



ecovapor



ECOVAPOR SYSTEM

Based on the experience, technological innovation and passion of ICI Caldaie, Ecovapor is the revolutionary range of intelligent systems for steam production, the confluence of three research areas (combustion, heat exchange and a predictive digital platform) merged into one system.

Ecovapor optimises the process of steam production as a source of thermal energy in an economical, efficient, intelligent, safe and environmentally friendly manner.

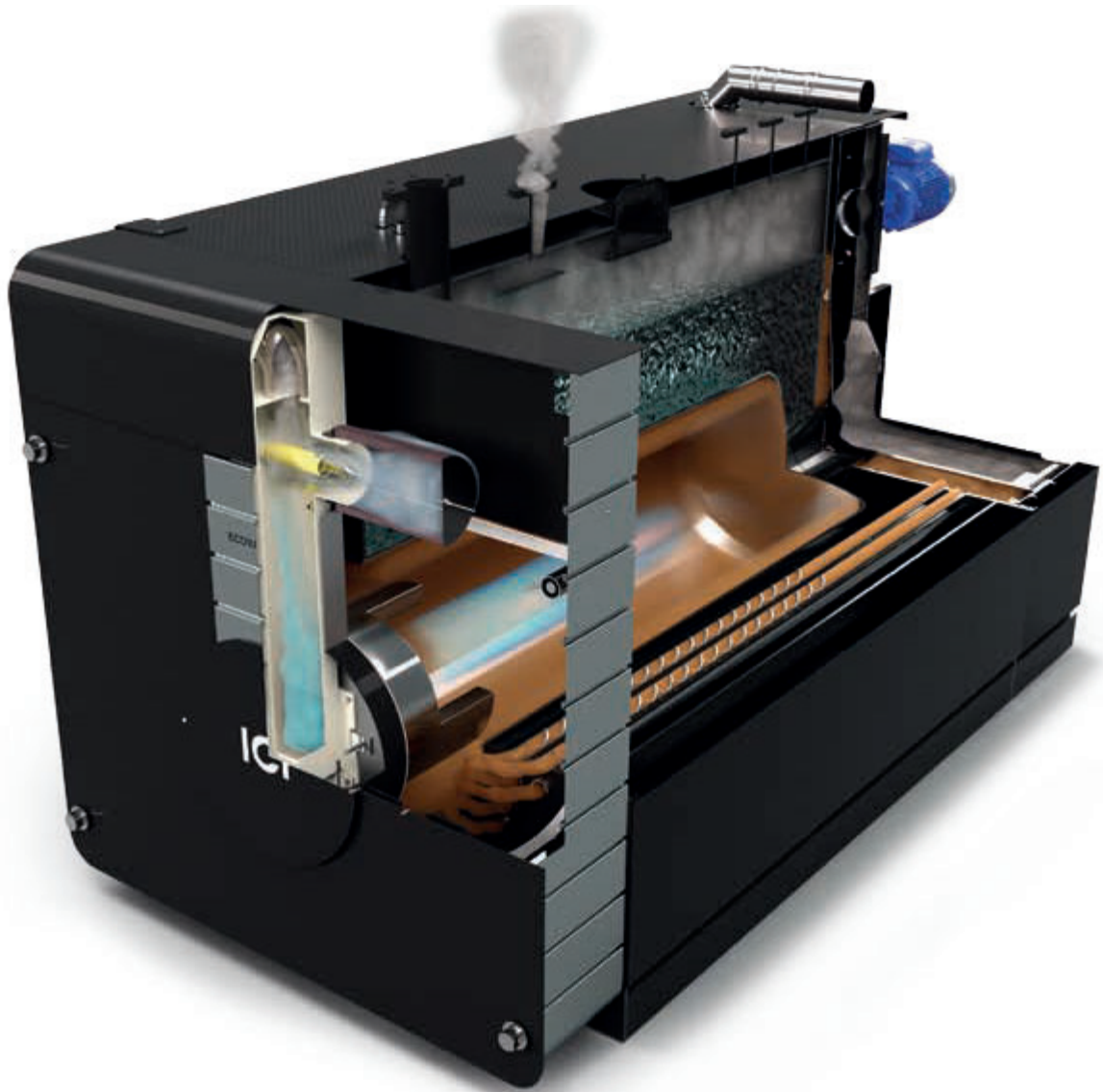
Developed as part of a project supported by the EU, Ecovapor is particularly suited for industrial applications with high modulation variability respecting the strictest NOx atmospheric emission limits and is able to communicate with other systems.



