



COMMERCIAL HOT WATER HEAT EXCHANGER TECHNICAL CATALOG





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COMMERCIAL HOT WATER HEAT EXCHANGER

INTRODUCTION

The H2O Max is a commercial hot water heat exchanger that generates hot water instantaneously and continuously from one of many different heating sources for any application where hot water is used. H2O Max is simply unique, high performing, ultra efficient and completely versatile, all in a compact design.

Simply Unique - H2O Max's tankless design is unlike any other. It doesn't require a sacrificial anode or interior lining to protect against corrosion since fresh cold water is introduced through the coiled copper tube bundle, creating a maintenance and corrosion-free design. Hot boiler water is injected into the tank, which does not contain the harmful affects of untreated water, and is used for instant thermal heating and won't corrode or scale up the tank like traditional storage tank-type hot water systems. Turbulence from the injected boiler water and from the natural heat expansion & contraction of the copper coils limits the potential for lime scaling.

High Performing - H2O Max uses more coiled copper tubing to maximize its performance and can produce up to 2.5 times more output as compared to same-sized stainless steel indirect water heaters. Furthermore, copper has the highest thermal conductivity of any other material, contrary to stainless steel, to effectively & efficiently transfer heat into the cold water. Both attributes contribute to H2O Max's unparalleled hot water heating output!

Ultra Efficient - Always hot and ready to go, H2O Max's "on demand" approach provides hot water when needed and continuously, reducing consumption (30 - 40% energy savings) and eliminating the need for storage or recovery time. Combined with H2O Max's unique injection system with extended heating surface allows for 99% thermal transfer efficiency.

Completely Versatile - H2O Max's multipurpose design makes it ideal for many water or low pressure steam applications for different installations. It can heat water for potable use (like apartments and dormitories), for process systems (like commercial laundry, car washes, sterilization or deicing), for pools & hot tubs (hotels and resorts), for space heating (both radiant and baseboard / radiators) and to buffer high efficiency boilers with low mass water content to prevent short cycling. The heating source is from a boiler using energy from natural gas, propane, oil, electric or solar.

Simply stated, H2O Max promotes longevity with the lowest lifetime operating costs of any other commercial hot water system. And it's backed by an unprecedented *10 year commercial limited warranty that is best in the industry!*



COMMERCIAL HOT WATER HEAT EXCHANGER

GUIDE SPECIFICATION

Note to Specifier: Select desired project specific product features & equipment options [in blue]

Furnish an H2OMax hot water heat exchanger manufactured in the U.S.A., model [H26, H48, H72, H119], designed for instantaneous and continuous heating of cold water traveling through multiple coiled copper tube bundles using hot boiler water as the heat source. The hot boiler water shall be injected into the tank from the top in a spiral formation causing turbulence that allows for maximum thermal transfer efficiency, which shall be no less than 99%, that minimizes stratification and thermal stresses.

Cold water shall enter the smooth ½” L-grade copper coil bundle near the bottom of the tank and shall extend upwards in a counterflow motion with the hot water outlet located at the top of the tank. The copper coil bundles shall have no less than [H26 (21), H48 (26.2), H72 (26.2), H119 (47.1)] sq.ft. of heat transfer area and shall be designed to produce turbulent flow within the coils to increase heat transfer and limit the potential for lime scaling. All copper coil bundles and components shall meet the low-lead requirements of the 2014 U.S. Safe Drinking Water Act and shall be NSF/ASNI 61 compliant (Drinking Water System Components Health Effects) with the coil bundle rated for 150 psig maximum allowable working pressure. Double-wall coil bundles shall not be permitted.

The heat exchanger shall have a compact, vertical construction, [H26 (19.5”), H48 (24.5”), H72 (26.5”), H119 (30.5”)] maximum width/depth x [H26 (42”), H48 (45”), H72 (49”), H119 (60”)] maximum height, with a [H26 (26), H48 (48), H72 (72), H119 (119)] gallon capacity. It shall have a continuous rating of _____ gallons per hour shall be based on:

- _____ °F Cold Inlet Water Temperature
- _____ °F Hot Outlet Water Temperature
- (_____ °F Water Temperature Rise)
- _____ °F Boiler Supply Water Temperature
- _____ °F Boiler Return Water Temperature
- _____ BTH/HR Boiler Output

The tank shall be constructed from AS36G steel material [and be certified in accordance to ASME Boiler and Pressure Vessel, Section VIII, Div. 1 code requirements] with a minimum [H26 (11 gauge), H48 (11 gauge), H72 (½”), H119 (½”)] shell thickness. The tank shall have a maximum temperature rating 190°F. The tank design shall be maintenance and corrosion-free design; sacrificial anodes or interior lining shall not be permitted. The tank shall be furnished with two (2) [H26 (1”), H48 (1¼”), H72 (1½”), H119 (2”)] NPT connections for boiler supply and return piping and two (2) [H26 (1¼”), H48 (1½”), H72 (1½”), H119 (2”)] NPT connections for cold water inlet and hot water outlet piping.

[Add for Space Heating Requirements] The tank will be furnished with two (2) [H26 (1¼”), H48 (1¼”), H72 (2”), H119 (2”)] FPT connections for hydronic supply and return piping for the building’s space heating system. The hydronic return connection shall have a dip tube installed inside the tank to allow for proper water circulation.

The tank shall be equipped with an ASME safety relief valve, temperature/pressure gauge, temperature well and four (4) adjustable legs to level the tank.

The tank exterior shall be furnished with a factory installed 22 gauge steel jacket, finished with powder coated paint containing Teflon, and insulated with a minimum “R” factor of 15 to meet the energy efficiency requirements of the latest edition of the ASHRAE 90.1 Standard and shall reduce heat loss less than ½°F per hour.

Heat Exchanger shall come with a minimum ten-year limited warranty against tank or copper coil bundle assembly failure resulting from defects in materials and workmanship (see warranty for details).



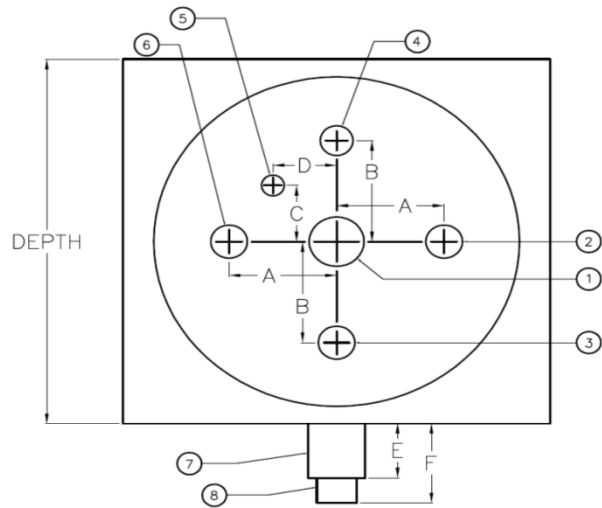
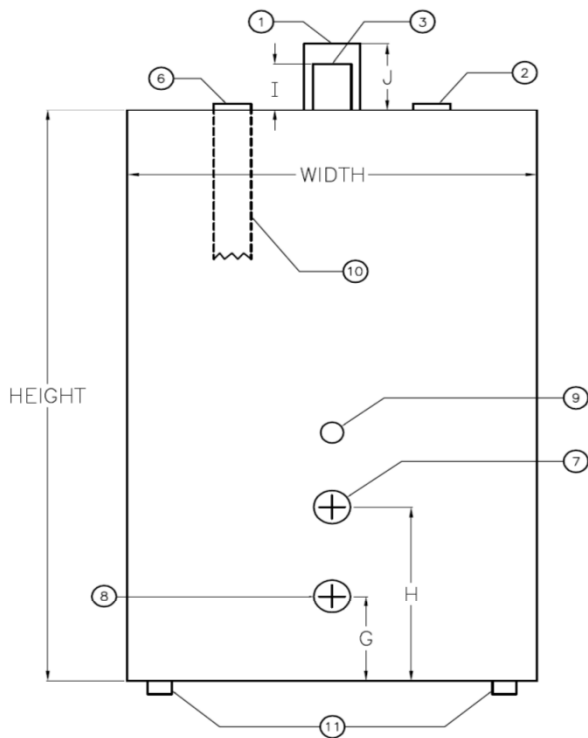
COMMERCIAL HOT WATER HEAT EXCHANGER

RATINGS AND DIMENSIONS

COMPONENT IDENTIFICATION

1. Hot Water Outlet
2. Hydronic System Supply
3. Boiler Water Supply
4. $\frac{3}{4}$ " Nipple for Safety Valve
5. $\frac{1}{2}$ " Coupling for T/P Gauge
6. Hydronic System Return
7. Cold Water Inlet
8. Boiler Water Return
9. Well for Aquastat
10. Diptube (included)
11. Adjustable Feet

Dimensions (inches)				
	H26	H48	H72	H119
A	5.00	5.50	7.00	8.00
B	4.00	7.50	9.00	10.00
C	3.25	5.75	6.00	7.00
D	3.25	5.75	6.00	7.00
E	2.50	4.00	5.00	7.00
F	3.00	5.50	6.50	9.00
G	2.00	2.25	2.50	2.50
H	9.00	12.00	12.50	13.70
I	2.50	4.00	5.00	7.00
J	3.00	5.00 <td 6.50	9.00	
Width/Depth	19.50	24.50	26.50	30.50
Height	42.00	45.00	49.00	60.00



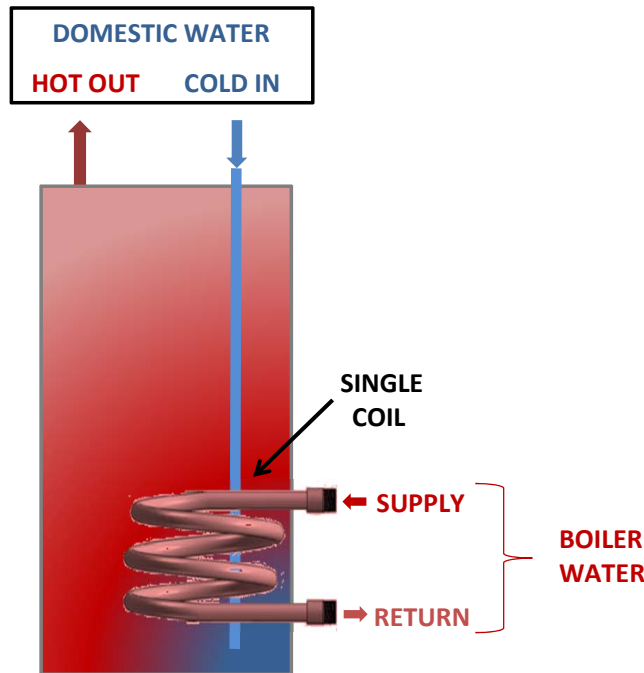
Technical Data								
Models	Tank Volume (gal.)	Heat Transfer Area (sq. ft.)	Domestic Water Connections (in)	Boiler Water Connections (in)	Hydronic Connections (in)	MAWP Domestic (psi)	MAWP Boiler (psi)	Weight (lb)
H26	26	21	1.25	1.00	1.25	150	30	210
H48	48	26.2	1.50	1.25	1.25	150	60	375
H72	72	26.2	1.50	1.50	2.00	150	115	575
H119	119	47.1	2.00	2.00	2.00	150	115	800

