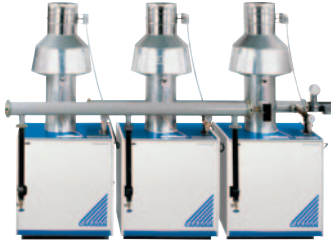


Look for our
Hydronic Explorer app
on iTunes, Google Play and at
www.hydroneexplorer.com
(Works on iPad, iPhone & Android devices)



Caravan Modular Boiler System

Cast-Iron, gas or oil-fired, hot water or steam boilers.



CHS Multiple Boiler System

Modulating condensing gas-fired, high efficiency boilers.



Jaguar Multiple Boiler System

Modulating condensing gas-fired, high efficiency boilers.



"Hybrid" Boiler System

Modulating high efficiency boilers with regular boilers



Intelligent ways to save fuel heating your Commercial building

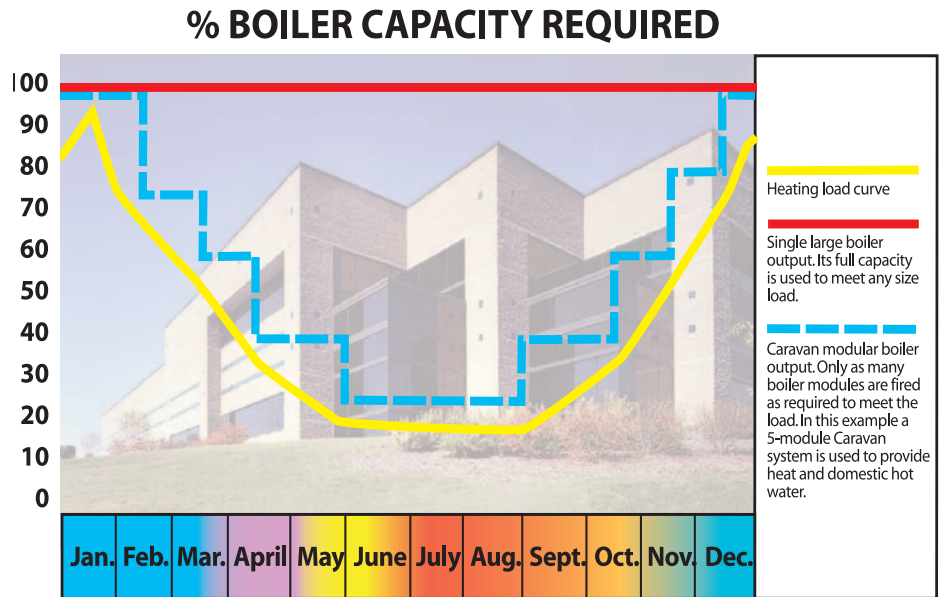


www.slantfin.com

Large boilers waste fuel money because they're oversized 90% of the year.

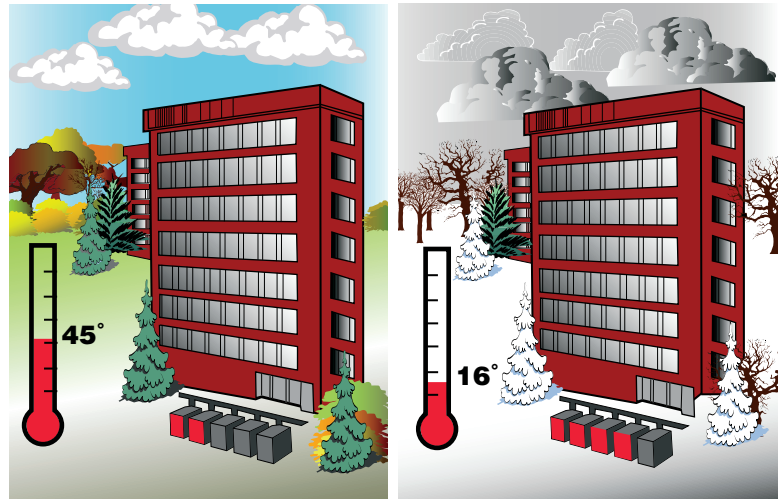
A typical single boiler's full output is generally needed for less than 10% of the year, when the coldest weather occurs. The rest of the time it wastes fuel because it fires at full capacity to meet a partial load. For much of the year, a single large boiler operates at less than 50% efficiency.

