Free-standing Convection Panel Heater with Integral Heat Source

Creating Heat using Heat-siphon Technology.....Heat Siphon Panel Heater

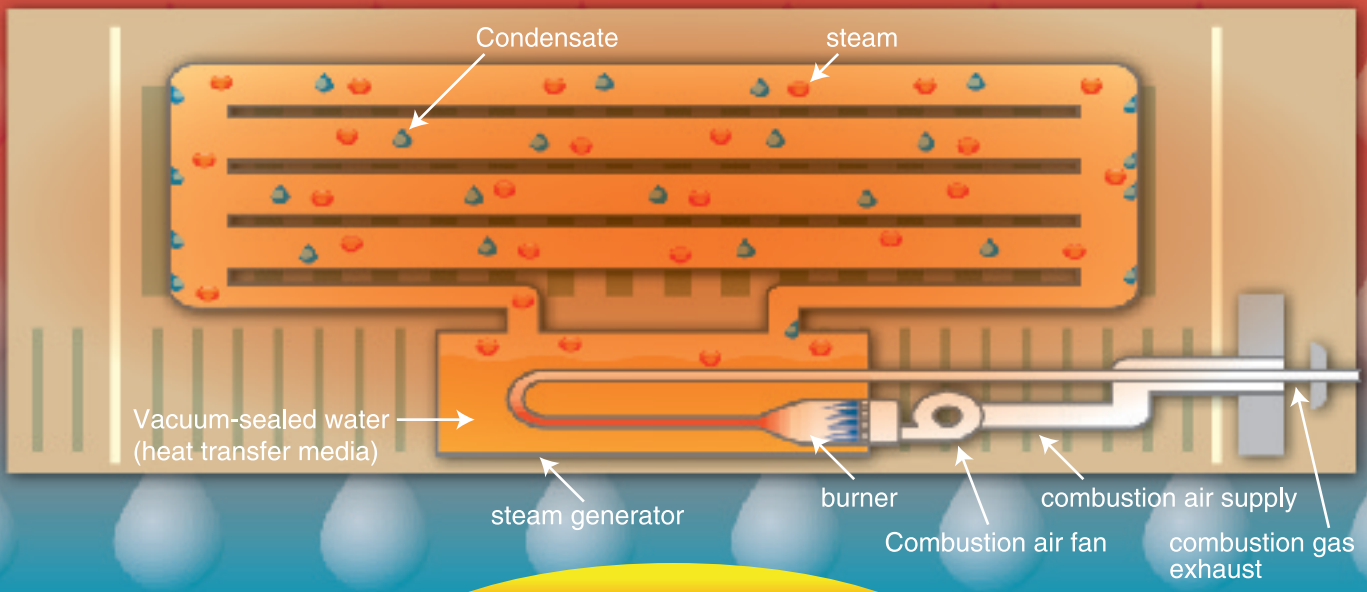
HPH

Heat-siphon Permanent Heater

Quiet, Clean, Natural Convection Room Heating

Rapid Heater Panel Temperature Rise Using Heat-siphon Technology

Vacuum-sealed Heat Generation Unit >>>>>> Coupled with <<<<<< Integral Natural Convection Heating Panel



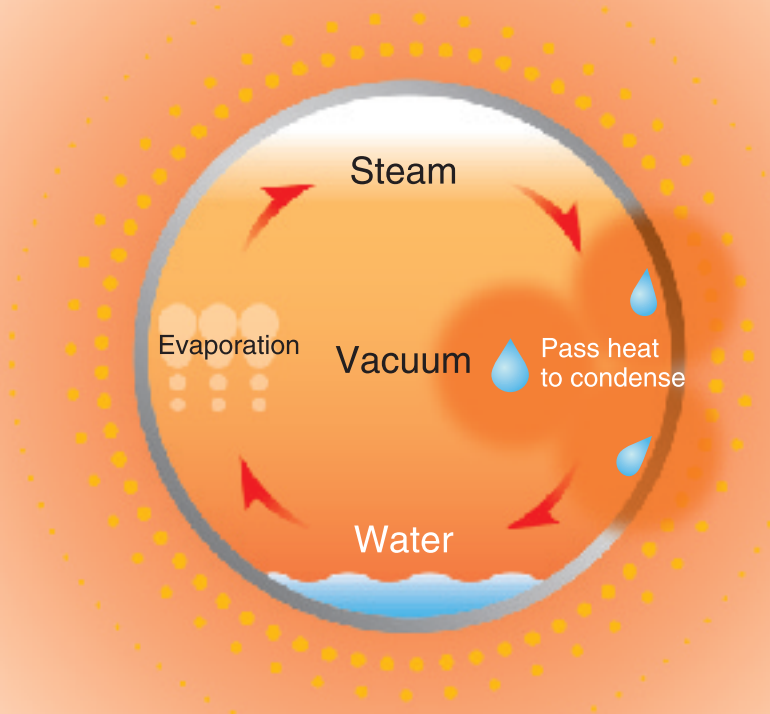
Heat-siphon Technology:
A Highly Effective
Heat Transfer Innovation

