Water Treatment

Lonza

CCH® Endurance

Installation and Operation Manual

Model #CCH-1SD

Lonza
Product Stewardship
Water Chemicals

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 our Product Stewardship Program, contact your Lonza Representative. For product inquiries, contact 1-800-478-5727 or cch@lonza.com.

Dealer Contact:

WARRANTY REGISTRATION

CCH® Endurance Feeder Warranty Policy

Registration

Register your **CCH®** Endurance Feeder (the "Equipment") within 30 days of your purchase date and your equipment will qualify for a two (2) year warranty! Scan the QR code on the feeder, manual or feeder carton and you will be directed to the feeder registration website. You can also go to www.cchendurance.com to register your equipment for this warranty. Please note you will need to provide proof of purchase with purchase date when registering your feeder.

Limited Extended Warranty

If your **CCH®** Endurance Feeder is registered within 30 days of purchase, your equipment is warranted against defects in material and workmanship for a period of 24 months after shipment by Lonza. If you do not register your **CCH®** Endurance Feeder before the registration deadline, your equipment is warranted against defects in material and workmanship for a period of 6 months after purchase. This warranty applies only to the original end-user and this warranty is not transferrable.

CCH® Endurance Replacement Parts

Lonza warrants any equipment replacement parts to be free of defects in material and workmanship for a period of ninety (90) days from the date of installation. This warranty is restricted to **CCH®** Endurance Feeder parts purchased on a replacement basis.

Exclusions

This warranty does not cover service, damage or failure due to accidents; fire, flood or other acts of God; abuse; misuse; abnormal or improper use; neglect; improper maintenance; alterations or modifications by anyone other than Lonza or a Lonza authorized dealer representative; repairs by anyone other than Lonza or a Lonza authorized dealer representative; or ordinary wear and tear. Use of any tablets or chemicals other than the **CCH®** Endurance Tablets with the equipment voids any warranty. Lonza makes no expressed or implied warranties other than those stated above. No Lonza representative or authorized dealer representative has authority to change or modify this warranty in any respect. Lonza shall not be responsible or liable for any indirect, special, or consequential damages or any damages with respect to loss of property or loss of revenues or profit that arise out of or in connection with the use or performance of the equipment.

Lonza

Lonza
1200 Bluegrass Lakes Parkway
Alpharetta, GA 30004

Table of Contents

1 Introduction

1.1 CCH® Endurance Tablets

The patent-pending, slow dissolving **CCH**® Endurance Tablets are a 3-in-1 product that chlorinates consistently, increases calcium to protect plaster, and increases alkalinity to stabilize pH. The benefits of the **CCH**® Endurance Tablets include but is not limited to:

- DOES NOT add cyanuric acid to your pool reducing wasteful drainage
- DOES NOT reduce ORP effectiveness
- Dissolves slowly to give long lasting chlorination
- Eliminates the formation of nitrogen trichloride (strong chlorine odor) associated with trichlor use
- Highly concentrated to reduce shipping and handling costs
- More concentrated than liquid bleach
- Longer shelf life when compared to liquid bleach
- Adds less total dissolved solids (TDS) than liquid bleach
- Class 2 Oxidizer

1.2 CCH® Endurance Feeder

The **CCH**® Endurance Feeder is an easy to use, automatic solution that is exclusively designed to feed **CCH**® Endurance Tablets. Other Calcium Hypochlorite or Trichlor tablets will not fit into the feeder nor will they dissolve properly and provide the appropriate feed rate. With the simplicity of an erosion feeder, the **CCH**® Endurance Feeder's streamlined design is easy to install, service and requires minimal operator maintenance.

2 Overview

2.1 Theory of Operation

The patent-pending **CCH**® Endurance System is a pressurized feeder system designed for pools and spas ranging from 500 to 60,000 gallons [1,892.7 to 227,124.7 liters]. A pre-filter to post filter loop will be added to the main pool recirculation system as part of the **CCH**® Endurance System. This recirculation loop will create the pressure differential to provide the proper flow of water through the feeder.

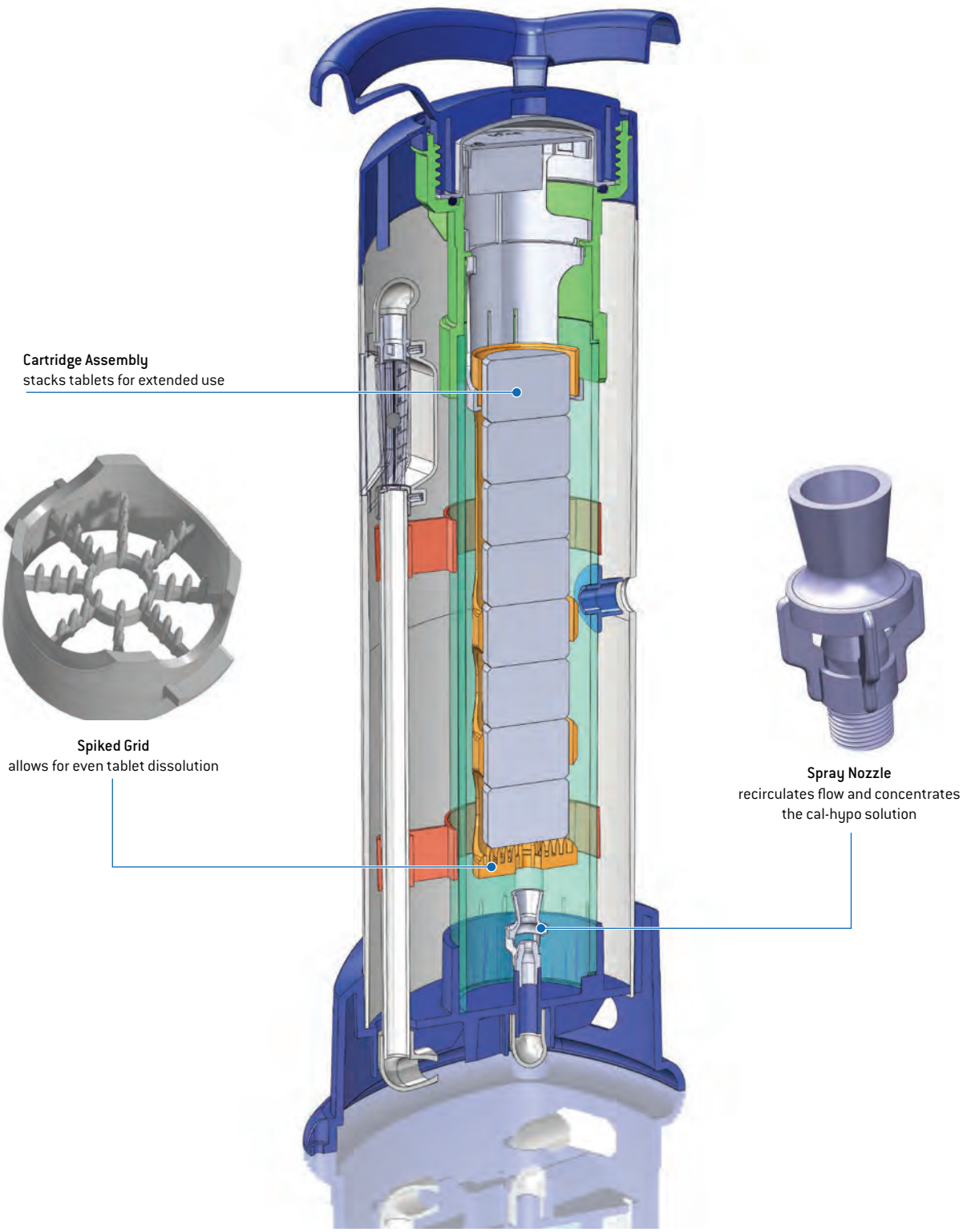
The **CCH**® Endurance System incorporates the principles of High Capacity Erosion (HCE) technology. Water rises in a "column" from a submerged nozzle below the tablet grid making contact with the **CCH**® Endurance Tablets. The tablets are then submerged in a column of water with the water flow from the nozzle creating a chlorinated solution that is discharged to the pool return line. The feeder operates in a pressurized condition with a pressure range between 5 to 20 psig [0.35 to 1.38 bar].