Optimize hydronic heating efficiency in smaller commercial buildings with modular and multiple boiler systems. Proven again and again over the years that these boiler systems are more efficient than single large input boilers. They're also easier to install, especially in retrofit.



Caravan modular boilers “step-fire” to use less fuel than a single big boiler.

- Step firing matches boiler output to load
- Reduces fuel bills by 20 to 40%
- Microprocessor controls monitor conditions, determine Caravan firing mode
- Wasteful “short cycling” eliminated



Controls and accessories for Caravan cast-iron modular boiler systems.

SC-Series controls for Caravan modular boilers optimize performance and save energy for small or large systems.

Slant/Fin SC-Series microprocessor controls maximize fuel savings of your Caravan modular boiler system. Not only do these “smart” SC-Series controls adjust supply water temperature based on outdoor and indoor air temperature, they actually anticipate future needs through computer logic. The controller then fires the right number of modules to maintain building comfort. “Installer friendly.” You enter simple parameters; the controller makes the calculations. The controller automatically calculates setpoint, reset ratio and control band.



SC-Series control features

- Step-fires boiler modules using computer logic
- Maximizes fuel savings
- Monitors outdoor temperature to determine boiler water temperature
- Integrates control of space heating and domestic hot water
- Interfaces with building automation system
- Designed specifically for Slant/Fin Caravan gas, or oil-fired boiler systems
- Lead/lag equalizes equipment usage
- Easy to program
- Detailed, user-friendly documentation and high caliber factory support

Model SC-3 Three stage operation. Space heating only.

Model SC-9 Nine stage operation. Space heating, domestic water or combination

Caravan Modular Boilers: The smart way to heat your building.

Gas-Fired Hot Water Models

Model No.	No. of Heating Modules	Module Model No.	Ratings for Natural and L.P. Propane Gases				Thermal Efficiency %
			C.S.A. Input (MBH)	Gross Output (MBH)	AHRI Net Output (MBH) †	Net Rating (Sq. Ft.) Water ‡	
GGT-600E	2	GG-300ES	600	486	422	2814	81.1
GGHT-700E ^c	2	GG-350HES	700	570	496	3306	81.4
GGHT-750E	2	GG-375HES	750	606	526	3506	80.9
GGHT-800E	2	GG-399HES	798	644	560	3735	80.6
GGT-900E	3	GG-300ES	900	729	633	4221	81.1
GGHT-1050E ^c	3	GG-350HES	1050	855	744	4959	81.4
GGHT-1125E	3	GG-375HES	1125	909	789	5259	81.9
GGHT-1200E	3	GG-399HES	1197	966	840	5601	80.6
GGT-1200E	4	GG-300ES	1200	972	844	5628	81.1
GGHT-1400E ^c	4	GG-350HES	1400	1140	992	6612	81.4
GGHT-1500E	4	GG-375HES	1500	1212	1052	7012	80.9
GGT-1500E	5	GG-300ES	1500	1215	1055	7035	81.1
GGHT-1600E	4	GG-399HES	1596	1288	1120	7468	80.6
GGHT-1750E ^c	5	GG-350HES	1750	1425	1240	8265	81.4
GGHT-1875E	5	GG-375HES	1875	1515	1315	8765	80.9
GGHT-2000E	5	GG-399HES	1995	1610	1400	9335	80.6
GGHT-2100E ^c	6	GG-350HES	2100	1710	1488	9918	81.4
GGHT-2250E	6	GG-375HES	2250	1818	1578	10518	80.9
GGHT-2400E	6	GG-399HES	2394	1932	1680	11202	80.6
GGHT-2450E ^c	7	GG-350HES	2450	1995	1736	11571	81.4
GGHT-2625E	7	GG-375HES	2625	2121	1841	12271	80.9
GGHT-2800E	7	GG-399HES	2793	2254	1960	13069	80.6
GGHT-2800E ^c	8	GG-350HES	2800	2280	1984	13224	81.4
GGHT-3000E	8	GG-375HES	3000	2424	2104	14024	80.9
GGHT-3150E ^c	9	GG-350HES	3150	2565	2232	14877	81.4
GGHT-3200E	8	GG-399HES	3192	2576	2240	14936	80.6
GHT-3375E	9	GG-375HES	3375	2727	2367	15777	80.9
GGHT-3500E ^c	10	GG-350HES	3500	2850	2480	16530	81.4
GGHT-3600E	9	GG-399HES	3591	2898	2520	16803	80.6
GGHT-3750E	10	GG-375HES	3750	3030	2630	17530	80.9
GGHT-4000E	10	GG-399HES	3990	3220	2800	18670	80.6



