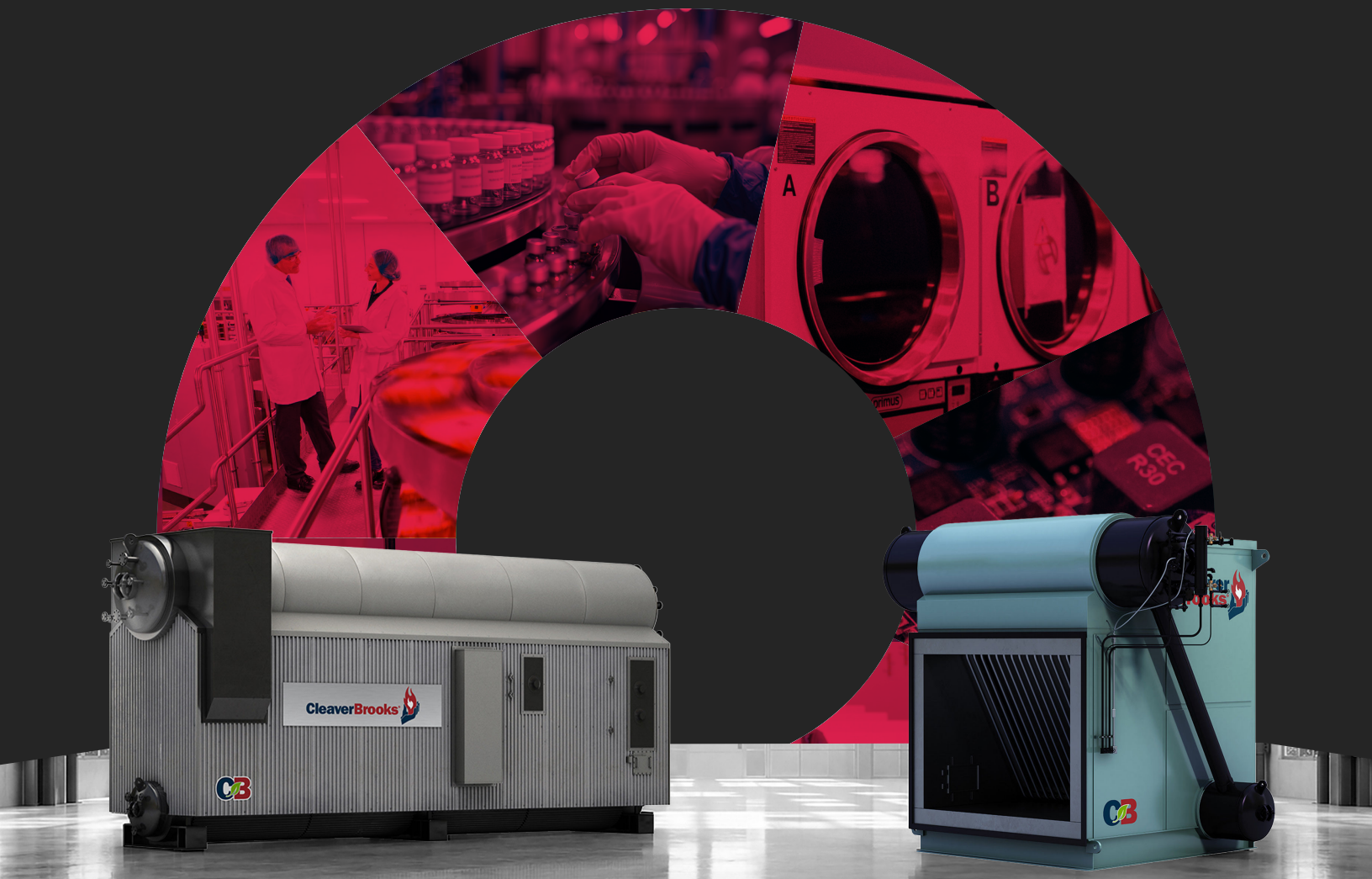
O'BRIEN



CleaverBrooks

Heat Recovery Steam Generators

When Reliability and Sustainability Matter, Turning Turbine Exhaust Into Usable Steam

Over 80% efficiency
Onsite power generation, HRSG vs standalone

Up to 226,796+ kg/h
Steam production across the range

~2,604 tonnes CO2
Avoided annually per MW of gas turbine

Turning waste heat into usable steam.

A gas turbine or reciprocating engine vents a huge amount of usable heat straight up its exhaust stack. An HRSG captures that heat instead and turns it into steam, so the energy already being generated on site does double duty rather than escaping unused. O'Brien supplies packaged and field-erected modular HRSGs as a single integrated system, from turbine exhaust through to stack outlet, built by Cleaver-Brooks and backed by O'Brien's local engineering and delivery.

What heat recovery gets you.