How far are you **ready to go?**

An innovative steam production system that adapts autonomously to the thermal profiles of the utilities, optimising energy consumption and respecting the strictest NOx emission limits.

More compact. **Most powerful.**



-20%
ELECTRICAL
CONSUMPTION



-15%
FUEL CONSUMPTION



30 mg/kWh
NO_x EMISSIONS



1 VS 275
STARTING-UPS



-30%
OVERALL
DIMENSIONS

ECOVAPOR








Reduced NOx emissions



DESCRIPTION







Thanks to the most advanced technologies on combustion, heat transfer and energy efficiency, ECOVAPOR ensures a very convenient cost of ownership combined to a very low environmental impact.

FEATURES

-  **Design pressure: 12 bar**
-  **Heat output: 681 ÷ 2044 kW**
-  **Steam capacity: 1000 ÷ 3000 kg/h**
-  **Efficiency: > 95,0 %**
-  **NOx emissions: <70 mg/kWh**

Versions with NOx emissions <30 mg/kWh available on request

ADVANTAGES

-  **Efficiency**
The modulation ratio, inverters on the motors, fewer thermal losses and load adaptation all contribute to decrease of electrical energy and fuel consumptions with respect to a traditional boiler.
-  **Safety**
Fuel and combustion air suction prevents dangerous flue gas leakages in the working environment.
-  **Unattended operation**
ECOVAPOR is certified for unattended operation for 24 (ECS24 Model) or 72 consecutive hours (ECS72 Model), according to the latest European Standards.
-  **Emissions**
The innovative vector flame and vacuum combustion system completely integrated into the structure keeps NOx emissions below the most restrictive international legal limits.
-  **Integration and simplicity**
Moving parts and complex electronic logics have been replaced by fixed systems.
-  **Connectivity**
ECOVAPOR adjustment and control system integrates control and adjustment functions, safety, connectivity and data logging of both the boiler and the combustion part.

Complete steam production system

AVAILABLE CERTIFICATIONS



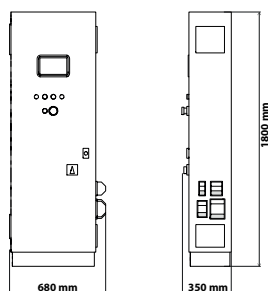
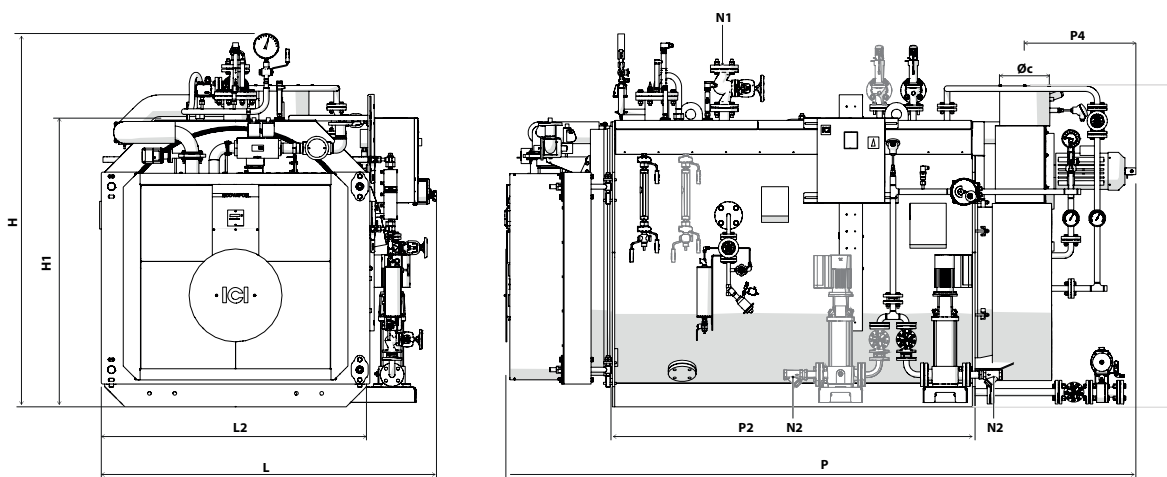
MAIN APPLICATIONS

