

# **XTherm**

ULTRA HIGH EFFICIENCY

## **Commercial Pool Heaters**

*Models 1005, 1505, 2005*

**97% Thermal Efficiency**



*Can be vented  
with PVC pipe*

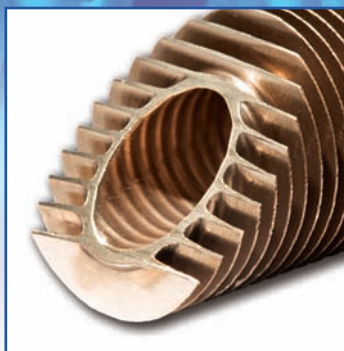
**Xtreme performance powered by**





# Xtreme Performance

## 97% thermal efficiency!



We use commercial grade Cupro-Nickel finned tubing in the primary heat exchanger. Standard copper-based heat exchangers can not stand up to the harsh environment of commercial pool heating. Your customers expect the best and Raypak delivers with professional grade commercial pool heaters.

### Raypak's Next Generation Condensing Heater

Time-honored technologies unite with cutting-edge advancements in Raypak's new XTherm® vertical heater. Never before has a vertical heater provided both the installer and pool builder such installation flexibility, ease-of-commissioning, reliability and long-term performance. Small space, not a problem. The XTherm has one of the smallest installed footprints of any vertical condensing heater. Our compact design makes it the perfect choice for those hard to reach retrofit projects. Raypak's XTherm is built with commercial-grade components and materials. From our steel channel base to our stainless steel flue wrapper, and secondary heat exchanger, you can tell the XTherm is built to last. It's easy to handle and install, but still user friendly to service. Now is the perfect time to take a closer look at Raypak.

### Flexibility

Industry-leading vent length allowances afford greater vent location options, thus reducing wasted space. Vent versatility is further enhanced by the self-tuning combustion system which compensates for unusual chimney and vent configurations.



Optional PVC Vent

**Category IV** - CSA-certified 97% efficiency at full fire for water heaters in pool applications. When the job requires high efficiency, XTherm meets your needs. The XTherm can use either AL29-4C stainless steel, PVC or CPVC for venting. Just specify the D-32 vent option when using PVC vent.

At the heart of every Raypak XTherm is a unique integral evaporator system - the first defense against condensation in the primary heat exchanger. Raypak's evaporator system collects and re-evaporates condensate which may form during initial start-up.

### Simplicity

The Raypak XTherm will precisely heat your pool. Utilizing the latest European technology for the combustion-components, the optimum fuel-air ratio is maintained throughout the entire range of the load-tracking operation. The XTherm automatically self-tunes to accommodate the widest range of gas supply pressures. The high quality integrated blower-gas valve is self-correcting and allows smooth operation with fluctuating gas supply pressures. The Raypak XTherm is cutting edge technology with atmospheric simplicity.

### Key Features

- PVC vent capable - optional at time of order
- 3 models from 1,000,000 to 2,000,000 BTUH
- 97% thermal efficiency at full fire in pool applications
- Minimum continuous inlet water temperature (50°F)
- Small footprint, less than 11 square feet
- AB 1953 low lead compliant
- On-board diagnostic center, real English, no codes
- All models indoor/outdoor certified
- Complete cabinet protects all controls and wiring
- Meets all current Low NOx regulations, including the new 2010 SCAQMD revisions
- Suitable for altitudes up to 10,000 ft. (derate above 5,000 ft.)
- Equipped with all cupro-nickel, bronze and stainless steel waterways

Think Green



Think Raypak



### 1. Low Voltage Wiring Terminal

Up front and easy to get to. Makes sensor wiring and BMS wiring simple and clean.

### 2. On Board Diagnostic Center

Factory-mounted standard equipment. Gives relevant service feedback as well as possible solutions to clear the fault. All in plain english, no cryptic codes to decipher. The control also stores up to 16 fault codes in its history file for the service technician to review.

