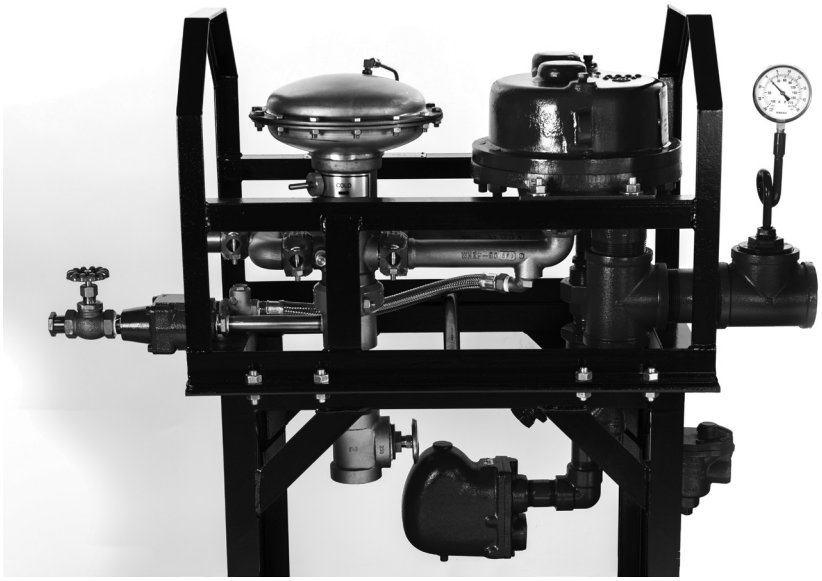
RediHeat Instantaneous Water Heater

Description

The RediHeat is a steam (shell side) to water (tube side) heat exchange package that incorporates a unique feed-forward temperature control system to instantly produce hot water within +/-4 °F (-15 °C) of the set temperature under widely varying demands. This outstanding performance makes the RediHeat the ideal solution for domestic hot water applications where tight temperature control and instant response to changes in demand are required.



Temperature control

Water temperature is controlled by a mechanical blending valve that operates based on demand. A manual adjustment compensates for seasonal changes in cold water supply temperature. The blending valve has a fail-safe design ensuring consumers can never be exposed to hot water at temperatures above set point – vital for domestic hot water applications. Potential failure or damage to the unit will produce only cold water.

Heat exchanger

The RediHeat features a spiral tubed helical heat exchanger for efficient heat transfer in a compact space. The coiled tube technology does not require tube supports allowing the tubes to be in very close proximity resulting in a more compact heat transfer bundle. The rugged casing and bourdon tube configuration also allows the entire assembly to expand and contract in response to temperature change without localized stressing. This is ideal for intermittent cycling that is common with domestic hot water applications.

Efficiency
The typical domestic hot water system only places a demand on the heat exchanger 15% of the time. The feed forward design of the RediHeat only consumes energy when responding to demand. With no hot water storage required, this mode of operation can save as much as 40% in energy costs when compared to a hot water tank system.

Anti-bacterial
The perfect environment for the growth of legionella bacteria is stagnant water between 68 °F and 122 °F (20 °C and 50 °C). The presence of scale and sediment only expedites colonization.
With the RediHeat feed-forward design, water is over-heated to 160 °F - 200 °F (71 °C - 93 °C) in the heat exchanger before being blended (in response to demand) with incoming cold water to the desired output temperature. In this way the presence of stagnant water at bacteria-friendly temperatures is eliminated.

Recirculation system
A problem many hot water systems encounter is the delayed supply of hot water to fixtures that are a substantial distance from the heater. During idle periods, heat loss in the piping system will result in cool water at the faucet until hot water produced from the heater is able to reach that point. Delays in providing hot water at the faucet can result in user dissatisfaction. To provide instantaneous hot water on demand in systems with long pipe runs a recirculation system incorporating a pump (not included) to maintain constant flow should be installed. The RediHeat recirculation system maintains loop temperatures by measuring the temperature of the returning hot water and, dependent on temperature, either passing it back through the heat exchanger for re-heating or diverting it back to the hot water loop.