Caravan Modular Boiler System

- 600,000 to multi-million Btuh input
- Hot water and steam
- Gas, oil, power gas
- Working pressure to 100 psi
- Thermal efficiency up to 81.9% for gas, up to 85.5% for oil

Cast-Iron Caravan Modules:

- Robust, long life design
- Big boiler heating capacity-small boiler simplicity
- Built-in back-up. If one module fails, the others continue to operate.
- Easy service with standard off the shelf controls and accessories.
- Lower maintenance cost -no special tools and controls needed
- 10 year factory limited warranty
- Advanced design cast-iron sections for long life

Gas-Fired Steam Models

Model No.	C.S.A. Input (BTU/HR)	Gross Output	Net AHRI Rating (Steam) (MBH) †	Net Rating (Steam Sq Ft.) §	No. of Modules	Thermal Efficiency %
GXHT-600HEZ	600	478	358	1492	2	79.70
GXHT-900HEZ	900	717	537	2238	3	79.70
GXHT-1200HEZ	1200	956	716	2984	4	79.70
GXHT-1500HEZ	1500	1195	895	3730	5	79.70

Oil-Fired Hot Water Models

Model No.	Ratings for No. 2 Oil					No. of Heating Modules	Thermal Efficiency %
	AHRI Firing Rate (GPH)*	Input (BTU/HR)	Gross Output (MBH)	AHRI Net Output (MBH) †	Net Rating (Water) (Sq. Ft.) ‡		
LDWO-600-2-5	4.30	602	500	435	2900	2	82.5
LDWO-750-2-6	5.20	728	602	523	3453	2	82.7
LDWO-850-2-7	6.00	840	711	618	4120	2	84.6
LDWO-900-3-5	6.40	896	750	652	4347	3	82.5
LDWO-1100-3-6	7.80	1092	903	785	5235	3	82.7
LDWO-1300-3-7	9.00	1260	1166	927	6180	3	84.6
LDWO-1700-4-7	12.00	1680	1421	1236	8240	4	84.6
LDWO-2100-5-7	15.00	2100	1777	1545	10300	5	84.6
LDWO-2500-6-7	18.00	2520	2132	1845	12360	6	84.6
LDWO-2900-7-7	21.00	2940	2487	2163	14420	7	84.6
LDWO-3400-8-7	24.00	3360	2843	2472	16480	8	84.6

Oil-Fired Steam Models

Model No.	Ratings for No. 2 Oil					No. of Heating Modules	Thermal Efficiency %
	AHRI Firing Rate (GPH)*	Input (BTU/HR)	Gross Output (MBH)	AHRI Net Output (MBH) †	Net Rating (Steam) (Sq. Ft.) §		
LDZO-600-2-5	4.3	602	497	373	1554	2	82.5
LDZO-750-2-6	5.2	728	622	467	1946	2	85.5
LDZO-850-2-7	6.0	840	699	526	2192	2	83.2
LDZO-900-3-5	6.4	896	740	555	2311	3	82.5
LDZO-1100-3-6	7.8	1092	934	700	2918	3	85.5
LDZO-1300-3-7	9.0	1260	1048	789	3287	3	83.2
LDZO-1700-4-7	12.0	1680	1398	1051	4379	4	83.2
LDZO-2100-5-7	15.0	2100	1747	1314	5474	5	83.2

*Ratings apply to the use of oil at 140,000 BTU per gallon.