### 3. TempTracker Mod Controller

Standard equipment on the XTherm. This factory-mounted multi-function control delivers precise temperature control with selectable mode displays that are easy to access and read.

### 4. Combustion Air Fan

Cast aluminum, non-sparking construction. The state of the art variable-speed fan is controlled by the TempTracker Mod and works in smooth harmony with the main gas valve.

### 5. Dungs Gas Valve

The XTherm uses a state-of-the-art main gas valve manufactured in Germany. This precision gas valve works in perfect unison with the combustion air fan. The result is silky smooth light-offs.

### 6. Flow Switch

Monitors water flow and provides safe shut down if water flow drops below the minimum required.

### 7. Vent Pressure Switch

Monitors vent pressure and provides safe shut down if back pressure is excessive.

### 8. Gas Inlet

The XTherm will operate at 100% full rate with gas pressures as low as 4.0" w.c.

### 9. Water Outlet



### 10. Heater Pump

Sometimes referred to as the primary pump. This fixed speed pump keeps flow constant through the primary heat exchanger.

### 11. Water Inlet

The XTherm can accept 50°F continuous inlet water temperature.

### 12. Cold Water Run Pump

The XTherm comes factory equipped with a built in Cold Water Run system. This advanced water control system keeps the inlet water temperature to the primary heat exchanger above 120°F, regardless of the incoming water temperature. It constantly self adjusts and regulates the incoming water flow while still maintaining a constant  $\Delta T$  in the heat exchanger.

### 13. Flue Outlet

The stainless steel flue outlet is compatible with AL29-4C. PVC or CPVC vent material may be used in conjunction with the D-32 vent option on the XTherm. Dramatically cut your installation costs by using these non-metallic vent materials.

### 14. Stainless Steel Secondary Heat Exchanger

Recovers waste heat to boost efficiency up to 97%. The XTherm utilizes a separate high-grade stainless steel heat exchanger. This allows the corrosive combustion condensate to be collected safely without damaging the heater. There is a condensate disposal connection on the rear of the heater. The XTherm is also equipped with a condensate switch that will sense a blocked condensate drain, which protects the heater.



### 15. Vertical Primary Heat Exchanger

Cylindrical, multi-pass heat exchanger captures all radiant energy, eliminating the need for heavy refractory.

### 16. Drain Valve

One of two drain valves located at the bottom of the heat exchanger. A third drain valve is located on the secondary heat exchanger. This allows for complete winterizing and drainage of the heater.

### 17. Viewing Port

Allows for easy burner inspection.

