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BOILTE CRUX

VERTICAL POWER FOR HIGH-TEMPERATURE PROCESSES

POWER: 150–8100 kW
TEMPERATURE: up to 300°C,
PRESSURE: 10 bar

Boilte Crux

FUEL: GAS / DIESEL / HEAVY FUEL OIL / HEATING OIL / WASTE OIL

Heating up to 300°C — without high pressure and risks

Boilte Crux is a vertical thermal oil heater, a specialised unit for safe and efficient heating of liquid organic heat transfer fluids up to 300°C at a system pressure not exceeding 10 bar. Crux is a radical solution to the problem of space shortage: the vertical configuration saves up to 40% of production floor space compared to horizontal alternatives.

The Crux model range covers thermal power from 150 to 8,100 kW (0.15–8.1 MW). Efficiency — up to 90%. Design service life — over 15 years, subject to operating conditions and thermal oil selection.

Crux is the choice for processes requiring uniform high-temperature heat: drying, mould heating, chemical synthesis, heat treatment of materials, as well as for facilities with limited boiler house space where every square metre counts.

Why vertical configuration?

- Space savings — up to 40%: unlike horizontal boilers requiring significant length, Crux arranges the heat exchange system vertically. This allows installation in confined spaces, in existing boiler houses without expanding openings or building reconstruction.
- Natural convection: the vertical design utilises natural convection — when pumps stop, hot oil rises upward, providing an additional safety margin.
- Ease of maintenance: all key components are located at accessible heights; vertical layout simplifies access to the burner, coil, and instrumentation.

Design features

Vertical coil combustion chamber. The heart of the Crux boiler is a coil heat exchanger made of seamless alloyed heat-resistant steel tubes, located in the high-temperature combustion chamber. Thermal oil circulates through the coil at 6–10 bar pressure, heated by the burner flame and hot gases.

Key design solutions:

- Vertical coil orientation — optimal use of building height, minimal floor space
- Seamless tube coil heat exchanger — made of special heat-resistant steel, designed for long-term operation at temperatures above 300°C and cyclic loads
- Forced circulation — powerful pumps maintain the required oil flow velocity through the coil, preventing local overheating and thermal cracking — the main cause of oil degradation
- Three-pass flue gas system — gases pass through three passes sequentially, maximising heat transfer, providing efficiency up to 90% even at high temperatures
- Sealed circuit — fully closed heating and oil circulation system prevents contact with atmospheric oxygen, avoiding oxidation

Thermal oil protection — key technology

Thermal oil is a significant cost item. Its degradation due to overheating leads to substantial losses. Boilte's technology is built around its protection:

- Precise flow velocity control using sensors and variable-speed pumps prevents stagnation and overheating
- Multi-point temperature measurement at inlet, outlet, and critical points of the coil transmits data to the controller in real time
- Emergency cooling circuits — in case of power failure or pump stoppage, the system automatically activates backup cooling to remove residual heat and prevent oil coking
- Hydrodynamic modelling of each circuit guarantees the absence of stagnant zones — the main cause of oil degradation
- Proper selection of heat transfer fluid increases the service interval from 8,000 to 24,000 hours

Quality control

Each Crux thermal oil boiler undergoes a multi-stage quality control system:

- Incoming material inspection — each pipe for the coil has a certificate confirming chemical composition and mechanical properties at high temperatures
- Non-destructive weld inspection — 100% radiographic or ultrasonic testing
- Hydraulic and pressure tests — the assembled coil block is tested at pressure significantly exceeding operating pressure

Standard scope of supply

- Basic package (Heating module) – ideal for integration into existing systems where some equipment is already installed. Includes: complete heater with insulation, coil heat exchanger made of heat-resistant steel, circulation pumps (main + standby) with variable frequency drives, automation unit with temperature control and emergency protection, base frame with vibration isolators, installation kit (flanges, gaskets).
- Extended package – full turnkey solution for new projects. Adds to the basic package: gas or diesel burner with flame control system, expansion tank with nitrogen blanketing, thermal oil degassing system, fine filtration station, thermal oil filling and make-up unit, control panel with touch screen, complete piping with shut-off and control valves, instrumentation (flow meters, pressure transmitters).
- Custom package (Special solutions) – exclusive configurations for non-standard applications. Options: flue gas heat recovery system (efficiency increase of 8–12%), explosion-proof design, Arctic package for -50°C operation, corrosion-resistant materials (stainless steel), remote monitoring.

Why choose Boilte Crux?

- Vertical configuration – up to 40% space savings – installation in confined spaces without boiler house expansion
- 300°C at <10 bar pressure – safer and more economical than steam systems
- Lifetime warranty on the coil heat exchanger – no time limit
- Thermal oil protection – flow velocity control, emergency cooling, hydrodynamic modelling
- Three-pass flue gas system – maximum heat extraction, efficiency up to 90%
- Natural convection – when pumps stop, oil rises – additional safety margin

Technical specifications

Model, Crux	Power, kW**	Efficiency, %	Boiler resistance, mbar	Oil circuit volume, L	Gas consumption 140–180°C m³/h	Gas consumption 240–280°C m³/h	H, mm	B, mm	L, mm	Dry weight, kg
150	174	88,2	3,2	46	21,19	22,35	1530	1150	995	650
250	291	88,4	3,7	51	28,75	37,25	1530	1340	995	1100
350	407	89,2	4,1	99	50,12	52,31	1840	1340	1170	1200
450	523	89,1	4,4	120	64,72	67,92	2080	1340	1170	1500
550	640	88,5	5,8	152	78,81	81,92	2400	1340	1200	1850
800	930	89,2	8,2	239	115,84	119,53	3040	1440	1340	1980
1000	1160	89,5	8,3	269	144,49	149,1	3300	1500	1500	2010
1250	1453	89,3	8,7	465	180,49	186,64	3740	1620	1530	2800
1500	1745	89,2	9,1	517	216,84	226,7	3830	1620	1530	3250
2000	2320	89,4	9,4	756	284,2	301,16	3740	2090	2090	5150
2500	2900	89,2	10,1	1320	350,4	368,1	3730	2350	2250	6450
3000	3480	90,1	10,5	1530	427,25	451,71	5150	2350	2250	7150
4000	4650	89,5	11,3	1980	579,2	603,5	5700	2350	2350	8300
5000	5810	89,2	12,5	2840	622,82	642,26	6120	2500	2500	12650
6000	6970	89,5	12,9	3200	868,21	895,3	6530	2500	2500	13500
7000	8100	89,3	13,4	3350	1008,98	1040,4	6750	2750	2750	14200

**Power: The values shown correspond to operation on methane (natural gas). When using diesel fuel or heavy fuel oil (mazut), a power adjustment (reduction) may be required in accordance with design standards and fuel-specific calculations.
Boilte reserves the right to modify dimensions and design without prior notice.
Dimensional tolerance: ±0.1–0.2% for all Boilte equipment.

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