

SB Series Commercial Condensing Boilers



Buderus
HYDRONIC SYSTEMS

- Ultra High Efficiency up to 98%
- Wide Range of Sizes: 484 — 4,079 MBH Gross Output
- Stainless Steel Fire Tubes for Long Life
- No Restriction on Return Temperature and Flow Rates
- Standard US Burners and Conventional Controls
- Perfect Match with Thermostream Boilers in Multiple Boiler Systems for Base Load Applications



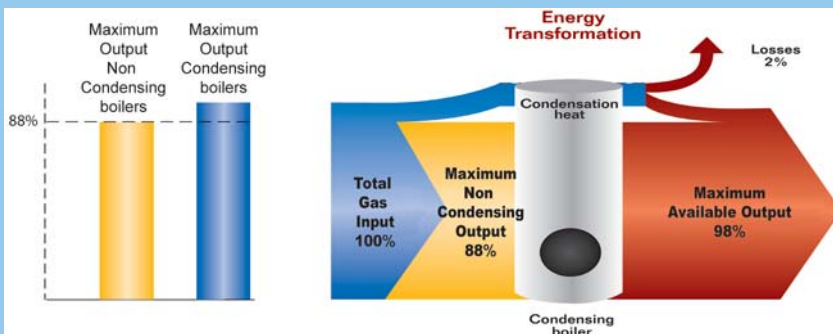
www.buderus.net

Condensing Boiler Technology

Condensing boiler technology is the most efficient form of gas heating available today. Thanks to lower fuel consumption and lower heating costs, condensing boilers usually pay of themselves in only a few years. An additional advantage: a modern condensing heating system increase the value of the building and the quality of life by reducing emissions. So there is no longer any reason to do without contemporary condensing technology wherever a gas connection already exists or can be installed.

Condensing Technology Improves Energy Utilization By Up To 15%

Condensing technology utilizes a part of the energy which disappears up the chimney in other heating systems; the condensation heat retained latently in the flue gases. With condensing technology, the water vapor contained in the flue gases condensed on the relatively cool heat exchanger surfaces of the boiler.



Modern condensing boilers achieve seasonal efficiencies of up to 98%.

The released heat is transmitted directly into the boiler water and thermal flue gas losses are minimized. The seasonal efficiency of the Buderus SB Series Condensing Boilers can reach up to 90%, reducing heating costs by up to 20% in comparison with conventional heating systems, especially in radiant floor and snowmelt applications.

Lower Operating Costs Compensate for Higher Investment Costs

Contemporary condensing boilers have a higher initial purchase price than conventional boiler. However, particularly in the medium and upper capacity ranges, this extra initial investment quickly pays for itself as condensing technology saves so much energy, resulting in substantially lower heating costs.

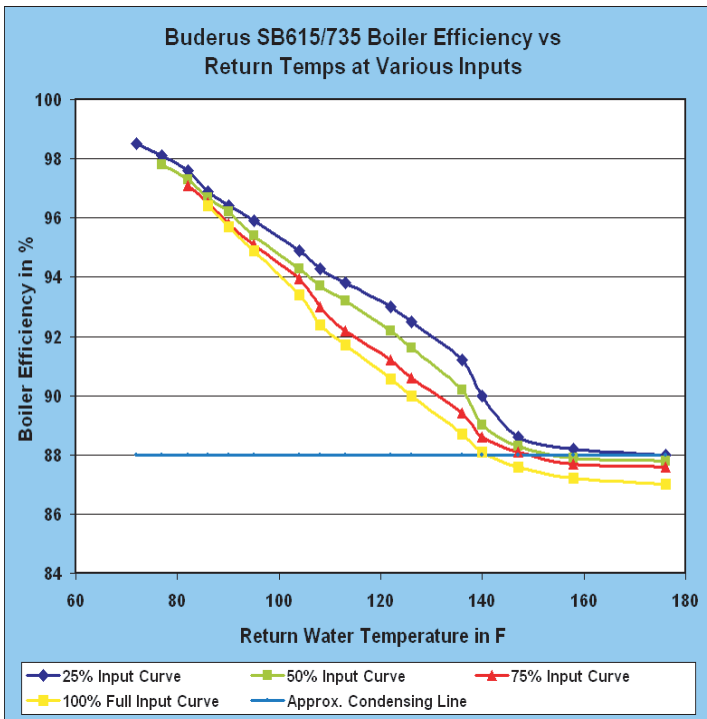
Technology Advantage

- Lower heating costs as a result of optimal energy utilization
- Higher efficiency due to a lower return flow temperature
- Quick amortization of the investment cost
- Reduction of pollutant emission with a consequent decrease in environmental pollution