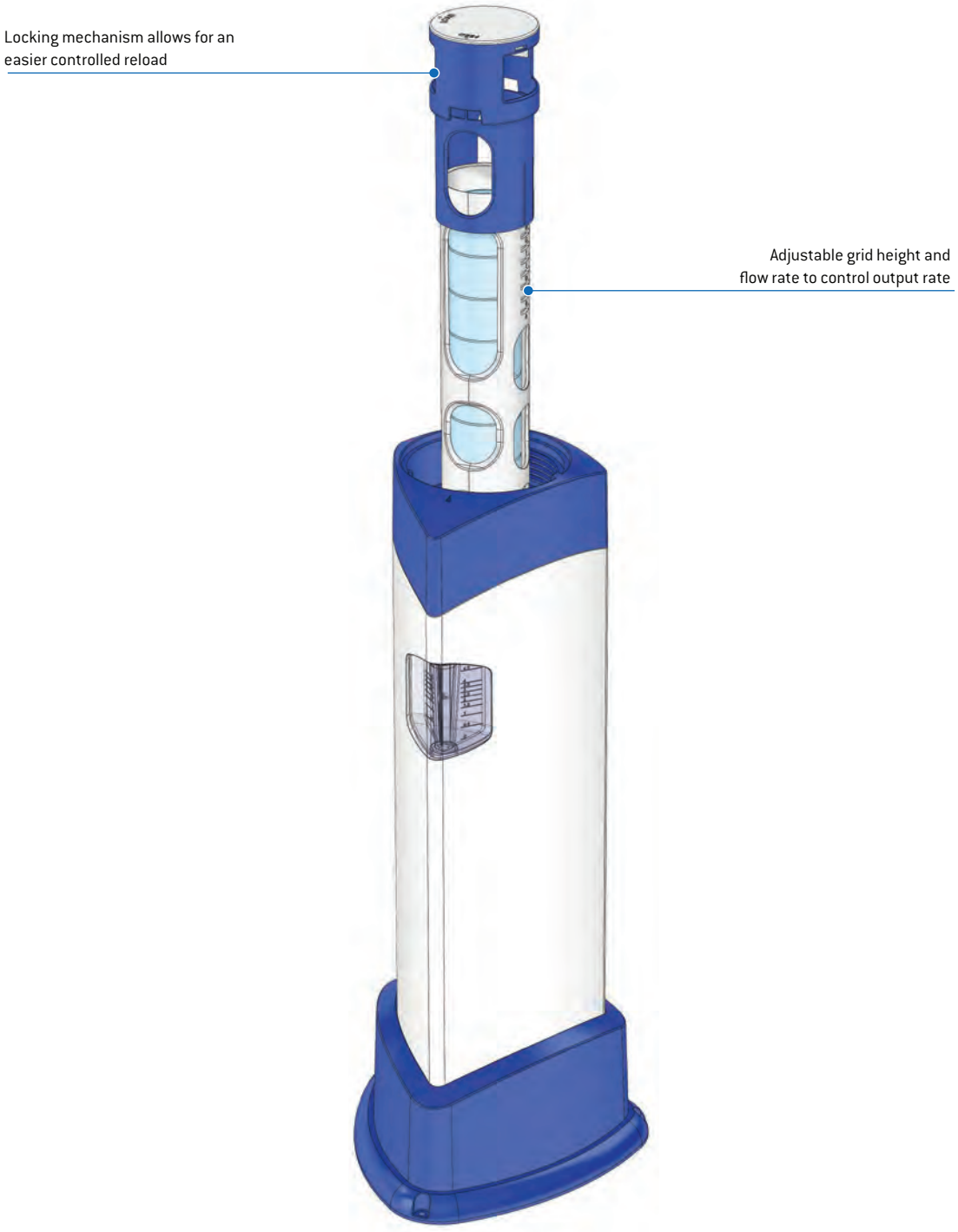
The chlorine output is controlled by the cartridge height setting (distance of the tablet from the nozzle) and the inlet flow rate which has an operating range of 1 to 4.5 gpm [3.7 to 17.03 lpm]. In addition, an ORP controller may be used for more precise control. The inlet flow rate will allow a minimum available chlorine (AvCl) output of 0.1 lb/day [0.05 kg/day] and will allow a maximum AvCl output of 8.5 lbs./day [3.86 kg/day].

2.2 Major Components

Integrated Flow Meter

2.2 Major Components (continued)




Locking mechanism allows for an easier controlled reload
Adjustable grid height and flow rate to control output rate

2.3 Specifications

Operational Characteristics	
Operating Pressure range	5 to 20 psig [0.35 to 1.38 bar]
Nominal Pressure	15 psig [1.03 bar]
Operating Temperature range	40° to 130° F [4.4° to 54.4° C]
Flow Rate range	1 to 4.5 gpm [3.7 to 17.03 lpm]

Dimensions	
Tubing	5/8" [15.9 mm] O.D. (LLDPE)
Feeder	W12" x D13" x H31" [304.8 mm x 330.2 mm x 787.4 mm]

Weight	
Feeder Weight full	29.4 lbs [13.3 kg]
Feeder Weight empty	23 lbs [13.3 kg]

Cartridge Capacity	
Tablet Quantity	11
Weight	6.4 lbs [2.9 kg]