WHY ENGINEERS, BUILDING OWNERS AND HEATING PROFESSIONALS CHOOSE CARAVAN MODULAR BOILERS

- Step-firing saves fuel - boiler "size" changes to closely match boiler output to heating demand
- Boiler modules may be installed virtually anywhere in the building
- Lower installed cost, easier to service than large single input boilers
- Cast-iron heat exchangers provide long life, reliable performance
- Built-in standby, reliable
- Low maintenance
- Advanced microprocessor controls optimize energy savings
- Slant/Fin technical support is just a phone call away; specification details available online



Slant/Fin Liberty Oil Fired Modules

† Net ratings are based on a piping and pick-up allowance of 1.15 for hot water & 1.33 for AHRI pick-up and piping allowances for steam. Slant/Fin should be consulted before selecting a boiler for installations having unusual piping and pick-up requirements. Ratings must be reduced by 4% at 2,000 feet elevation and an additional 4% for every additional 1,000 feet elevation over 2,000 feet. Slant/Fin should be consulted before selecting a boiler for installations having unusual piping and pick-up requirements.

‡ Based on 150 Btuh per square foot E.D.R at 170°F average water temperature.

§ Based on 240 Btuh per square foot E.D.R. at 215°F steam temperature.

c For use with natural gas. For Propane (L.P.) gas consult factory.

NOTES:

1. Many state and local codes require intermittent ignition devices for gas boilers. Please specify if necessary.
2. FOR LARGER SIZES, USE MULTIPLES OF THE ABOVE. Modules in excess of those shown above should be piped in parallel in two or more batteries.

FOR COMPLETE SPECIFICATIONS, REFER TO CARAVAN APPLICATION GUIDES AND ENGINEERING BULLETINS.

High efficiency boilers: The clever way to heat your building.

Jaguar CARAVAN

Condensing Multiple Boiler Systems

The Jaguar Modulating Condensing High Efficiency Multiple Boiler System

- Up to 96.1% thermal efficiency at minimum input
- 390,000 Btu's max input per boiler
- Modulation down to 110,000 Btu's
- For single and multiple boiler applications
- PVC venting up to 100'
- Cast aluminum alloy heat exchanger
- Natural Gas
- Built-in digital cascading control with outdoor reset for up to 8 boilers
- Floor Standing
- Up to 80psi max working pressure (ASME)



Aluminum Heat Exchanger



Boiler Dimensions: 52 7/8" H x 23 3/8" W x 30" D



Built-in cascading control
for up to 8 boilers

Ratings

Model No.	CSA Input (MBH)		Gross output (MBH)	AHRI Net †	Thermal Efficiency % at Maximum Input	Combustion Efficiency % at Maximum Input
	Max	Min				
J-390	390	110	352	306	90.2%	91.6%

Jaguar Multiple Boiler Ratings (Based on performance of J-390 Model)

Consists of		Input (MBH)		Gross output (MBH)	Net output (MBH) †		Turndown Ratio
No. of Htg. Boiler	Boiler Model No.	Max	Min		Max	Min	
2	J-390	780	110	704	612	92	7 to 1
3	J-390	1170	110	1056	918	92	10.6 to 1
4	J-390	1560	110	1408	1224	92	14.2 to 1
5	J-390	1950	110	1760	1530	92	17.7 to 1
6	J-390	2340	110	2112	1836	92	21.3 to 1
7	J-390	2730	110	2464	2142	92	24.8 to 1
8	J-390	3120	110	2816	2448	92	28.4 to 1

† Net ratings are based on piping and pick-up allowance of 1.15. Slant/Fin should be consulted before selecting a boiler for installation having unusual piping and/or pick-up requirements.

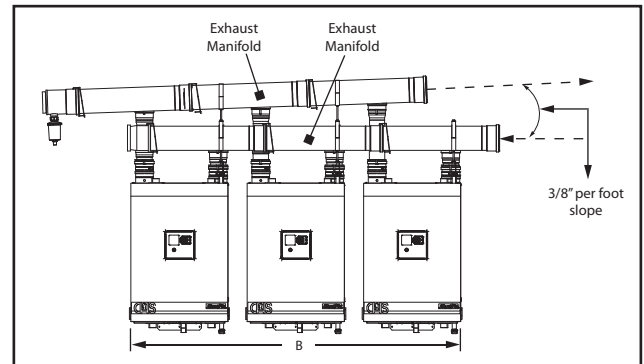
High Efficiency condensing boilers maximize fuel savings. With efficiencies up to 96%, it is easy to get dramatic fuel savings over other typed of systems. The advanced technology of either the Jaguar or CHS Boiler is the perfect way to save fuel.

