ECOLEAN™

Air to water liquid chiller and heat pump

20 – 200 kW

ENERGY EFFICIENCY
ACOUSTIC PERFORMANCE

ECOLEAN™, winning
ENERGY PERFORMANCE

The ECOLEAN™ delivers energy efficiency at full and partial load by the use of R410A multi scroll compressors and specific algorithms designed to reduce energy costs.

R410A, unequalled performance while protecting the environment

The ECOLEAN™ is equipped with high performance cooling systems that protect the environment by the use of R410A multi scroll* compressors and an optimised heat exchange area.

- ¬ Reduced loss of charge for improved COP.
- ¬ Increased isentropic efficiency of the compressors.
- ¬ Greater power efficiency than other HFC fluids.
- ¬ Zero potential for destruction of the Ozone layer.
- ¬ Very low refrigerant charge to limit environmental impact.
- ¬ Refrigerant charge possible for servicing.

Multi scroll* high performance compressors for optimum, long lasting efficiency

- ¬ Increased efficiency when operating at partial load.
- ¬ Increased relative heat exchange area while reducing power.
- ¬ Intelligent defrost algorithm as standard (Dynamic™ defrost).

**Multiscroll 47 kW to 200 kW. Single 25 to 43 kW compressor.*

Intelligent control that continuously optimises power consumption

With the 7 day time programming periods, CLIMATIC™ control manages power consumption according to the use of the premises: automatic switching to occupation mode, unoccupied or frost-free, automatic water set point offset according to the outside air temperature.

Depending on the size of the installation, CLIMATIC™ regulation can control from one to eight units in master/slave operation and provide communication with the technical department in the building or Lennox Adalink™ monitoring.

Depending on the desired communication protocol, the ECOLEAN™ can be fitted with a communication card

¬ ModBUS®. ¬ LonWorks®. ¬ BacNET®. ¬ Adalink™.

eComfort™ eco-efficiency contribution by Lennox

eComfort™
efficiency • environment

ECOLEAN™, THE LOWEST SOUND LEVEL ON THE MARKET*

One of the principle features of the ECOLEAN™ unit is an adjustable sound level for night and day to comply with the surrounding acoustic requirements.

OWLET™ fans and acoustic attenuation of compressor noise

The ECOLEAN™ is designed to achieve the lowest noise level on the market. The principal technological innovations are the new fan blades and silent compressor operation. Usage of OWLET™ fans, together with acoustic insulation of the compressor housings, ECOLEAN™ has achieved acoustic performance that is unrivalled on the market.

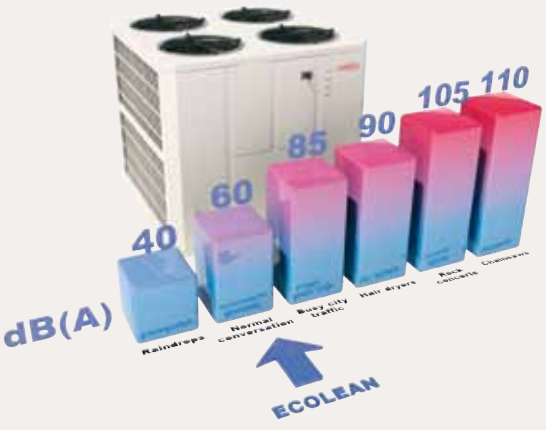
OWLET fan with profiled blades provides unequalled performance!

Low and super low noise versions (LN & SLN)

The ECOLEAN™ range includes two basic models: the standard (S) version mainly for outdoor installation and the high static pressure version (F) is mainly for indoor installations with an internal ducted installation.

Each standard Ecolean model is available in 3 main versions to match every customer need.

- **Standard version (S)**: This version features a standard efficiency unit with 2 speed fans.
- **Low noise version (LN)**: This version features quiet performance with an average reduction of -7 dB(A) obtained by the use of low speed fans and an insulated compressor in a high performance acoustic housing.
- **Super low noise version (SLN)**: This is a very low noise version with an average reduction of -10 dB(A) owing to low speed fans and compressors insulated in a high performance acoustic housing.



** European market study carried out in February 2011*

ECOLEAN™, variable water flow
FOR ENERGY SAVINGS

The cost of pumping power represents more than 20% of the total energy cost

In a water system, the pump is one of the main energy consumption items. The energy cost of pumping can represent more than 20% of the total energy cost of a chiller. eDrive™ variable speed pump technology is part of the responses made by Lennox to save energy while exploring the possibilities of reducing installation costs.