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INDIRECT TANK DESIGN COMPARISON

TYPICAL INDIRECT WATER HEATER versus H2OMAX HEAT EXCHANGER

TYPICAL INDIRECT WATER HEATER:

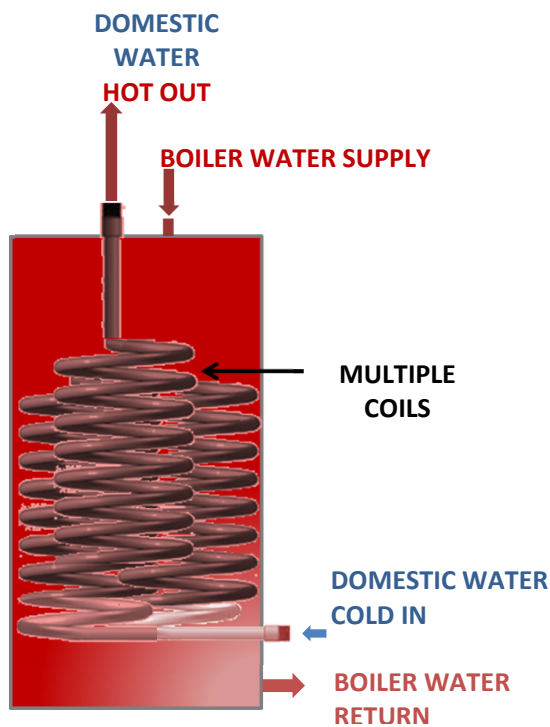


BOILER WATER **INSIDE THE COIL**

DOMESTIC WATER **INSIDE THE TANK**

- LEADS TO SCALE BUILD-UP & CORROSION
- RECOVERY TIME REQUIRED

H2OMAX HEAT EXCHANGER:



BOILER WATER **INSIDE THE TANK**

- SCALE & CORROSION-FREE (TURBULENCE TECHNOLOGY)
- BUFFERS BOILER (ELIMINATES SHORT CYCLING)
- THERMAL STORAGE CAN SATISFY DOMESTIC HOT WATER DEMAND WITHOUT BOILER

DOMESTIC WATER **INSIDE THE COILS**

- NO STORAGE REQUIRED (INSTANTANEOUS)
- NO RECOVERY DOWN TIME (CONTINUOUS)

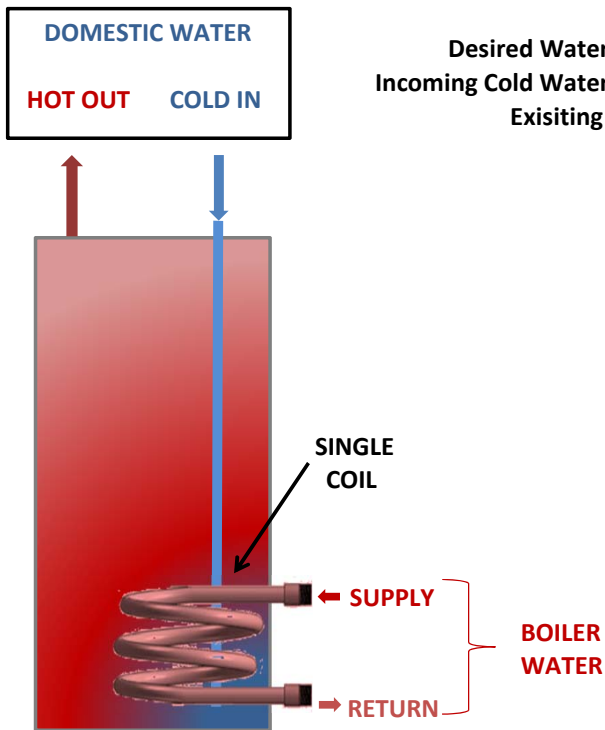
INDIRECT TANK APPLICATION COMPARISON

TYPICAL INDIRECT WATER HEATERS

versus

H2OMAX HEAT EXCHANGER

TYPICAL INDIRECT TANK WATER HEATER:



APPLICATION EXAMPLE:

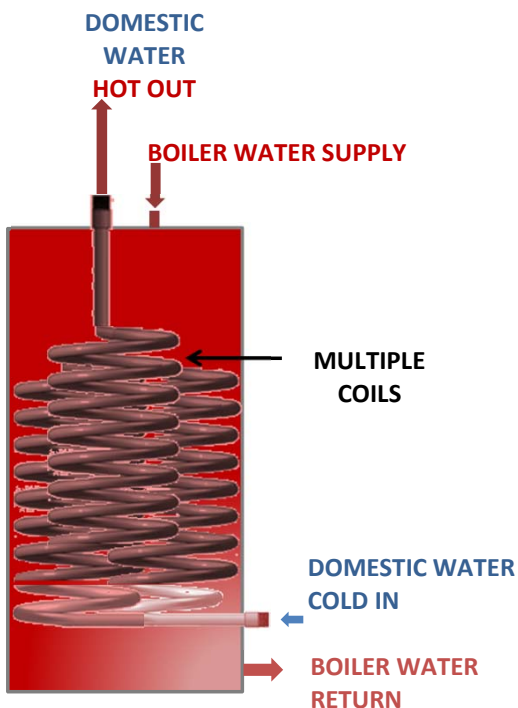
Spa Hot Tub:	60 Gallons
Desired Water Temperature:	110 °F
Incoming Cold Water Temperature:	40 °F
Existing Boiler Output:	98,400 BTU/HR

Supply 60 gallons of water at 110°F in 10 minutes

Typical indirect water heater will require an 80 gallon tank:

- Only 70% of the tank volume will be available as hot water
- Indirect water heater will not be able to recover in 10 minutes (it would be full of cold water after filling the hot tub)
- Recovery to 110°F will take 18 minutes using an 80 gallon tank with existing boiler

H2OMAX HEAT EXCHANGER:

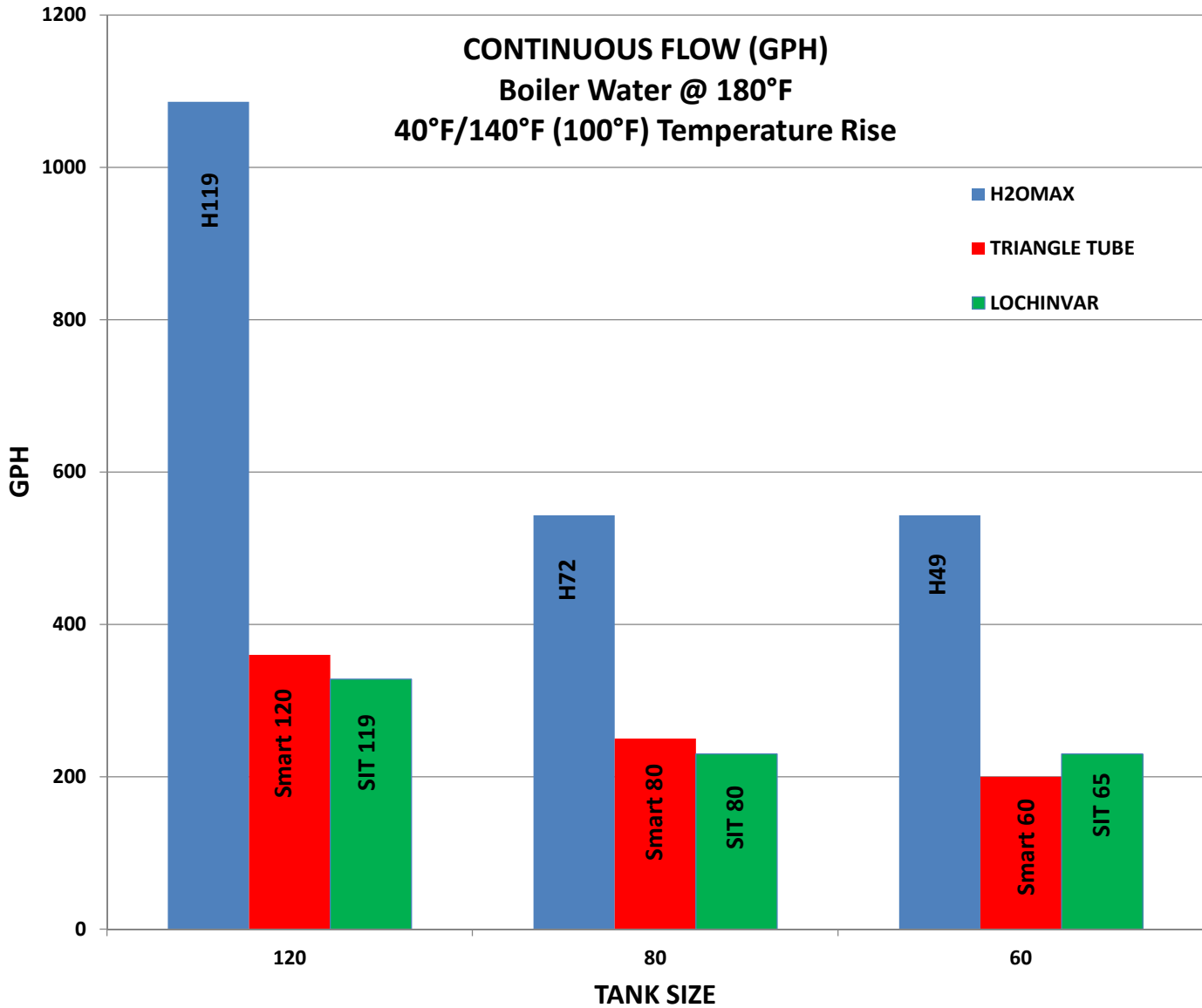


H2OMax can use its Model H26, a 26 gallon tank:

- 29,988 btu ... Btu needed to heat 60 gallons in 10 minutes (60 gal. water x temperature rise [110-50] x 8.3 lb/gallon)
- 16,400 btu from Boiler ... Btu available in 10 minutes (98,400 btu/hr boiler x 10 minutes ÷ 60 minutes)
- 12,995 btu from Tank ... Btu in the boiler water acting as thermal storage
- 29,395 btu total from boiler and tank to heat 60 gallons of water in 10 minutes

CONCLUSION: After 10 minutes, the H2OMax continues to supply hot water at 3+ GPM and the water in the storage-type indirect tank is COLD!