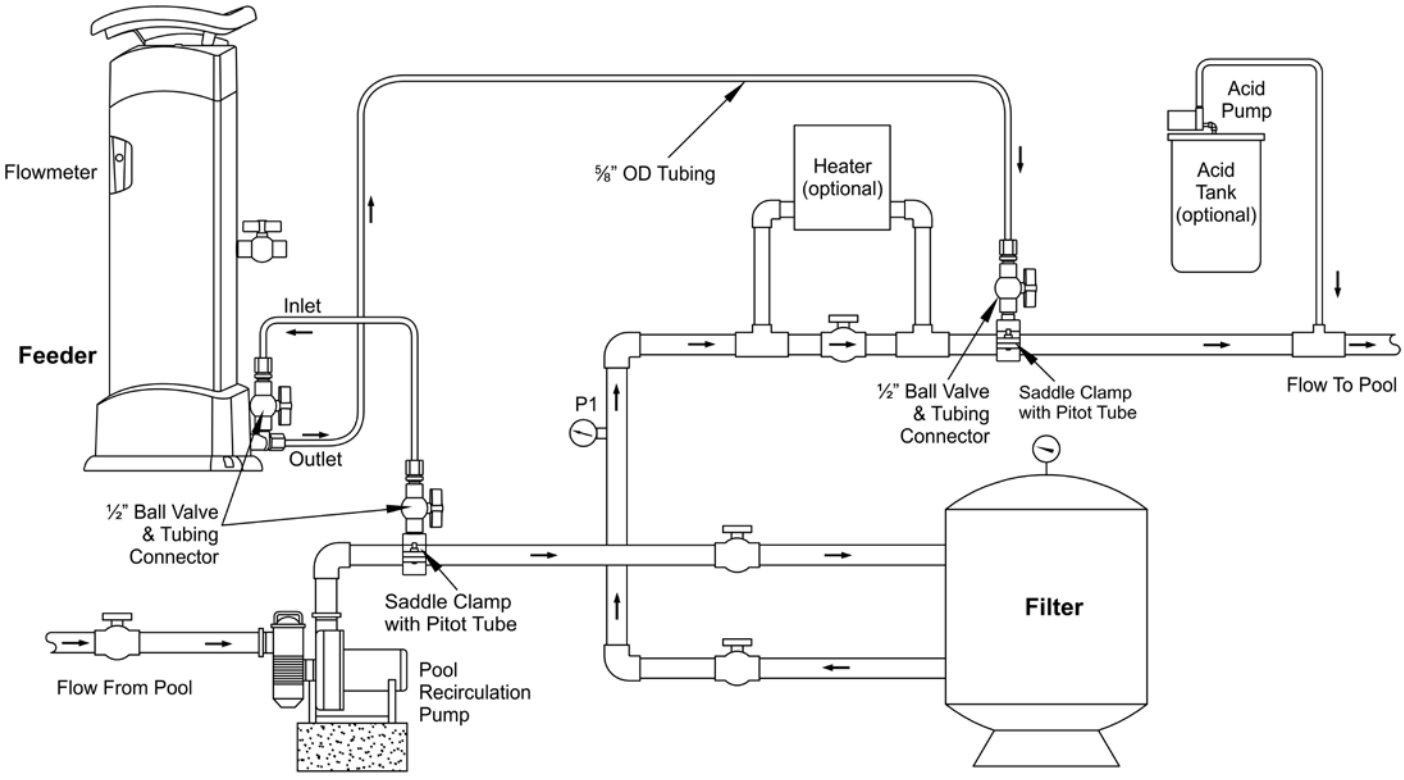
Feed Rate	
Available Chlorine (per day)	0.1 to 8.5 lbs [0.05 kg to 3.86 kg]

Recommended Pool Size	
Indoor	1,000 to 60,000 gallons [3,785.4 to 227,124.7 liters]
Outdoor Stabalized	1,000 to 40,000 gallons [3,785.4 to 151,416.5 liters]
Outdoor Un-Stabalized	1,000 to 25,000 gallons [3,785.4 to 94,635.30 liters]
Commercial Spa	500 to 5,000 gallons [1,892.7 to 18,927.1 liters]

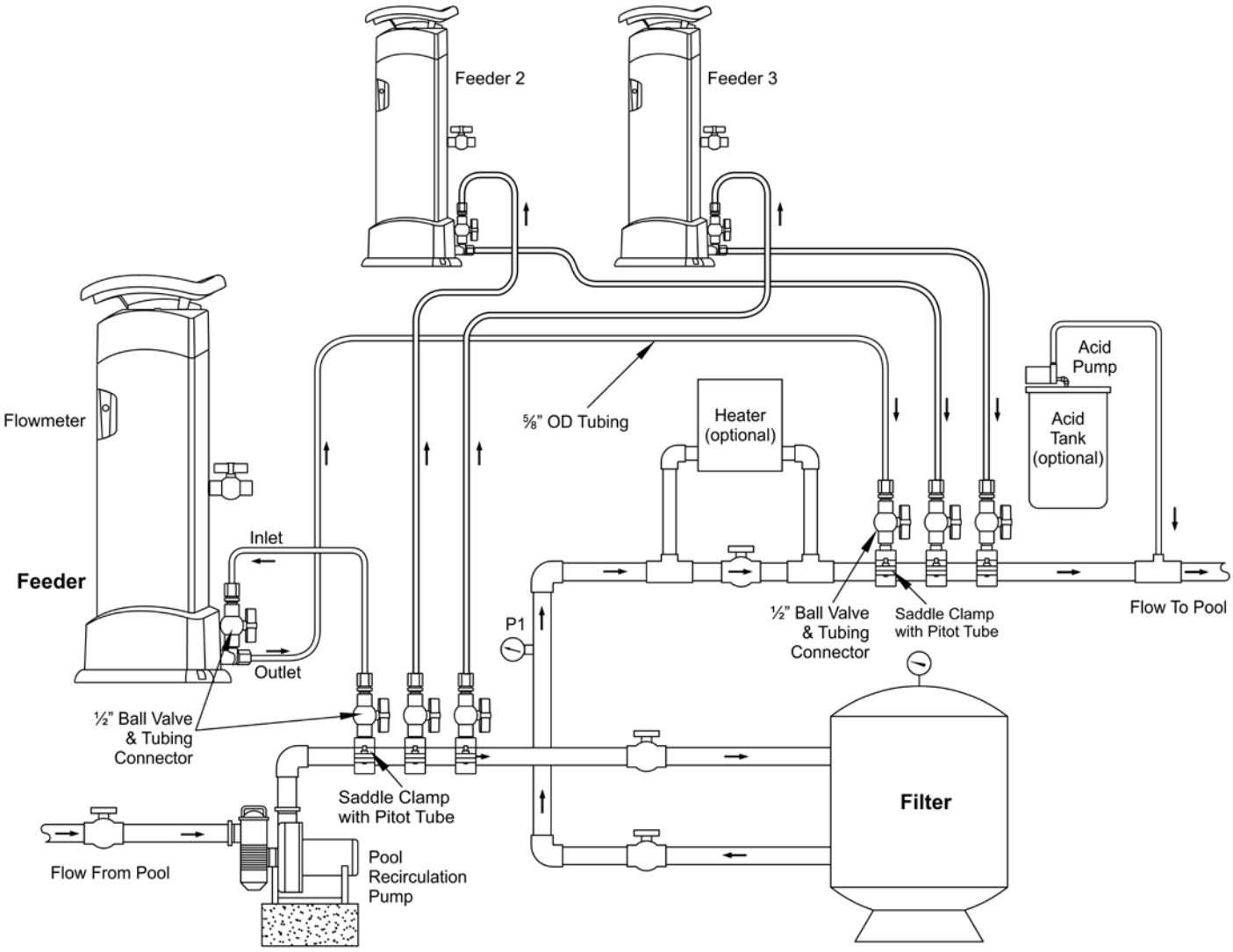
3 Installation

Choose a location in the pump room that will allow easy access for replenishing the feeder cartridge with **CCH**® Endurance Tablets. The **CCH**® Endurance Feeder will be positioned in a location such that the pre to post filter recirculation loop is feasible.

