The single most critical component of insuring bather safety & comfort

Good plumbing system design takes into account both peak hot water demands as well as the typical demands of the building as they fluctuate around the clock. When designing a system, the trick is to provide an adequate supply of hot water regardless of whether there are one or many bathers at any point in time, and to maintain a comfortable hot water temperature regardless of the demand placed on the system. The key to good plumbing system design is proper valve sizing.

Proper valve sizing is typically achieved by employing one of two methods of calculating demand — Hunter's Curve Method and the Full Flow Method.

Why Some Master Mixing Valves Perform Poorly

Poor valve operation occurs when the valve selected is drastically under or over-sized, or if the recirculation system is piped improperly causing erratic temperature fluctuations (See Circulation Systems on other side).

Hunter's Curve Method – Demand is assessed by assigning a specific rating to each fixture, totaling up the ratings and determining the total gallons per minute required on the ASPE curve. A valve is then selected that can accommodate this demand.

Full Flow Method – Demand is determined by multiplying the flow rate of each fixture by the estimated usage for that fixture. This is done for all fixtures, then the results are added up to provide total demand.

Specification Table

Maximum Pressure Drop	100 psid (689 kPa)
Maximum Static Pressure	125 psid (861 kPa)
Maximum Hot Water Temp.	200° F (93° C)
Minimum Hot Water Approach Temp.	15° F (8.0° C) above set point
Outlet Temperature Range	40°-160° F (4.0°-71° C)
Flow Rate	
431:	25.0 gpm @ 45 psid (95.0 lpm at 310 kPa)
432:	45.0 gpm @ 45 psid (170.0 lpm at 310 kPa)
433:	80.0 gpm @ 45 psid (303.0 lpm at 310 kPa)
434:	125.0 gpm @ 45 psid (473.0 lpm at 310 kPa)
Certified	CSA B125
Listed	ASSE 1017

Minimum Flow†	
431:	4.0 gpm (15.0 lpm)
432:	7.0 gpm (26.0 lpm)
433:	10.0 gpm (38.0 lpm)
434:	15.0 gpm (57.0 lpm)

†Minimum flow at which value will control to specification at ASSE 1017

Typical Specification

Master mixing valve for tempered water control shall be of the thermostatic type, capable of maintaining water temperature to any set point within the range of 40°F to 160°F (4.0°-71°C). Valve must compensate for inlet temperature changes. It shall have bronze body construction with non-corrosive parts. Valve construction shall employ poppets which are independently seated, balanced, and self-aligning. Valve must have a quick-acting actuator in order to guarantee precise control when tested in accordance to ASSE 1017 and CSA B125. Union inlets with strainers and checkstops must be provided.

Master mixing valves shall be of Powers Series 430. Any alternate must have a written approval prior to bidding.

Visit us Online at
www.powerscontrols.com

Engineering Approval

Project ______________________

Contractor______________________

Architect/Engineer ______________________

HydroGuard® Series 430 Supply Fixtures

Valves

Finish	Model	Model	Model	Model
Rough Bronze	431-1000	432-1000	433-1000	434-1000
Polished Chrome	431-2000	432-2000	433-2000	434-2000

How to specify and order a supply fixture:

4 3 ☐ ☐ ☐ ☐ S ☐ ☐

Order Code

Valve *(capacity at 45 psid)*

25 gpm	431
45 gpm	432
80 gpm	433
125 gpm	434

Valve and Pipe Finish

Rough Bronze	A
Polished Chrome	C

Piping Inlets/Outlets

Top/Top	D
Bottom/Top	E
Bottom/Bottom	F
Bottom/Side	G
Top/Double Top	H
Bottom/Double Top	J
Back/Back (exposed fixtures only)	K
Back/Side (exposed fixtures only)	L

Cabinet Style Δ

Exposed, no cabinet	M
Stainless Steel, Recessed	N
Stainless Steel, Semi-Recessed	P
Stainless Steel, Wall Mount	Q
Painted, Recessed	R
Painted, Semi-Recessed	T
Painted, Wall Mount	U

Δ *Window on the cabinet door, please consult Powers Technical Support Dept. for the part number.*

Motor Range Standard

Standard 40°–160°F (4.5° – 71°C)	S

Options

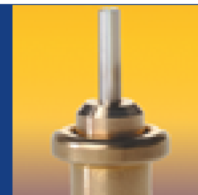
None	0
Vacuum Breaker (VB)	1
Cold Water By-pass	2
Vacuum Breaker and Cold Water By-Pass	3
Combination T/P Gauge on inlets	4
VB & Combination T/P Gauge on inlets	5
Cold Water By-pass & Comb. T/P Gauge on inlets	6
VB, Cold Water By-Pass & Comb. T/P Gauge on inlets	7

AquaSentry 2 Alarm Systems* 4

* *Not available in all configurations.*
Please consult Powers Technical Support Dept. for availability.

