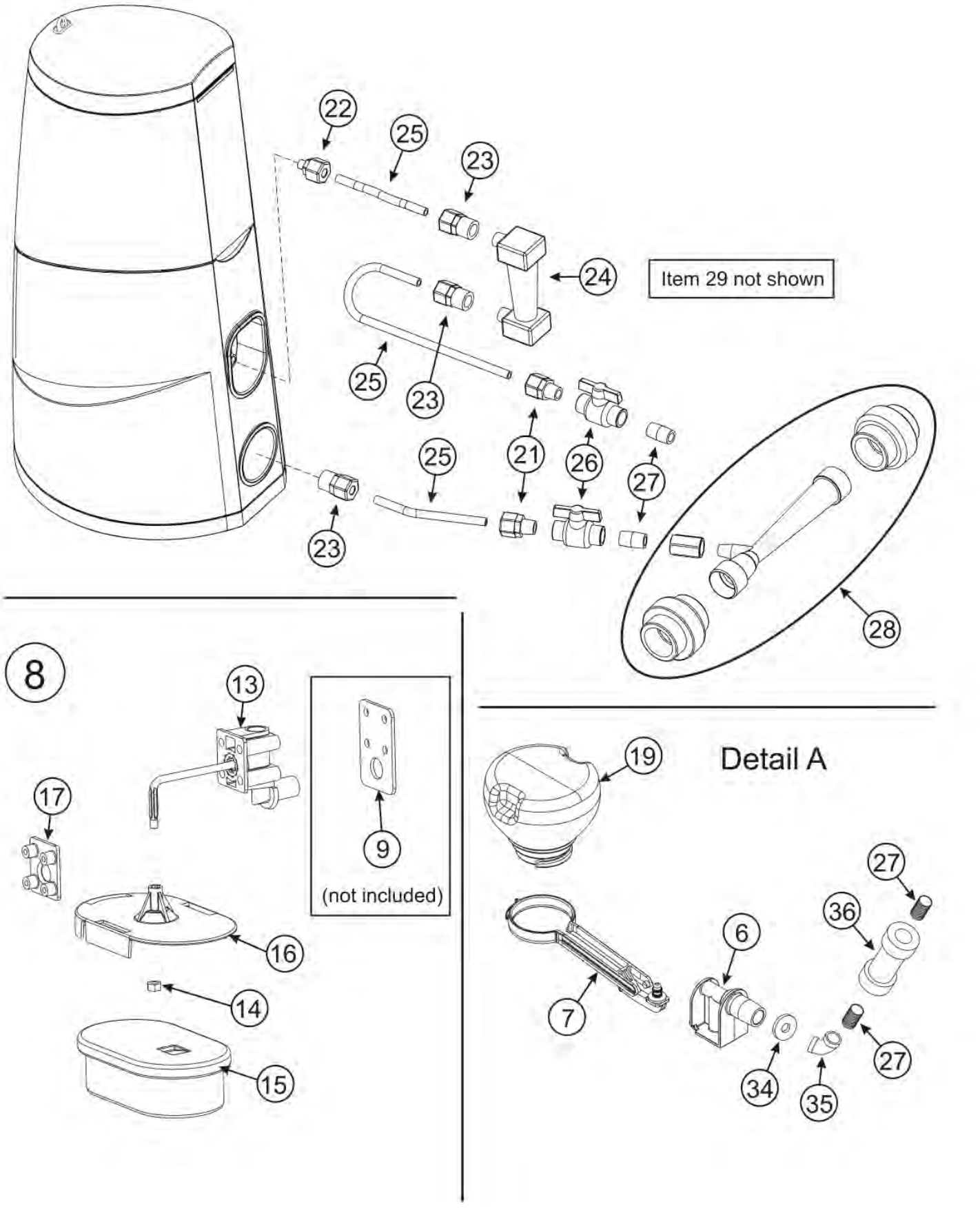
Pulsar® 1 Feeder: Diagram A

See page 16 for Diagram Descriptions



Pulsar® 1 Feeder: Diagram B

See page 16 for Diagram Descriptions



Pulsar® 1 Feeder: Diagram A & B Descriptions

Diagram Number	Part Number	Qty / Unit	Description
0	79803	1	**Pulsar® 1** Feeder
1	74066	1	P1 Base
2	77334	1	P1 Hopper
3	77332	2	P1 Grid (High, Low)
4	71448	2	P1 Grid (Med-High, Med-Low)
5	77331	1	P1 Dissolving Cup with Nozzles Assembly
6	79806	1	Discharge Valve (DV) Body
7	79805	1	Discharge Valve Arm with EPDM Washer
8	71496	1	Emergency Shut-Off Valve (ESV) Assembly - Part 71910 Not Included
9	71910	1	Rubber Gasket for Emergency Shut Off Valve
10	74059	1	3/8” OD Tubing x 1/4” NPT Female Elbow (W6FE4)
11	71619	1	3/8” OD Tubing x 3/8” NPT Male Elbow (W6ME6)
12	71618	1	3/8" OD PE Tubing (15”)
13	71535	1	Emergency Shut Off Valve (ESV) with Arm Only
14	71538	1	ESV Float Plate/Discharge Valve Arm PVC (1/4” x 20) Nut
15	71540	1	ESV Float
16	71539	1	ESV Float Plate
17	71536	1	ESV Mounting Plate
18	71537	4	ESV Mounting PVC Screws (1/4” x 20 x 2 1/4”)
19	79810/79808	1	Discharge Valve Float
20	71583	1	Discharge Valve Locknut
21	71890	2	1/2” OD Tubing x 1/2” NPT Male Connector (W8MC8)
22	71614	1	1/2” OD Tubing x 1/2” NPT Male Connector (W8MC4)
23	71588	3	1/2” OD Tubing x 1/2” NPT Female Connector (W8FC8)
24	74060	1	Flow Indicator - P1
25	71626	1	20' of 1/2” O.D. PE Tubing
26	74061	2	1/2” FNPT x 1/2” FNPT PVC Ball Valve
27	71611	2	1/2” Close PVC Nipple
28	71974	1	Venturi & Installation Parts
29	74145	1	Cleaning Pan for **Pulsar® 1** Feeder
30	77330	1	Grid Tool
31	77335	1	Lid
32	77333	2	Hinge Pin
33	77336	1	Lid Hinge
34	71576	1	DV Gasket
35	79222	0	45° PVC 1/2” FNPT Threaded Elbow
36	79218	0	1/2” FNPT PVC True Union Check Valve

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

Lonza

1200 Lower River Road, P.O. Box 800
Charleston, TN 37310-0800

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.