INDIRECT TANKS COMPARISON



<u>TANK SIZE</u>	<u>120 GALLON</u>	<u>80 GALLON</u>	<u>60 GALLON</u>
H2OMAX	H119 119 gallons 1086 GPH	H72 72 gallons 543 GPH	H49 48 gallons 543 GPH
TRIANGLE TUBE	Smart 120 119 Gallons 360 GPH	Smart 80 70 Gallons 260 GPH	Smart 60 56 Gallons 200 GPH
LOCHINVAR	SIT119 114 Gallons 328 GPH	SIT080 82 Gallons 230 GPH	SIT65 67 Gallons 230 GPH



COMMERCIAL HOT WATER HEAT EXCHANGER

SIZING RECOMMENDATIONS

TANK MODEL	BOILER SIZE RANGE (MBH) ¹	TYPICAL APPLICATIONS
H26	Up to 350	MOST RESIDENTIAL APPLICATIONS
H48	Up to 500	LARGE HOMES WITH HOT TUB AND SMALL APARTMENT BUILDINGS (UP TO 20 UNITS)
H72	Up to 600	APARTMENT ² / OFFICE BUILDINGS, HOTELS / MOTELS, SCHOOLS, DORMATORIES, CHURCHES, HOSPITALS, NURSING HOMES, LAUNDRIES, FOOD SERVICE, EVENT STADIUMS, ATHLETIC CLUBS, SWIMMING POOLS
H119	Up to 1,050	

NOTES:

- 1) Boiler size based on 40°F cold water inlet with boiler supply @ 180°F and return @ 160°F.
- 2) H72 tank model can handle up to 30-35 apartment units in a single tank system.
H119 tank model can handle up to 80-85 apartment units as a single tank system.
- 3) Multiple tanks can be installed in parallel to handle domestic hot water demands that exceed the capacity of a single tank. (It is recommended to use reverse-return piping to equalize flow/btu through the tanks).
- 4) In commercial applications, it may be better to select two smaller tanks (rather than one larger) to provide backup capability.
- 5) DON'T OVERSIZE TANK. Tank selection should be matched as close to demand as possible to ensure maximum flow through the coils. Remember, flow turbulence helps optimize the tank's design performance for max heat transfer and prevent scaling inside the coils.
- 6) An anti-scald/mixing valve should always be used in the tank system design to optimize hot water supply (regulates to extend hot water usage) and boiler operational efficiency (eliminates short cycling).
- 7) In large demand applications, the H2O Max may be used in conjunction with a storage tank by selecting the **smallest** H2O Max tank to handle **only the boiler btu's**.



COMMERCIAL HOT WATER HEAT EXCHANGER APARTMENTS ¹ 3-HOUR PEAK DEMAND

APT UNITS	NUMBER OF PERSONS	HOT WATER DEMAND 3-HRS (GPH) ²	BOILER OUTPUT (BTU/HR)	PUMP FLOW (GPM)			H2OMAX TANK MODELS			
				AT BOILER SUPPLY / RETURN DELTA T			QTY REQUIRED (MINIMUM)			
				20 Δ T	25 Δ T	30 Δ T	H26	H48	H72	H119
1-6	15	164	119,000	12	10	8	1	----	----	----
7-10	25	275	162,000	16	13	11	1	----	----	----
11-15	38	375	204,000	20	16	14	2	1	----	----
16-20	50	500	294,000	29	24	20	2	1	----	----
21-25	63	620	336,000	34	27	22	3	2	1	----
26-30	75	750	379,000	38	30	25	3	2	1	----
31-35	88	870	423,000	42	34	28	3	2	2	----
36-40	100	1,000	462,000	46	37	31	4	2	2	1
41-50	125	1,100	571,000	57	46	38	4	3	2	1
51-60	150	1,281	626,000	63	50	42	4	3	2	1
61-70	175	1,462	680,000	68	54	45	----	4	2	1
71-80	200	1,637	771,000	77	62	51	----	4	3	1
81-90	225	1,806	786,000	79	63	52	----	4	3	2
91-100	250	1,975	810,000	81	65	54	----	4	3	2
101-120	300	2,291	859,000	86	69	57	----	----	4	2
121-140	350	2,613	1,008,000	101	81	67	----	----	4	2
141-160	400	2,899	1,090,000	109	87	73	----	----	5	2
161-180	450	3,217	1,192,000	119	95	79	----	----	5	3
181-200	500	3,500	1,289,000	129	103	86	----	----	----	3
201-220	550	3,750	1,358,000	136	109	91	----	----	----	3
221-240	600	4,000	1,396,000	140	112	93	----	----	----	3
241-260	650	4,200	1,561,000	156	125	104	----	----	----	3
261-280	700	4,350	1,574,000	157	126	105	----	----	----	4
281-300	750	4,500	1,647,000	165	132	110	----	----	----	4
301-325	813	4,875	1,827,000	183	146	122	----	----	----	4
326-350	875	5,250	1,879,000	188	150	125	----	----	----	4

SIZING CRITERIA BASED ON:

COLD WATER IN:	40	°F
HOT WATER OUT:	140	°F
TEMPERATURE RISE (DIFFERENCE):	100	°F
BOILER WATER SUPPLY:	180	°F
AVERAGE OCCUPANCY:	2.5	PERSONS/APT
SHOWER HEAD FLOW:	3.0	GPM
AVERAGE TIME/SHOWER:	5	MINUTES

NOTES:

- 1) If apartments occupy students, please use DORMITORIES (1-HOUR PEAK DEMAND) sizing chart.
- 2) Three-hour hot water demand estimates average consumption for shower, lavatories and residential dishwasher. Other large hot water consuming appliances (ie. clothes washer) may increase the above peak demand requirements, thus raising the minimum hot water capacities needed. Consult appliance manufacturer's specifications for appropriate hot water demand.
- 3) Information above reflects MINIMUM heating requirements.
- 4) For different conditions than those stated above, please consult the factory for sizing assistance.



COMMERCIAL HOT WATER HEAT EXCHANGER

HOTEL / MOTEL ¹

2-HOUR PEAK DEMAND

APT UNITS	NUMBER OF PERSONS	HOT WATER DEMAND 2-HRS (GPH) ²	BOILER OUTPUT (BTU/HR)	PUMP FLOW (GPM)			H2OMAX TANK MODELS			
				AT BOILER SUPPLY / RETURN DELTA T			QTY REQUIRED (MINIMUM)			
				20 Δ T	25 Δ T	30 Δ T	H26	H48	H72	H119
1-6	9	100	160,000	16	13	11	1	----	----	----
7-10	15	165	169,000	17	14	11	1	----	----	----
11-15	23	230	215,000	22	17	14	2	1	----	----
16-20	30	300	251,000	25	20	17	2	1	----	----
21-25	38	370	273,000	27	22	18	3	2	1	----
26-30	45	450	314,000	31	25	21	3	2	1	----
31-35	53	520	342,000	34	27	23	3	2	2	----
36-40	60	570	420,000	42	34	28	4	2	2	1
41-50	75	650	495,000	50	40	33	4	3	2	1
51-60	90	730	593,000	59	47	40	4	3	2	1
61-70	105	800	608,000	61	49	41	----	4	2	1
71-80	120	870	643,000	64	51	43	----	4	3	1
81-90	135	970	715,000	72	57	48	----	4	3	2
91-100	150	1,050	808,000	81	65	54	----	4	3	2
101-120	180	1,200	901,000	90	72	60	----	----	4	2
121-140	210	1,320	1,052,000	105	84	70	----	----	4	2
141-160	240	1,430	1,087,000	109	87	72	----	----	5	2
161-180	270	1,650	1,279,000	128	102	85	----	----	5	3
181-200	300	1,800	1,345,000	135	108	90	----	----	----	3
201-220	330	1,980	1,446,000	145	116	96	----	----	----	3
221-240	360	2,160	1,472,000	147	118	98	----	----	----	3
241-260	390	2,350	1,661,000	166	133	111	----	----	----	3
261-280	420	2,530	1,685,000	169	135	112	----	----	----	4
281-300	450	2,700	1,721,000	172	138	115	----	----	----	4
301-325	488	2,925	1,945,000	195	156	130	----	----	----	4
326-350	525	3,150	1,992,000	199	159	133	----	----	----	4

SIZING CRITERIA BASED ON:

COLD WATER IN:	40	°F
HOT WATER OUT:	140	°F
TEMPERATURE RISE (DIFFERENCE):	100	°F
BOILER WATER SUPPLY:	180	°F
AVERAGE OCCUPANCY:	1.5	PERSONS/ROOM
SHOWER HEAD FLOW:	3.0	GPM
AVERAGE TIME/SHOWER:	5	MINUTES

NOTES:

- 1) If hotel / motel have convention facilities and/or located in heavily traveled areas, please use DORMITORIES (1-HOUR PEAK DEMAND) sizing chart. Hot water loads for restaurants, laundry operations and other uses should be sized separately.
- 2) Two-hour hot water demand estimates average consumption for shower and lavatories. Other large hot water consuming appliances (ie. jacuzzi) may increase the above peak demand requirements, thus raising the minimum hot water capacities needed. Consult appliance manufacturer's specifications for appropriate hot water demand.
- 3) Information above reflects MINIMUM heating requirements.
- 4) For different conditions than those stated above, please consult the factory for sizing assistance.