- + Paper industry
- + Chemical and pharmaceutical industries
- + Wine farms
- + Manufacturing industry
- + Food and beverage industry
- + Hospitals
- + Meat processing
- + Dairy Industry
- + Distilleries
- + Heavy industry
- + Beer industry
- + Petrochemical industry

TECHNICAL DATA

Model	Heat Output	Heat Input	Steam Cap.	Total volume H2O	Gas consumption	Total weight
ECOVAPOR ECS72	kW	kW	kg/h	lt	Nm3/h	kg
1000	681	715	1000	2150	73,4	3460
1300	886	930	1300	2150	95,5	3460
1700	1158	1216	1700	2840	124,8	5250
2000	1363	1431	2000	2840	146,9	5250
2500	1703	1789	2500	3970	183,6	6220
3000	2044	2146	3000	3970	220,3	6220

DIMENSIONS



Model	H	H1	L	L2	P	P2	ØC	N1	N2
ECOVAPOR ECS72	mm	mm	mm	mm	mm	mm	mm	DN/in	DN/in
1000	2150	1690	2126	1550	2686	1770	330	50	32
1300	2150	1690	2123	1550	3096	2180	330	50	32
1700	2300	1840	2258	1680	3278	2180	398	65	32
2000	2300	1840	2020	1680	3967	2540	398	65	32
2500	2460	1990	2180	1840	4027	2540	430	80	32
3000	2540	1990	2180	1840	4466	2922	430	80	32

STANDARD EQUIPMENT

Accessories on the steam side, including:

- Steam outlet globe valve
- spring safety valve (no.2 standard valves only for Ecovapor 2500 model)
- level indicator with direct reflection
- shut-off valve groups and drain indicator

Integrated economiser consisting of:

- 2 check thermometers
- 1 pressure gauge with three-way test valve
- safety valve

Water delivery unit mounted on boiler support containing:

- 1 vertical multi-stage centrifugal pump suitable for 120° C water with integrated inverter
- 1 shut-off globe valve
- 1 pump suction filter
- 2 non-return valves

Adjustment and control system allowing:

- Water level adjustment which depends on the actual steam request from the system
- Thermal power adjustment which depends on the actual steam request from the system
- Burner modulation adjustment, for the management of any power between the minimum and maximum limits, for an optimal adaptation to the feed instant request
- Adjustment of frequency and duration of automatic blowdown
- Entry thresholds adjustment depending on the salinity control unit TDS
- Dynamic programming of the boiler operating pressure set-point

Automatic blow down system unit containing:

- globe valve
- rapid opening drain ball valve, with steel body, pneumatic actuator and return spring equipped with compressed air solenoid valve

Sample cooler containing:

- AISI 304 barrel with an internal water-cooling coil
- cooling water injection ball valve
- handwheel valve for sample picking

Pressure monitoring instrumentation manifold, consisting of:

- large dial 3 way test valve manometer
- fail safe manual reset safety pressure switch
- analogue pressure transducer

Temperature monitoring

- ambient temperature
- flue gas temperature

Automatic conductivity probe level regulator, consisting of:

- capacitive probe for level control and management
- 1st alarm and burner shut off probe for low level with self-checking
- 2nd alarm and burner shut off probe for low level with self-checking
- high level safety probe

Connectivity and data logging

ECOVAPOR management system is certified to manage safety chains, has an expandable control system and has a connectivity system via LAN, WiFi, Modbus, Modem. It is fully equipped with a SIM for the transmission of data.