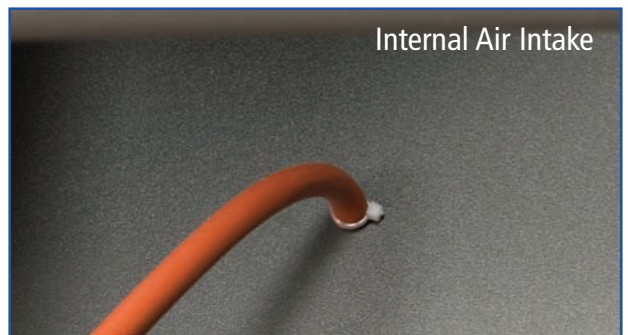
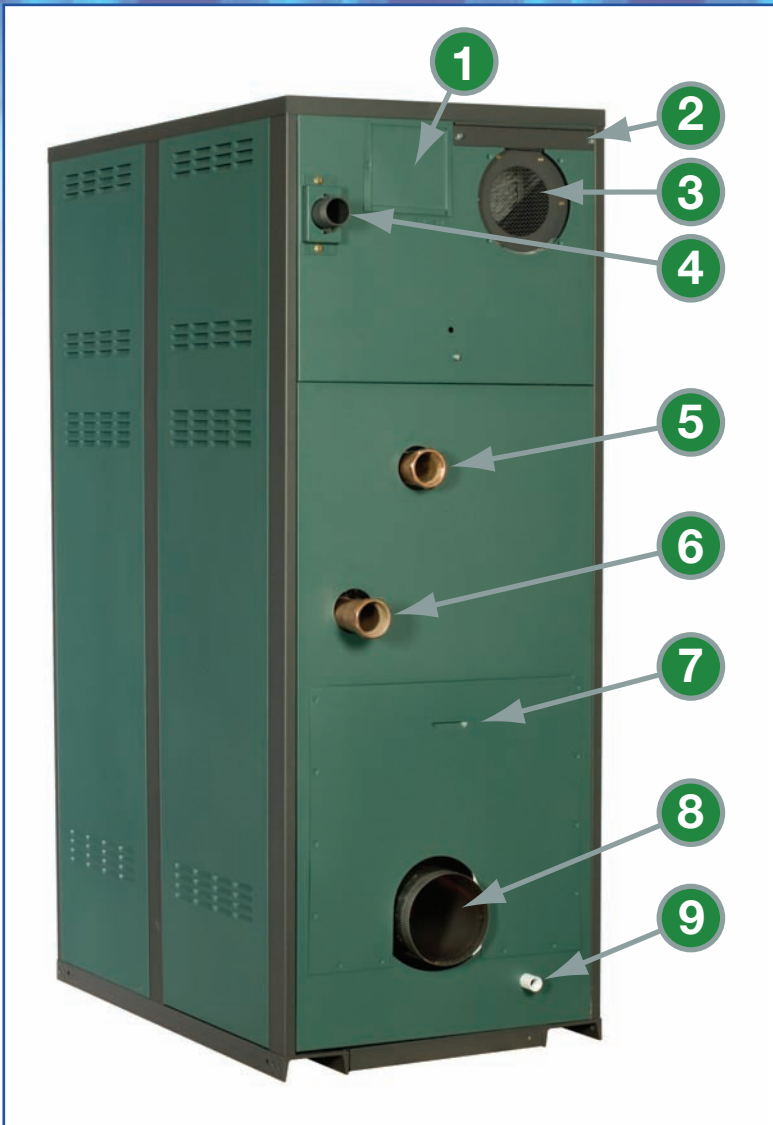
### 18. Weather-Proof Jacket

Heavy gauge galvanized steel with a UV-resistant Polytuf powder coat is impervious to weather and corrosion. The Polytuf coating passes the 1000 hour salt spray test (ASTM B117).



# Xtreme Versatility

Can be installed indoor or outdoors!



**1. High Voltage Wiring Box**  
120VAC connections.

**2. Removable Air Filter**  
Provides easy access and is easily removable for inspection and replacement. 12"x20"high capacity filter is rated MERV 8 (95% - 98% arrestance.)

**3. Direct Vent Capability**  
Every XTherm is direct vent capable. By installing the optional vent pipe adapter (D-18) and air plenum plug, your XTherm is ready for direct vent. This makes it ideal for storage of pool chemicals in the same room as the XTherm. Damaging chemicals are not in contact with the heat exchanger or combustion chamber.

**3a. Outdoor Cover**  
If your job requires outdoor installation, an optional air

vent plug easily screws on to cover the direct vent air intake. The combustion air will then be drawn from inside the heater through screened plenum openings. *See photo above right.*

**4. Gas Inlet**  
The XTherm will operate at 100% full rate with gas pressures as low as 4.0"w.c.

**5. Water Outlet**

**6. Water Inlet**  
The XTherm can accept as low as 50°F continuous inlet water temperature without damage to the primary heat exchanger.