COMMERCIAL HOT WATER HEAT EXCHANGER

DORMITORIES ¹

1-HOUR PEAK DEMAND

NUMBER OF PERSONS	HOT WATER DEMAND 1-HR (GAL.)	BOILER OUTPUT (BTU/HR)	PUMP FLOW (GPM)			H2OMAX TANK MODELS QTY REQUIRED (MINIMUM)			
			AT BOILER SUPPLY / RETURN DELTA T			H26	H48	H72	H119
			20 Δ T	25 Δ T	30 Δ T				
1-10	125	188,000	19	15	13	1	----	----	----
11-15	187	235,000	24	19	16	2	1	----	----
16-20	250	319,000	32	26	21	2	1	1	----
21-25	277	333,000	33	27	22	3	2	1	----
26-30	300	374,000	37	30	25	3	2	1	----
31-40	320	391,000	39	31	26	4	2	2	----
41-50	350	408,000	41	33	27	4	3	2	----
51-60	370	473,000	47	38	32	4	3	2	1
61-70	400	533,000	53	43	36	----	3	3	1
71-80	435	576,000	58	46	38	----	4	3	1
81-90	475	609,000	61	49	41	----	4	3	2
91-100	500	683,000	68	55	46	----	4	3	2
101-120	600	784,000	78	63	52	----	5	4	2
121-140	700	896,000	90	72	60	----	----	4	2
141-160	800	998,000	100	80	67	----	----	5	2
161-180	900	1,129,000	113	90	75	----	----	5	2
181-200	1,000	1,195,000	120	96	80	----	----	----	3
201-225	1,125	1,340,000	134	107	89	----	----	----	3
225-250	1,250	1,461,000	146	117	97	----	----	----	3
251-275	1,375	1,661,000	166	133	111	----	----	----	3
276-300	1,500	1,755,000	176	140	117	----	----	----	4
301-325	1,625	1,856,000	186	148	124	----	----	----	4
326-350	1,750	1,988,000	199	159	133	----	----	----	4

SIZING CRITERIA BASED ON:

COLD WATER IN:	40	°F
HOT WATER OUT:	140	°F
TEMPERATURE RISE (DIFFERENCE):	100	°F
BOILER WATER SUPPLY:	180	°F
AVERAGE OCCUPANCY:	2.5	PERSONS/ROOM
SHOWER HEAD FLOW:	3.0	GPM
AVERAGE TIME/SHOWER:	5	MINUTES

NOTES:

- 1) Hot water loads for laundry operations and other uses should be sized separately.
- 2) Information above reflects MINIMUM heating requirements.
- 3) For different conditions than those stated above, please consult the factory for sizing assistance.



COMMERCIAL HOT WATER HEAT EXCHANGER PERFORMANCE RATINGS

H2OMAX MODEL - H26

COLD WATER IN: 40°F / HOT WATER OUT: SEE BELOW

BOILER WATER SUPPLY: 180°F
BOILER WATER RETURN: 160°F

HOT OUT:	110°F	120°F	140°F	160°F
TEMP RISE:	70°F	80°F	100°F	120°F
BOILER OUTPUT (BTU/HR)	CONTINUOUS (GPH)			
150,000	258	226	181	151
180,000	309	271	217	181
200,000	344	301	241	202
250,000	429	376	302	----
280,000	481	422	338	----
300,000	515	452	362	----
350,000	601	527	422	----
400,000	687	----	----	----

BOILER WATER SUPPLY: 200°F
BOILER WATER RETURN: 180°F

HOT OUT:	110°F	120°F	140°F	180°F
TEMP RISE:	70°F	80°F	100°F	140°F
BOILER OUTPUT (BTU/HR)	CONTINUOUS (GPH)			
150,000	258	226	181	130
180,000	309	271	217	156
200,000	344	301	241	173
250,000	429	376	302	216
280,000	481	422	338	----
300,000	515	452	362	----
350,000	601	527	422	----
400,000	687	602	483	----
450,000	773	678	543	----
500,000	----	----	603	----



COMMERCIAL HOT WATER HEAT EXCHANGER PERFORMANCE RATINGS

H2OMAX MODEL - H26

COLD WATER IN: 50°F / HOT WATER OUT: SEE BELOW

BOILER WATER SUPPLY: 180°F
BOILER WATER RETURN: 160°F

HOT OUT:	110°F	120°F	140°F	160°F
TEMP RISE:	60°F	70°F	90°F	110°F
BOILER OUTPUT (BTU/HR)	CONTINUOUS (GPH)			
150,000	301	258	201	165
180,000	361	310	241	198
200,000	402	344	268	220
250,000	502	430	335	275
280,000	562	482	375	----
300,000	602	516	402	----
350,000	703	602	469	----
400,000	803	688	----	----

BOILER WATER SUPPLY: 200°F
BOILER WATER RETURN: 180°F

HOT OUT:	110°F	120°F	140°F	180°F
TEMP RISE:	60°F	70°F	90°F	130°F
BOILER OUTPUT (BTU/HR)	CONTINUOUS (GPH)			
150,000	301	258	201	140
180,000	361	310	241	168
200,000	402	344	268	186
250,000	502	430	335	233
280,000	562	482	375	261
300,000	602	516	402	----
350,000	703	602	469	----
400,000	803	688	536	----
450,000	----	----	603	----
500,000	----	----	670	----



COMMERCIAL HOT WATER HEAT EXCHANGER PERFORMANCE RATINGS

H2OMAX MODEL - H48

COLD WATER IN: 40°F / HOT WATER OUT: SEE BELOW

BOILER WATER SUPPLY: 180°F
BOILER WATER RETURN: 160°F

HOT OUT:	110°F	120°F	140°F	160°F
TEMP RISE:	70°F	80°F	100°F	120°F
BOILER OUTPUT (BTU/HR)	CONTINUOUS (GPH)			
150,000	258	226	181	151
180,000	309	271	217	181
200,000	344	301	241	202
250,000	429	376	302	252
300,000	515	452	362	302
350,000	601	527	422	----
400,000	687	602	483	----
450,000	773	678	543	----
500,000	859	753	----	----

BOILER WATER SUPPLY: 200°F
BOILER WATER RETURN: 180°F

HOT OUT:	110°F	120°F	140°F	180°F
TEMP RISE:	70°F	80°F	100°F	140°F
BOILER OUTPUT (BTU/HR)	CONTINUOUS (GPH)			
150,000	258	226	181	130
180,000	309	271	217	156
200,000	344	301	241	173
250,000	429	376	302	216
300,000	515	452	362	260
350,000	601	527	422	292
400,000	687	602	483	----
450,000	773	678	543	----
500,000	859	753	603	----
550,000	945	828	664	----
600,000	----	----	724	----
650,000	----	----	784	----



COMMERCIAL HOT WATER HEAT EXCHANGER PERFORMANCE RATINGS

H2OMAX MODEL - H48

COLD WATER IN: 50°F / HOT WATER OUT: SEE BELOW

BOILER WATER SUPPLY: 180°F
BOILER WATER RETURN: 160°F

HOT OUT:	110°F	120°F	140°F	160°F
TEMP RISE:	60°F	70°F	90°F	110°F
BOILER OUTPUT (BTU/HR)	CONTINUOUS (GPH)			
150,000	301	258	201	165
180,000	361	310	241	198
200,000	402	344	268	220
250,000	502	430	335	275
300,000	602	516	402	330
350,000	703	602	469	----
400,000	803	688	536	----
450,000		774	603	----

BOILER WATER SUPPLY: 200°F
BOILER WATER RETURN: 180°F

HOT OUT:	110°F	120°F	140°F	180°F
TEMP RISE:	60°F	70°F	90°F	130°F
BOILER OUTPUT (BTU/HR)	CONTINUOUS (GPH)			
150,000	301	258	201	140
180,000	361	310	241	168
200,000	402	344	268	186
250,000	502	430	335	233
300,000	602	516	402	280
350,000	703	602	469	326
400,000	803	688	536	----
450,000	903	774	603	----
500,000	----	860	670	----
550,000	----	----	737	----
600,000	----	----	805	----
650,000	----	----	872	----



COMMERCIAL HOT WATER HEAT EXCHANGER PERFORMANCE RATINGS

H2OMAX MODEL - H72

COLD WATER IN: 40°F / HOT WATER OUT: SEE BELOW

BOILER WATER SUPPLY: 180°F
BOILER WATER RETURN: 160°F

HOT OUT:	110°F	120°F	140°F	160°F
TEMP RISE:	70°F	80°F	100°F	120°F
BOILER OUTPUT (BTU/HR)	CONTINUOUS (GPH)			
150,000	258	226	181	151
200,000	344	301	241	202
250,000	429	376	302	252
300,000	515	452	362	302
350,000	601	527	422	353
400,000	687	602	483	----
450,000	773	678	543	----
500,000	859	753	----	----
550,000	945	828	----	----
600,000	1,031	----	----	----

BOILER WATER SUPPLY: 200°F
BOILER WATER RETURN: 180°F

HOT OUT:	110°F	120°F	140°F	180°F
TEMP RISE:	70°F	80°F	100°F	140°F
BOILER OUTPUT (BTU/HR)	CONTINUOUS (GPH)			
150,000	258	226	181	130
200,000	344	301	241	173
250,000	429	376	302	216
300,000	515	452	362	260
350,000	601	527	422	300
400,000	687	602	483	343
450,000	773	678	543	----
500,000	859	753	603	----
550,000	945	828	664	----
600,000	1,031	903	724	----
650,000	----	----	784	----



COMMERCIAL HOT WATER HEAT EXCHANGER PERFORMANCE RATINGS

H2OMAX MODEL - H72

COLD WATER IN: 50°F / HOT WATER OUT: SEE BELOW

BOILER WATER SUPPLY: 180°F
BOILER WATER RETURN: 160°F

HOT OUT:	110°F	120°F	140°F	160°F
TEMP RISE:	60°F	70°F	90°F	110°F
BOILER OUTPUT (BTU/HR)	CONTINUOUS (GPH)			
150,000	301	258	201	165
200,000	402	344	268	220
250,000	502	430	335	275
300,000	602	516	402	330
350,000	703	602	469	----
400,000	803	688	536	----
450,000	903	774	603	----
500,000	1,004	860	----	----
550,000	----	946	----	----

BOILER WATER SUPPLY: 200°F
BOILER WATER RETURN: 180°F

HOT OUT:	110°F	120°F	140°F	180°F
TEMP RISE:	60°F	70°F	90°F	130°F
BOILER OUTPUT (BTU/HR)	CONTINUOUS (GPH)			
150,000	301	258	201	140
200,000	402	344	268	186
250,000	502	430	335	233
300,000	602	516	402	280
350,000	703	602	469	326
400,000	803	688	536	----
450,000	903	774	603	----
500,000	1,004	860	670	----
550,000	----	946	737	----
600,000	----	----	805	----
650,000	----	----	872	----



COMMERCIAL HOT WATER HEAT EXCHANGER PERFORMANCE RATINGS

H2OMAX MODEL - H119

COLD WATER IN: 40°F / HOT WATER OUT: SEE BELOW

BOILER WATER SUPPLY: 180°F
BOILER WATER RETURN: 160°F

HOT OUT:	110°F	120°F	140°F	160°F
TEMP RISE:	70°F	80°F	100°F	120°F
BOILER OUTPUT (BTU/HR)	CONTINUOUS (GPH)			
400,000	687	602	483	403
450,000	773	678	543	453
500,000	859	753	603	504
550,000	945	828	664	554
600,000	1,031	903	724	----
650,000	1,117	979	784	----
700,000	1,202	1,054	845	----
750,000	1,288	1,129	905	----
800,000	1,374	1,205	965	----
850,000	1,460	1,280	1,026	----
900,000	1,546	1,355	1,086	----
950,000	1,632	1,430	----	----
1,000,000	1,718	1,506	----	----
1,050,000	1,804	1,581	----	----

