




## **MicroMix® II and MicroMax Instantaneous Water Heaters**

Reliable, Durable, Simple to Operate



**GRAHAM**  
ENGINEERING ANSWERS



**Graham engineers analyze  
your specific vacuum and  
heat transfer requirements to  
maximize the efficiency and  
performance of your process.**

**Because it's not just about  
engineering products, it's about  
engineering answers.**

## Designed for performance

Graham has engineered two different styles of indirect fired instantaneous water heaters to meet the stringent demands of both comfort and process hot water heating. As a result, Graham MicroMix® II and MicroMax\* produce the precise amount of water, at the right temperature, under widely varying demands. This outstanding performance is confirmed by the many installations in hospitals, schools, hotels, restaurants, laundries, ships, factories and food plants.

The MicroMix II and MicroMax use a unique feed-forward temperature control system to instantly produce hot water within +/- 4° F of the set temperature. The feed-forward design is the only true instantaneous water heater because the water temperature is controlled at the demand point, which is after the heat exchanger.

MicroMix II and MicroMax are instantaneous water heaters that use the most efficient method of heat transfer available, making them very compact. They need only 6 square feet of floor space and can easily fit where any man can. No storage tank is required, and energy savings as high as 40 percent can be realized.

The MicroMix II is a steam-to-water heater utilized when steam is available for heating, and the MicroMax is a boiler water-to-water heater used when high temperature boiler water is the heating medium.



## Engineered for reliability

With the MicroMix II and MicroMax, Graham has built a better water heater by making it easy to use, simple to maintain and resistant to the harsh service of varying demand.

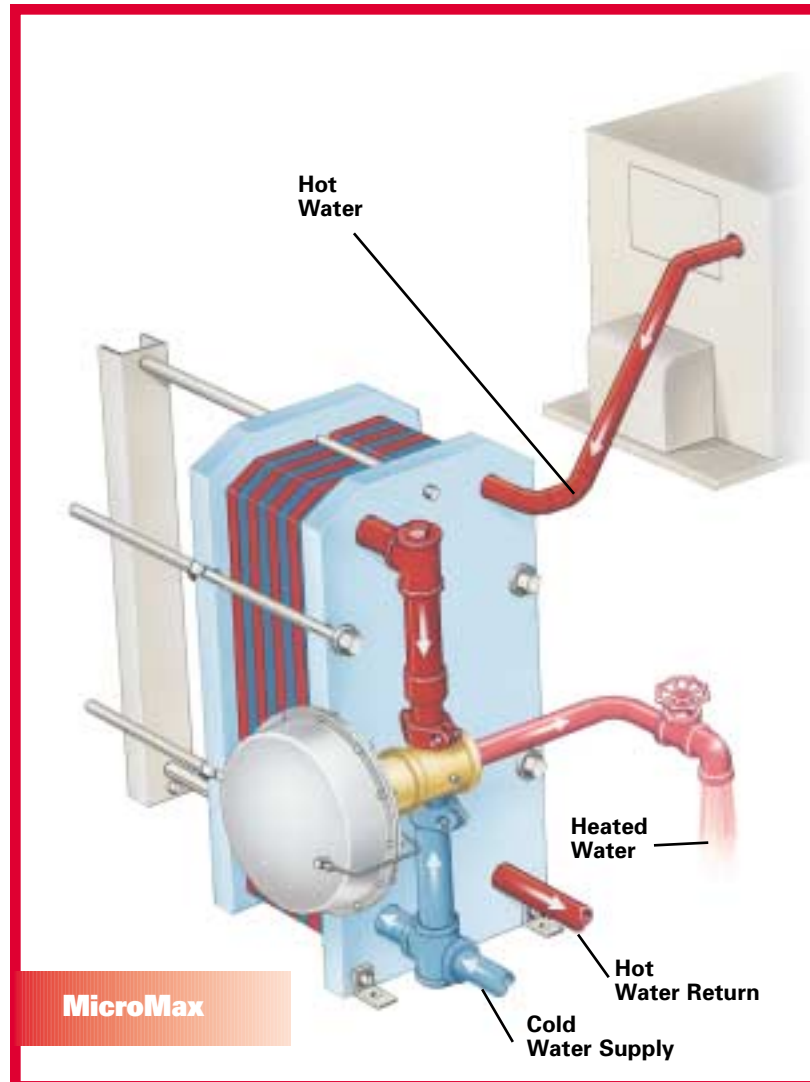
- **Simple Mechanical Design:** Water temperature is controlled by a mechanical blending valve that operates based on demand so there are no extraneous power sources, controls or temperature sensors required.
- **“Hands-Free” Design:** The feed-forward system has been used for more than 40 years to guarantee the continuous steady flow of hot water with a minimal amount of maintenance.
- **Heavy Duty:** The MicroMix II features the proven Graham spiral-tubed Heliflow® heat exchanger for converting steam to hot water. Its rugged casing and bourdon tube configuration allow the entire assembly to expand and contract without localized stresses, making them perfect for the intermittent cycling they are subject to.
- **Flexible:** The MicroMax employs a plate heat exchanger with removable heat transfer plates to convert the boiler water to hot water. This makes for fast, easy maintenance and allows for adding plates to increase the capacity of the heater at a later date if necessary.
- **Anti-Bacterial:** Feed-forward design requires no water storage and overheating of the domestic water in the heat exchanger prior to the blending valve. This produces a double-edged bacteria-busting effect and reduces the risk of legionella and other contaminants.
- **Security:** The blending valve is designed in such a way to be fail-safe. Potential failure or damage to the unit will produce only cold water.

