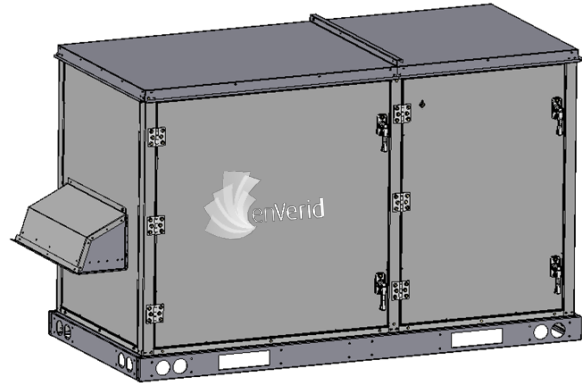


# HLR 1000E-15R



## HVAC Load Reduction® (HLR®) Technology

HLR technology represents a vital addition to conventional HVAC systems to reduce the heating and cooling load of outside air. enVerid's molecular air cleaning technology removes previously hard-to-capture contaminants from indoor air, thereby decreasing the required volume of outside air ventilation while providing the most cost effective, safe and reliable solution for indoor air quality.



*The HLR 1000E-15R is designed for outdoor installation*

## Procedure for Ventilation and Health

The HLR 1000E-15R is compliant with ASHRAE 62.1 Indoor Air Quality Procedure (IAQP), the preferred approach to achieve energy efficiency and indoor air quality (IAQ). Introduced in 1981, IAQP is a performance-based design procedure that determines outdoor air intake rates based on an analysis of contaminant sources and air cleaning capacity to stay below recommended contaminant concentration limits.

**The ASHRAE 62.1 Standard recognizes that "The IAQP may allow for a more cost-effective solution to providing good air quality." Additionally, "The IAQP may also be used to achieve better air quality than VRP."**

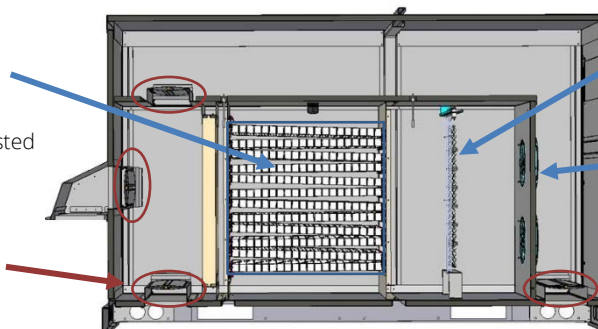
## What's Inside

The HLR module is an all-inclusive solution that contains regenerative sorbent cartridges, along with embedded web-accessible controls and sensors. The system is designed to be scalable to any building size. Individual or multiple HLR modules can be used in new construction, or easily retrofitted to existing HVAC infrastructure. The HLR 1000E-15R is designed for outdoor use, typically on a rooftop. Indoor models for mechanical rooms are also available.

**Cartridge Bank** houses a set of air-permeable sorbent cartridges.

**Construction** is weatherized steel tested for 1000 hour salt-spray.

**Actuators & Dampers** (4 in total) automatically control air flow paths during adsorption and regeneration.



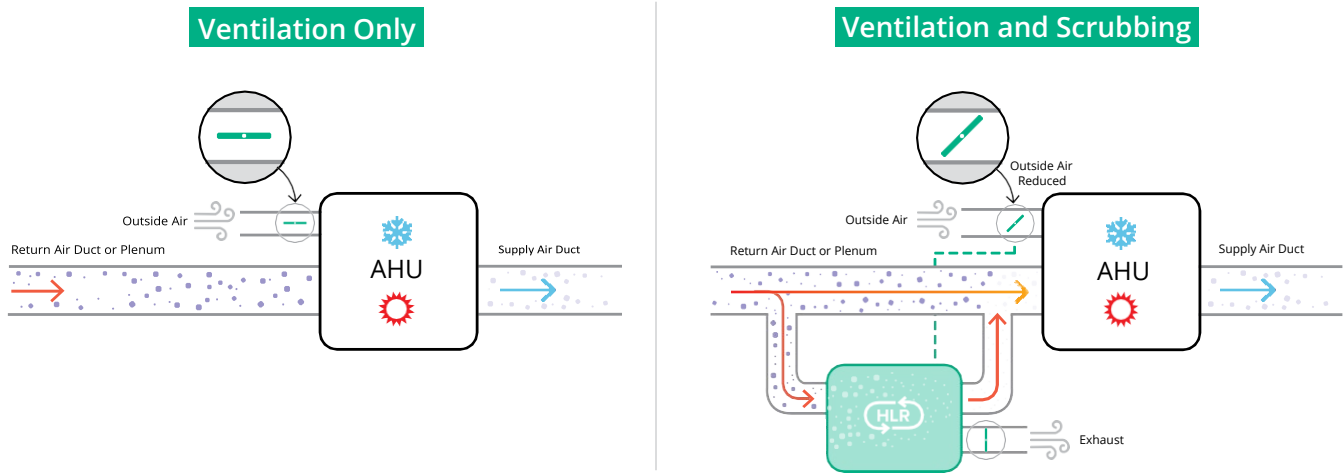
**Heater Coil** raises the internal temperature to release captured contaminants during regeneration.