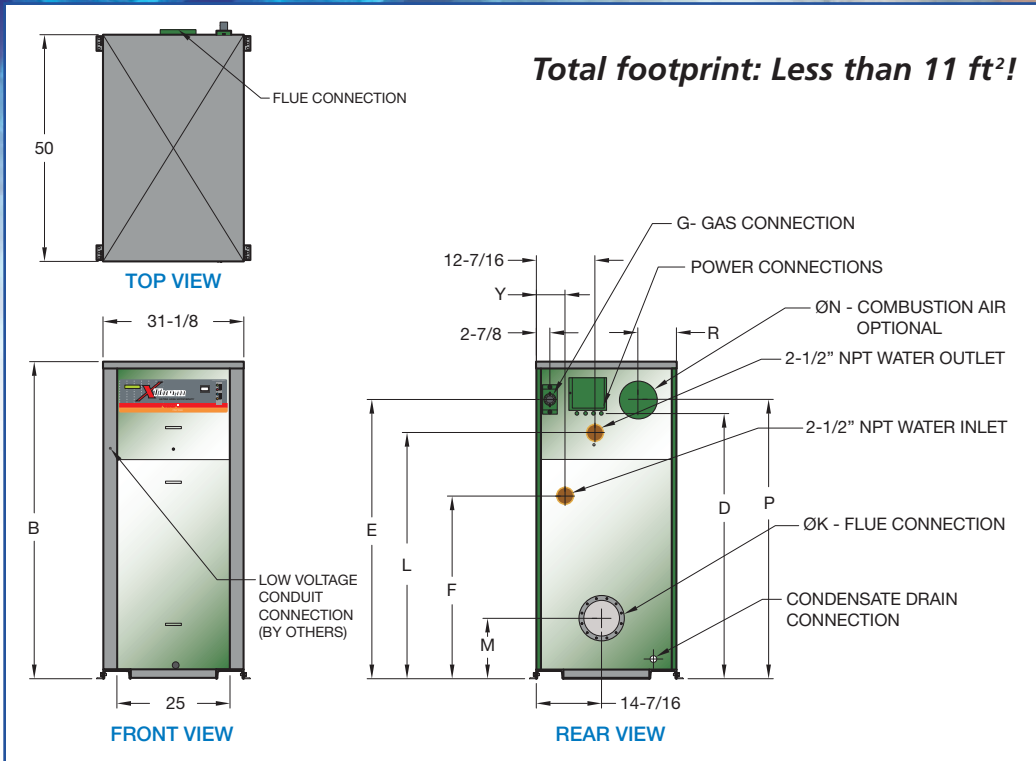
**7. Access Panel to Cold Run Pump**  
Easily removable access panel even when unit is

plumbed in place. Provides full access to inspect and service the Cold Run Pump system and condensate drain switch.

**8. Flue Outlet**  
The stainless steel flue outlet is compatible with AL29-4C. For a dramatic cost reduction over Category IV stainless steel, PVC or CPVC vent material may be used in conjunction with the D-32 vent option.

**9. Condensate Drain**  
3/4"NPT PVC connection for condensate removal. Raypak offers optional condensate neutralizer kits (Z-12) that can be plumbed between the heater and the drain.

# Xtremely Small Footprint



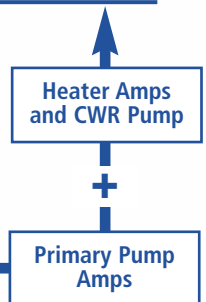
PHYSICAL DATA	Model	Dimensions (inches)											Operating Weight (lbs.)	Heater Amps <sup>†</sup>	
		B Ht.	D	E	F	G* NPT	K Flue Ø	L	M	N C/A Ø	P	R			Y
	1005	55-1/8	45	47-1/8	36-1/2	1-1/4	6	40-1/16	11-1/2	6	47-1/8	8-1/16	6-1/16	1065	15
	1505	67-1/8	57	59-1/16	38-1/2	1-1/4	8	52-1/16	12-5/8	8	59-1/8	8-3/16	6-1/16	1234	15
	2005	81-1/8	71	71-3/16	38-1/2	2	8	64-1/16	12-5/8	8	73-1/8	8-3/16	6-1/4	1461	21

\*For propane gas, all models are 1-1/4" NPT.