- Onsite power generation efficiency increased beyond 80 per cent.
- Fuel usage in conventional boilers cut by up to 2,051 kilowatts of load.
- Around 2,604 metric tonnes of CO2 avoided annually for every megawatt of gas turbine generation.

Why combined heat and power changes the maths.

Generating power and heat separately wastes energy at both ends. A standalone power plant and boiler running side by side deliver around 56 per cent useful energy from the fuel that goes in. Pair a gas turbine with an HRSG in a combined heat and power configuration instead, and that figure climbs to around 80 per cent, simply because the exhaust heat that would otherwise be lost is put to work.

Approach	Useful energy	Breakdown
Separate power plant and boiler	56%	21% power, 35% heat, remainder lost
Combined heat and power (HRSG)	80%	31% power, 49% heat, remainder lost

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Slant HRSG Series: **single-pass recovery in a compact footprint.**

The Slant Series is a natural circulation HRSG built around a single-pass design, offered in two configurations. The traditional Slant model positions its steam and water drum diagonally, maximising heating surface for a given shipping profile and keeping the whole unit compact. Both the traditional Slant and the VC, or Vertical Drum Cross Flow, model are suited to applications with a gas side inlet temperature under 927°C.

VC model: drum-over-drum design.

The VC model stacks its drums one over the other, a layout well suited to higher-pressure steam, integral CO or SCR systems, and horizontal exhaust flow arrangements. It can be customised with a stainless steel inner liner, a refractory lining, or water-cooled membrane wall construction, depending on what the process actually needs.

Steam	4,536 to 68,039+ kilograms per hour
Pressure	Up to 159 bar
Gas flow	Up to 181,437+ kilograms per hour
Steam temperature	Up to 566°C

Max-Fire® HRSG Series:
Integral furnace, one shop-assembled package.

The Max-Fire Series combines a furnace, evaporator and, where needed, a superheater into a single shop-assembled unit built around natural circulation. Its water-wall combustion chamber uses the same membrane wall construction as the rest of the range, paired with an evaporator section that allows supplemental firing temperatures up to 1,538°C. Steam flows reach up to 226,796 kilograms per hour, and the series is offered in A-type and O-type configurations.

- Water-cooled membrane wall construction runs throughout the boiler, eliminating high inner casing temperatures.
- Vertical or horizontal gas outlet options to suit tight space restrictions.
- A mix of bare and finned tube sections optimised for heat transfer and pressure drop.
- Downcomers at both ends of the boiler for natural circulation.

Membrane wall construction.

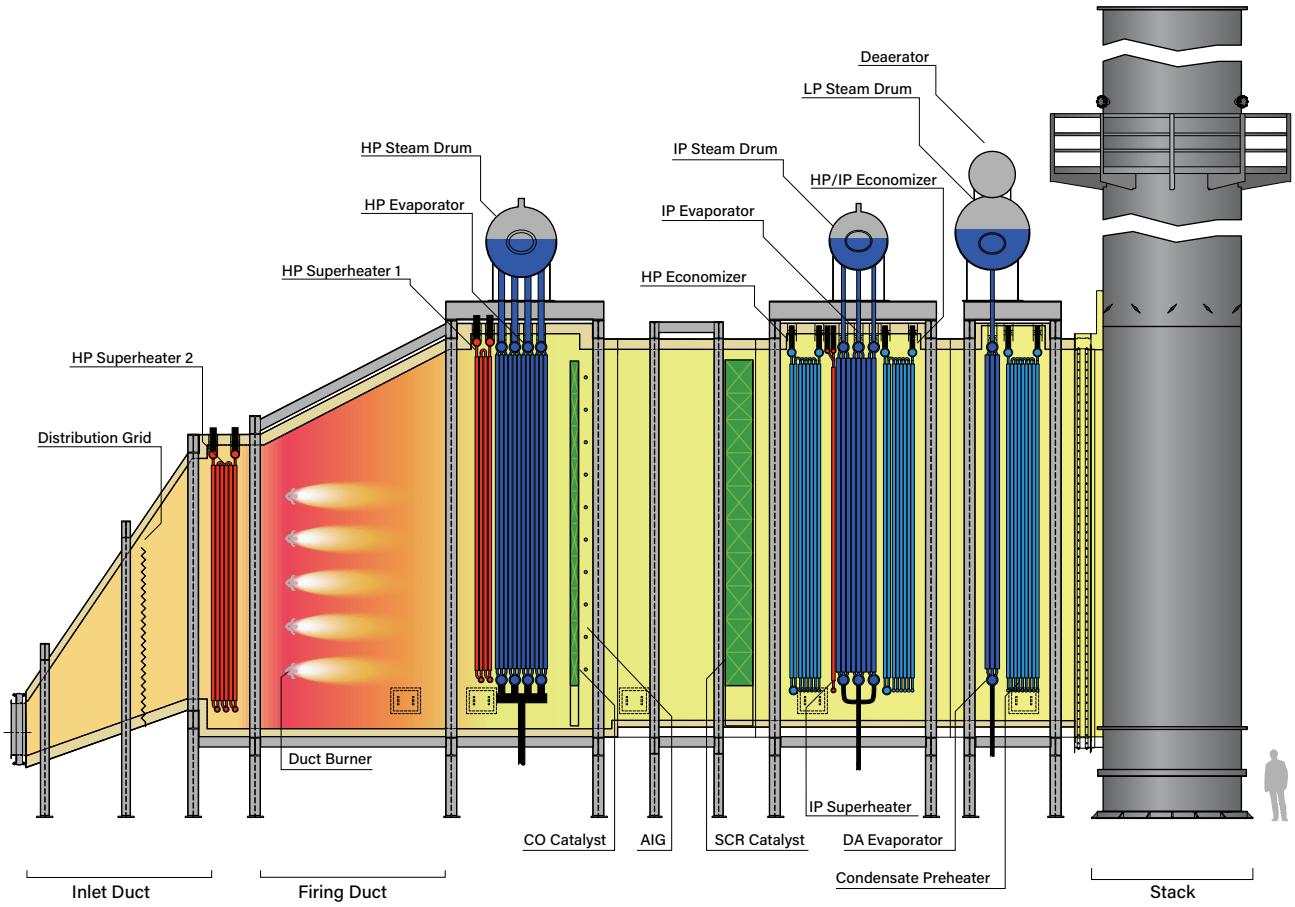
The Max-Fire design eliminates refractory wherever possible. Its water-cooled membrane walls safely handle firing or flue gas temperatures up to 1,538°C, while cutting the high-maintenance refractory that older designs depend on, sealing the furnace against flue gas entrapment, and adding structural strength without sacrificing thermal efficiency. Cleaver-Brooks controls the manufacturing of the burner, boiler and controls as one supplier, which is what makes that consistency repeatable across units.

