HAYWARD SERIES CCS CALIBRATION CYLINDERS INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

SAFETY WARNINGS

PLEASE READ THE FOLLOWING INFORMATION PRIOR TO INSTALLING AND USING HAYWARD SERIES CCS CALIBRATION CYLINDERS. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PRODUCT DAMAGE, PROPERTY DAMAGE, PERSONAL INJURY, OR EVEN DEATH.

1. Hayward Flow Control (Hayward), a division of Hayward Industries, guarantees its products against defective material and workmanship only. Hayward assumes no responsibility for property damage or personal injury resulting from improper installation, misapplication, or abuse of any product.
2. Hayward assumes no responsibility for property damage or personal injury resulting from chemical incompatibility between its products and the process fluids to which they are exposed. Determining whether a particular PVC, CPVC, PP or PVDF product is suitable for an application is the responsibility of the user. Chemical compatibility charts provided in Hayward literature are based on ambient temperatures of 70°F and are for reference only.
3. Hayward products are designed for use with non-compressible liquids.

WARNING

Hayward PVC and CPVC products should NEVER be used or tested with compressible fluids such as compressed air or nitrogen. Use of PVC and CPVC products in compressible fluid applications may result in product damage, property damage, personal injury, or even death.

WARNING

The Series CCS is intended for use in liquid service only. Do not attempt to use this product for controlling air or gases. Use of this product in air or gas service may result in product damage, property damage, personal injury, or even death.

4. The maximum recommended fluid velocity through any Hayward product is eight feet per second (8 ft/s). Higher fluid velocity can result in damage due to the water hammer effect.
5. Piping systems must be designed and supported to prevent excess mechanical loading on Hayward products due to system misalignment, weight, shock, vibration, and the effects of thermal expansion and contraction.
6. The effect of temperature on plastic piping systems must be considered when the systems are initially designed. The pressure rating of plastic systems must be reduced with increasing temperature. Maximum operating pressure is dependent upon material selection as well as operating temperature. Before installing any Hayward product, consult Hayward product literature for pressure vs. temperature curves to determine any operating pressure or temperature limitations.
7. PVC and CPVC plastic products become brittle below 40°F. Use caution in their installation and operation below this temperature.

WARNING

Hayward PVC and CPVC products should not be used in services with operating temperature below 34°F.

8. Due to differential thermal expansion rates between metal and plastic, transmittal of pipe vibration and pipe loading forces, **DIRECT INSTALLATION OF PLASTIC VALVES INTO METAL PIPING SYSTEMS IS NOT RECOMMENDED**. Wherever installation of plastic valves into metal piping systems is necessary, it is recommended that at least 10 pipe diameters in length of plastic pipe be installed upstream and downstream of the plastic valve to compensate for the factors mentioned above.
9. Published operating requirements are based on testing of new product using clean water at 70°F. Product performance is affected by many factors including fluid chemistry, viscosity, specific gravity, flow rate, and temperature. These should be considered when sizing Hayward products.
10. Systems should always be depressurized and drained prior to installing or maintaining any Hayward product.

WARNING

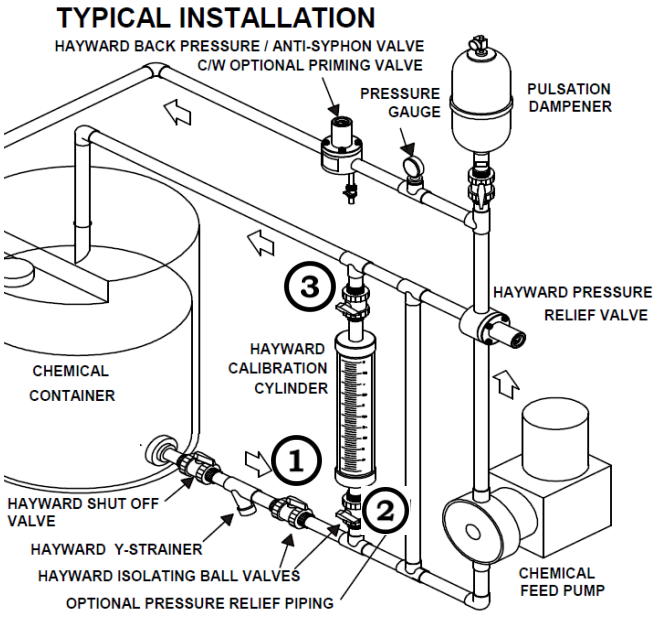
Failure to depressurize and drain system prior to installing or maintaining valve may result in product damage, property damage, personal injury, or even death.

11. Always follow your site and or company procedures for any safety training and or site specific precautions or warnings in addition to those in this document.

Installation Instructions:

Install the calibration cylinder in the suction line before the chemical metering pump. Ensure that the cylinder is vertical and level. For Sealed and EZ-Clean configurations, two (2) isolating valves are typically installed as per the drawing below. The top of the cylinder should be vented back to the top of the chemical container or to drain. The cylinder must never be pressurized above 15 psi.

⚠ **Caution! Max. Cylinder pressure is 15 psi.**



Operating Instructions:

There are two (2) methods for using the calibration Cylinder; 1) measuring volume or 2) flow rate.