Low Boiler Return Water Temperatures Result in Higher Efficiency

Condensation develops only if the return flow temperature is below the dew point of the combustion gases. If it is reduced further, even more heat can be reclaimed from the condensation process. Low flue gas temperatures are achieved by means of highly efficient heat exchanger surfaces, two staged or full modulating burners, and of course continuous operation and low return water temperatures. Condensing Boilers are ideally suited for direct piping in commercial systems to make maximum use of low return water temperatures which lowers system complexity, installation and maintenance costs. Outdoor reset can be done directly through the boiler without the use of costly 3- or 4-way valves or primary/secondary piping.

Buderus SB615/735 Boiler Efficiency vs Return Temperatures at Various Inputs

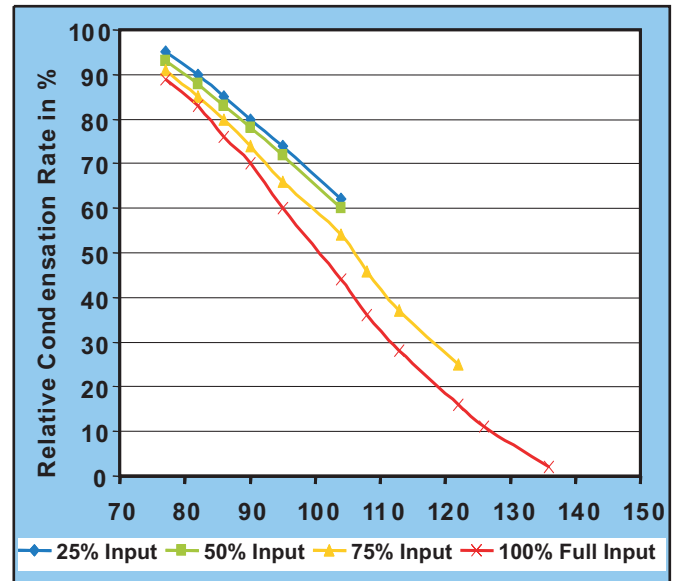


Max Supply Temperature: 210° F

Max Operating Pressure: SB615 - 36psi SB735 - 43.5psi

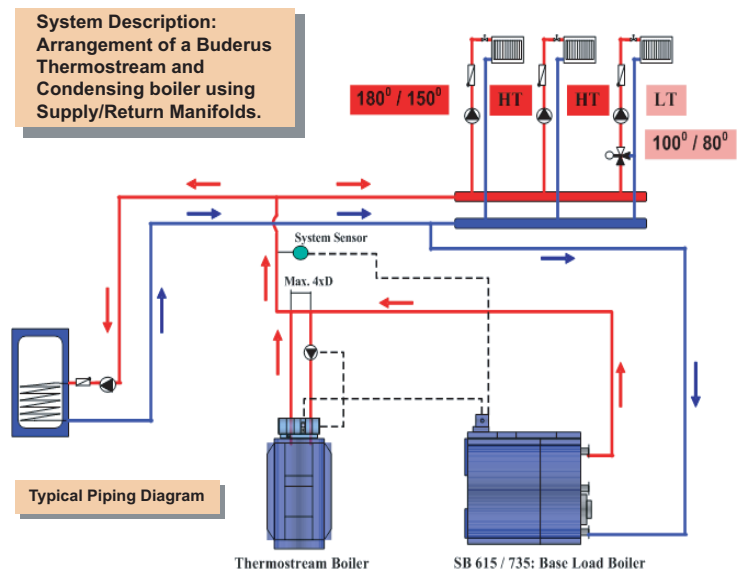
The system diagram to the right is just one example of many possible applications for the SB condensing boiler in a base load application. Additional configurations, designs and options are available from your local Buderus Dealer.