3.1 CCH® Endurance System: Standard Installation

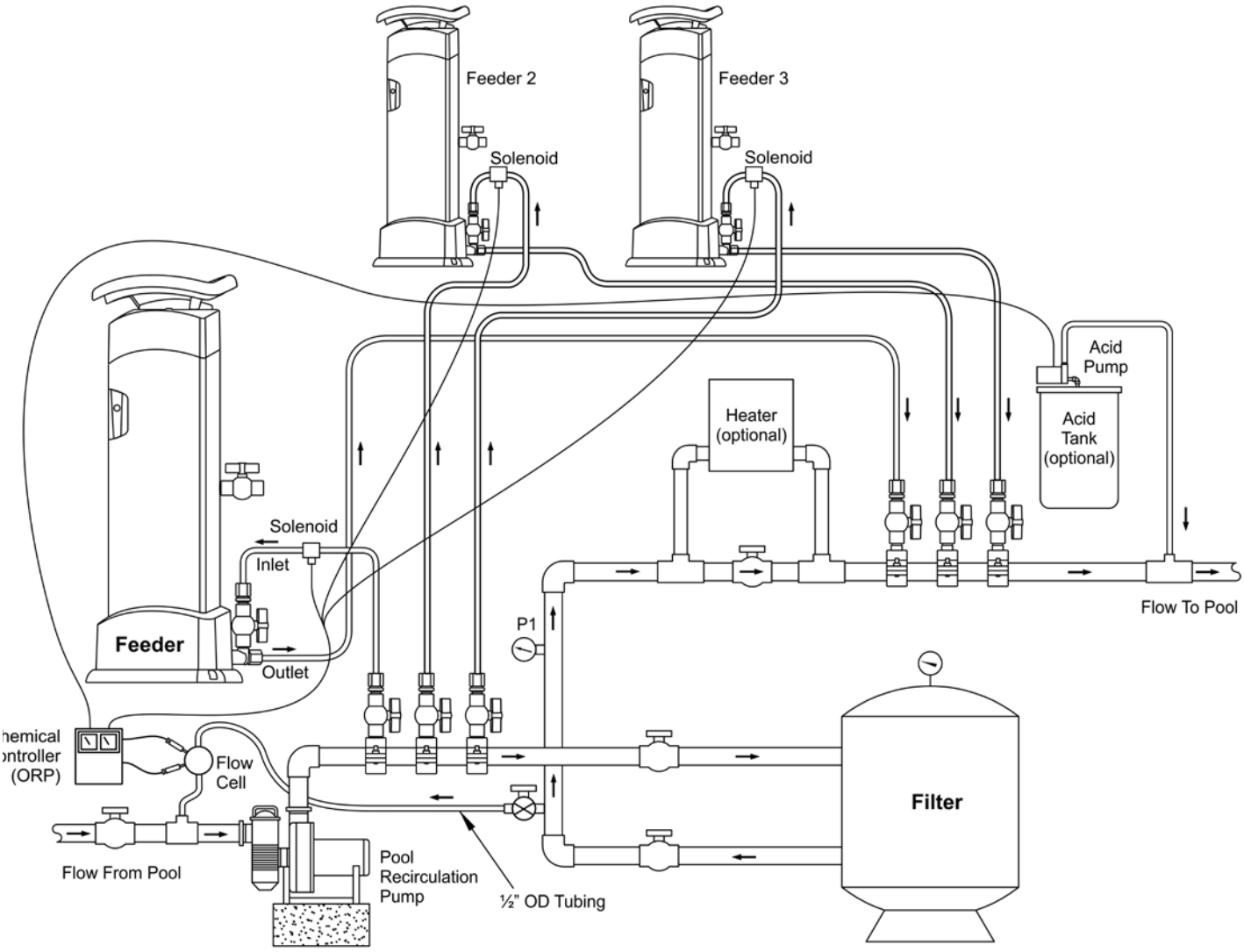


3.1.1 CCH® Endurance System: Increased Feed Rate Installation



NOTE: A maximum of three feeders can be used in parallel to provide increased chlorine output. Above this will reduce the flow rate going through the filter below health code recommended values. Refer to the feed rate table in section 4.2.2 (page 21) for feeder output rates.

3.1.2 CCH® Endurance System: Increased Feed Rate Installation with Optional Solenoid Kit (for use with a chemical controller)



NOTE: A maximum of three feeders can be used in parallel to provide increased chlorine output. Above this will reduce the flow rate going through the filter below health code recommended values. Refer to the feed rate table in section 4.2.2 (page 21) for feeder output rates.

3.2 Tools & Equipment Required for Feeder Installation

- Drill – Cordless Recommended
- 7/8" [22.2 mm] Drill Bit
- Plumbers Tape or Pipe Sealant
- Tube Cutters or Utility Knife
- Gas Pliers (Channel Locks)
- 3/8" [9.53 mm] Nut Driver, Socket or Box wrench

3.3 Installation Parts and Assemblies

Part	Description	Part Number
	A - (2) Adjustable Saddle Clamp Assembly for 2" [50.8 mm] pipe	73096
	B - (2) Adjustable Saddle Clamp Assembly for 1-1/2" [38.1 mm] pipe	73096
	C - (2) 5" x 1/2" [127 mm x 12.7 mm] MNPT Pitot tube	73086
	D - (3) 1/2" [12.7 mm] FNPT x 1/2" [12.7 mm] FNPT PVC Ball Valves	74061
	E - (4) 1/2" [12.7 mm] MNPT x 5/8" [15.9 mm] O.D. Tubing Connector - W10MC8	71918
	F - 12' X 5/8" [365.76 cm X 15.9 mm] O.D. LLDPE Tubing	73095
	G - (2) 1/2" [12.7 mm] PVC Closed Nipples	71611

3.4 Installation Procedure

Background: The next steps involve installing a loop around the pool filter where the **CCH**® Endurance Feeder will be located. The pool filter will create a pressure differential to provide flow through the **CCH**® Endurance Feeder. This loop is created using the saddle clamps, pitot tubes, ball valves, tube fittings, and tubing provided with your system.

NOTE: Refer to the schematics on pages 11-13 for a pool system installation and follow the steps below.

NOTE: Before starting installation, determine if the pipes to be drilled are above or below the pool water level. If they are below the pool water level, isolation valves must be shut to prevent backflow through the holes that are being drilled. If isolation valves are shut properly, some water may drain out of the drilled holes but will stop once piping is empty.

NOTE: Apply plumbers tape to all male threads to ensure a leak free connection.

3.4.1 Making the inlet connection from the pool to the feeder (Pre-Filter)

Choose a location on the main pool recirculation piping on the discharge side of the pool pump but upstream of the pool filter(s). Make sure the pool pump is off and shut isolation valves from the pool piping so that it is dry.

1. Drill 7/8" (22.2 mm)hole anywhere on the top half of the pipe (figure 1). **Caution: Do not drill on the bottom half of the pipe. Excess debris may enter your feeder**.

2. For 2" [50.8 mm] pool pipe, use Assembly A (figure 2a). Do not yet fully tighten nuts (figure 2b). For 1-1/2" [38.1 mm] pool pipe, use Assembly B (figure 2c).