Installation
With a footprint of only 6.5 square feet and a height of 33.5" for the largest unit, the RediHeat is the most compact instantaneous water heater available – important when space is at a premium. The unit requires no extraneous power sources, controls or temperature sensors making installation quick and simple. The RediHeat may be wall or floor stand mounted or can be suspended from the ceiling. Approximately 3' clearance from the floor is required to allow room for steam and condensate connections and the hot water outlet. An optional angle iron stand is available and recommended for floor mounting. For optimal heater performance, the steam trap should discharge to 0 psig, below the level of the trap. If lift of condensate is required or the trap must discharge to a back pressure, an automatic pump trap (APT) should be fitted for correct operation. Contact Spirax Sarco for details. The steam inlet pressure to the heat exchanger is limited to 15 psi g (1.03 bar). Greater steam supply pressures require installation of a pressure regulator. A pressure relief valve set at 75 psi g (5.2 bar) (for RH-30 and RH-60) or 50 psi g (3.4 bar) (for RH-90 and RH-120) should be installed in the steam inlet pipe downstream of the pressure regulator if steam pressure to the heat exchanger can exceed these limits.
Acceptable cold water inlet pressure range is 30 to 150 psi (2.07 to 10.3 bar g). Water pressure must be at least 15 psi (1.03 bar) greater than steam pressure for correct operation. The RediHeat incorporates an integral pressure relief valve (located on side of the blending valve) to relieve excess water pressure caused by thermal expansion.

Maintenance
When maintenance on the helical heat exchanger is required, the coiled tube bundle can be either removed for cleaning or cleaned in place. Due to the helical design, removal is easy and does not require the withdraw space typical with other shell and tube designs. An acid pump cleaning system is available for cleaning the coil in situ when poor water quality can result in scaling.

Typical specification
The domestic hot water heater shall be a Spirax Sarco RediHeat steam-fired, instantaneous water heater incorporating feed forward temperature control to instantly produce hot water within +/-4 °F (-15 °C) of the set temperature under widely varying demands. The unit will incorporate an ASME code stamped helical coil heat exchanger and blending valve. The coiled tube bundle must be capable of being removed for inspection and service without breaking steam connections or removing the unit from its installed position. The unit shall be completely self-contained and require hook-up only to steam and water. There shall be no electric or pneumatic requirements. Each heater shall be a factory assembled package with the capacity to heat ___ gpm of water from __ to ___ degrees Fahrenheit without the use of thermostatic control devices or storage tanks. Supply steam pressure is ___ psig.

RediHeat Model	RH-30		RH-60		RH-90		RH-120	
Performance								
Nominal maximum output in gpm (litres)	30 (114 L)		60 (227 L)		90 (341 L)		120 (454 L)	
Capacity	Heat 40 °F (4.4 °C) water up to 140 °F (60 °C). Outlet temperature adjustable.							
Steam inlet pressure	10 to 15 psi g (0.69 to 1.03 bar g) standard 20 to 250 psi g (1.38 to 17.2 bar g) requires pressure regulator (H package)							
Steam flow	Approximately 50 lbs/hr (22.7 kg/hr) per 1 gpm (3.79 L) of water heated.							
Water inlet pressure	30 to 150 psi g (2.07 to 10.3 bar g) (must be at least 15 psi (1.03 bar) above steam pressure for correct operation)							
Connections (NPT)								
Potable Water: In – Out	1½"	2"	2"		2½"		2½"	
Steam In - Condensate Out	3"	1¼"	3"	2"	4" ANSI	2"	4" ANSI	2½"
Materials of Construction								
Steam side piping	Steel							
Potable water side piping	Brass							
Heat Exchanger (standard)	Cast iron shell, copper tubes							
Heat Exchanger (options)	Cast steel shell Tubes: admiralty, 70/30 Cu Ni, 316SS and Double Wall (copper only)							
Blending Valve	Bronze body, Hastalloy valve plug, Neoprene diaphragm							
Design								
Blending Valve	Instantaneous: responds to pressure differential Fail-safe (cold) Integral pressure relief valve							
Piping	Quick disconnect Victaulic fittings							
Pressure	Potable water side: 150 psi (5.2 bar) Steam side: 50 psi (3.4 bar) (RH-90 and RH-120), 75 psi (5.2 bar) (RH-30 and RH-60)							
Certification	ASME Section VIII							
Accessories								
Included with RediHeat	Steel frame, steam inlet pressure gauge, water outlet temperature gauge							
Required (not included)	Main and Drip traps plus strainers							
Optional	"H" (pressure reducing) package, angle iron stand, recirculation package, solenoid safety shut-off system, thermal insulation blanket, OSHA cover, chemical cleaning system							
Nominal dimensions in inches (mm)								
Height	21 (533)		22.5 (572)		33 (838)		33.5 (851)	
Width	22.5 (572)		25 (635)		23.5 (597)		24.5 (622)	
Length	31.5 (800)		31.5 (800)		31.5 (800)		39 (991)	