**Fans (2)** control airflow through the module; no reliance or impact on external static pressure.

**Sensors** measure air quality as well as temperature, humidity, and pressure levels.

## How It Works

The diagrams below compare HVAC operations using ventilation only (outside airflow based on ASHRAE 62.1 Ventilation Rate Procedure, or VRP) with HLR scrubbing and ventilation (outside airflow decreased using ASHRAE Standard 62.1 IAQP<sup>1</sup> calculations and maintaining positive building pressure).



HLR 1000E modules have four integrated capabilities:

### Indoor Air Scrubbing

A fraction of the return air stream is directed through the HLR module to remove indoor-generated contaminants using a blend of sorbents that capture carbon dioxide (CO<sub>2</sub>) along with a wide range of volatile organic compounds (VOCs), ozone, aldehydes, acids and particulate matter (PM<sub>2.5</sub>) resulting in cleaned air that flows back into circulation.



### Outside Air Intake Reduction

By following ASHRAE Standard 62.1 IAQP, HLR enables significant outside air reduction relative to the typically prescribed amounts, while maintaining indoor air quality and complying with all codes and regulations. Outside air reduction leads to lower cooling and heating energy consumption<sup>2</sup> and helps minimize the intake of outdoor pollutants.



### Automatic Self-Cleaning (Regeneration)

The sorbents are designed to release captured contaminants upon heating. The HLR module is equipped with a built-in heater and performs a periodic regeneration process to clean the sorbents and expel contaminants outside of the building.

Regeneration is automatically managed for optimal performance and minimal energy use.



### Monitoring and Reporting

HLR software communicates continuously with the onboard sensors to record, report and optimize all aspects of HLR module's operation. The system provides secure, real-time reporting of IAQ and operating parameters to the enVerid Cloud™.

In addition, the HLR module can link to the building automation system using BACnet protocol.

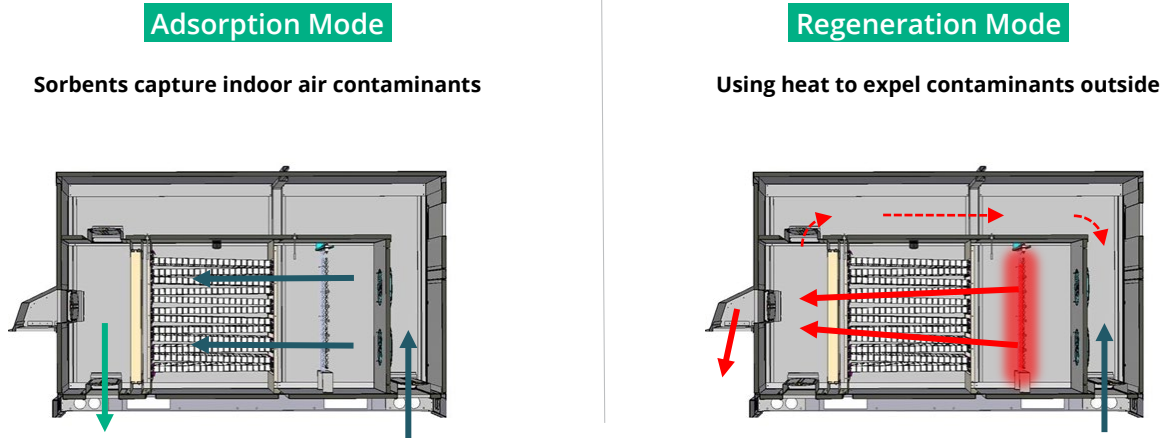


<sup>1</sup> The mass balance analysis is performed per contaminant and per zone to ensure all contaminants are properly below their established limits. These “per zone” outside air CFMs are summed to yield the total ventilation required for the building. enVerid's IAQP calculator makes it easy.

<sup>2</sup> When economizer operation is favorable, outside air is increased and the HLR module is in standby.

## HLR Operating Modes

The diagrams below depict an “under-the-hood” view of HLR 1000E-15R operation during **Adsorption** and **Regeneration** Modes.