For added safety, the AquaSentry2 temperature alarm system senses and reports abnormal temperature conditions.

HydroGuard®



430 Series Master Mixing Valve

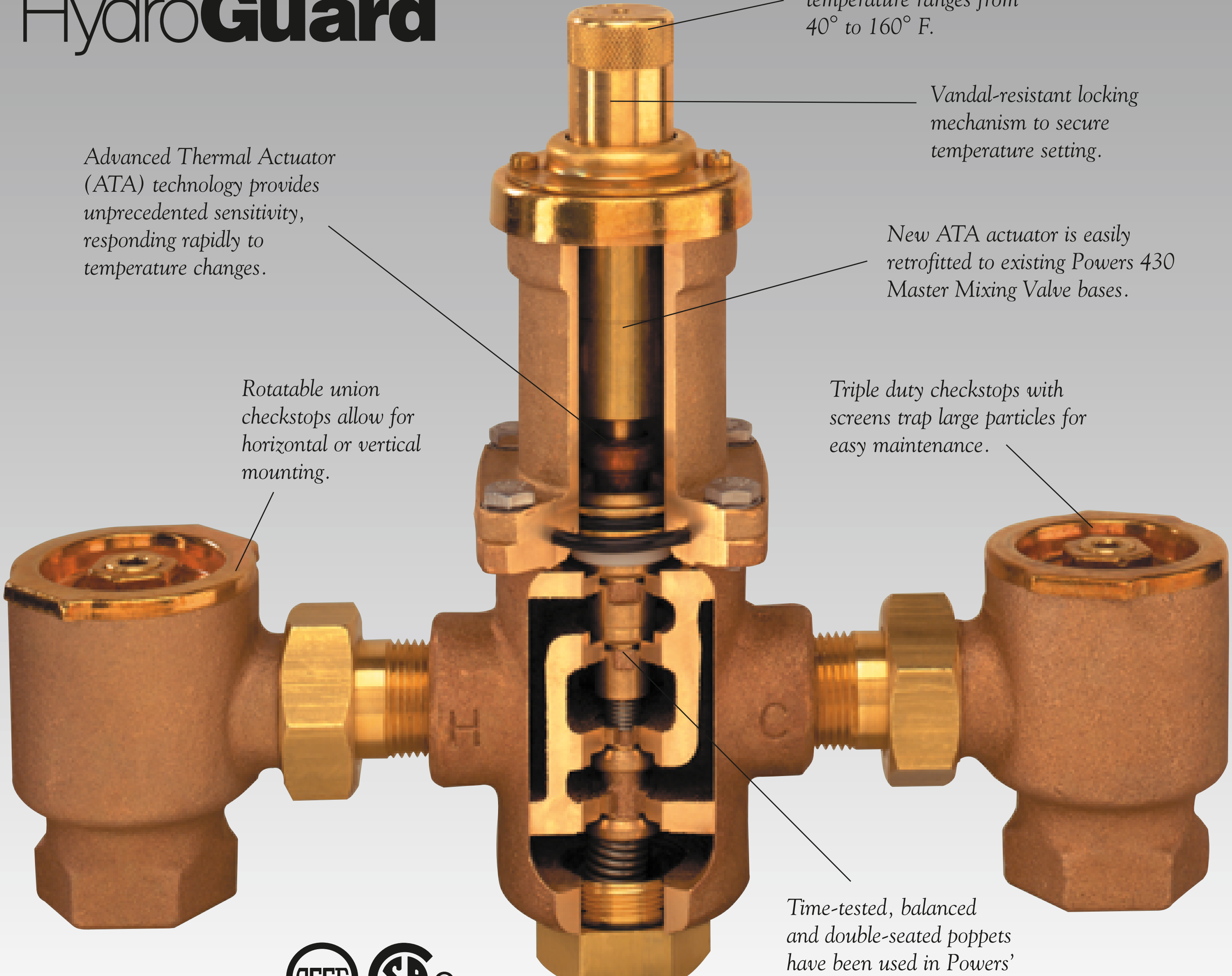
For Safe, Tempered Water Distribution

POWERS™

Water Tempering Innovation Since 1891

A valve so reliable, it took 50 years to improve it.