BOILER WATER SUPPLY: 200°F
BOILER WATER RETURN: 180°F

HOT OUT:	110°F	120°F	140°F	180°F
TEMP RISE:	70°F	80°F	100°F	140°F
BOILER OUTPUT (BTU/HR)	CONTINUOUS (GPH)			
400,000	687	602	483	346
450,000	773	678	543	389
500,000	859	753	603	433
550,000	945	828	664	476
600,000	1,031	903	724	519
650,000	1,117	979	784	562
700,000	1,202	1,054	845	605
750,000	1,288	1,129	905	----
800,000	1,374	1,205	965	----
850,000	1,460	1,280	1,026	----
900,000	1,546	1,355	1,086	----
950,000	1,632	1,430	1,146	----
1,000,000	1,718	1,506	1,207	----
1,050,000	1,804	1,581	1,267	----
1,100,000	----	1,656	1,327	----
1,150,000	----	1,732	1,388	----
1,200,000	----	----	1,448	----
1,250,000	----	----	1,508	----



COMMERCIAL HOT WATER HEAT EXCHANGER PERFORMANCE RATINGS

H2OMAX MODEL - H119

COLD WATER IN: 50°F / HOT WATER OUT: SEE BELOW

BOILER WATER SUPPLY: 180°F
BOILER WATER RETURN: 160°F

HOT OUT:	110°F	120°F	140°F	160°F
TEMP RISE:	60°F	70°F	90°F	110°F
BOILER OUTPUT (BTU/HR)	CONTINUOUS (GPH)			
400,000	803	688	536	440
450,000	903	774	603	495
500,000	1,004	860	670	550
550,000	1,104	949	738	605
600,000	1,205	1,033	805	659
650,000	1,305	1,119	872	----
700,000	1,405	1,205	939	----
750,000	1,506	1,291	1,006	----
800,000	1,606	1,377	1,073	----
850,000	1,707	1,463	1,140	----
900,000	1,807	1,549	----	----
950,000	----	1,635	----	----
1,000,000	----	1,721	----	----
1,050,000	----	1,805	----	----

BOILER WATER SUPPLY: 200°F
BOILER WATER RETURN: 180°F

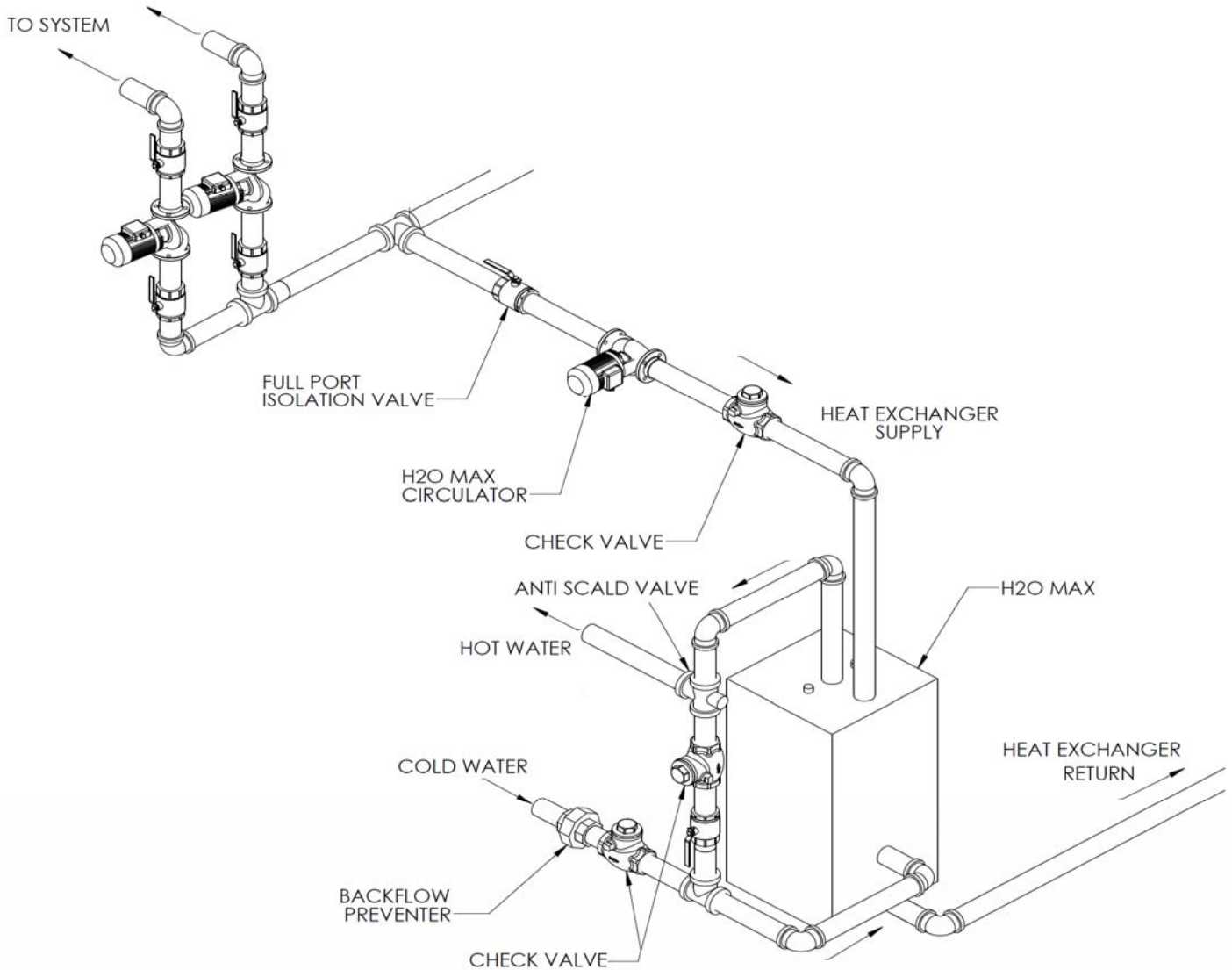
HOT OUT:	110°F	120°F	140°F	180°F
TEMP RISE:	60°F	70°F	90°F	130°F
BOILER OUTPUT (BTU/HR)	CONTINUOUS (GPH)			
400,000	803	688	536	373
450,000	903	774	603	419
500,000	1,004	860	670	466
550,000	1,104	946	737	513
600,000	1,205	1,033	805	559
650,000	1,305	1,119	872	606
700,000	1,405	1,205	939	----
750,000	1,506	1,291	1,006	----
800,000	1,606	1,377	1,073	----
850,000	1,707	1,463	1,140	----
900,000	1,807	1,549	1,207	----
950,000	----	1,635	1,274	----
1,000,000	----	1,721	1,341	----
1,050,000	----	1,807	1,408	----
1,100,000	----	----	1,475	----
1,150,000	----	----	1,542	----



COMMERCIAL HOT WATER HEAT EXCHANGER

RECOMMENDED NEAR UNIT PIPING

ONE (1) H2OMAX HEAT EXCHANGER



NOTES:

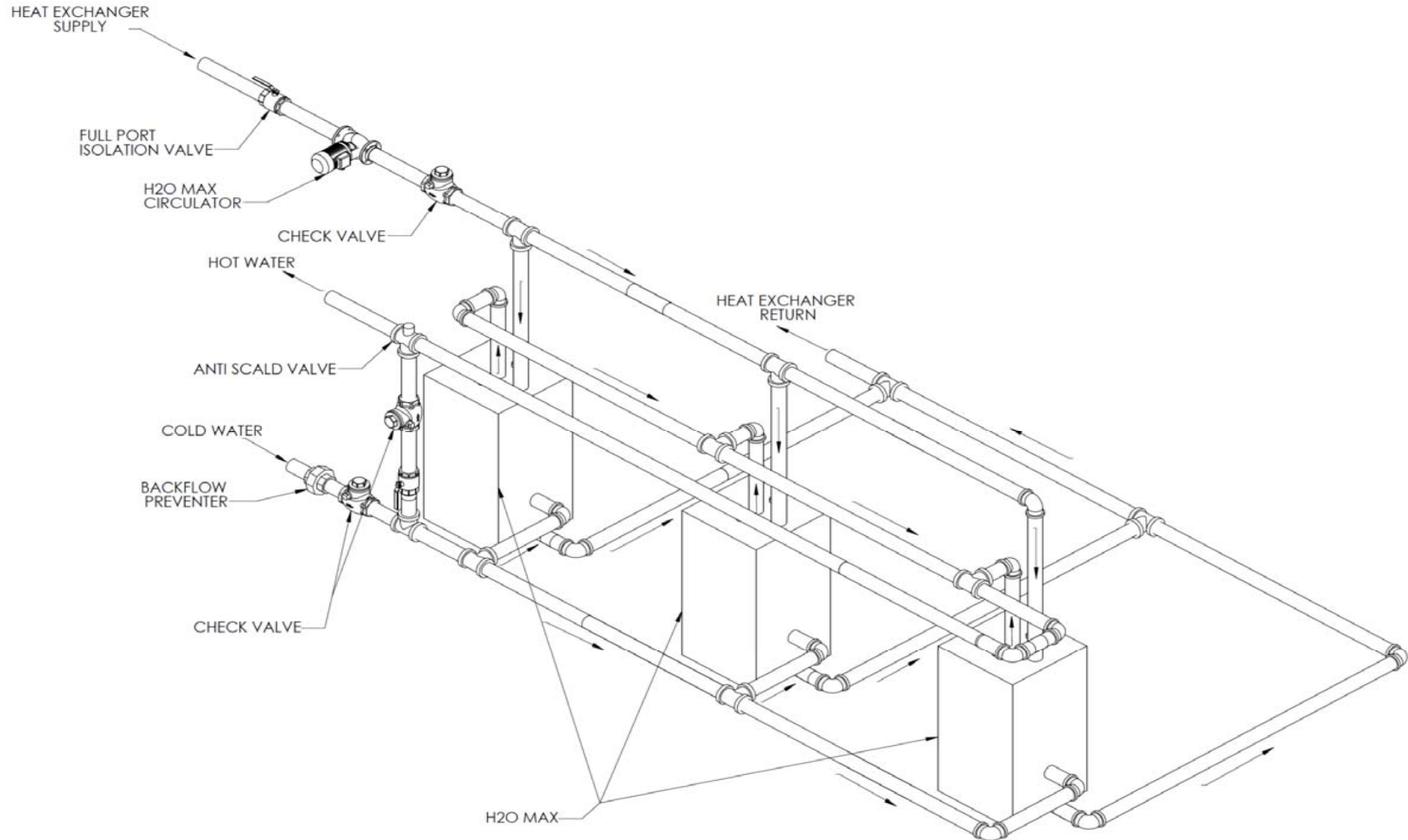
- A) This is a suggested piping configuration. It is the installer's responsibility to confirm with local codes and ordinances for additional requirements.
- B) Refer to "Installing an Anti-Scald Valve" in H2OMAX Commercial Heat Exchanger Installation Manual and valve manufacturer's instructions.