†Amp load does not include primary heater pump; a separate 120 VAC electrical connection must be supplied for the primary pump.

MBTUH	Model	MBTUH Input	Pool Heater	
			Output	Efficiency
	1005	999	969	97%
	1505	1500	1455	97%
	2005	1999	1939	97%

XTherm Model	Primary Pump Sizes	
	HP	Amps
1005	1/2	7
1505	3/4	11
2005	1	14



Add heater amps to pump amps to find total amp draw.

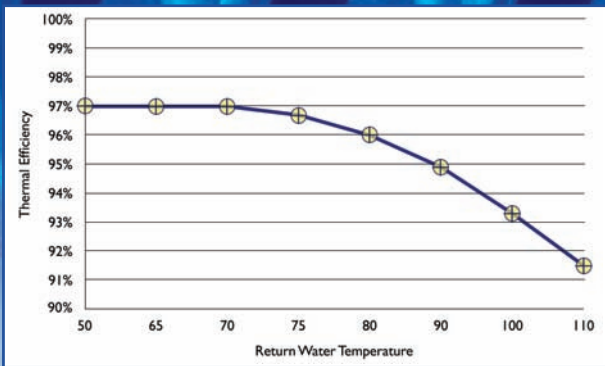
CLEARANCES	Heater Side		From Combustible Surfaces (min.)	For Service (Minimum)
	Heater Side	From Combustible Surfaces (min.)		
	Floor*		0	N/A
	Rear		12	36
	Right Side		1	24
	Left Side		1	1
	Front		24	24
	Top	Indoor	0	10
		Outdoor	Unobstructed	Unobstructed
	Vent Stack	Indoor	1	N/A
	Vent Cap	Outdoor	12	12

\* Do not install on carpeting Note: Local codes may require increased clearances

**Salt Water Chlorination**  
 The XTherm can be used with pools that are sanitized via Salt Water Chlorination; up to 3000 PPM.  
 As with all Raypak heaters, please feel free to contact your local Raypak representative or our Applications Department for assistance with planning your next installation.



# Xtreme Pumping



25 meters X 25 meters X 1-1/2 meters deep				
BTUH	Annual Fuel Usage			
	Efficiencies			
	68%	78%	82%	97%
2,000,000	\$26,243	\$22,039	\$20,712	\$16,898

Using one 2,000,000 BTUH Heater

50 meters X 25 meters X 2 meters deep				
BTUH	Annual Fuel Usage			
	Efficiencies			
	68%	78%	82%	97%
4,000,000	\$80,653	\$66,424	\$62,047	\$49,756

Using two 2,000,000 BTUH Heater

The annual fuel usage is based on maintaining an indoor swimming pool at 80°F for 6 months of the year and using a fuel cost of \$1.00 per therm.

## How to use the table below:

1. Select the desired temperature of the pool water.
2. Determine the mean (average) temperature of the month in which the pool will be used.
3. Subtract the mean temperature from the desired swimming temperature. The difference is the temperature rise.
4. Calculate the surface area of the pool in square feet.
5. Under the column headed by the temperature rise, determined in Step 3, find the number closest to, but not less than, the pool surface area from Step 4. The left-hand column will give you the correct model heater.

## Sizing Formula

BTUH INPUT REQUIRED = (Pool Surface Area square feet) X (Temperature Rise) X (15)  
This formula is based upon a 1° to 1-1/4° F temperature rise per hour and an average 3-1/2 MPH wind velocity.

Where high-wind conditions exist, select one size larger than determined by the formula.

## Rapid Heating

For 1-1/2°F rise per hour: Increase BTUH input by 50%.

For 2°F rise per hour: Increase BTUH input by 100%.