HydroGuard®

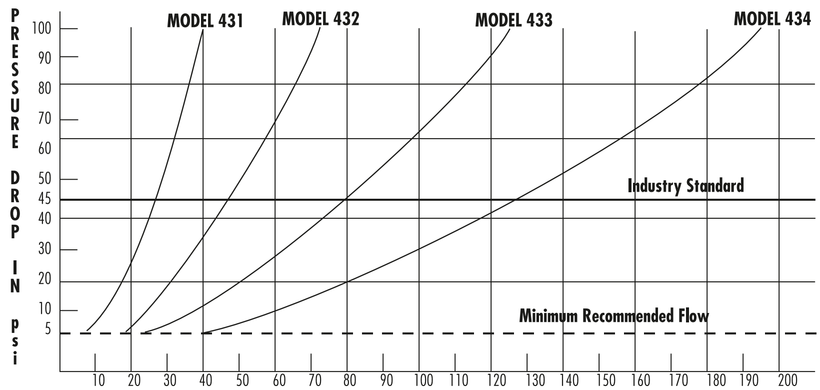


e430 Master Mixing Valve

Over 50 years of reliability and unparalleled sensitivity make the 430 the unbeatable choice for new applications and replacing existing 430 valves.

- Tamper-resistant temperature adjustment.
- Advanced Thermal Actuator reacts quickly to correct fluctuations in inlet temperature.
- Solid brass poppets and seats provide precise control without tight-fitting parts to stick or bind.
- ASSE 1017 listed, CSA B125 Certified.

The 430 HydroGuard incorporates ATA technology that holds the mixed water temperature to within 5°F of setpoint– within the range of 40°F to 160°F– meeting the requirements of both ASSE 1017 and CSA B125. It compensates for both temperature and pressure changes in supply lines and reduces water flow during supply failure. The 430 is available in a variety of sizes to suit virtually any application, and comes in two finishes: rough bronze or polished chrome. Recommended applications include shower rooms and group showers, small building domestic water and tempered water for light industrial processes.



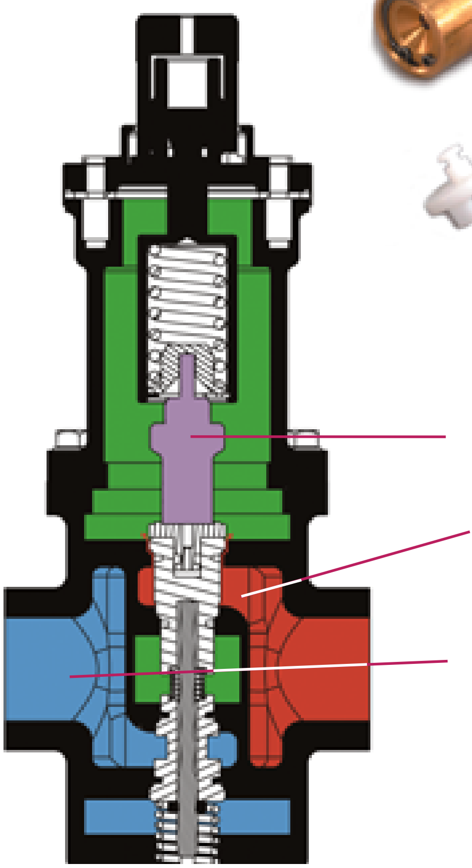
Flow rate based on 140˚ F (60˚ C) hot inlet, and 100˚ F (38˚ C) delivery temperature.
Valves were tested in full open position, with strainer checkstops, and no outlet restrictions

Model	Upgrade Kit
431	390 - 016
432	390 - 017
433	390 - 511
434	390 - 512

Temperature range
40˚F (7˚C) - 160˚F (71˚C).

The cost-effective way to upgrade existing HydroGuard 430 valves

Want to upgrade existing valves to the most advanced level of control? The new Powers 430 ATA Upgrade option is the fast, easy and cost-effective way to achieve cutting-edge performance.



Advanced Thermal Actuator (ATA) reacts to temperature or pressure changes to temper water.

A. When hot water flows increase, ATA actuator expands, moving poppet and seat to reduce hot water flow and increasing cold water flow. The result is precisely tempered water.

B. When cold water supply fails, ATA actuator contracts, shutting off hot water flow to the outlet.

The second main area of concern when it comes to bather safety & comfort

Proper Circulation...

- prevents cool down of hot water line during low/no use periods.
- saves water and energy.
- is required by many plumbing codes when length of hot water piping exceeds 100 feet.

Most commercial establishments with properly sized valves have little difficulty accommodating the hot water demands placed on a system during periods of peak usage. The basic guidelines listed below will help insure stable control of the domestic water system during normal to low/no use periods (see Figure 1).

- Locate master mixer close to hot water source to minimize pressure variations.
- DO NOT recirculate low temperature hot water (LTHW) and high temperature hot water (HTHW) with the same pump, return water may come back hotter than mixer setpoint.
- To ensure that flowpaths remain separate, use TWO (2) circulating pumps, and use check valves to prevent reverse flow.
- Always use an aquastat set at a temperature below the setpoint of the mixer.
- Be certain HTHW cannot be introduced into cold side of mixer.
- Always tie LTHW return to cold water side of mixing valve, as well as to the cold water inlet of the water heater.