Condensation Potential vs Return Water Temperature at Various Inputs



Condensing Technology the Efficient Solution

The SB condensing boilers function with a return flow temperature which is below the dew point for 96% of the operation period. That means outstanding condensation conditions during the entire year, even in existing heating systems. In new buildings, which are usually much more effectively thermally insulated, even lower heating curves can be implemented with smaller systems designs. The return water temperature frequently remains below the dew point throughout the entire year. Optimum conditions for realizing the optimum savings potential of modern condensing technology!

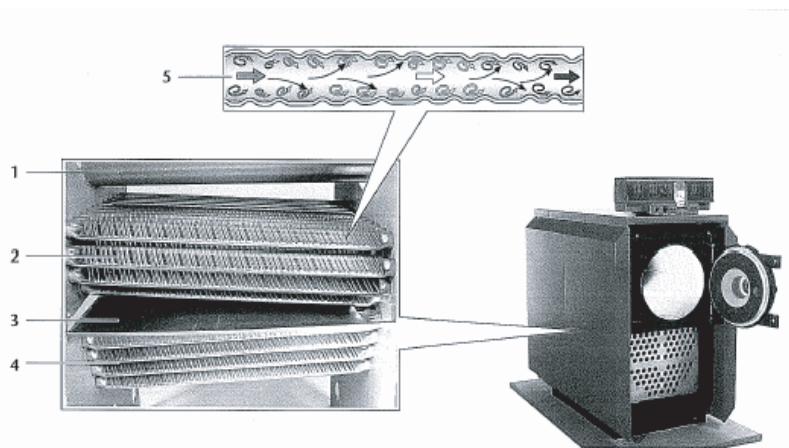


Technical Innovation

Kondens[®] Heating Surface

High Energy Utilization Through the Kondens[®] Heating Surface

The extremely efficient method of heat generation using condensing technology is further improved by the Buderus Kondens[®] heating surfaces. The secondary heating surfaces are long and extremely large in order to ensure optimal heat transfer. **The exiting flue gas temperature is only up to 30 degrees Fahrenheit above the return water temperature**, indicating extremely high efficiency.



1. Combustion Chamber
2. Upper Kondens[®] Heating surface
3. Water baffle
4. Lower Kondens[®] heating surface
5. Cross Section of spiral tube of the Kondens[®] heating surface with a diagram of the flue gas flow.

10% More Condensation with Micro-Turbulence

A high degree of condensation is achieved through the intense contact of the combustion gases with the heat transfer surfaces. The Kondens[®] heating surface, designed with a special swirling effect, generates micro-turbulence within each fire tube. By channeling practically all combustion gases to the cold heating surface, it generated up to 10% more condensation than a smooth heating surface. The tapered design of the fire tubes also helps to maintain a constant velocity of the flue products with only a small loss in pressure and increase heat transfer.

Kondens[®] Advantages

- The large Kondens[®] heating surfaces ensure optimal heat transfer by reducing the flue gas temperature
- Micro-turbulences and optimized water flow result in an additional 10% condensation
- Large openings for easy inspection of the main combustion chamber and Kondens[®] fire tube heating surface