3. Insert part C (figure 3a). **Make sure Pitot tube is fully inserted prior to tightening saddle clamp** (figure 3b).

4. Connect part D, Ball Valve (figure 4).

5. Connect part E, Tubing Connector (figure 5).

Figure 1

Figure 2a

Figure 2b

Figure 2c

Figure 3a

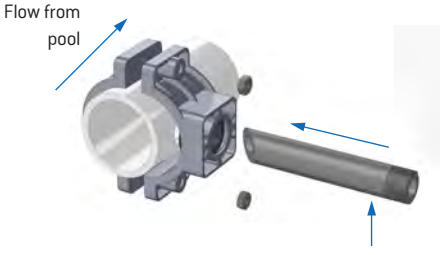


Figure 3b

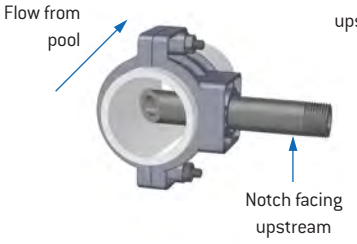


Figure 4

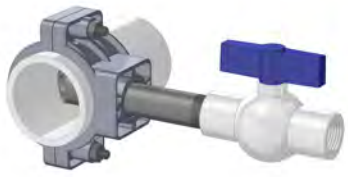
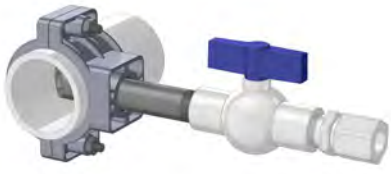


Figure 5

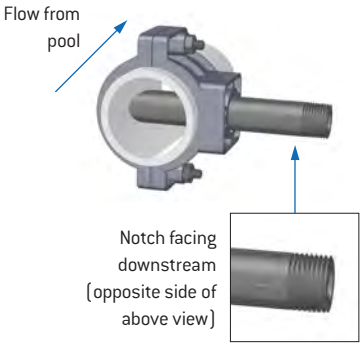


3.4 Installation Procedure (continued)

3.4.2 Making the chlorine injection connection from the feeder to the pool (post-filter and heater)

Choose a location on the main pool recirculation piping downstream of the pool filter(s), and heater (if available), but before the acid or CO_2 injection point.

1. To make the outlet connection from the feeder to the pool, repeat all steps from section 3.4.1 except for step #3. Step #3 is modified as follows:



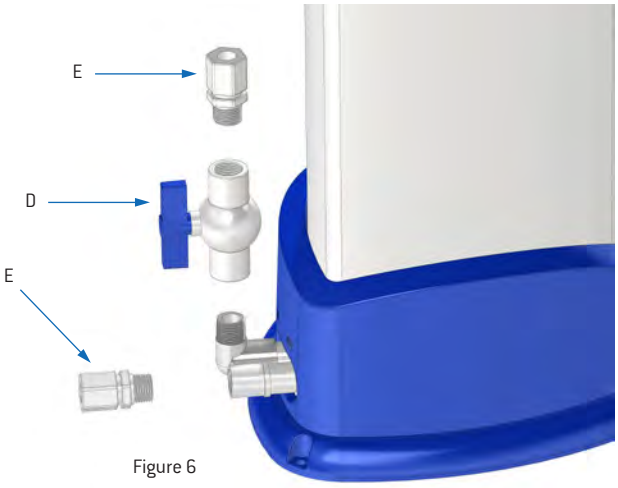


Figure 6

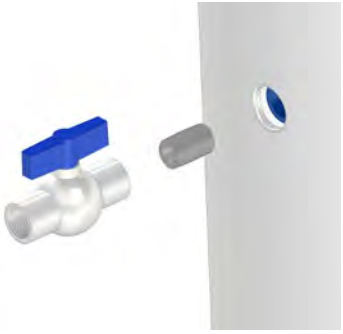


Figure 7a

Figure 7b

3.4.3 Completing the feeder circulation loop

1. Complete feeder assembly with parts part D, ball valve, and part E, tubing connector (figure 6).

2. Connect part D, ball valve, and part G, closed nipple to the drain port to complete the feeder assembly (figure 7a & 7b).

3. Choose a location for the **CCH**® Endurance Feeder that allows easy access for filling and maintenance.

4. Using the 5/8" [15.9 mm] O.D. tubing, part F (see figure 8), cut the tubing to size and connect the feeder inlet to the pre-filter tubing connector installed in step #5 of section 3.4.1, and connect the feeder outlet to the post-filter tubing connector installed in step # 1 of section 3.4.2.

This completes your feeder recirculation loop.

Figure 8

4 Feeder Start Up

4.1 Pre-Startup Procedure

Following the steps outlined below will ensure a smooth start-up of the CCH® Endurance Feeder. For seasonal operation, perform this procedure each Spring.

IMPORTANT!! Do NOT put CCH® Endurance Tablets in the feeder during the start-up operation.

4.1.1 Verify water flow through feeder

1. With the CCH® Endurance Feeder fully installed per the installation procedure, section 3.4, turn on the pool recirculation system, and open all valves to the feeder.

   Note: Before starting the flow test, ensure the pressure cap at the top of the feeder is on and shut. Turn cap clockwise a quarter turn until the triangle of the cap lines up with the body of the feeder. This indicates the pressure tight seal on the feeder.

2. Increase the flow rate going through the feeder until it reaches the maximum flow rate as read on the flow meter on the front of the feeder.

3. With maximum flow going through the feeder, check the system for leaks. Tighten all fittings as necessary if leakage is observed.

4. When all leaks have been corrected, shut the inlet valve first, then shut the outlet valve to fully isolate the feeder from the pool filter system.

4.1.2 Adjusting the cartridge feed rate setting

Note: Adjust cartridge feed rate setting prior to loading with CCH® Endurance Tablets. The feed rate setting of the cartridge may not be able to be reduced if already full of tablets.

1. With pressure cap and seal cap removed, remove the cartridge assembly from the feeder, turn counter clockwise so that load lines up with arrow on the feeder (figure 9). This locks the cartridge assembly for easy loading or feed rate setting adjustment. Follow steps #2 - #5 to complete the feed rate setting adjustment.

2. See figure 10.

3. Twist counterclockwise (figure 11).

4. Slide up or down (figure 12).

5. Twist clockwise (figure 13).

Figure 9

Figure 10

Figure 11

Figure 12

Figure 13

4.1.3 Loading the cartridge assembly with CCH® Endurance Tablets

WARNING - Use ONLY CCH® Endurance Tablets in the feeder. 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 the cartridge with more tablets.

WARNING - Wear protective gloves when handling CCH® Endurance Tablets.

1. See figure 14a & 14b.
2. Open the Ball Valve at the drain and drain the solution into a bucket or down to a drain (figure 15). Caution: Failure to perform this step may result in a chlorine spill and possible injury.
3. See figure 16a & 16b (page 19).
4. See figure 17 (page 19).
5. Verify that O-ring is still in place and there is no debris in the O-ring groove before replacing seal cap (figure 18, page 19).
6. See figure 19 (page 20).
7. Turn pressure cap clockwise a quarter turn until the triangle of the cap lines up with the body of the feeder (figure 20, page 20).