\*MicroMax is patent pending

# MicroMax

## Boiler Water-to-Water Heater

- **High Efficiency:** The corrugated heat transfer plates and counter-flow arrangement in the MicroMax produce heat transfer rates that are 5 times higher than with tubular surfaces used in other water heaters. The result is a smaller package with less boiler water usage. The boiler water to potable water flow can be as low as 1 to 1 in a MicroMax water heater, compared with 4 to 1 for a conventional type.
- **Scale Prevention:** Plate heat exchangers, as used in the MicroMax, substantially reduce the risk of scale by constantly redirecting the flow against the heat transfer plates, scouring them clean of most scale or biological buildup. For extreme cases, disassembly of the plate pack allows for easy cleaning.
- **Flexible:** The gasketed plate construction allows for the simple addition or removal of plates to handle future hot water demands. It also makes the MicroMax the easiest water heater to service.
- **Safe:** Optional double-wall plates can eliminate the risk of cross-contamination between boiler and domestic water.

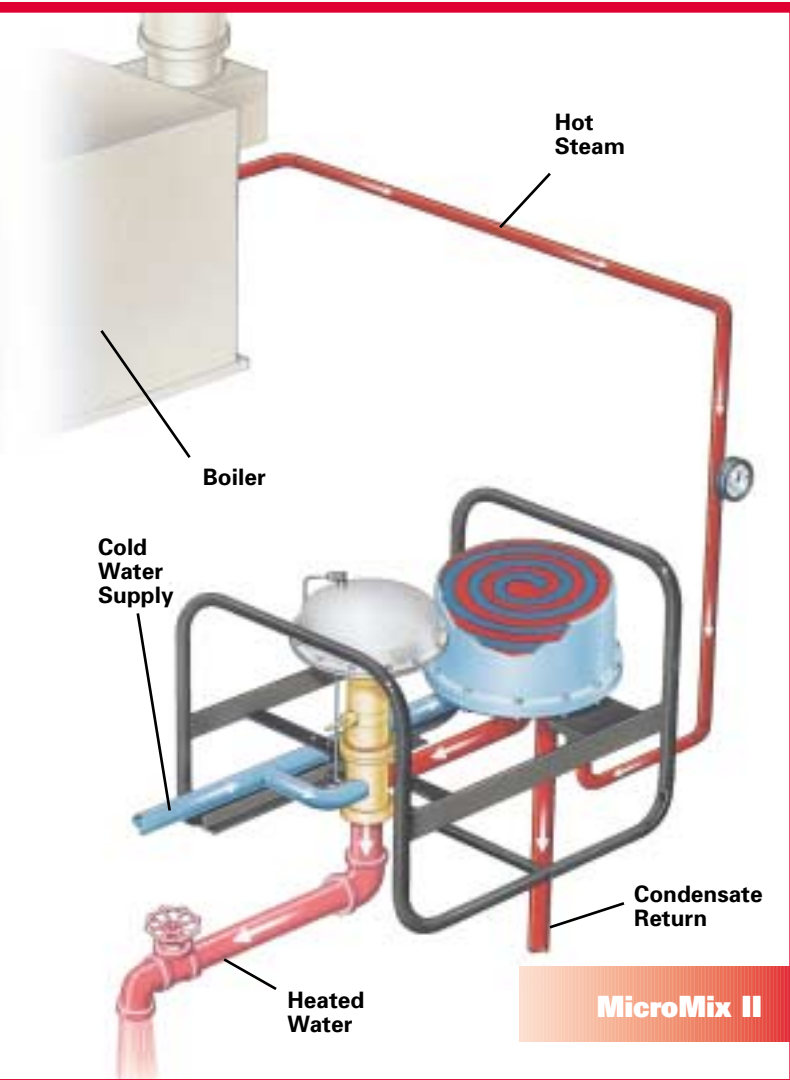


### How it works:

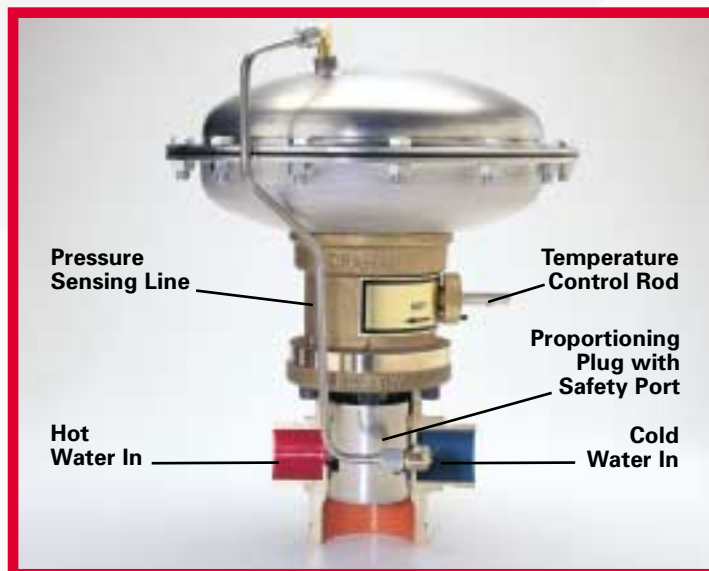
1. The heat source is properly connected to the heat exchanger of the appropriate package – steam for the MicroMix II and boiler water for the MicroMax.
2. The water to be heated is piped to the water heater inlet, where it is directed to both the cold port of the blending valve and the heat exchanger. The heat exchanger heats the water to the required temperature before sending it to the hot port of the blending valve for mixing.
3. The blending valve has a proportional valve plug regulated by the movement of the diaphragm, which is induced by pressure differentials in the sensing head.
4. A sensing line “loads” the top portion of the diaphragm with supply line cold water pressure while blended water outlet pressure is being sensed below.
5. Flow demand creates a pressure imbalance above (+) and below (-) the diaphragm, resulting in movement of the diaphragm and proportioning plug.
6. The movement aligns ports in the plug with supply ports in the valve body, introducing the correct proportion of hot and cold water.
7. This action automatically generates blended hot water through all rated flow capacities at the chosen preset temperature (+/- 4° F).
8. The integral fail-safe system permits stem travel in the event of plug restriction or parts failure, opening an auxiliary cold water port. Cold water flooding yields cooler water or, in parts failure, no water at all.
9. Temperature is easily adjusted by side-to-side movement of the control rod on the valve body. Stabilization adjustments are made during the initial startup by rotation of the control rod.