Maximum Heat Gain Through Counterflow Heat Exchange and Optimized Water Flow

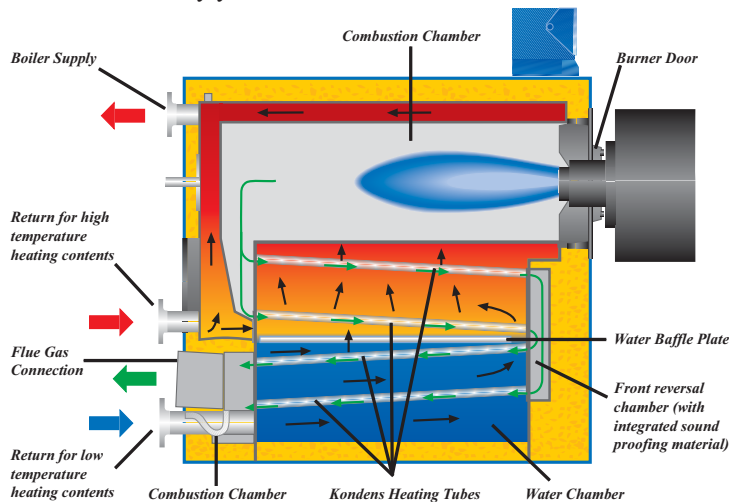
The efficiency of the Kondens[®] heating surface is supported by a special water channeling system between the second and third flue passes. The main return water flow forms a counter flow to the combustion gas flow. Exiting combustion gasses always meet the coldest return water. Simultaneously the lower water channeling element ensures that the main condensation zone is fully separated from the return flow water of the high temperature heating circuit, further increasing the condensation rate. **The proportion of low-temperature return water volume of 20% minimum of the total return flow is adequate to achieve maximum efficiency.**

Ultra High Efficiency Simple System Design

With seasonal efficiencies of up to 98% the SB Series of condensing boilers are among the most efficient condensing boilers available today. The Kondens® heating surface, developed by Buderus, has been perfectly designed to ensure efficient condensation utilization. This advanced technology is also conducive to low NOx and CO levels, making this an ideal choice for any application, but especially for those needing to meet air quality control regulations.

Innovative Boiler Design: Higher Capacity in Less Space

The new Buderus SB Series Condensing Boilers are an ideal solution for maximum energy utilization. The full three-pass boiler design with a full-pass combustion chamber ensures compact dimension and outstanding combustion results. All components which come into contact with combustion gases and condensate are made of corrosion-resistant 316 stainless steel, which guarantees efficient heating conditions for many years.



The intelligent water channelling in the SB Series Condensing Boilers supports condensation, making the condensing technology even more efficient for high energy utilization.

Top Marks in Economy and Other Areas

The SB Series Condensing Boilers have more than just exemplary economy to offer. Combined with a two staged or modulating forced-draft gas burner, they achieve extremely low pollutant emissions. In addition, high- and low-temperature heating circuits can be connected depending on your requirements. Buderus condensing boilers are equipped with two return water connections, enabling additional energy savings of up to 8%. The important feature here is that the higher boiler supply temperatures do not negatively influence the condensation capacity.

Simple System Technology Reduces Planning Time and Cost

The SB Condensing Boilers have no operational requirement with regard to water flow, minimum return temperature, temperature rise through the boiler or minimum burner capacity. Thus the heating circuit flow and low temperature return flow can be connected without any additional equipment, e.g. flow monitors, or shunt pumps. In order to achieve seasonal efficiencies of up to 98% optimal condensation is required — separate return flow connection provide the ideal practical solution. In the Buderus SB boilers, the proportion of low-temperature return water volume of 20% of the total return flow is adequate to achieve maximum efficiency. **Maximum condensate recover is 10 gallons per hour per million Btu/hour input.**

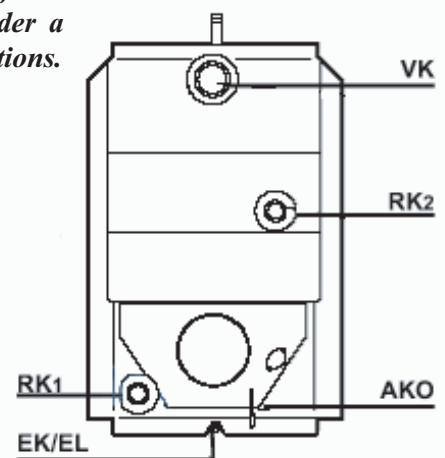
Design Advantages

- Ultra-high efficiency — up to 98%
- Inexpensive installation with comprehensive equipment and simple system technology
- Low NOx and CO output levels with conventional burners as a result of the full three pass flue design.
- Kondens® technology
- 30/20/10 — Three parameters for maximum efficiency