Always select a heater equal to or larger than the requirement. Over-sizing generally reduces fuel costs.

Model	Input	Output	Desired Temperature Rise (Degrees F)				
			20°	25°	30°	35°	40°
1005	999,000	969,030	4,153	3,322	2,769	2,373	2,076
1505	1,500,000	1,455,000	6,236	4,989	4,157	3,563	3,118
2005	1,999,000	1,939,030	8,310	6,648	5,540	4,749	4,155

Number in box indicates surface area of pool

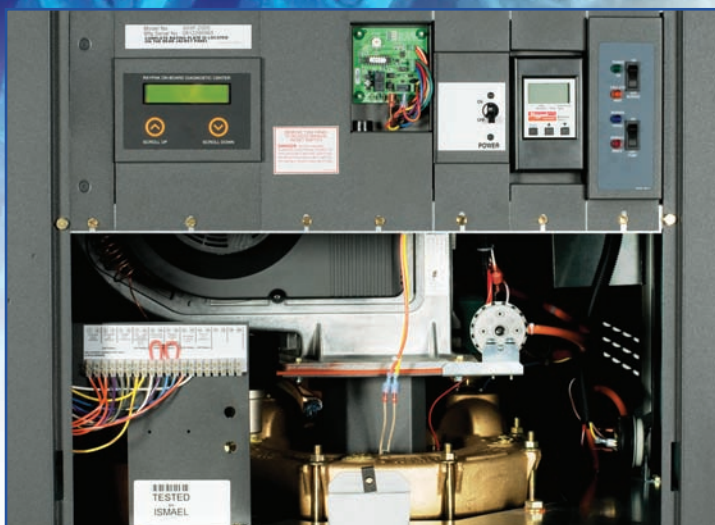


## Cold Water Run System

The XTherm comes standard with a state-of-the-art Cold Water Run system factory mounted and plumbed. Raypak's Cold Water Run system provides constant protection against condensation in the primary heat exchanger. The system utilizes a variable speed pump to inject just the right amount of water from the main system loop into the heater to maintain the optimum inlet temperature. This allows the full capacity of the heater to be utilized to meet the system load, while at the same time continuously maintaining the optimum inlet water temperature to prevent condensation in the primary heat exchanger. All of this keeps the condensate where it belongs, in the stainless steel secondary heat exchanger.



# Xtreme Control



## Simple Serviceability

Raypak's easy-to-understand user interface, including on-board diagnostics and LED operating status lights, tells the technician all he needs to know. All service/repair components are readily accessible from the front or side for maximum installation flexibility. To enhance serviceability, the control box is completely removable allowing total access.

## TempTracker Mod

Raypak's XTherm comes standard with TempTracker Mod control. The control monitors and displays inlet and outlet temperatures. Adjustable limits prevent over-cycling, saving energy and extending the life of the heater. Your XTherm is never down with a sensor failure thanks to Raypak's exclusive TempTracker software. It can operate with as little as one functioning sensor, keeping you up and running until service arrives.