Kohno Company Limited

User Benefits of Heat-siphon Permanent Heater (HPH)

1. Cleaner and healthier: Natural convection heat delivery; no uncomfortable forced air drafts scattering dust or germs.
2. Fast Response: Rapid room temperature rise to set point
3. Comfortable: Gentle, even warmth throughout the room — like a high-tech wood stove.
4. Safe: No risks from exposed flames. Complete, redundant safety system.
5. Energy Cost Saving: Individual units allow usage flexibility, reduced fuel cost.
6. Fuel Flexibility: Oil, Nat Gas, or LPG
7. Durability: Vacuum-sealed unit is free from internal corrosion and freezing.

What is the HPH technical innovation ?



A Summary of the revolutionary Heat-siphon process:

1. Ordinary tap water is vacuum-sealed in the panel heater assembly.
2. The burner assembly heats the water, converting it to steam which migrates up into the heater panel.
3. The steam condenses in the panel, releasing its heat to the heated space by natural convection.
4. The condensed water migrates down to the steam generator where it repeats the steam generating-condensing cycle continuously.

HPH Design Features:

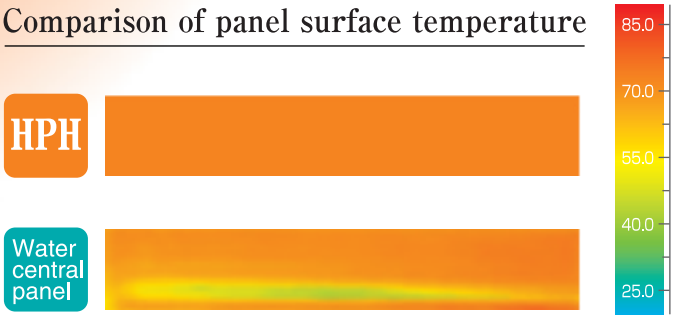
Heat-siphon Panel
Uniform, rapid temperature rise

Natural Convection Efficiency
Panel heat flux equal to hot water panel

Small, efficient integral burner
Available for three fuels: Oil, Nat Gas, and LPG

Result is: Lower installation cost
Quick room heat up
Reduced fuel cost
Reduced maintenance

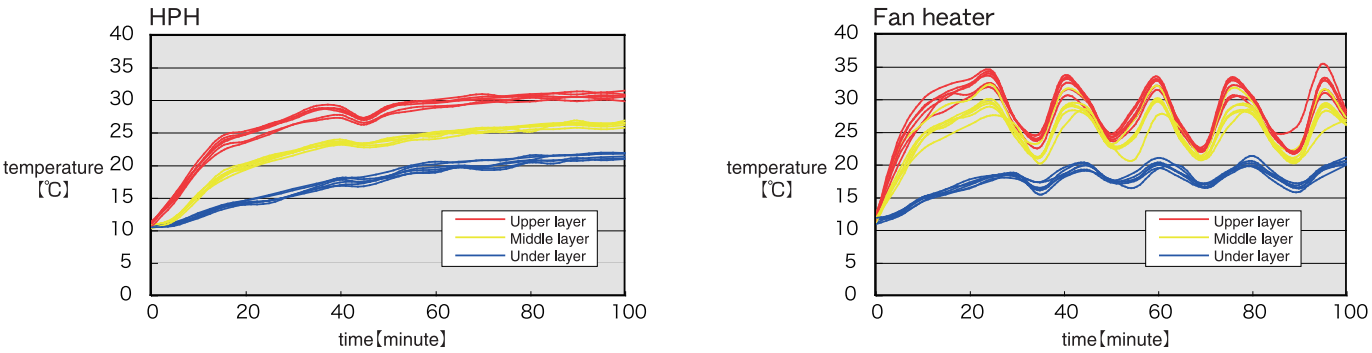
Comparison of panel surface temperature



US Patent No.: US7424887B2

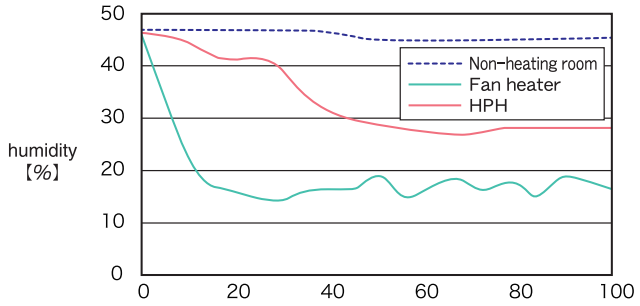
Temperature & Humidity changes (HPH vs. Fan heater)