CHS CARAVAN

Condensing Multiple Boiler Systems

The CHS Modulating Condensing High Efficiency Boiler

- 95% Thermal Efficiency
- Stainless steel, down-fired fire tube design
- Two models 300 and 399,000 BTU/Hr
- Full modulation: 5:1 turndown
- Advanced Honeywell Sola Boiler Controller with backlit screen display
- Low NOx operation—Environmentally friendly
- Venting to 150'
- Free standing or wall hung
- ASME Certified Heat Exchanger - up to 75 psi
- Top or Bottom Connections
- Natural or L.P. gas
- Cascading control for up to 8 boilers



2 or 3 Boiler Common Venting Option

Ratings CHS-399

Boiler Model	CSA Input (MBH)		Gross output (MBH)	AHRI Net † (MBH)	Thermal Efficiency %	Combustion Efficiency %
	Max	Min				
CHS-399	399	79.8	380	330	95.4%	96%

Boiler Model	No. of Heating Boilers	Input (MBH)		Gross output (MBH) Max	Net Rating (MBH) Max	Water Content Gal.	Turndown Ratio
		Max	Min				
CHS399	2	798	79.8	760	660	12.8	10 to 1
CHS399	3	1197	79.8	1140	990	19.2	15 to 1
CHS399	4	1596	79.8	1520	1320	25.6	20 to 1
CHS399	5	1995	79.8	1900	1650	32.0	25 to 1
CHS399	6	2394	79.8	2280	1980	30.4	30 to 1
CHS399	7	2793	79.8	2660	2310	44.8	35 to 1
CHS399	8	3192	79.8	3040	2640	51.2	40 to 1

Ratings CHS-300

Boiler Model	CSA Input (MBH)		D.O.E. Capacity (MBH)	AHRI Net † (MBH)	AFUE %
	Max	Min			
CHS-300	299	79.8	278	239	94%

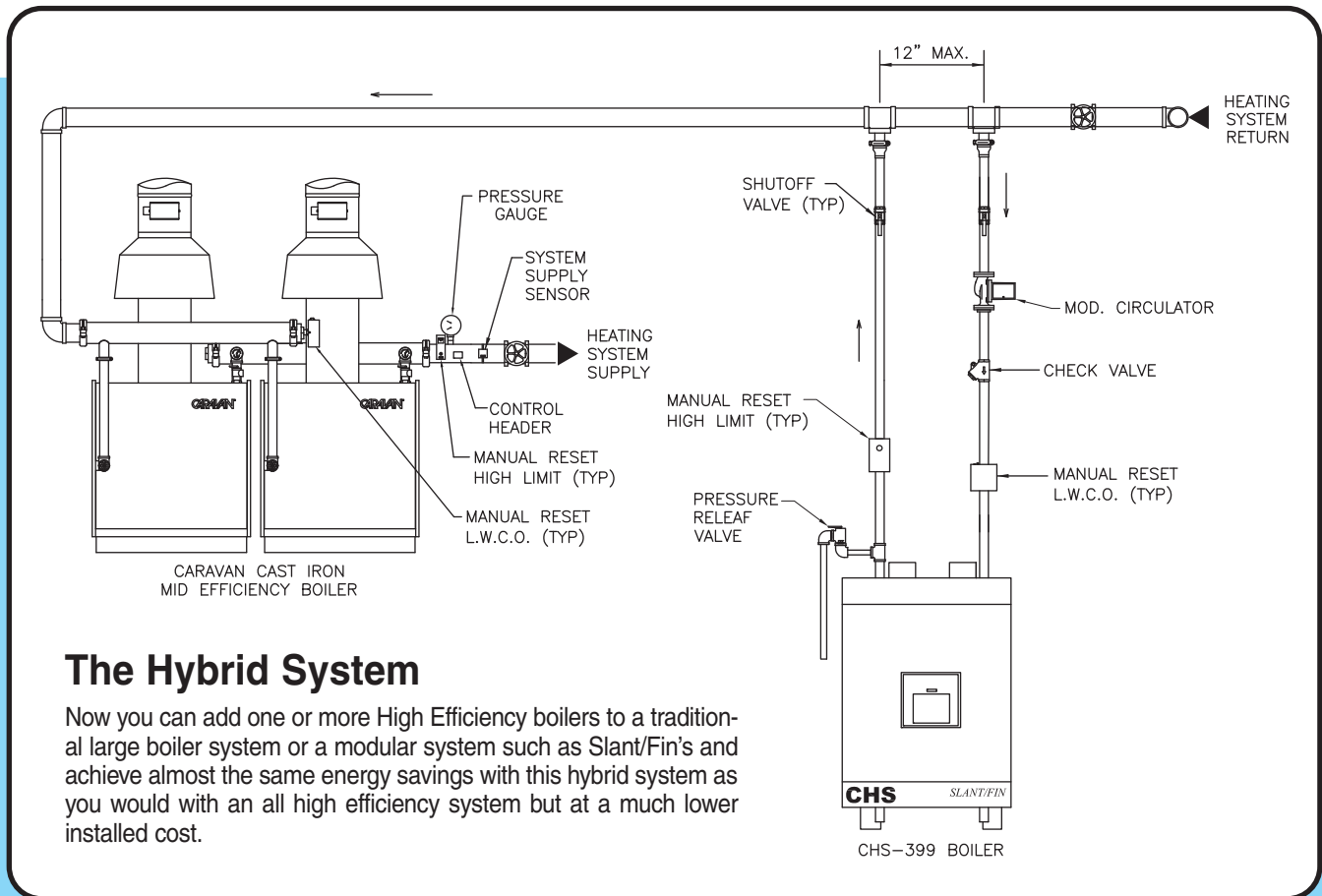
Boiler Model	No. of Heating Boilers	Input (MBH)		D.O.E. Heating Capacity (MBH) Max	Net Rating (MBH) Max	Water Content Gal.	Turndown Ratio
		Max	Min				
CHS300	2	598	79.8	556	478	12.8	7.5 to 1
CHS300	3	897	79.8	834	717	19.2	11.2 to 1
CHS300	4	1196	79.8	1112	956	25.6	15 to 1
CHS300	5	1495	79.8	1390	1195	32.0	18.7 to 1
CHS300	6	1794	79.8	1668	1434	30.4	22.5 to 1
CHS300	7	2093	79.8	1946	1673	44.8	26.2 to 1
CHS300	8	2392	79.8	2224	1912	51.2	30 to 1



