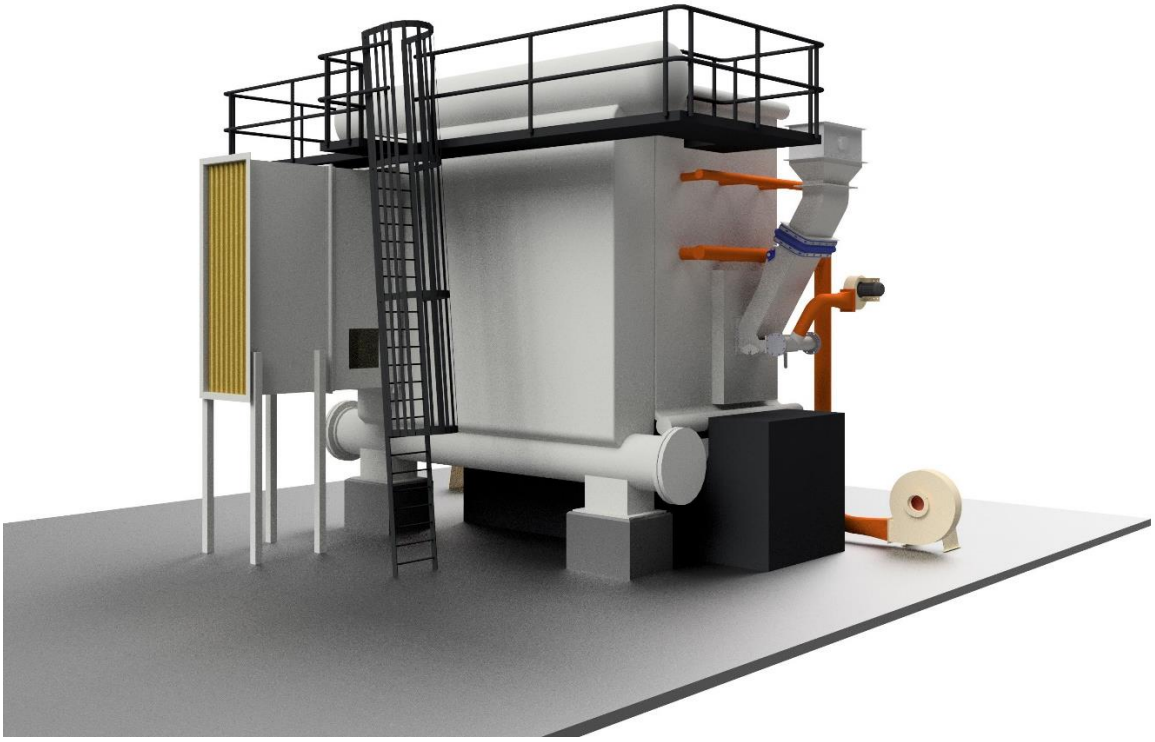
Windsor Steampac™ Biomass Boiler Range

Windsor has extended its Water Tube Steampac™ Boiler Range to include a 6MW Wood fired boiler (WFB6000) and a 7.5MW Pellet fired boiler (PFB7500). We are now offering these high performance, long life and low maintenance combustion system in an affordable package to suit the sub 10MW biomass boiler market. Windsor stand behind our combination of windswept spout feeders, vibrating grate and control system as the best combustion system available in the New Zealand market for combusting local wood fuels.

1. Features and Benefits

- Superior combustion system in an affordable “off the shelf” package
- Clients may save money by undertaking on site works themselves, with support from Windsor
- Fully unattended operation in accordance with the NZ Code of Practice
- Minimal operator time, freeing up time for other site duties
- Minimum fuel costs achieved through high combustion efficiency
- High availability. The plant is capable of operating 24/7 between statutory inspections
- Windsor has over 20 years’ experience burning NZ wood fuels. The wood boiler can handle a wide range of ash and moisture content. It can burn sawdust, shavings and a proportion of the fuel can be sludge. It can also burn hogged fuel provided maximum length < 150mm.
- Guaranteed to meet or exceed all NZ requirements and inspections
- Quality product designed and supported in New Zealand including servicing and spare parts through our nationwide Service and Products divisions
- Up to 10bar steam
- Turndown ratio of 4:1
- Suitable for outdoor installation
- Full waterwalls make for a low refractory boiler (only minimal amount on firing wall) means low maintenance and suited to New Zealand’s seismic environment
- Compact combustion system for small footprint
- Windsor is the OEM of major components including our signature combustion system, pressure parts, heavy duty fans, and ducts
- Valves, instruments, minor fans and motors are from global brands with local representatives, making spares and support readily accessible
- Pressure parts will be fabricated by our long-standing partner in their Thailand workshop. All other fabricated components will be fabricated in New Zealand
- Emissions will be <50mg/Nm3 achieved with optional Electrostatic Precipitator (ESP). Lower particulate levels can be achieved by a Windsor baghouse, if required
- Optional LPG ignition burner can start the boiler at the push of a button– can be retrofitted
- The Wood Boiler has a fully automated de-ashing system. The pellet boiler capitalises on the low ash content of wood pellets meaning only periodic manual de-ashing is required
- Balance of Plant is optional including feedtank, blowdown tank, ESP, Stack