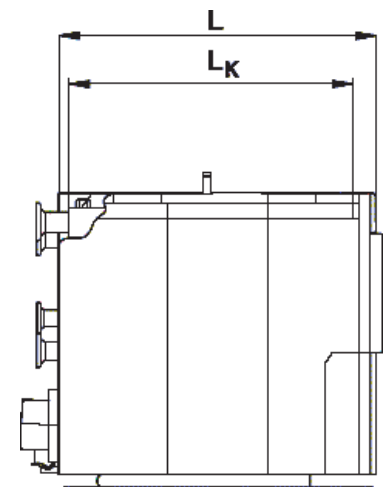
SB Boiler Specifications

The gas-fired SB condensing boilers are equipped with stainless steel heating surfaces specially designed for condensing technology. Designed to operate efficiently under a variety of operating conditions and to meet strict NOx and CO environmental regulations.

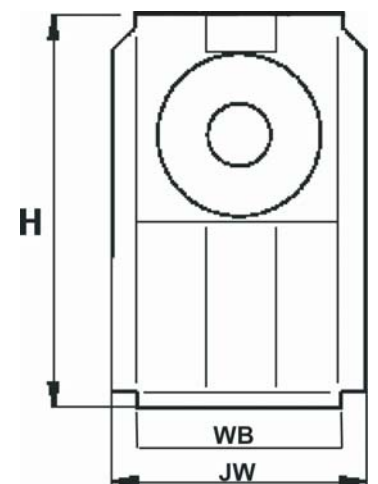
- There shall be provided and installed a quantity of ___ Buderus SB615 or SB735 Series condensing gas fired boilers, suitable for firing with natural gas or propane utilizing a forced draft combustion system. Each SB615/735 series boiler shall have an input rating of ___ MBH each.
- All SB condensing boilers shall have a full three pass fire tube design to allow complete combustion of the fuel in the main combustion chamber. All of the flue side surfaces, including those of the main combustion chamber, the second and the third flue passages shall be constructed of 316 stainless steel. This design maximizes the condensate formation. All the flue passages are fully water-backed to minimize the thermal stresses on the boiler vessel.
- Boiler(s) shall be constructed with dual return water connections where the lower connection shall be aligned with the lowest (coldest) return water temperature for maximum efficiency.
- Boiler(s) shall be suitable to operate under any return water temperature, any boiler water flow rate and without any restrictions on temperature rise through the boiler vessel. Boiler(s) shall be able to operate at efficiencies up to 98% at suitably low return water temperatures.
- The condensing secondary and tertiary Kondens® fire tube flue passages shall be fabricated from 316 stainless steel with a reduced cross section in the direction of flue products flow to maintain a near constant velocity of combustion products and to enhance micro turbulences for maximum heat transfer.
- Boiler(s) shall have an internal water baffle plate separating return water between second and third flue passages for maximum efficiency.
- Boiler(s) shall be fully serviceable from the front by means of a reversible swing burner door and removable access cover.
- The boiler vessel shall be wrapped with a full 4" thermal insulation blanket for minimal stand-by loss.