For more details on air flow configurations, refer to the HLR Technology Design Guide.

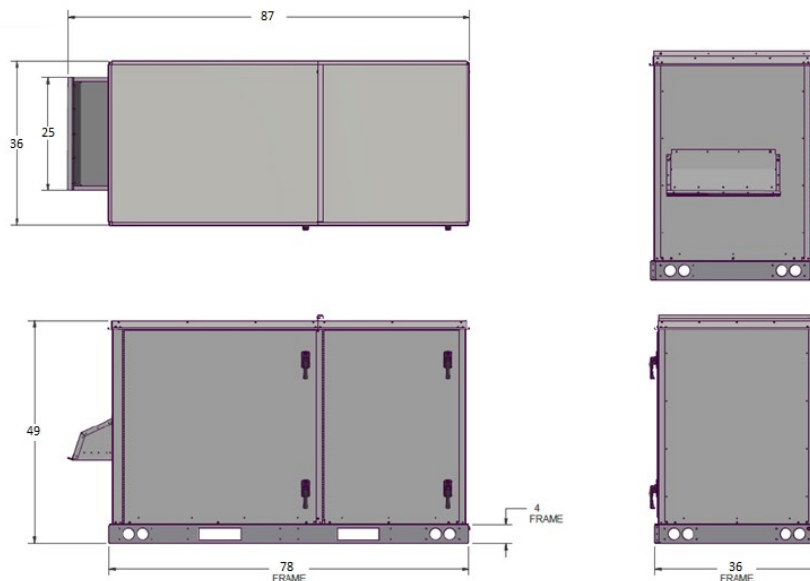
## Connectivity

The HLR 1000E-15R module supports IoT connectivity and is linked to the enVerid Cloud™ using a secure cellular connection. End-to-end encryption and system hardening provide additional layers of security. With a secure login to the enVerid Cloud, facility managers and engineers have 24/7 access to a dashboard with IAQ measurements and HLR system performance, including:

- Anytime, anywhere access from any Internet- connected device (PC, tablet, smartphone)
- Real-time view of energy savings and IAQ, as well as other performance data.

The HLR-1000E-15R also supports standard **BACnet** protocol enabling integration with most types of Building Management Systems (BMS).

## Layout Dimensions



## Specifications

Module		HLR 1000E-15R	
Outdoor Installation		Insulated curb or above roof on equipment support	
Construction		Double-wall, insulated, powder-coated galvanized steel	
Sorbent Cartridges per Set		12	
Cabinet Weight with Cartridge Set		960 lbs	
Maximum Airflow		1000 SCFM	
Typical Airflow (Adsorption)		700 – 800 SCFM	
Typical Airflow (Regeneration)		250 - 300 SCFM	
Static Pressure Added to AHU Fan		None	
Sound Level		< 68 dB	
Maximum Allowed External Static Pressure		0.2"WG / 50 Pa	
Maintenance		Annual	
Operating Life		20+ years when scheduled maintenance is performed	
Dimensions			
Height (including rail)		49 in / 1245 mm	
Length (allow additional 36" clearance on front for service)		87 in / 2210 mm	
Width (allow additional 36" clearance on front for service)		36 in / 914 mm	
Ducts		6.5 in x 22.75 in / 165 mm x 578 mm	
Voltage	Frequency (Hz)	MCA	MOCp
208 V	50/60 Hz	34.3 Amp	35 Amp
277 V	50/60 Hz	30.6 Amp	35 Amp
System Power Consumption		208 V	277 V
Adsorption Mode		300 W	300 W
Regeneration Mode		5,800 W	6,800 W
Communications			
Cellular Link		3G / 4G	
BMS Integration		BACnet over MSTP or Hardwire	
Component Power			
Fans (max, each of 2)		24VDC / 120W	
Heater with PID Control (2 heater options)		277VAC / 6.5kW	
		208VAC / 5.5kW	
Required Control Connections			
Start/Stop		Input to HLR Module 5V DC or via BACnet	
Fire Signal		Input to HLR Module 5V DC	
Temperature of Outside Air		Input to HLR Module: 2-10 VDC or via BACnet	
Outside Air Flow or Damper Position		Input to HLR Module: 2-10 VDC or via BACnet	
HLR Status		Output from HLR Module 24 V DC or via BACnet	
Additional Connections			
Regeneration booster fan Start/Stop		Output from HLR Module 24V/1A or via BACnet	
Indoor Air CO <sub>2</sub> sensor		Output from HLR Module via BACnet	
Indoor Air TVOC sensor (optional)		Output from HLR Module via BACnet	
Available Dry Contact		Input to HLR Module	