  (CAUTION: Omission of this connection can be extremely dangerous!)
- Be sure to properly size master mixing valve (see Proper Valve Sizing on the other side of this page).
- To minimize natural heat convection, locate master mixer below hot water source…or install a heat trap, which is about a two foot drop in the hot water pipe before going up to the mixing valve.

Flow Capacity When Tested to ASSE 1017 Standard

Valve	Min. Flowrate*	(CV) 1psi (7 kPa)	Min. Flow to ASSE 1017	PRESSURE DROP ACROSS VALVE						
				5psi (35 kPa)	10psi 69 kPa	15psi (103 kPa)	20psi (138 kPa)	30psi (207 kPa)	45psi (310 kPa)	60psi (414 kPa)
431	0.5 gpm (1.9 lpm)	3.73	4.0 gpm (15 lpm)	8.3 gpm (31.0 lpm)	11.8 gpm (45.0 lpm)	14.4 gpm (55.0 lpm)	16.7 gpm (63.0 lpm)	20.4 gpm (77.0 lpm)	25.0 gpm (95.0 lpm)	28.9 gpm (109.0 lpm)
432	0.5 gpm (1.9 lpm)	6.71	7.0 gpm (26.0 lpm)	15.0 gpm (56.0 lpm)	21.2 gpm (80.0 lpm)	26.0 gpm (98.0 lpm)	30.0 gpm (114.0 lpm)	36.8 gpm (139.0 lpm)	45.0 gpm (170.0 lpm)	52.0 gpm (197.0 lpm)
433	0.5 gpm (1.9 lpm)	11.93	10.0 gpm (38.0 lpm)	26.7 gpm (101.0 lpm)	37.7 gpm (143.0 lpm)	46.2 gpm (175.0 lpm)	53.4 gpm (202.0 lpm)	65.3 gpm (247.0 lpm)	80.0 gpm (303.0 lpm)	92.4 gpm (350.0 lpm)
434	0.5 gpm (1.9 lpm)	18.63	15.0 gpm (57 lpm)	41.7 gpm (158.0 lpm)	58.9 gpm (223.0 lpm)	72.2 gpm (273.0 lpm)	83.3 gpm (315.0 lpm)	102.0 gpm (386.0 lpm)	125.0 gpm (473.0 lpm)	144.3 gpm (546.0 lpm)

*Minimum flow when the valves are installed at or near hot water source with re-circulated tempered water with a properly sized continuously operating re-circulating pump.

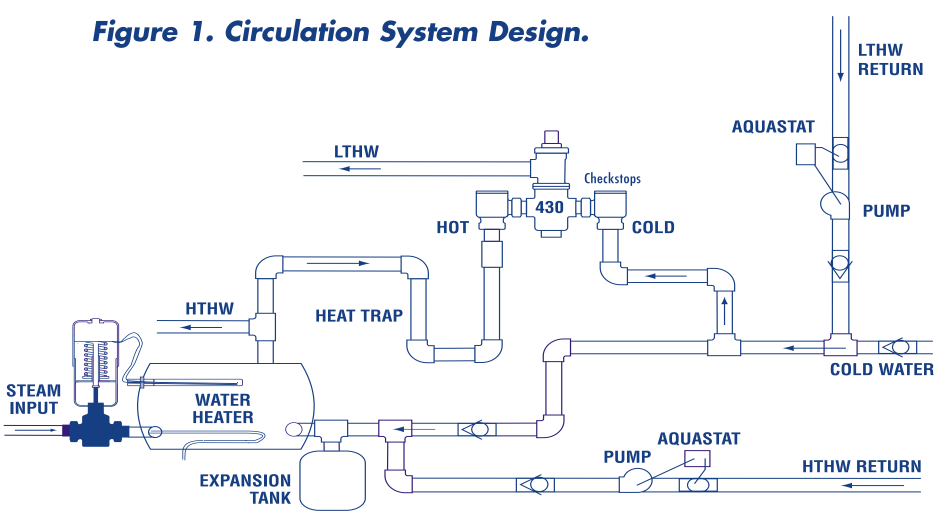


Figure 1. Circulation System Design.

Flow Rate	Pressure Drop (ft.- H_2O)			
GPM	431	432	433	434
1	0.17	0.05	0.02	0.01
2	0.66	0.21	0.06	0.03
3	1.49	0.46	0.15	0.06
4	2.66	0.82	0.26	0.11
5	4.15	1.28	0.41	0.17
6	5.97	1.85	0.58	0.24
7	8.13	2.51	0.80	0.33
8	10.62	3.28	1.04	0.43
9	13.44	4.15	1.31	0.54
10	16.60	5.13	1.62	0.67
11	20.08	6.21	1.96	0.80
12	23.90	7.39	2.34	0.96
13	28.05	8.67	2.74	1.12
14	32.53	10.05	3.18	1.30
15	37.34	11.54	3.65	1.50