# MicroMix® II

## Steam-to-Water Heater

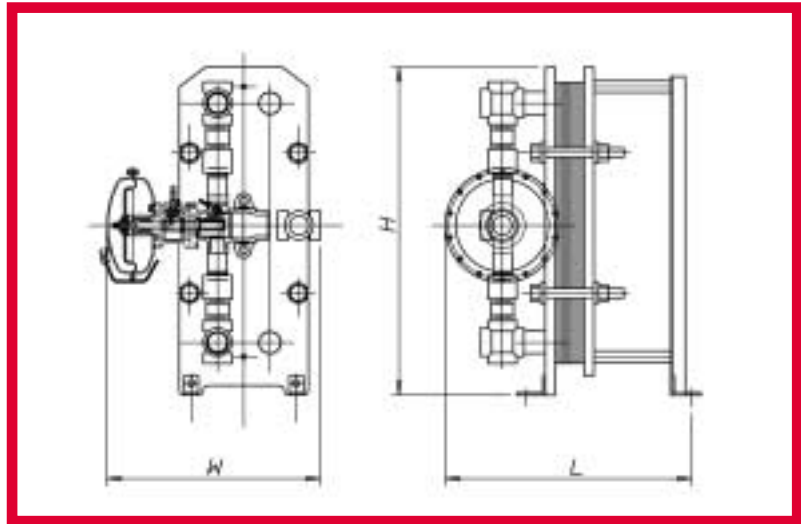


- **Longer Life:** The Heliflow heat exchanger has helically coiled tubes that are free to expand and contract with temperature changes. This protects the heat exchanger from the constant cycling that can exist with instantaneous heating.
- **Compact:** The tubes in the Heliflow are coiled to minimize space requirements while providing proper steam distribution. This makes the MicroMix II the smallest instantaneous water heater available.
- **Heavy Duty:** The rugged cast construction and brazed tube joints make the Heliflow more durable than any other heat exchanger (i.e., shell and tube or plate type) for condensing steam service.
- **Easy Maintenance:** When maintenance on the Heliflow is required, the coiled bundle can be cleaned in place, removed for cleaning or replaced in minimal space.
- **Safe:** Optional double-wall tubes can eliminate the risk of cross-contamination between steam and domestic water.



# MicroMax

## Boiler Water-to-Water Heater



### Specifications

Model	MX15	MX30	MX45	MX60	MX75	MX90	MX105	MX120
<b>Performance</b>								
Maximum flow rate (gpm)	15	30	45	60	75	90	105	120
Capacity	Heat 40° F water up to 140° F. Outlet temperature adjustable. Consult Graham for double-wall or other capacities.							
Boiler water temperature	180° F to 210° F							
Boiler water flow	Boiler water to potable water flow: 2.0 / 1.0 for 180° F to 1.0 / 1.0 for 210° F							
<b>Connections – Size – NPT</b>								
Potable water in/out (in.)	2	2	2	2	2 / 2.5	2 / 2.5	2 / 2.5	2 / 2.5
Boiler water in/out (in.)	2	2	2	2	2	2	2	2
<b>Connection Material</b>	Potable water: steel; boiler water: steel							
<b>Heat Exchanger Construction</b>	Painted steel frame, 316SS thermal plates, nitrile gaskets							
Optional construction	316SS connections, EPDM gaskets							
<b>Control Valve</b>	Instantaneous type; blending by mechanical means only based on pressure differential; fail in cold position							
Materials	Bronze body, Hastelloy valve plug, neoprene diaphragm. Option: 316SS valve/piping							
Piping	Quick disconnect Victaulic fittings; integral pressure relief valve							
<b>Design</b>	150 psi potable water side / 150 and 300 psi boiler side / ASME certified							
<b>Accessories</b>	Boiler water inlet/outlet manual control valves and pressure gauges. Temperature gauges for boiler inlet water and potable water outlet.							
<b>Optional Construction</b>	Double-wall plate construction, water recirculation package, hot water shut-off system – solenoid controlled, boiler/potable water booster pump package							
<b>Dimensions</b>								
Height (in.)	35	35	35	35	35	35	35	35
Width (in.)	23	23	23	23	25	25	25	25
Length (in.)	34	34	34	34	56	56	56	56