Stainless Steel Heat Exchanger

For other Caravan Boiler Ratings & Specifications, go to www.slantfin.com

Hybrid boiler systems: Definition, Sizing, and Efficiency... The shrewd way.



What is a Hybrid Boiler System?

A Hybrid Boiler System is a combination of two types of boilers used in the same system. Slant/Fin Hybrid Boiler Systems combine high efficiency condensing boilers with non condensing cast iron boilers.

Why combine Condensing boilers with Non-Condensing boilers?

Simply put, we combine both types of boilers because condensing boilers operating efficiency is over 90% only when the system water temperature is lower. When system water temperatures are higher a condensing boiler operating efficiency is not much higher than our non condensing boilers. A Hybrid Boiler System optimizes the use of both condensing and non-condensing boilers delivering a cost effective, yet efficient heating plant. Lower first cost, lower maintenance costs and longer boiler system life are expected with a Hybrid Boiler System.

How do you decide the make up of a Hybrid Boiler System?

On most existing hot water heating systems generally two thirds of the boiler system capacity will be in the non-condensing water temperature range and one third of the capacity is in the condensing water temperature range. Condensing

water temperature is 130°F or lower and above 130°F water temperature we are above the condensing water temperature. Your mechanical engineer can calculate what percentage of your heating load can be satisfied in the condensing water temperature range and therefore, choose the condensing boiler capacity for your heating plant.

What can you expect with a Slant/Fin Hybrid boiler system?

Combining our non-condensing Caravan Boilers with our Jaguar or CHS condensing boilers lowers your equipment and installations first cost while optimizing operating performance of the boilers with the result of low fuel costs. You should also have lower maintenance costs while increasing the life expectancy of both types of boilers. In addition you will have boiler back up in the unlikely event a boiler fails to operate.

Hybrid Boiler Systems optimize the performance of both types of boilers!