COMMERCIAL HOT WATER HEAT EXCHANGER

RECOMMENDED NEAR UNIT PIPING

MULTIPLE H2O MAX HEAT EXCHANGERS



NOTES:

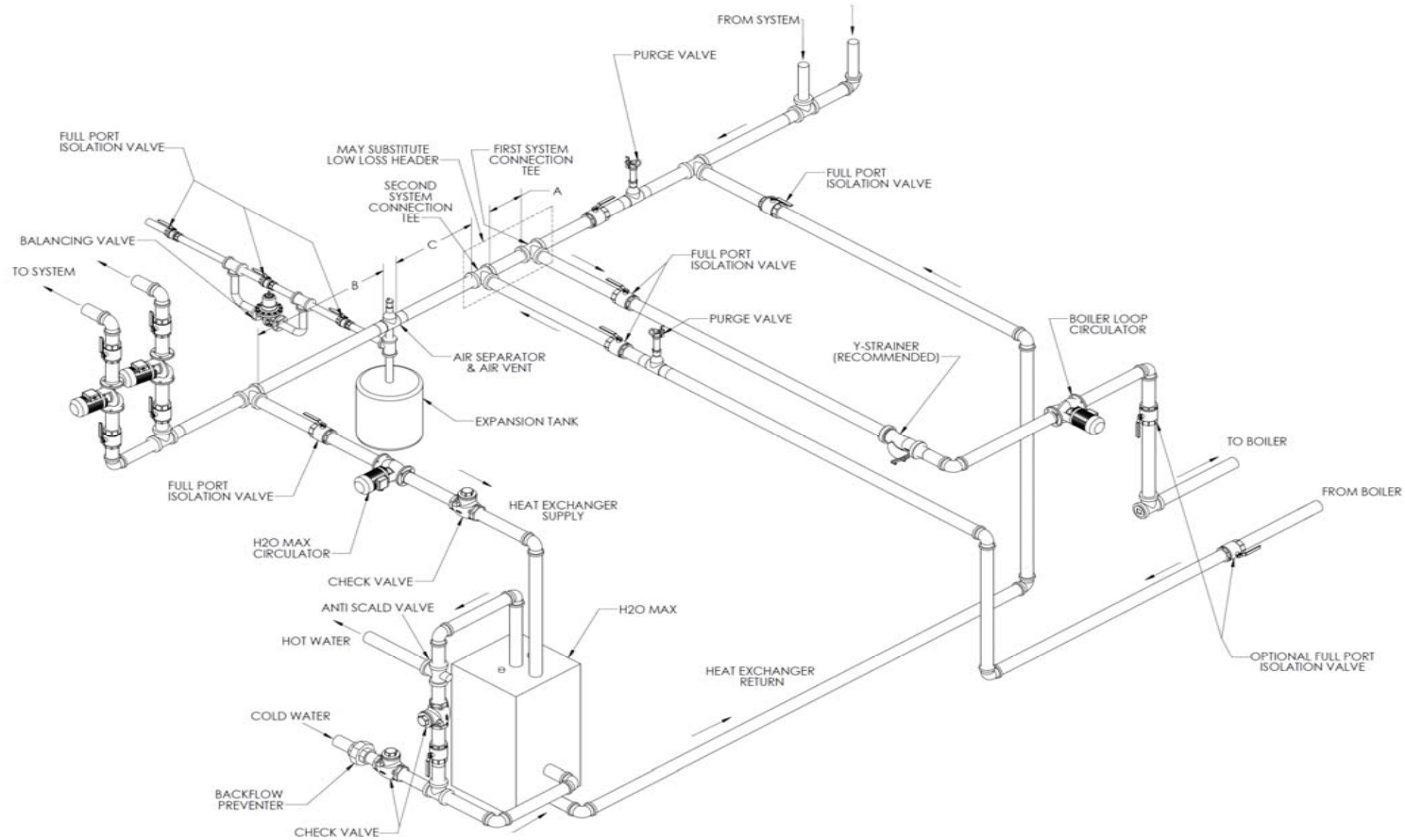
- A) This is a suggested piping configuration. It is the installer's responsibility to confirm with local codes and ordinances for additional requirements.
- B) Refer to "Installing an Anti-Scald Valve" in H2O MAX Commercial Heat Exchanger Installation Manual and valve manufacturer's instructions.



COMMERCIAL HOT WATER HEAT EXCHANGER

RECOMMENDED PIPING WITH HOT WATER BOILERS

ONE (1) HOT WATER BOILER and ONE (1) H2O MAX HEAT EXCHANGER



NOTES:

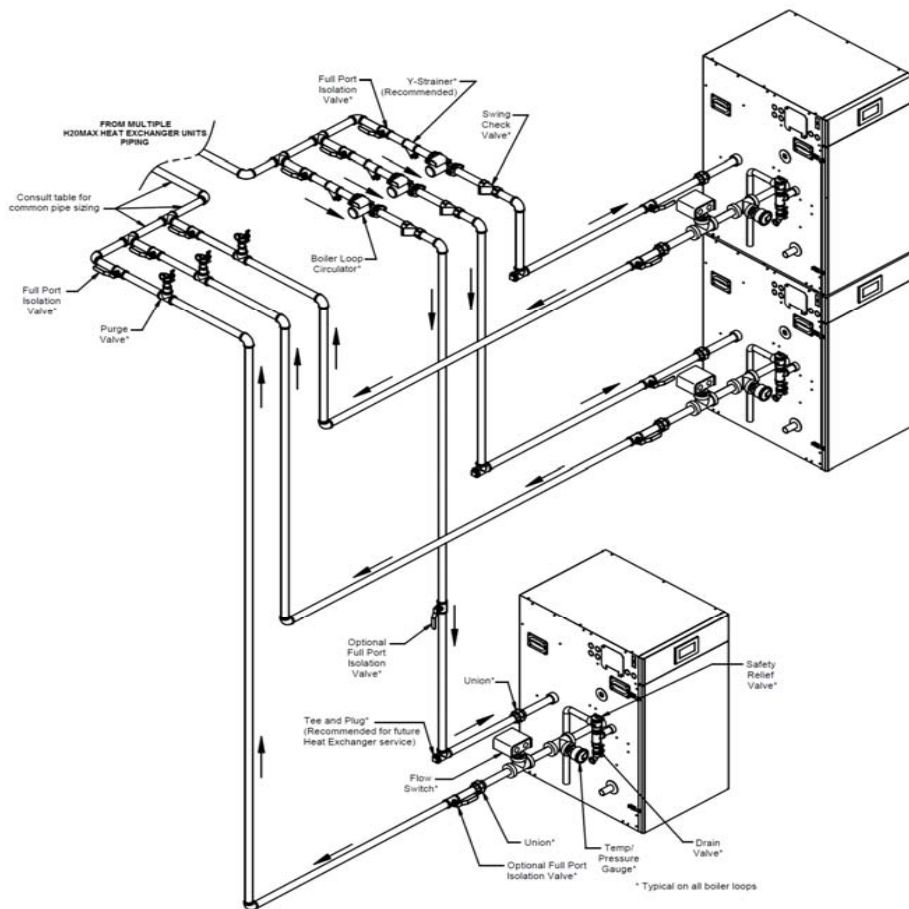
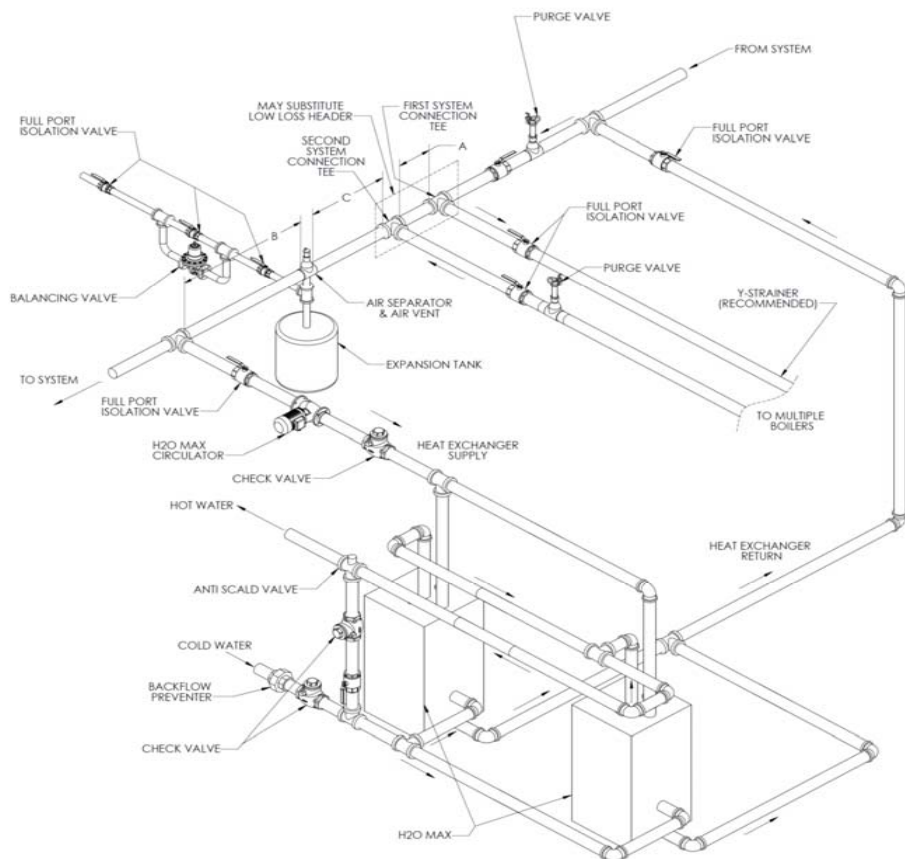
- No further apart than 12 inches or four pipe diameters, whichever is smaller.
- Keep this distance as short as practical.
- At least 18 inches of straight pipe for conventional air scoop.
- This is a suggested piping configuration. It is the installer's responsibility to confirm with local codes and ordinances for additional requirements.
- Pressure relief valve setting shall not exceed pressure rating of any component in the system.
- Boiler Pump must be sized to overcome pressure drop across entire boiler loop.
- Refer to "Installing an Anti-Scald Valve" in H2O MAX Commercial Heat Exchanger Installation Manual and valve manufacturer's instructions.