SB 615 Rear View



SB Series Side View



SB Series Front View

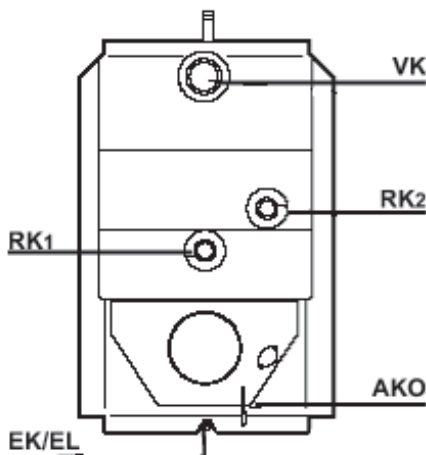
SB615	Unit of Measure	145	185	240	310	400	510	640
Performace data								
Gas Input	MBH	506	644	835	1080	1393	1776	2228
Gross IBR Output*	MBH	484	612	791	1022	1317	1678	2104
Max Output Range **	MBH	440 - 484	560 - 612	730 - 791	940 - 1022	1220 - 1317	1550 - 1678	1950 - 2104
Net IBR Rating	MBH	421	532	688	889	1145	1459	1830
Thermal Efficiency	%	95.6	95	94.8	94.6	94.5	94.5	94.4
Combustion Efficiency	%	97.1	96.7	96.5	96.4	96.3	96.2	96.2
Boiler Horse Power		14.4	18.2	23.6	30.5	39.3	50.1	62.8
Available Breeching Pressure	inch WC	Dependent on Burner						
Fireside Pressure Drop	inch WC	0.49	0.63	0.89	0.97	1.22	1.44	1.78
Piping Connections								
Vent Pipe Diameter (inner)	inch	7	7	8	8	10	12	12
Vent Conn. Height	inch	11¾	11¾	12	12	13	14½	14½
Boiler Supply Conn. (VK)	inch	2½	2½	3	3	4	4	4
Boiler Return (low) (RK1)	inch	2½	2½	3	3	4	4	4
Boiler Return 2 (RK2)	inch	2	2	2½	2½	2½	3	3
Physical Dimensions								
Length w/o Burner (L)	inch	68¾	68¾	70	70	70	75¼	75¼
Length w/o Jacket (Lk)	inch	60	60	61	61	61	66¼	66¼
Height (H)	inch	54¼	54¼	55½	55½	63½	69¼	69¼
Width (JW)	inch	35½	35½	38¼	38¼	38¼	43¼	43¼
Width w/o Jacket (WB)	inch	28¼	28¼	31¼	31¼	31¼	36¼	36¼
Dry Weight	lbs	1690	1700	1950	2030	2600	2970	3020
Water Content (approx)	gal	148	147	179	171	180	229	223

Approved venting material: AL29 4C, 316 stainless or CPVC.
Boiler approved for side-wall venting.
See diagrams for dimension locations.

* Listed output based on IBR testing procedure.

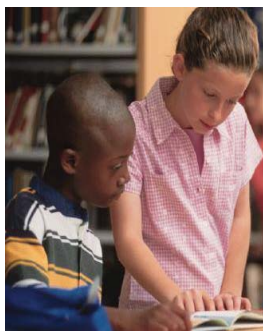
** Output dependent on return temperature and firing rate.

- VK Supply Connection
- RK1 Low Temperature Return Connection
- RK2 High Temperature Return Connection
- AKO Condensate Drain
- Ek Water Feed
- EL Boiler Drain
- H Height
- WB Width without Jacket
- JW Width with Jacket
- L Length



SB 735 Rear View

SB735	Unit of Measure	790	970	1200
Performace data				
Gas Input	MBH	2751	3378	4179
Gross IBR Output*	MBH	2650	3251	4079
Max Output Range **	MBH	2400 - 2650	2950 - 3251	3650 - 4079
Net IBR Rating	MBH	2265	2827	3547
Thermal Efficiency	%	96.9	96.3	97.6
Combustion Efficiency	%	94.7	95.6	96.5
Boiler Horse Power		77.8	97	121.8
Available Breeching Pressure	inch WC	Dependent on Burner		
Fireside Pressure Drop	inch WC	1.98	2.31	2.6
Piping Connections				
Vent Pipe Diameter (inner)	inch	14	14	14
Vent Conn. Height	inch	19	19	19
Boiler Supply Conn. (VK)	inch	4	5	5
Boiler Return (low) (RK1)	inch	4	5	5
Boiler Return 2 (RK2)	inch	3	4	4
Physical Dimensions				
Length w/o Burner (L)	inch	91½	108¼	108¼
Length w/o Jacket (Lk)	inch	75½	92	92
Height (H)	inch	81¼	81¼	81¼
Width (JW)	inch	54	54	54
Width w/o Jacket (WB)	inch	43¾	43¾	46
Dry Weight	lbs	3811	4780	4855
Water Content (approx)	gal	494	660	668



Venting system not installed, only lower return connection is used here



Vancouver Washington School District, SB615 Installation.

Contact your local dealer
for additional information

Visit our
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dealer in
your area

Buderus

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