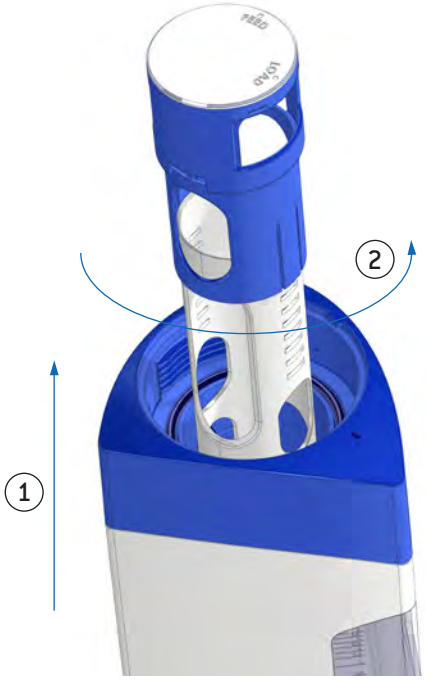


Figure 14a

Figure 14b

Figure 15

4.1.3 Loading the cartridge assembly with CCH® Endurance Tablets (continued)

Figure 16a

Figure 16b

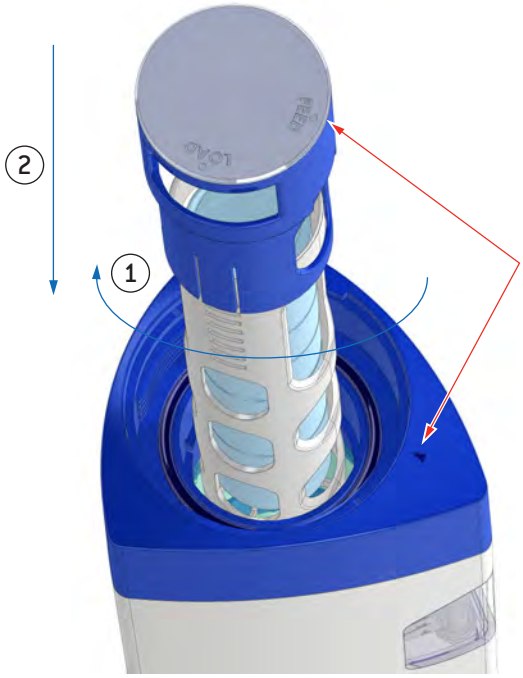


Figure 17

Figure 18

4.1.3 Loading the cartridge assembly with CCH® Endurance Tablets (continued)

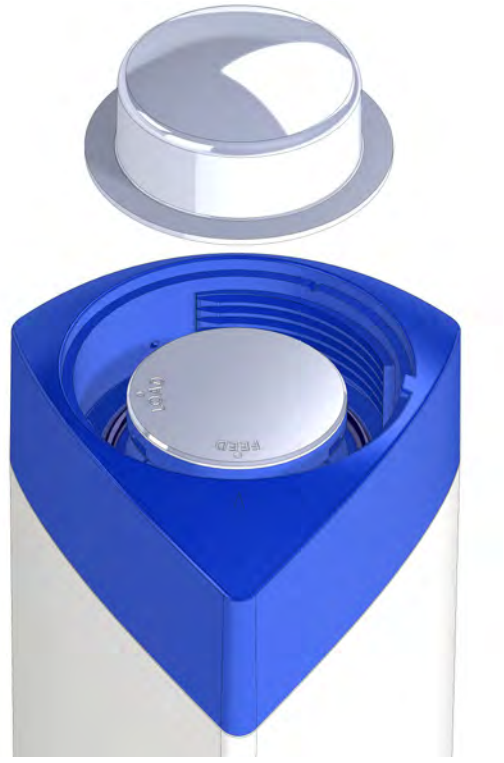


Figure 19

Figure 20

4.2 Startup Procedures

WARNING - KEEP OUT OF REACH OF CHILDREN

4.2.1 Feeder Startup

After completing the PRE-START-UP PROCEDURE, and establishing that all components of the feeder are operating properly, your **CCH®** Endurance Feeder is ready for start-up.

1. Establish the proper cartridge feed rate setting for your pool using the chart in section 4.2.2

2. Load the cartridge assembly with **CCH®** Endurance Tablets by following section 4.1.3.

3. Open the inlet and outlet ball valves at the pool piping.

4. Open the ball valve at the feeder inlet and set the flow meter to the recommended feed rate setting determined in step 1 using the ball valve at the feeder inlet.

   Note: If using the optional ORP kit, fully open the ball valve at the feeder inlet to allow maximum flow into the feeder and set the cartridge feed rate setting to the highest setting. The ORP or chemical controller will then control chlorine dosing based on your established set points.

5. Monitor the flow rate through the feeder daily to ensure that the proper flow rate is being maintained.

6. During the first few days of operation, check the chlorine level in the pool frequently to establish the best Inlet flow rate and cartridge feed rate setting for your pool. Adjust the chlorine output either up or down according to the table, or adjust the ORP setpoint if using the ORP kit.

4.2.2 Feed Rate Table

Cartridge Setting	Inlet Flow Rate - gpm *(lpm)*								
	0.5 *(1.9)*	1 *(3.8)*	1.5 *(5.7)*	2 *(7.6)*	2.5 *(9.5)*	3 *(11.4)*	3.5 *(13.2)*	4 *(15.1)*	4.5 *(17)*
	Output Rate lbs *(kg)* Av. CL/Day								
A	*	*	*	*	3.2 *(1.5)*	3.5 *(1.6)*	4.5 *(2)*	5.5 *(2.5)*	8.5 *(3.9)*
B	*	*	*	*	2.9 *(1.3)*	3.2 *(1.5)*	4.2 *(1.9)*	5.2 *(2.4)*	7.5 *(3.4)*
C	*	*	*	*	2.6 *(1.2)*	3.5 *(1.6)*	3.9 *(1.8)*	4.9 *(2.2)*	6.5 *(2.9)*
D	*	*	*	2 *(0.9)*	2.3 *(1)*	3.2 *(1.5)*	3.6 *(1.6)*	4.5 *(2)*	6 *(2.7)*
E	0.8 *(0.4)*	1.1 *(0.5)*	1.6 *(0.7)*	1.8 *(0.8)*	2 *(0.9)*	2.9 *(1.3)*	3.3 *(1.5)*	4.2 *(1.9)*	5.5 *(2.5)*
F	0.7 *(0.3)*	1 *(0.5)*	1.4 *(0.6)*	1.6 *(0.7)*	1.8 *(0.8)*	2.6 *(1.2)*	3 *(1.4)*	4 *(1.8)*	5 *(2.3)*
G	0.6 *(0.3)*	0.9 *(0.4)*	1.2 *(0.5)*	1.4 *(0.6)*	1.6 *(0.7)*	2.3 *(1)*	2.7 *(1.2)*	3.8 *(1.7)*	4.5*(2)*
H	0.5 *(0.2)*	0.8 *(0.4)*	1 *(0.5)*	1.2 *(0.5)*	1.4 *(0.6)*	2 *(0.9)*	2.4 *(1.1)*	3.5 *(1.6)*	4 *(1.8)*

* use higher flow rate

NOTE: A maximum of three feeders can be installed in parallel to increase the total output rate. See sections 3.1.1 and 3.1.2 on page 12 and 13 for increased feed rate installations.