COMMERCIAL HOT WATER HEAT EXCHANGER

RECOMMENDED PIPING WITH HOT WATER BOILERS

MULTIPLE HOT WATER BOILERS and MULTIPLE H2O MAX HEAT EXCHANGERS



NOTES:

- A) No further apart than 12 inches or four pipe diameters, whichever is smaller.
- B) Keep this distance as short as practical.
- C) At least 18 inches of straight pipe for conventional air scoop.
- D) This is a suggested piping configuration. It is the installer's responsibility to confirm with local codes and ordinances for additional requirements.
- E) Pressure relief valve setting shall not exceed pressure rating of any component in the system.
- F) Boiler Pump must be sized to overcome pressure drop across entire boiler loop.
- G) Refer to "Installing an Anti-Scald Valve" in H2O MAX Commercial Heat Exchanger Installation Manual and valve manufacturer's instructions.



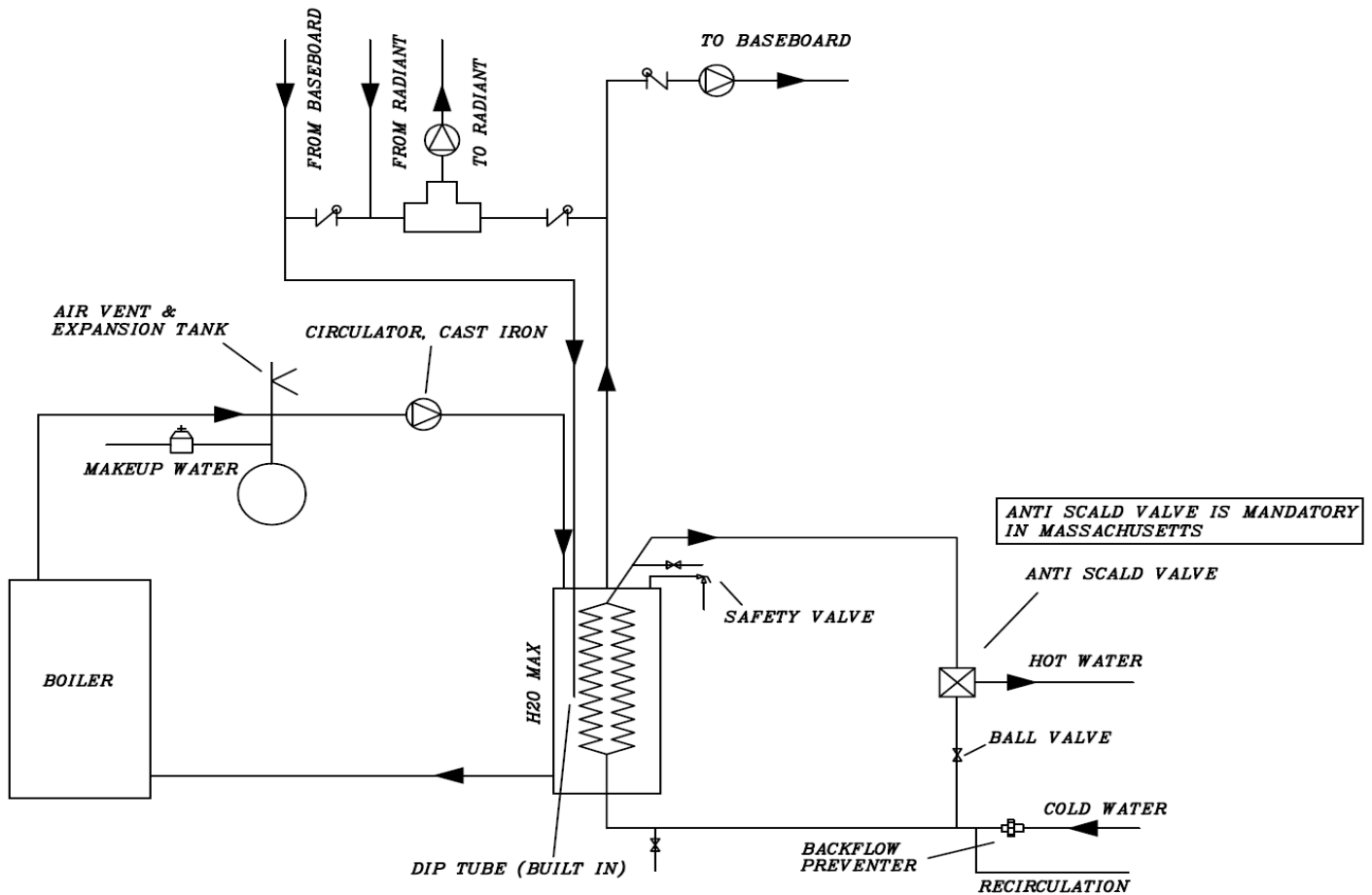
COMMERCIAL HOT WATER HEAT EXCHANGER

ALTERNATIVE PIPING SCHEMATICS WITH HOT WATER BOILER

SCHEMATICS ARE CONCEPTUAL AND ARE USED FOR ILLUSTRATIVE PURPOSES ONLY

ONE (1) HOT WATER BOILER and ONE (1) H2O MAX HEAT EXCHANGER

Domestic Hot Water, Radiator & Baseboard Zones (and Radiant Heating, if applicable) and Buffering Boiler *



* Primarily for Residential Installations



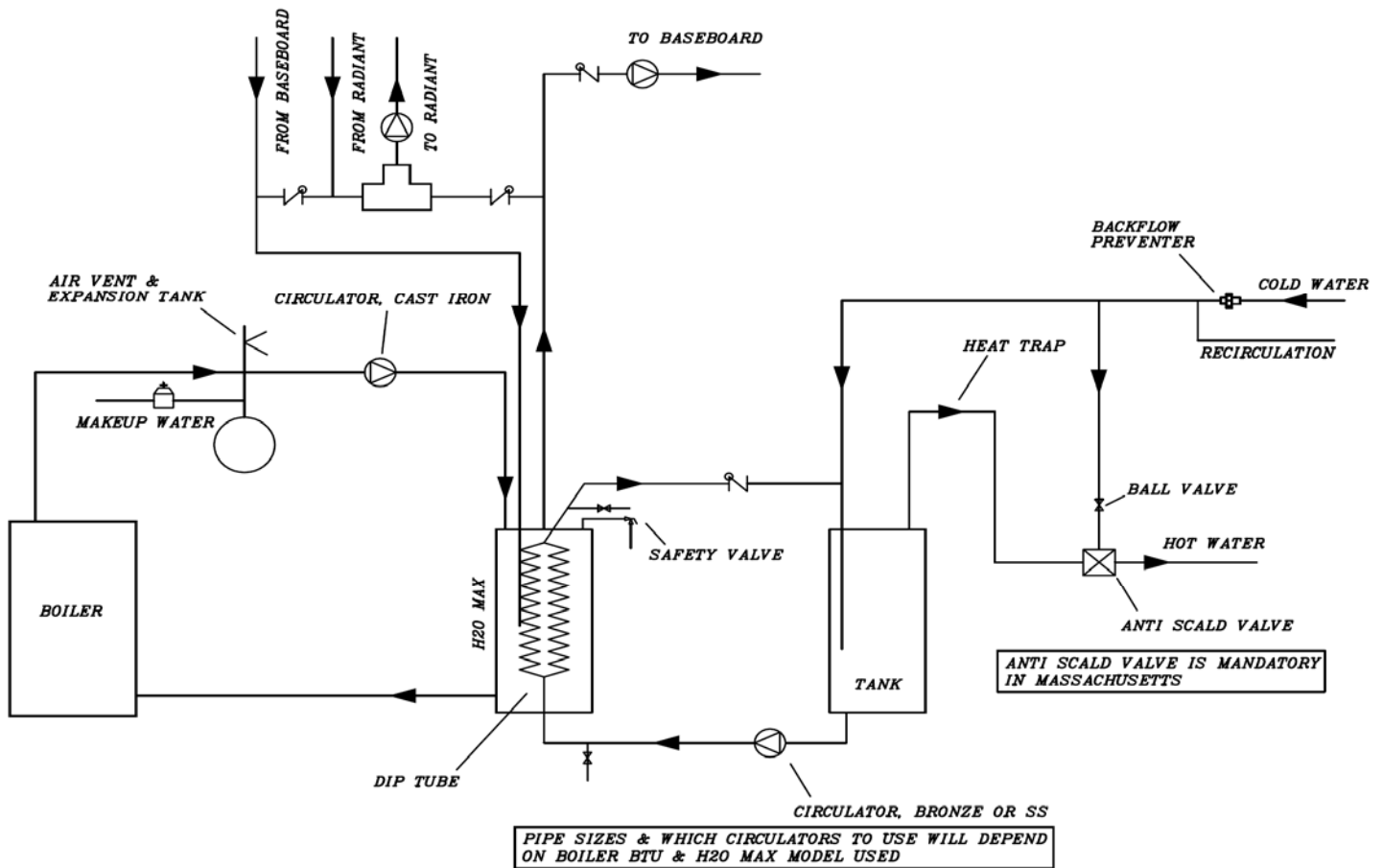
COMMERCIAL HOT WATER HEAT EXCHANGER

ALTERNATIVE PIPING SCHEMATICS WITH HOT WATER BOILER

SCHEMATICS ARE CONCEPTUAL AND ARE USED FOR ILLUSTRATIVE PURPOSES ONLY

ONE (1) HOT WATER BOILER, ONE (1) H2O MAX HEAT EXCHANGER and ONE (1) STORAGE TANK

Domestic Hot Water, Radiator & Baseboard Zones (and Radiant Heating, if applicable) and Buffering Boiler