●Temperature comparison



Measuring points: area 60m2, 6 places at 0.3m(lower), 1.2m(middle), 2.7m(upper) from the floor, total 18 positions

●Humidity comparison



Integrated control

Pinpoint heating of the room by remote control

(Central control screen)

Capability Comparisons with Other Systems (HPH is Best Overall)

HEATER COMPARISON:	HPH	Fan Heater	Water Central Heating	Electric Storage Heater
Room Temperature Uniformity	***	*	**	**
Speed of Room Temperature Rise	**	***	*	*
Energy Efficiency	***	**	*	*
CO2 Emissions	***	**	*	*
Installed Equipment Cost	**	***	*	*
Operating Cost	***	***	*	**
Maintenance Cost	***	**	*	**
Estimated System Life	25 years	10 years	20 years	20 years

Legend of System Comparison: *** = Best ** = Better * = Poor

Actual installation scenes

（Local town hall）

（nursing home for elderly）

（elementary school classroom）

<Product Specifications>

Product Name:		HPH Heat-siphon Permanent Heater							
Type:		Natural Convection, Vacuum-sealed, Panel Heater with Integral Steam Generator and Forced-air Combustion burner							
Models:									
		HPH-2000		HPH-3000		HPH-5000		HPH-7000	
[1] Heating Output:		8155 Btu/h		12693 Btu/h		21428 Btu/h		29890 Btu/h	
Fuel Combustion Conversion Efficiency		Heating Oil: 86%				Nat. Gas/LPG: 82%			
[2] Fuel Consumption [3] K: Oil [4] N: Nat. Gas [5] P: LPG		.071 gal/h 8.12 ft³ /h 3.53 ft³/h		.11 gal/h 12.71 ft³/h 5.65 ft³/h		.19 gal/h 21.54 ft³/h 9.53 ft³/h		.26 gal/h 30.02 ft³/h 13.42 ft³/h	
Gas Supply Pressure		Nat Gas: 0.284 psig; LPG: 0.397 psig							
Electric Power Source:		120V/60/1 AC							
Electric Power Consumption		Oil	Nat Gas/LPG	Oil	Nat Gas/LPG	Oil	Nat Gas/LPG	Oil	Nat Gas/LPG
	[6] maximum	600W	20W	600W	20W	600W	40W	600W	40W
	Heating	20W	20W	20W	20W	40W	40W	40W	40W
	Paused/Standby	3W	3W	3W	3W	3W	3W	3W	3W
Control System		On/Off Control							
Safety Equipment		Earthquake sensor, high temperature cut-off sensor, combustion gas pipe failure sensor, low water level sensor, ignition safety device, combustion control unit, incomplete combustion detector, high-pressure safety relief device							
Wall Penetration dim. for combustion air/exhaust pipe		80 mm/3.15 in. dia. hole to accommodate 60 mm/2.36 in. dia. combustion air & exhaust pipe/fitting							
Unit Dimensions (Exterior)		W63xH25.6x D8.5 (in.)		W63xH29.5x D8.5 (in.)		W86.6xH29.5x D8.5 (in.)		W118.1xH29.5x D8.5 (in.)	
Unit Weight		258 lbs		320 lbs		419 lbs		551 lbs	
Included Items for Installation		Air & exhaust piping/fitting, flexible exhaust pipe, exhaust expansion/contraction pipe, stop rings for exhaust pipe, air supply hose, air supply hose bands, insulation cover for exhaust pipe, wall fittings to secure piping.							

[1] Heating Output: Tested at room temperature of 22C (71.6F). Measuring tolerance of Heating Output is +/- 1%.
[2] Fuel Consumption: Fuel consumption rates are computed based on maximum burner output capacity.
[3] K: heating oil heat content: (specific gravity = 0.8) 46,300KJ/kg (19947 Btu/lb)
[4] N: natural gas heat content: 45,000KJ/m³ (1208 Btu/ft³)
[5] P: LPG heat content: 100,465KJ/m³ (2698 Btu/ft³)
[6] Maximum watts consumption is needed only for oil-fired unit for electrical preheating of internal oil reservoir during cold startup.

This specification is as of September, 2011 and is subject to change without notice.

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