- This allows the following benefits:
- Register the product in the machine database to facilitate remote service operations.
- Recording of start-up and maintenance operations.
- Connection between the boiler and the other management and control systems.
- Free update of the boiler control software.
- Collection of data on the operating state through external and internal sensors of the plant room and boiler.
- Self-checking and alarm status indications.

Pneumatic salinity control unit TDS consisting of:

- direct reading conductivity probe in the boiler
- 2 shut-off valves
- pneumatic exhaust valve with compressed air solenoid valve

PRODUCT CODES

ECOVAPOR ECS72	Code
1000	86441004
1300	86441304
1700	86441704
2000	86442004
2500	86442504
3000	86443004

ACCESSORIES AVAILABLE FOR THE RANGE

Code	Description	ECOVAPOR
		ECS 72
See "Accessories" section	Ecovapor second level indicator kit	■
See "Accessories" section	Ecovapor second safety valve kit	■
See "Accessories" section	Ecovapor backup supply pump kit	■
See "Accessories" section	Electric steam outlet valve kit	■
See "Accessories" section	Check valve kit	■
See "Accessories" section	Monitoring of steam flow rate	■
See "Accessories" section	Ecovapor natural gas consumption monitoring	■
96140210	Ecovapor electric energy consumption monitoring	■
See "Accessories" section	Ecovapor energy monitoring	■
86900039	Automatic purging system	included
38040100	Sample cooler	included

COMPONENTS FOR HEATING PLANT ROOM COMPATIBLE WITH THE RANGE



VRC
Condensate collection tank



VRC-V
Condensate collection tank



DEG
Atmospheric deaerator



DEG/P
Pressurised deaerator



ADD
Feed water treatment unit for steam boilers



BDV
Blowdown vessel



VEX
Steam accumulator



ecovapor



ACCESSORIES

Components designed to further improve boiler performance of ECOVAPOR series.

System Accessories

ECOVAPOR system is equipped of adjustment and safety accessories that allow automatic operation, however, in some countries or for certain specific requests from the customer, it should be necessary to provide the supply of some optionals that are shown in this section.

SECOND LEVEL INDICATOR



Standard equipment:

- level indicator with direct reflection
- interception valve and drain indicator unit

It is supplied as an optional and/or when the prevailing Regulation in the country of destination of Ecovapor requires the second level indicator. The kit is assembled and tested in our factory.

PRODUCT CODES

MODELS	KIT CODE
ECOVAPOR 1000 - 2000	96140250
ECOVAPOR 2500 - 3000	96140251

SECOND SAFETY VALVE



It is supplied as an optional when the prevailing Regulation in the country of destination of Ecovapor requires the spring double safety valve. The kit is assembled and tested in our factory. The only boiler model Ecovapor 2500 is provided as a standard with the double safety valve.

PRODUCT CODES

MODELS	KIT CODE
ECOVAPOR 1000 - 2000	96140260
ECOVAPOR 3000	96140261

SECOND SAFETY VALVE



Standard equipment:

- 1 backup feed pump with characteristics similar to service pump
- 1 pump suction filter
- 1 non-return valve on pump downstream
- 1 shut-off valves on pump downstream

To ensure a continuous operation of the boiler by avoiding any production downtime in case of a supply pump failure, a second backup pump is supplied and installed in parallel with the service one. In the event of a service pump failure, the failure is indicated on the control panel and the exchange occurs automatically. The backup supply pump is thus controlled in the same way as the service pump. Both pumps, hydraulically connected to the same feed pipe, are equipped with a non-return valve and a shut-off valve dedicated to each pump to avoid the water flow towards the pump in stand-by conditions.

PRODUCT CODES

MODELS	KIT CODE
ECOVAPOR 1000 - 1700	87050025
ECOVAPOR 2000 - 3000	87050035

ACCESSORIES FOR THE OPERATION OF MULTIPLE BOILERS

The management strategy of multiple steam boilers is a very important aspect if you want maximising the performance of a heating plant room.