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Hybrid Boiler System Control

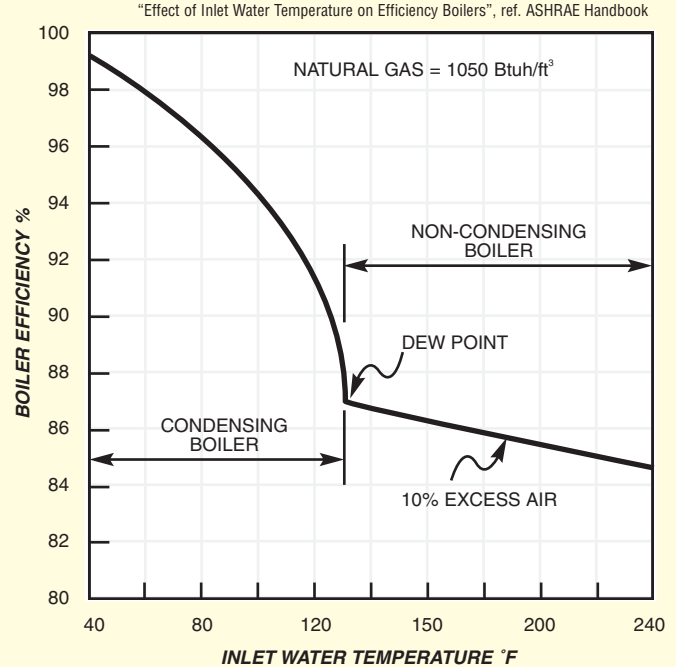
As with any boiler system, it is important to properly control a hybrid boiler system. The goal is to optimize comfort and efficiency, minimize maintenance and maximize product life expectancy. End result should be good savings-to-investment ratio and return on investment.

The condensing boilers are the most expensive equipment, have the higher maintenance cost and tend to have a shorter life span. Therefore, the goal is to operate the condensing boilers when they condense and have them in stand-by when they will not condense or when their operating efficiency drops. This decreases maintenance and increases expected product life.

The non-condensing boilers are less expensive, have lower maintenance costs and have a longer life span. In addition, non-condensing boilers should not condense. Therefore, the goal is to operate them when the system water temperature is above the condensing range and have them in stand-by when water temperature is in condensing range. Operating them only when they do not condense decreases maintenance costs and increase expected product life.

The approximate water temperature range for condensing is below 130° F and the non-condensing return water temperature range is above 130° F.

Very simply put, operate the condensing boilers when water temperature is in the condensing range. When water temperature is above the condensing range, shut the condensing boilers off and have the non-condensing boilers handle the load. If and when the non-condensing load exceeds the capacity of the non-condensing boilers (reaches peak demand), bring the condensing boilers back on line. As a general statement, if a hybrid boiler system is not oversized, peak



demand may occur 8 to 10 days during a heating season. Please remember, boiler systems tend to be oversized.

A properly controlled hybrid boiler system maximizes boiler system life span and return on investment, while minimizing life cycle costs.

Boiler system control manufacturers, such as, Heat Timer and Tekmar, offer nice Hybrid Boiler System controls that will coordinate operation of condensing and non-condensing boilers. Outdoor temperature boiler water reset is generally built into these controls.

ONLINE RESOURCES

- Engineers web link:
<http://slantfin.com/professionals/engineer-info/>
- Technical Services:
<http://slantfin.com/professionals/technical-assistance/>
E-mail: techservice@slantfin.com
ph: (800) 873-4346

US: www.slantfin.com • Canada: www.slantfin.ca

Practice what you preach...



In the fall of 2012, Slant/Fin upgraded our home office's Caravan Boiler System to a Hybrid Boiler System. The existing non-condensing Gas-Fired Caravan boiler remained...we added two high efficiency condensing Jaguar J-390C boilers in a primary/secondary piping arrangement to the boiler return water piping to the existing Caravan boiler system and made it a "hybrid system". We upgraded the control system to a CNC step control with outdoor water temperature reset. This replaced the existing step controller with outdoor reset. The control fires the high efficiency condensing Jaguar boilers only when the system water temperature is within the condensing range. It also modulates Jaguars' boiler input to maximize efficiency. When the water temperature is above the condensing range, the existing Caravan modular boiler handles the heating load and the Jaguar boilers are turned off. If the existing Caravan cannot handle the maximum heating load, the Jaguar boilers will come on line to meet the heating demand. Condensing boilers condense only when the water temperature is low and in the condensing range.

The result was a payback of one heating season. In addition, there is less usage on the more expensive condensing boilers, resulting in an increased life expectancy, along with lower maintenance costs!



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