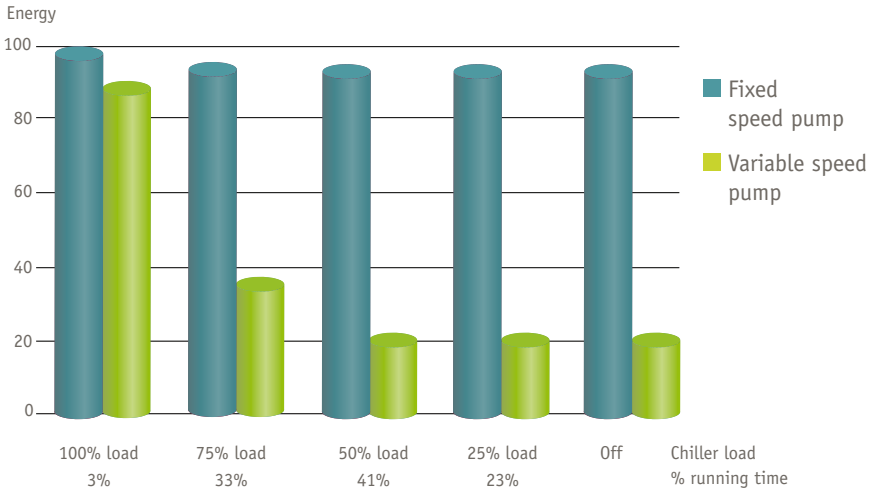
eDrive™ automatically controls energy costs

- At full load owing to electronic adjustment of the pump curve. Elimination of power losses caused by the manual water flow control valve.
- At partial load by automatically reducing the pump speed when operating at reduced chiller load.
- During shutdown periods of the cooler owing to operation of the pump at minimum speed.
- On starting owing to the speed controller which reduces the starting current pump.

The power consumption of the pump varies with the cube of the pump speed.
20% flow reduction = Power consumption reduced by 50%
40% flow reduction = Power consumption reduced by 80%

eDrive™: 70 % reduction of the annual pumping consumption

Pump energy consumption



A well balanced design
TO REDUCE COSTS

Integrated pump, buffer tank with or without immersion heater in the most compact machine on the market !

Lennox designed the ECOLEAN™ with a compact hydraulic module (Version HY). The machine also includes all the necessary hydraulic components: single pump (optional twin pumps), expansion tank, etc.

ECOLEAN™ with buffer tank (version HN)

A version with an additional buffer tank is available to increase the water volume of the system so as to avoid short cycles of the unit or for applications where maintenance of a precise water temperature is required. This tank also contributes to avoiding the effects of the heat pump defrost cycle, with heat from the tank being used for the heating circuit. As an option, immersion heaters can provide reduced power of the heat pump with a low ambient temperature.

The eDrive™ variable water flow reduces installation costs

Up to now, two types of hydraulic system were possible for liquid chillers: a “direct” constant flow circuit or a “decoupled” primary-secondary circuit with constant primary. The ECOLEAN™ fitted with optional eDrive™ now offers a 3rd possible choice: variable primary flow. A “direct” variable primary flow circuit is particularly beneficial in comparison with a “decoupled” primary-secondary circuit since the secondary pump and the costs incurred can be eliminated (pump, electrical power supply, hydraulic connections).

In addition, the flow control valve is eliminated since the pump is electronically adjusted to the actual requirements of the plant. These factors can considerably reduce the initial cost of installation. In comparison with a “direct” constant flow circuit, the “direct” variable primary flow circuit permits the use of 2-way instead of 3-way valves on the terminal units and thus contributes to reducing the cost of installation.

Lennox eDrive™ variable primary water flow

Lennox variable speed pump

+

Lennox speed controller

+

Lennox control Algorithms
Constant delta P mode: terminal units with 2-way valves.