Method 1 – Volumetric, Any drawdown time may be used: (Using the mL Scale)

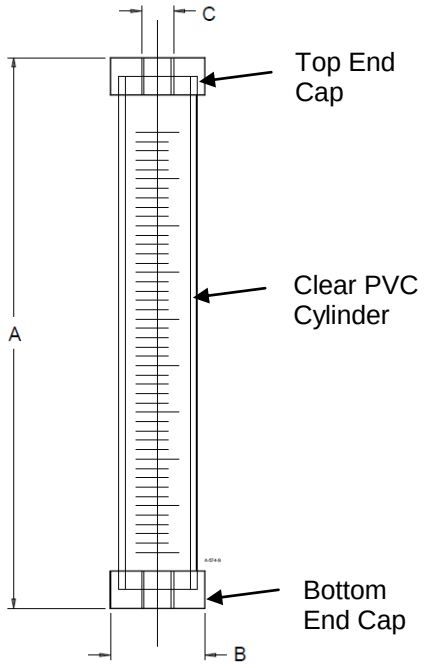
1. Open isolating valves 1 and 2 to fill the cylinder to the top mark on the scale (0 mL). Valve 3 is open for venting.
2. Close isolating valve 1 from the tank on the suction line. Leave isolating valves 2 and 3 on the calibration cylinder open. Note: the top needs to be open to vent.
3. Turn on the chemical feed pump for a measured drawdown time (seconds). Turn off the pump or close valve 2 (first) and open valve 1 from the tank. The volume displaced from the cylinder can be read on the left side of the cylinder scale in mL. If not starting at zero, subtract the starting reading from the final reading.
4. To convert the mL reading into LPH or GPH use one of the following two formulas:
   LPH = 3.6 x [mL] ÷ Time (sec)
   GPH = 0.951 x [mL] ÷ Time (sec)
5. If the reading is not the desired flow rate, adjust the pump speed or stroke setting and repeat steps 1-4 until the correct flow rate is achieved.
6. Close valves 2 and 3 for normal system operation and drain, or empty column.

Method 2 - Flow Rate, capacity based on 30 sec drawdown time: (Using the USGPH scale)

1. Open isolating valves 1 and 2 to fill the cylinder to the top mark on the scale (0 USGPH). Valve 3 is open for venting.
2. Close isolating valve 1 from the tank on the suction line. Leave isolating valves 2 and 3 on the calibration cylinder open. Note: the top needs to be open to vent.
3. Turn on the chemical feed pump for 30 seconds. Turn off the pump or close valve 2 (first) and open valve 1 from the tank. The USGPH reading is on the right side of the cylinder scale. If not starting at zero, subtract the starting reading from the final reading.
4. If the reading is not the desired rate of flow adjust the pump setting and repeat the process until the correct rate of flow is achieved.
5. Close valves 2 and 3 for normal system operation and drain, or empty column.

Description of Sizes:

PVC



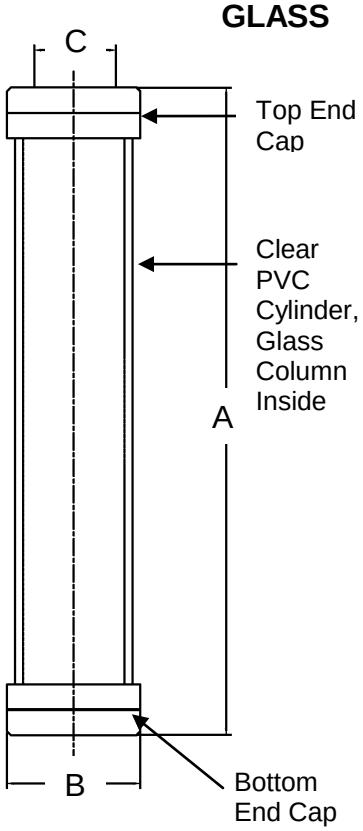
Capacity (mL) ◊	Max Flow ▲ (USgph)	(lph)	Scale (mL)	Scale ▲ (gph)	A (in)	B (in)	C (in) NPT
100	3.17	12	1	.1	11	1.5	1/2
200	6.34	24	1	.1	19	1.5	1/2
300	9.51	36	5	.2	13	2.2	1/2
500	15.85	60	5	.2	13	2.5	3/4
1,000	31.70	120	5	.2	22	2.5	3/4
2,000	63.40	240	10	1	20	3.7	1
3,000	95.10	360	10	1	17	4.9	1 1/2
4,000	126.8	480	10	1	37	3.7	1
5,000	158.5	600	10	1	28	4.9	1 1/2
7,000	221.9	840	10	1	38	4.9	1 1/2
10,000	317.0	1200	100	5	25	6.95	2
15,000	475.5	1800	100	5	36	6.95	2
20,000	634.0	2400	100	5	47	6.95	2
30,000	952.0	3600	200	10	65*	9.5*	4
40,000	1,268.0	4800	200	10	77.5*	9.5*	4

▲ Max Flow and gph scale are based on 30 second drawdown

◊ For 60 sec draw down, double capacity in mL or flow size

* Reference only

GLASS



Capacity (mL)	Size (USgph)	Scale (mL)	A (in)	B (in)	C (in) NPT
30	.95	1	14	1.4	1/4
100	3.2	2	15	2.5	1/2
200	6.4	2	21	2.5	1/2
500	16	5	15	3.5	3/4
1,000	32	5	27	3.5	3/4
2,000	63	10	27*	5.0	1
3,000	95	10	21	7.5	1 1/2
4,000	127	10	39*	5.0	1
5,000	160	10	29	7.5	1 1/2
7,000	225	10	39	7.5	1 1/2
10,000	320	20	27	9.15	2
20,000	640	20	39	9.15	2

* 2,000mL w/ PTFE End Cap ONLY, Dim A = 26 in

* 4,000mL w/ PTFE End Cap ONLY, Dim A = 38 in