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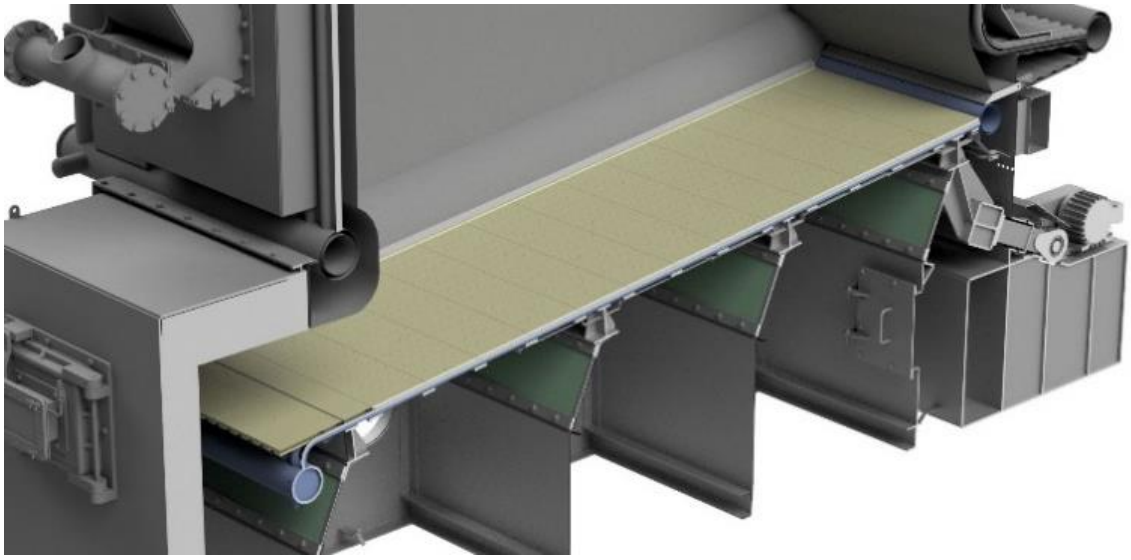
2. Boiler Description

2.1. Water Cooled Vibrating Grate with Windswept Spout Feeder



Windsor manufactured water-cooled vibrating grate coupled with windswept spout feeders, offers an optimal solution for biomass combustion. This grate provides a combustion plant that is flexible, automated, and able to ensure that steam pressure remains within specified limits during all stoking and grate actions.

Advantages of water-cooled vibrating grates:

- Unlike mass-fed systems, the fuel is blown in and spread evenly across the grate. Fuel is dried in the air and volatiles are allowed to escape where they are immediately combusted. This even fuel distribution and low inventory on the grate, combine to provide flexible and reliable technology for your needs.
- Rate of change is 3 x faster than step grate
- Heat release is 3 x higher than step grate, for the same area
- Cooling the grate with feedwater increases the life of the grate, significantly delaying grate re-tiling maintenance.
- Minimal moving parts compared with step grates for reduced wear and maintenance
- Supports variability in plant steam load demand allowing good turn down and rates of load change compared with other grate systems. This reduces wasted energy through steam venting
- Superior combustion efficiency with complete combustion and reduced clinker
- Handle a greater fuel variability than fixed and rotary grates in terms of both moisture and size distribution
- Highly stable and tuneable combustion
- Overfire air system to ensure full and complete combustion resulting in high efficiency and minimal fly ash.
- No undergrate de-ashing is required between annual shuts
- Pellets low ash properties mean the grate will be supplied as a fixed grate (non-vibrating). The grate is periodically raked to remove any ash build up into the ash trench where it can be evacuated during the annual shut.

2.2. Windsor Steampac™ WFB and PFB Boilers

The Wood Fired Boiler is designed to produce 6MW of steam using a 50% moisture content wood. Using a drier fuel will increase the boiler's steam output. The Pellet Fired Boiler will produce 7.6MW of steam.

Windsor's well established inhouse Steampac™ water tube boiler design has now been adapted for the biomass range. This is a two drum, 3-pass natural circulation design with water cooled fully welded membrane tube panels to provide a completely welded gas tight enclosure. Flue gas velocities are carefully designed to avoid any high velocity areas and excessive tube corrosion.

Large amounts of furnace refractory can be difficult and dangerous to maintain and does not perform well during earthquakes. The Windsor WFB has a low level of refractory which requires minimal review and touch-up per year is combined with generous heat transfer surface area to ensure long life from pressure parts.

2.3. Windsor Economiser

The economiser pre-heats the boiler feedwater before it enters the steam drum. The Windsor economiser is a continuous horizontal flow design. It is designed to be non-steaming under all load conditions. Windsors in depth understanding of boiler design means we can optimise efficiency vs capital cost to provide fuel savings over time.

2.4. Water Coil Air Heater (WCAH)

Further gains in fuel efficiency and combustion stability are made using a heat exchanger in the feedwater loop to preheat the forced draft combustion air supplied to the boiler below the grate. Clients enjoy lower fuel cost, better steam control and lower particulate emissions when combustion is controlled properly. This is not required for the pellet boiler due to its low moisture content and is not included.

2.5. Control System

The control system will utilise an Allen Bradley CompactLogix based PLC and associated I/O.

The human interface for the boiler is a Schneider Magelis 10.4" HMI touch screen located adjacent to the boiler. A data register is available for interfacing with the client's site SCADA system if required. An ethernet switch is included in the panel for this purpose.

The boiler control system will fully control the boiler from after manual light-off phase through to full operation of the boiler at required load. The control system will protect the integrity of the boiler from damage and fully comply with the New Zealand Boiler Code of Practice.

2.6. Grate Ash Extraction (Wood Boiler only)

Two ash screws from the generating bank lead into the grate ash transfer conveyor fitted at the end of the vibrating grate. These are electrically driven but could be manually operated for cost reduction purpose. The system is designed to provide continuous operation without shut-down to de-ash between statutory inspections. Due to the low ash content of pellets, manual ash extraction is sufficient