In order to achieve this goal, it is important that each boiler present in the heating plant room is designed to be automatically adjusted and operated, depending on the needs of the system to be operated. The non-return valve and motorised steam outlet valve shown in this section are used for this purpose.

ELECTRIC STEAM OUTLET VALVE KIT



The butterfly valve is a safety valve with a disc-shaped shutter turning around a standard axis of the pipe thus stopping the flow. It can be used as control valve or simply as shut-off valve.

The main advantages offered by the butterfly valve are:
 compact dimensions with consequent less space required
 possibility to be assembled in any position
 reduced weight with easy transport and maintenance
 negligible load losses
 long duration over time

The valve is equipped with an electric actuator controlled by the boiler management system.

PRODUCT CODES

MODELS	DN	KIT CODE
ECOVAPOR 1000 - 1300	50	90060130
ECOVAPOR 1700 - 2000	65	90060131
ECOVAPOR 2500 - 3000	80	90060132

ECOVAPOR SMART MANAGEMENT

System requests would often allow to turn off the boilers, lower operating pressures, modulate the load, anticipate requests, etc., and this would lead to additional savings, but it is not done because data which help to make decisions are not available.

Systems shown in this section make it possible to access data and make these decisions easier and safer, possibly with the support of ICI CALDAIE specialised technicians.

ECOVAPOR STEAM PROFILE



The curve of the steam production could become an important information in order to analyse load profiles of request and then make it possible to optimise adjustment parameters, with consequent greater efficiency.

It is possible to detect and represent these data by installing, downstream of the ECOVAPOR system, an appropriate kit that allows you to measure total and instant steam flow rate, transmit data to the control and adjustment system, and build relevant curves.

PRODUCT CODES

DN	KIT CODE
50	96140240
80	96140242
100	96140244

ECOVAPOR FUEL PROFILE



The curve of the methane gas consumption could become an important information in order to analyse the operation and responses of a boiler according to requests. General gas consumption data of the facility or whole heating plant room, including other boilers or machines, are often available and these data do not provide information useful for this purpose. It is possible to detect and represent these data by installing, downstream of the ECOVAPOR system, an appropriate kit that allows you to measure total and instant fuel flow rate, transmit data to the control and adjustment system, and build relevant curves.

PRODUCT CODES

MODELS	KIT CODE
ECOVAPOR 1000 - 1700	96140220
ECOVAPOR 2000 - 3000	96140225

ECOVAPOR POWER PROFILE



Electricity consumption of a steam boiler is a piece of information that usually is neglected or underestimated although important. Nowadays it is always useful to assess the global consumptions of a system, not just those related to fuel, and learning about the system absorption capacity makes it possible to collect data useful to detect any malfunctions in advance. It is possible to detect and represent these data by installing, downstream of the ECOVAPOR system, an appropriate kit that allows you to measure total and instant electric energy consumptions, transmit data to the control and adjustment system, and build relevant curves.

PRODUCT CODES

ACCESSORY CODE:	96140210
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The following describes combinations between operating pressure and Ecovapor models, for proper selection of the instrument.

PRESSURE bar	ECOVAPOR					
	1000	1300	1700	2000	2500	3000
7	DN50	DN80	DN80	DN80	DN80	DN100
10	DN50	DN50	DN80	DN80	DN80	DN80
12	DN50	DN50	DN80	DN80	DN80	DN80

ECOVAPOR FEED WATER & ENERGY PROFILE



The monitoring of the water delivery flow rate at the system inlet is a data which can be useful to obtain information on the actual operating trend of the boiler, heat lost from drains and system efficiency.

It is possible to detect and represent these data by installing, downstream of the ECOVAPOR system, an appropriate kit that allows to measure total and instant water consumptions, transmit data to the control and adjustment system, and build relevant curves.

This kit further allows you to simultaneously calculate the thermal energy recovered by the economiser, thanks to the calculation unit and two temperature probes that are part of this system.

PRODUCT CODES

MODELS	KIT CODE
ECOVAPOR 1000 - 1700	96140230
ECOVAPOR 2000 - 3000	96140235