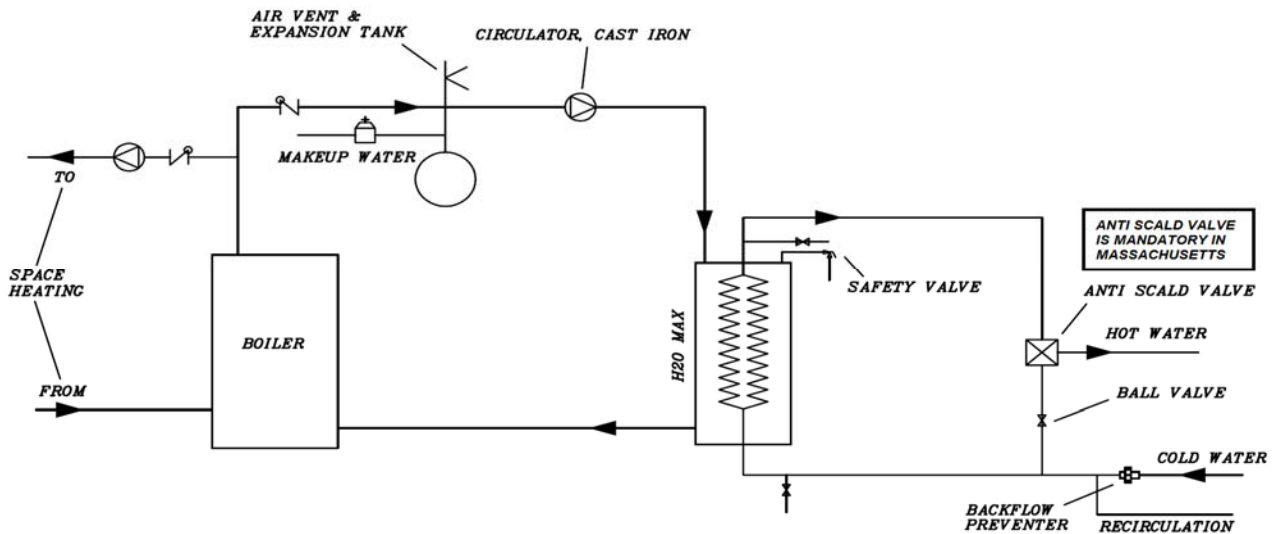
COMMERCIAL HOT WATER HEAT EXCHANGER

ALTERNATIVE PIPING SCHEMATICS WITH HOT WATER BOILER

SCHEMATICS ARE CONCEPTUAL AND ARE USED FOR ILLUSTRATIVE PURPOSES ONLY

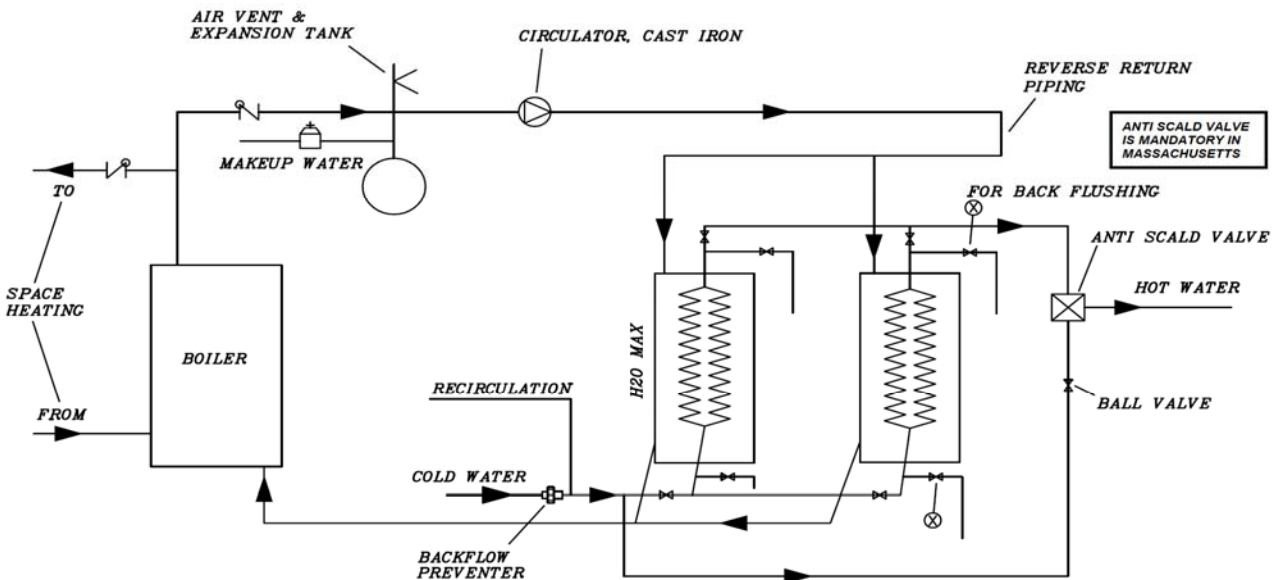
ONE (1) HOT WATER BOILER and ONE (1) H2O MAX HEAT EXCHANGER

Domestic Hot Water and Radiator & Baseboard Zones (and Radiant Heating, if applicable)



ONE (1) HOT WATER BOILER and TWO (2) H2O MAX HEAT EXCHANGERS

Domestic Hot Water and Radiator & Baseboard Zones (and Radiant Heating, if applicable)





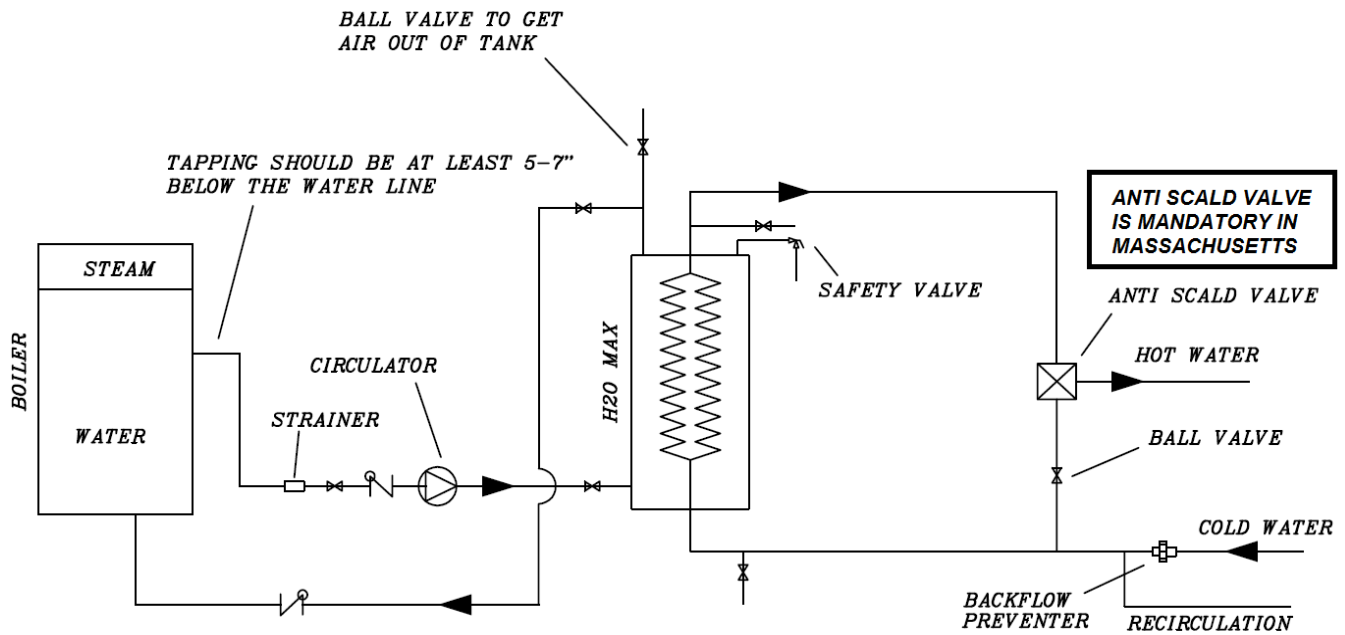
COMMERCIAL HOT WATER HEAT EXCHANGER

RECOMMENDED PIPING SCHEMATIC WITH LOW PRESSURE STEAM BOILERS

SCHEMATICS ARE CONCEPTUAL AND ARE USED FOR ILLUSTRATIVE PURPOSES ONLY

ONE (1) LOW PRESSURE STEAM BOILER and ONE (1) H2O MAX HEAT EXCHANGER

Domestic Hot Water





COMMERCIAL HOT WATER HEAT EXCHANGER

PRESSURE LOSS

BOILER WATER FLOW (GPM)	<u>PRESSURE LOSS</u> (FEET OF HEAD)			
	H26	H48	H72	H119
10	0.4	0.1	0.1	----
15	1.0	0.3	0.2	----
20	1.7	0.6	0.3	0.1
25	2.7	0.9	0.5	0.2
30	3.9	1.3	0.6	0.3
35	----	1.8	0.9	0.4
40	----	2.3	1.2	0.5
45	----	2.9	1.5	0.6
50	----	3.6	1.9	0.7
55	----	----	2.3	0.8
60	----	----	2.8	1.0
65	----	----	3.3	1.2
70	----	----	----	1.4
80	----	----	----	1.8
90	----	----	----	2.3
100	----	----	----	2.8
110	----	----	----	3.4



COMMERCIAL HOT WATER HEAT EXCHANGER

CIRCULATOR SIZING

Circulator or pump size is calculated on the basis of how much heat must be transferred from the boiler to the domestic cold water.

CIRCULATOR OR PUMP FLOW

Boiler Output	=	BTU	}
Boiler Temperature Rise (Delta T) (Temperature difference between boiler water supply & return)	=	DT °F	

EXAMPLE: (1 Qty, H119 Unit)

760,000 BTU	
30 °F	

CIRCULATOR OR PUMP FLOW FORMULA

$$\frac{(\text{ BTU })}{(\text{ DT}^\circ\text{F} \times 8.33 \times 60)} = \text{GPM}$$

$$\frac{760,000 \text{ BTU}}{(30^\circ\text{F} \times 8.33 \times 60)} = 51 \text{ GPM}$$

Flow through each H2OMAX	=	$\frac{\text{GPM}}{\text{Unit Qty}}$	}
--------------------------	---	--------------------------------------	---

$\frac{51 \text{ GPM}}{(1 \text{ qty) Model H119}}$	=	51 GPM
---	---	--------

CIRCULATOR OR PUMP FLOW → 51 GPM
--

TOTAL PRESSURE LOSS

Pressure loss through H2OMAX (See "Pressure Loss Table")	=	ft/hd	}
Pressure loss through piping	=	$\frac{\text{ft/hd}}$	
TOTAL PRESSURE LOSS (Add H2OMAX and Piping pressure losses together)	=	ft/hd	

Through H2OMAX (55 GPM for H119)	=	0.8 ft/hd
Through piping *	=	<u>4.5 ft/hd</u>
TOTAL PRESSURE LOSS	=	5.3 ft/hd

* Based on 20 feet of 2-1/2" piping and (4) 90° elbows

TOTAL PRESSURE LOSS → 5.3 ft/hd

CIRCULATOR NEEDED:

Circulator or Pump Flow		GPM	}
Total Pressure Loss		ft/hd	

Flow through H119	51 GPM
Total Pressure Loss	5.3 ft/hd