- Factory set PID logic
- 4-20ma output
- LCD Display
- Freeze Protection

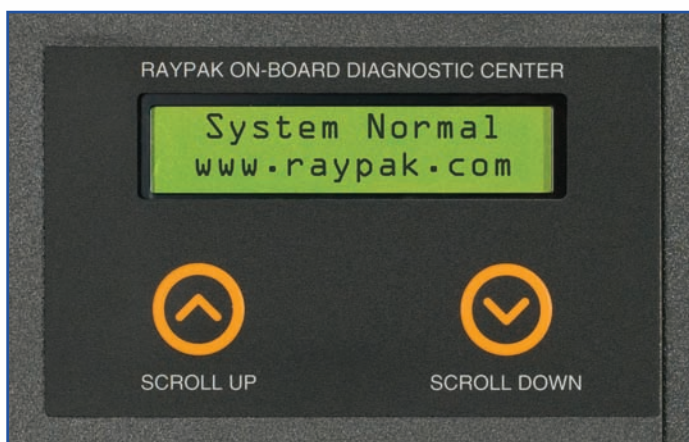
## On-Board Diagnostic Center

Raypak's XTherm comes equipped with a microprocessor-controlled diagnostic control center that displays its information on a 2x20 character LCD display in plain English. This control monitors system safeties, ignition faults and system status, while storing up to 16 reported faults. Raypak's diagnostic center monitors the fault outputs of the Fenwal ignition control, converting the Fenwal's fault codes into real English that anyone can understand. The control is also equipped with a SPDT dry contact relay output that is switched anytime a safety fault occurs. This can be used for a heater alarm or a safety interface.

### Example Diagnostic Fault Report:

**Water Flow Sw Fault**  
**Check Boiler Pump, Purge Air, Replace Flow Switch**

Note: Diagnostic information rotates



## Diagnostic Information

### Safety Faults

- PVC Vent Limit
- Condensate Drain
- Manual High Limit
- Auto High Limit
- Low Water Cut-off
- Vent Pressure
- High Gas Pressure
- Low Gas Pressure
- Controller Alarm
- Flow Switch
- Blower Switch
- Factory Option
- External Interlock
- Cold Water Run

### Ignition Control Faults

- Low Air
- Flame- No CFH
- Ignition Lockout
- Low HSI Current
- Low 24VAC
- Internal Control Fault



HEAT EXCHANGER	ASME, National Board Registered, 160 PSI	• HLW Stamp	●
	Heat Exchanger Tubes	• Cupro Nickel	●
	Bronze Headers		●
	Stainless Steel Condensing Heat Exchanger	• U Stamp	●
	Pressure Relief Valve (Mounted on Outlet) (Currently Shipped Loose)	• 125 PSI	●
	Temperature & Pressure Gauge		●
	Pump - Primary	• 120V, Single-Phase	●
JACKET	Indoor/Outdoor Certified		●
	Vent Terminal	• Outdoor • Through-the-Wall	○
	Fully-Enclosed Controls		●
	Combustible Floor Rated		●
OPERATING CONTROLS	120V Power Supply with 120V/24V Transformer		●
	On/Off Switch		●
	Programmable Pump Time Delay, Single-Phase	• Included in TempTracker Mod Controller	●
	Terminal Block Connections (Front mounted)	• Enable / Disable • External Interlocks • 0-10 VDC Setpoint/Direct Drive Input	●
	LCD diagnostic display with 16-Event History (2x20 character display, reads in plain English)		●
	Status Display Lights (4)		●
	Temperature Controller with 3 Water Sensors	• TempTracker Mod	●
	Multiple Heater Controller	• TempTracker Mod+, up to 16 heaters	○
SAFETIES	Hot Surface Ignition System	• 1-try • 3-try	○
	High/Low Gas Pressure Switches		○
	Blocked Vent and Air Pressure Switches		●
	High Limit Switch	• Manual Reset, Fixed • Manual Reset, Adjustable • Automatic Reset, Adjustable (Shipped Loose)	●
	Low Water Cut-Off, 24V	• With Manual Reset and Test Buttons	○
	Flow Switch		●
GAS TRAIN	Combination Gas Valve		●
	Combustion Air Blower		●
	Additional Safety Valve	• Motorized (externally mounted) • Solenoid (externally mounted)	○
OTHER	CSA-Certified Efficiency	• 97% at Full Fire	●
	Air Filter		●
	TruSeal Direct-Vent Ready		●
	PVC Vent Adapter Option D-32 (Factory installed only)		○
	Alarm System		○
	CSD-1 / GE GAP Control System		○
	Low NOx	• Meets all current requirements	●
	Cold Water Run - Variable Speed Pump	• Prevents condensation in primary heat exchanger	●

● = Standard    ○ = Optional