NOTE: For increased feed rate installations, the total output rate of the system is the sum of the feed rate settings of each feeder.

5 Feeder Maintenance

Due to the combination of low chlorine concentration and relatively high flow rate, maintenance of the **CCH**® Endurance Feeder will be minimal. To reduce the maintenance frequency even further, 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 **CCH**® Endurance Feeder.

6 Troubleshooting Guide

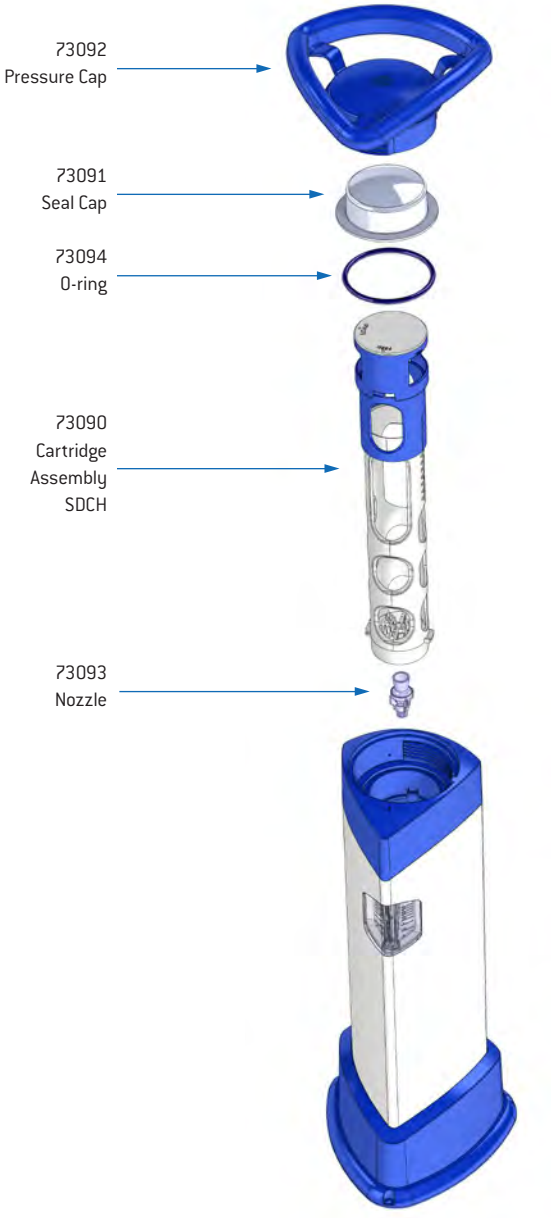
Problem	Cause	Solution
Insufficient water flow to feeder	Inlet shut off valve closed or not open enough	Check flow meter and open valve to allow sufficient flow into the feeder
	Inlet piping to feeder made after the pool filter	Correct feeder installation to provide inlet water before the pool filter
	Clogged inlet piping, flow meter or feeder nozzle	Install an optional 1/2" [12.7 mm] NPT inline strainer if inlet water is contaminated (Lonza Part # 71605)
	Solenoid valve not operating (ORP kit only)	Check solenoid connection to chemical controller and verify controller operation
	Solenoid stuck closed (ORP kit only)	Replace/clean solenoid
Insufficient chlorine in pool	Feed rate/output too low	Check feed rate table on page 21 and increase inlet flow and/or modify cartridge feed rate setting until desired feed rate is achieved
	Cartridge feed rate setting is incorrect for feed rate required	Check feed rate table on page 21 and modify cartridge feed rate setting
	Feeder empty	Refill Cartridge assembly with **CCH**® Endurance Tablets
	No inlet water flow due to shut inlet valves	Open inlet valves
	No water flowing out of feeder due to shut outlet valve	Open outlet valve
	Chemical controller not operating / sending signal to solenoid valve (ORP kit only)	Check solenoid connection to chemical controller and verify controller operation
	Solenoid stuck closed (ORP kit only)	Replace/clean solenoid
Excess chlorine in pool	Feed rate/output too high	Check feed rate table on page 21 and decrease inlet flow and/or modify cartridge feed rate setting until desired feed rate is achieved
	Chemical controller problem (ORP kit only)	Refer to chemical controller user manual or contact your dealer
	Solenoid stuck open (ORP kit only)	Replace/clean solenoid
Water leaking through pressure cap	Pressure cap not properly installed	Completely twist cap
	O-ring no longer providing proper seal	Replace O-ring
	O-ring not seated properly or debris in O-ring groove	Remove pressure cap. Clean and adjust O-ring so it properly sits in O-ring groove,
	Seal cap missing or broken	Replace seal cap

7 Feeder Views

7.1 Feeder Assembly View

Note: Quantities listed below represent the number of parts shipped with the feeder. Part numbers are for procurement of 1 individual spare part unless otherwise stated.

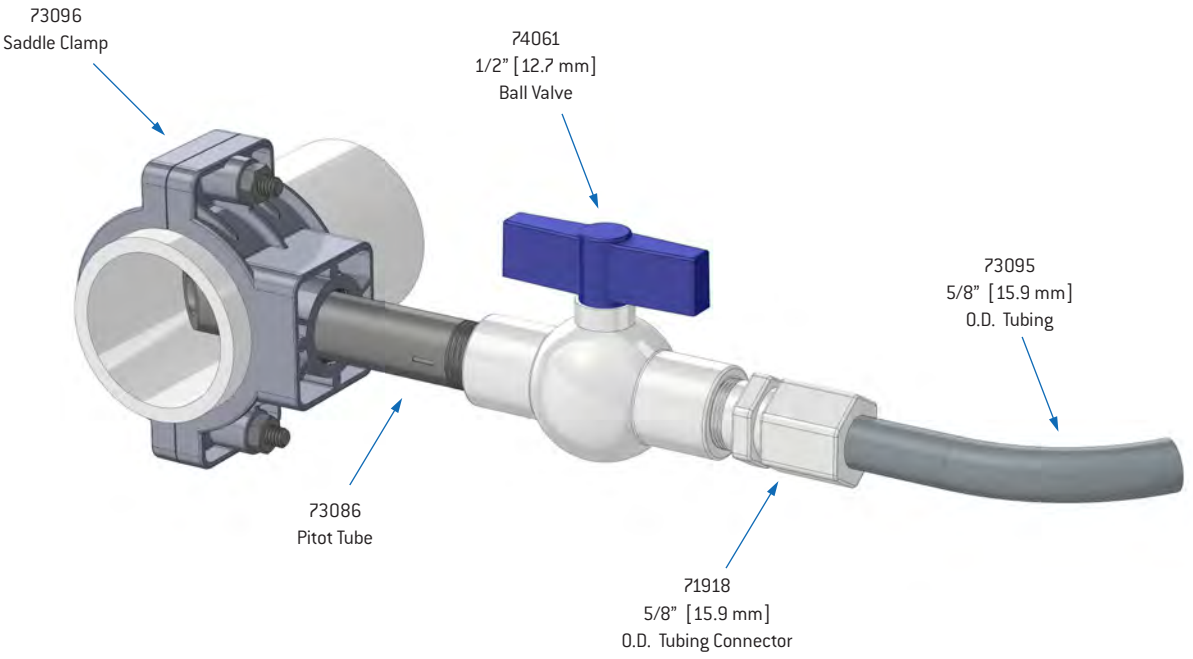
Part	Description	Qty	Part Number
CCH® Endurance Feeder	Complete Feeder assembly	1	73100
Pressure Cap	Threaded Cap with Handle	1	73092
Seal Cap	Inner Seal Cap	1	73091
O-ring	O-ring Seal	2 (1 spare)	73094
Cartridge Assembly SDCH	Cartridge for **CCH**® Endurance Tablets	1	73090
Nozzle	Standard SDCH Nozzle	1	73093