Steam	4,536 to 226,796+ kilograms per hour
Pressure	Up to 159 bar
Gas flow	Up to 453,592+ kilograms per hour
Steam temperature	Up to 566°C

Modular HRSG Series:
Maximum shop assembly, minimum field labour.

Where field erection time and cost matter most, the Modular Series shifts as much of the build as possible into the shop. Its natural circulation design cuts parasitic power consumption and reduces the maintenance that comes with rotating equipment, and every project goes through the same engineering review: thermal performance, mechanical fatigue evaluation, circulation studies and pipe stress analysis.

- Multistage high-pressure and high-temperature superheaters.
- Vertical-tube, natural-circulation evaporators with top-supported coils for unrestricted downward expansion.
- Tube bundles pre-installed in a shop-assembled casing, with large remote steam drums sized for load swings.
- External, unheated downcomers and convection access doors at each bundle for straightforward inspection and maintenance.



Steam production	226,796+ kilograms per hour
Steam pressure	Up to 159 bar
Steam temperature	Up to 566°C
Exhaust gas flow	226,796 to 453,592+ kilograms per hour

Boosting output and cleaning up the exhaust.

Duct burners.

A duct burner supplements the gas turbine exhaust with its own flame stabiliser system, adding extra steam capacity for combined heat and power applications that need it. It can fire natural gas, landfill gas, digester gas, refinery gas, hydrogen or fuel oil. In-house computational fluid dynamics modelling covers the full picture, exhaust flow, distribution grid, combustion, heat recovery and SCR, and the control system can run the HRSG, duct burner and SCR together or manage the duct burner on its own.

Custom controls.

Every combustion application gets a custom PLC control system rather than a generic one, with the same state-of-the-art hardware and programming standard whether the job is straightforward or highly complex.

SCR and CO catalyst.

Selective catalytic reduction treats flue gas after combustion, cutting NOx emissions by up to 95 per cent and down to 1 ppm. Computational fluid dynamics modelling predicts flue gas distribution to optimise the SCR design, while a CO catalyst converts carbon monoxide and hydrocarbons into carbon dioxide and water vapour. Integrated controls keep ammonia slip to a minimum without sacrificing response time.

Freestanding stacks.

Single and double-wall freestanding stacks are available in carbon steel, COR-TEN® or stainless steel, with integral dampers, silencers and bypass stacks added where the application calls for them.

Why O'Brien?

- **Australia's Largest**
  Leading supplier of industrial boilers across Australia
- **20+ Years Experience**
  Decades of engineering expertise in steam & hot water systems
- **24/7 Support**
  Around the clock support with instant phone assistance
- **Accredited Training**
  RTO Code 45484, boiler operation training nationwide
- **Tailored Solutions**
  Custom engineered, with no off the shelf compromises
- **765+ Active Clients**
  Trusted across Australia and internationally

Ready to engineer your energy solution?

Connect with us at

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