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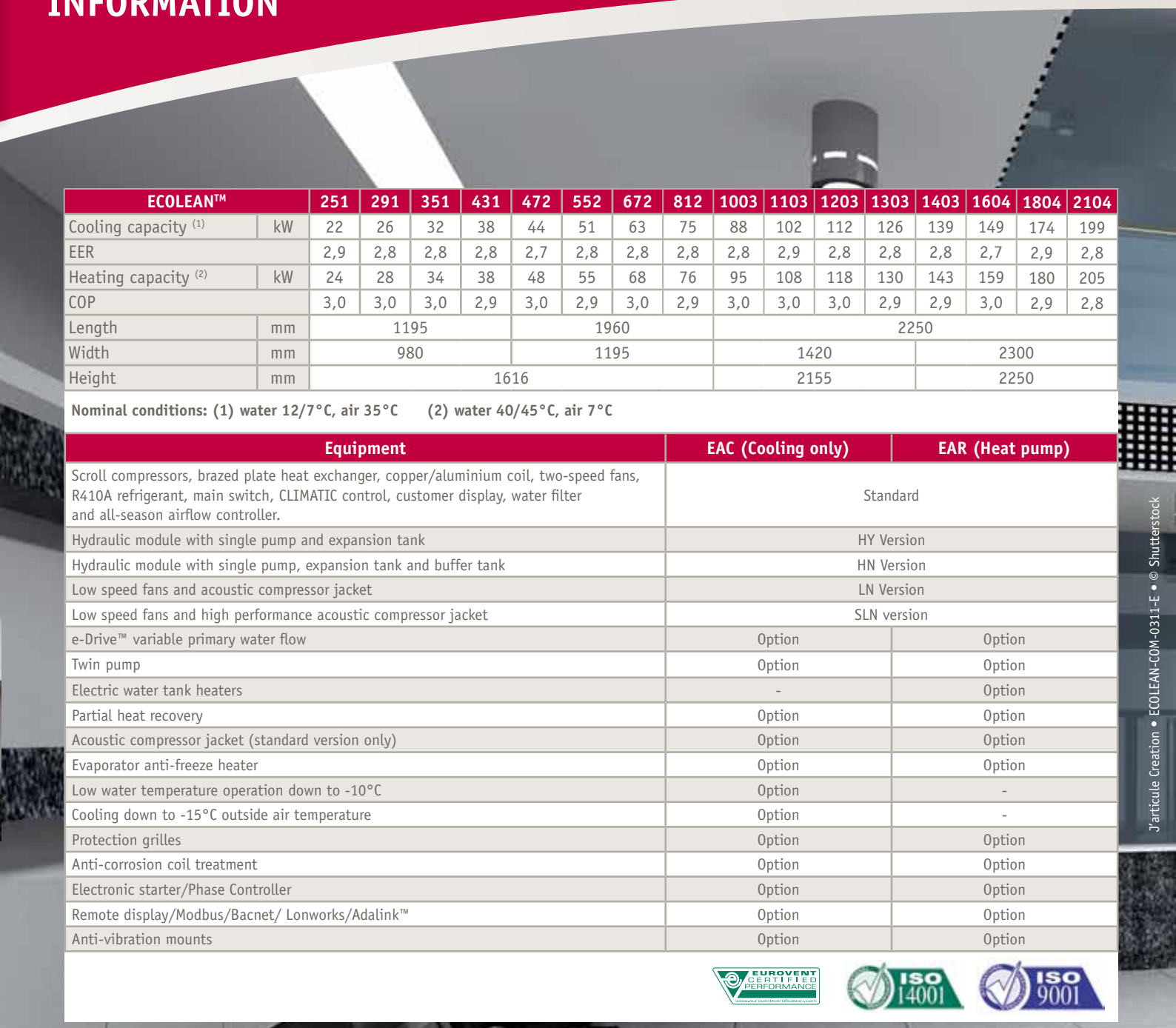
Optional eDrive™
Variable Primary Water Flow by Lennox.

TECHNICAL INFORMATION



ECOLEAN™		251	291	351	431	472	552	672	812	1003	1103	1203	1303	1403	1604	1804	2104
Cooling capacity (1)	kW	22	26	32	38	44	51	63	75	88	102	112	126	139	149	174	199
EER		2,9	2,8	2,8	2,8	2,7	2,8	2,8	2,8	2,8	2,9	2,8	2,8	2,8	2,7	2,9	2,8
Heating capacity (2)	kW	24	28	34	38	48	55	68	76	95	108	118	130	143	159	180	205
COP		3,0	3,0	3,0	2,9	3,0	2,9	3,0	2,9	3,0	3,0	3,0	2,9	2,9	3,0	2,9	2,8
Length	mm	1195				1960				2250							
Width	mm	980				1195				1420				2300			
Height	mm	1616								2155				2250			

Nominal conditions: (1) water 12/7°C, air 35°C (2) water 40/45°C, air 7°C

Equipment	EAC (Cooling only)	EAR (Heat pump)
Scroll compressors, brazed plate heat exchanger, copper/aluminium coil, two-speed fans, R410A refrigerant, main switch, CLIMATIC control, customer display, water filter and all-season airflow controller.	Standard	
Hydraulic module with single pump and expansion tank	HY Version	
Hydraulic module with single pump, expansion tank and buffer tank	HN Version	
Low speed fans and acoustic compressor jacket	LN Version	
Low speed fans and high performance acoustic compressor jacket	SLN version	
e-Drive™ variable primary water flow	Option	Option
Twin pump	Option	Option
Electric water tank heaters	-	Option
Partial heat recovery	Option	Option
Acoustic compressor jacket (standard version only)	Option	Option
Evaporator anti-freeze heater	Option	Option
Low water temperature operation down to -10°C	Option	-
Cooling down to -15°C outside air temperature	Option	-
Protection grilles	Option	Option
Anti-corrosion coil treatment	Option	Option
Electronic starter/Phase Controller	Option	Option
Remote display/Modbus/Bacnet/ Lonworks/Adalink™	Option	Option
Anti-vibration mounts	Option	Option

LENNOX®

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