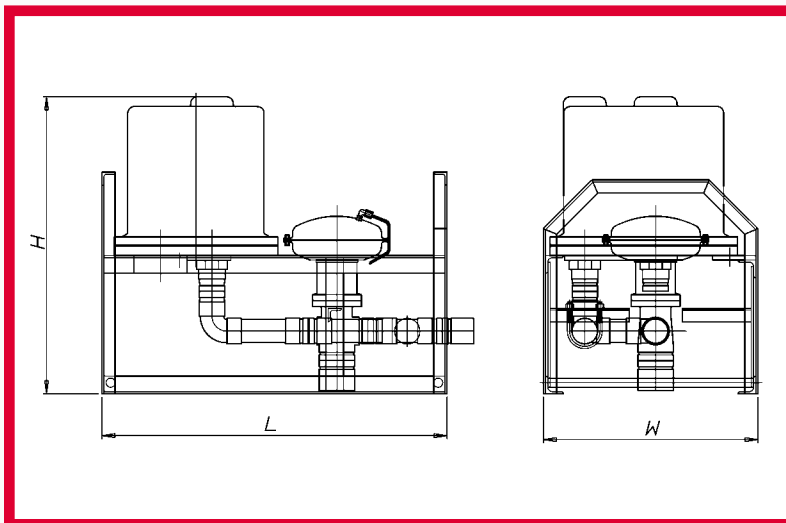
**Model** MX-ab

a = nominal flow in gpm (15, 30, 45, 60, 75, 90, 105, 120)

b = special construction (D = double-wall, E = EPDM gaskets)

# MicroMix® II

## Steam-to-Water Heater



### Specifications

Model	MM-30	MM-60	MM-90	MM-120
<b>Performance</b>				
Maximum flow rate (gpm)	30	60	90	120
Capacity	Heat 40° F water up to 140° F. Outlet temperature adjustable. Consult Graham for double-wall or other capacities.			
Steam pressure	5 to 15 psig standard, 20 to 250 psig requires pressure regulator (H package)			
Steam flow	Approximately 50 lbs./hr. per 1 gpm of water heated			
<b>Connections – Size – NPT</b>				
Potable water in/out (in.)	1.5 / 2	2	2.5	2.5
Steam in/condensate out (in.)	3 / 1.25	3 / 2	4 ANSI / 2	4 ANSI / 2
<b>Connection Material</b>	Potable water: brass; steam: cast iron			
<b>Heat Exchanger Construction</b>	Painted steel/cast iron casing, copper tubes			
Optional construction	Tubes in admiralty, 70/30 cu.ni. or 316SS			
<b>Control Valve</b>	Instantaneous type; blending by mechanical means only based on pressure differential; fail in cold position			
Materials	Bronze body, Hastelloy valve plug, neoprene diaphragm. Option: 316SS valve/piping			
Piping	Quick disconnect Victaulic fittings; integral pressure relief valve			
<b>Design</b>	150 psi potable water side / 50, 75 and 150 psi steam side / ASME certified			
<b>Accessories</b>	Steel frame, condensate traps and strainers (main and drip), steam inlet pressure gauge, water outlet temperature gauge			
<b>Optional Construction</b>	Double-wall construction, water recirculation package, hot water shut-off system – solenoid controlled, potable water booster pump package			
<b>Dimensions</b>				
Height (in.)	21	22.5	33	33.5
Width (in.)	22.5	25	23.5	24.5
Length (in.)	31.5	31.5	31.5	39

**Models** MM-abc

a = nominal flow in tens of gpm (3 = 30, 6 = 60, 9 = 90, 12 = 120)

b = tube material (0 = copper, 1 = admiralty, 2 = 70/30 cu.ni., 6 = 316SS)

c = special construction (D = double-wall, H = high pressure steam with regulator, S = cast steel shell)

## Other products from Graham

Graham designs and manufactures two distinct lines of products: vacuum systems and heat transfer equipment. Contact us for more information on any of the following:

- **Ejectors:** Steam jet and organic motivated ejectors, thermocompressors and steam vacuum refrigeration systems.
- **DryFlo™ pumps:** Dry vacuum pump and standard booster systems.
- **Liquid ring pumps:** Vacuum, compressors, packaged vacuum systems and hybrid systems.
- **Process vacuum condensers.**
- **Steam surface condensers:** Turbine-generator condensers and mechanical drive condensers.
- **Heliflow® heat exchangers:** Cryogenic vaporizers and coolers, vent condensers, vaporizers, gas coolers, liquid to liquid, sample coolers and seal coolers.
- **Plate heat exchangers.**
- **Clean steam generators.**
- **Desuperheaters:** Venturi and steam-atomizing.

Graham Corporation  
20 Florence Avenue  
Batavia, New York USA 14020  
Phone: 585-343-2216 Fax: 585-343-1097  
Visit: [www.graham-mfg.com](http://www.graham-mfg.com)

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