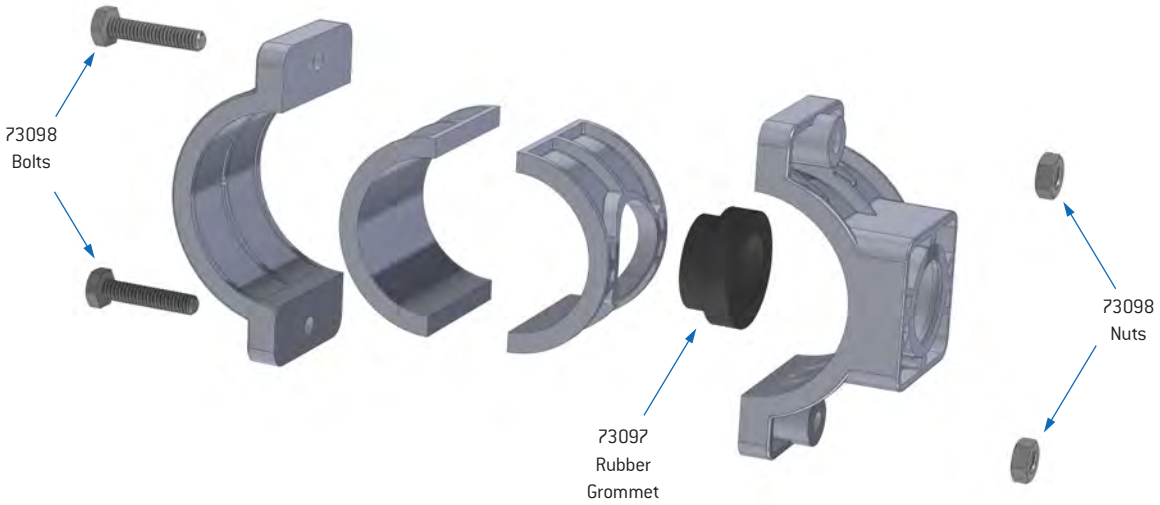


7.2 Installation Kit View

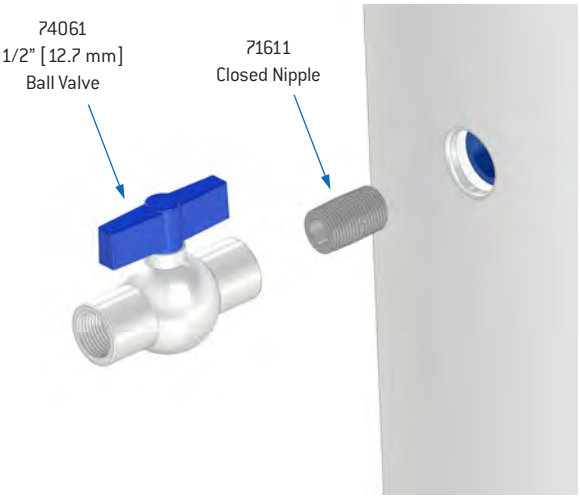
Note: Quantities listed below represent the number of parts shipped with the feeder. Part numbers are for procurement of 1 individual spare part unless otherwise stated.

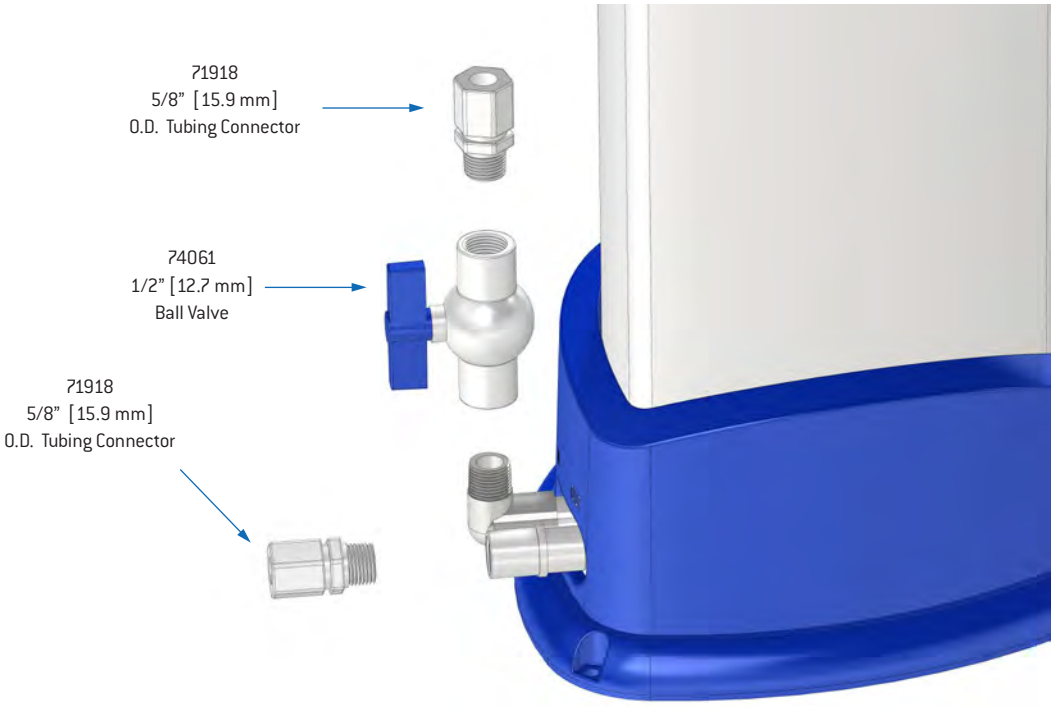
Part	Description	Qty	Part Number
Saddle Clamp	1 1/2" to 2" [38.1 mm to 50.8 mm] Adjustable Saddle Clamp	2	73096
Rubber Grommet	Seal for Saddle clamp	2	73097
Nuts and Bolts	For saddle clamps, 4 pack	1	73098
Pitot Tube	5" x 1/2" [127 mm x 12.7 mm] NPT, 45° angle cut, 2 pack	1	73086
Ball Valve	1/2" [12.7 mm] female threaded	3	74061
Tubing Connector	5/8" [15.9 mm] O.D. Tubing Connector, W10MC8	4	71918
Tubing	12' x 5/8" [365.8 cm x 15.9 mm] O.D. x 1/2" [12.7 mm] I.D. LLDPE Tubing	1	73095
Closed Nipple	1/2" [12.7 mm] PVC Closed Nipple for Drain Port	2 (1 spare)	71611





7.2 Installation Kit View (continued)





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