



ROBERTS GORDON[®]



CoRayVac[®]

High Efficiency, Condensing Infrared Heating

**Featuring Modulating Burners
and Advanced Controls**

800.828.7450

www.corayvac.com

CORAYVAC® Helps Reduce Energy Bills and Improve Comfort



CORAYVAC® gas-fired, low-intensity, infrared heating systems help provide custom comfort, while facilitating reduced energy consumption up to 50% and more! CORAYVAC® is a continuous burners-in-series vacuum-operated system that can be designed to condense. This efficient operating mode, combined with the principles of infrared energy, can result in considerable energy savings and comfort, while helping to lower your building's carbon footprint and environmental impact.

With the innovation of CORAYVAC®, Roberts-Gordon pioneered energy efficient low-intensity, infrared heating. Today, CORAYVAC® continues to innovate green products by offering a fully modulating infrared heating system.

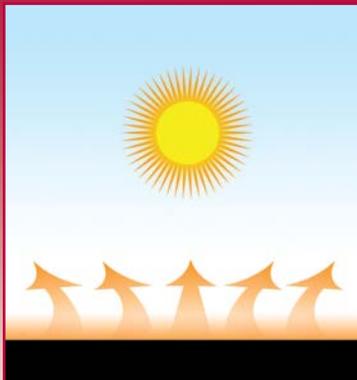
LESS HEAT STRATIFICATION

CORAYVAC® does not blow high temperature heated air that ends up rising to the ceiling. In fact, CORAYVAC® does not heat air. CORAYVAC® reflects and directs infrared energy toward the floor. The infrared energy is in the form of electromagnetic waves that can be directed and reflected like light. These waves travel through the air (not heating it) toward the floor until they strike solid objects. The objects are heated when they absorb the infrared energy. Floors, people and equipment below CORAYVAC® absorb and store heat, then re-radiate heat and warm the air by convection as air passes across the warm objects. Compared to other traditional heating systems, CORAYVAC® uses less energy to heat the area at occupant level. In addition, since there is no need for ceiling fans to push heat to the floor, electrical usage can be reduced.



REDUCED BUILDING HEAT LOSS

Because CORAYVAC® does not introduce high temperature air into the heated space, it generates less heat stratification. Air temperatures at the ceiling are lower than with other heating systems. Lower ceiling temperatures result in reduced heat loss through the roof and lowered building heat loss. Lowered building heat loss means less heat is needed to heat the same space.

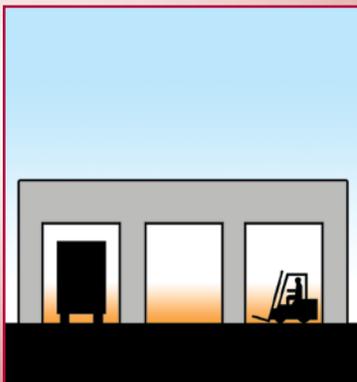


FLOORS BECOME HEAT RESERVOIRS

The sun does not heat the earth's atmosphere directly; rather its infrared rays heat the earth, people and objects. CORAYVAC® uses less fuel than other heating systems because it heats a building and its occupants similar to how the sun heats the earth. With CORAYVAC®, floors and objects become massive secondary heat exchangers. These objects act as heat reservoirs, storing heat, then releasing it into the space by re-radiation and convection to raise space temperature at occupant level.

FREE ENERGY RECOVERY

In commercial and industrial buildings, rapid air changes and heat loss commonly occur when large doors are opened. As a result, valuable heated air escapes outdoors, wasting money. With air heating, more time and money is required for heat recovery because all the energy burned is used only to heat air, when the heated air is lost, no energy remains in the space. With CORAYVAC®, energy stored in floors and objects is re-used for faster energy recovery in the space, without burning more fuel.



GREATER COMFORT AT LOWER TEMPERATURES

To obtain fuel savings of up to 50% over conventional heating systems, it is essential to design an infrared system for maximum distribution and comfort. When designing systems for comfort, or reaching the operative temperature (T_o), designers need to maximize the mean radiant temperature (MRT) and depress the air temperature (T_{air}). For example, to reach a perceived comfort of 65° F (18° C), with infrared, the air temperature can be lowered to 55° F (12° C). This helps reduce energy costs!

Due to elevated mean radiant space temperature, building occupants feel the same amount of warmth when thermostats are set 5° to 10° F (-15° to -12° C) lower with CORAYVAC® than with other heating systems. Lower thermostat setpoint translates into additional energy savings.

CLEAN, QUIET, DRAFT-FREE HEAT

Since CORAYVAC® quietly warms objects without drafts or blowing air, heated areas are cleaner and quieter.

HIGH EFFICIENCY CONDENSING SYSTEM

CORAYVAC® is unique from other infrared heaters because it can be designed as a condensing system. Lowering exhaust temperatures puts more heat in the space and less wasted through the exhaust. This results in additional efficiency and fuel savings.

ENHANCED FUEL SAVINGS WITH MODULATION

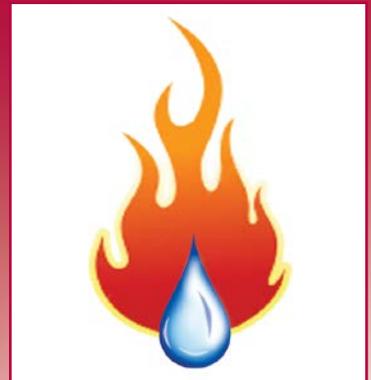
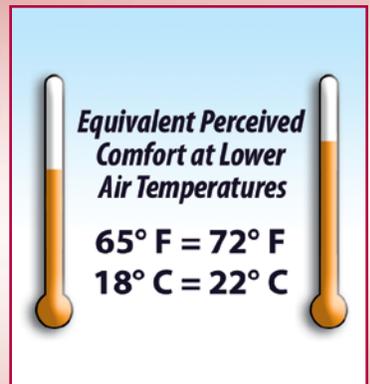
CORAYVAC® modulating and building management controls package, called ULTRAVAC™, allow building owners to graduate to higher levels of comfort and energy efficiency. PC based centralized building management control and connectivity is provided in an easy-to-use Windows-based software package. These controls, coupled with proper burner modulation (continuous adjustment of fuel and combustion air), compound the energy saving benefits of CORAYVAC®. An economical CORAYVAC® modulating controls package is also available. CORAYVAC® helps provide a field-proven solution for today's green industrial and a variety of commercial buildings.

UNIFORM COMFORT

Continuous burners-in-series design with custom layout provides even heating and uniform comfort. CORAYVAC® systems are custom-engineered and designed to match the specific building plan and space requirements.

CORAYVAC® spreads a gentle blanket of low-intensity, infrared energy that directly warms people, floors and objects in a building. By more effectively delivering heat to the occupied area (floor level), CORAYVAC® offers many benefits that can result in improved conditions and greater fuel savings.

Proper design, installation, use and maintenance is necessary for optimum performance. This document is intended to assist licensed professionals in the exercise of their professional judgment.



CORAYVAC® High Efficiency, Condensing Infrared System Features



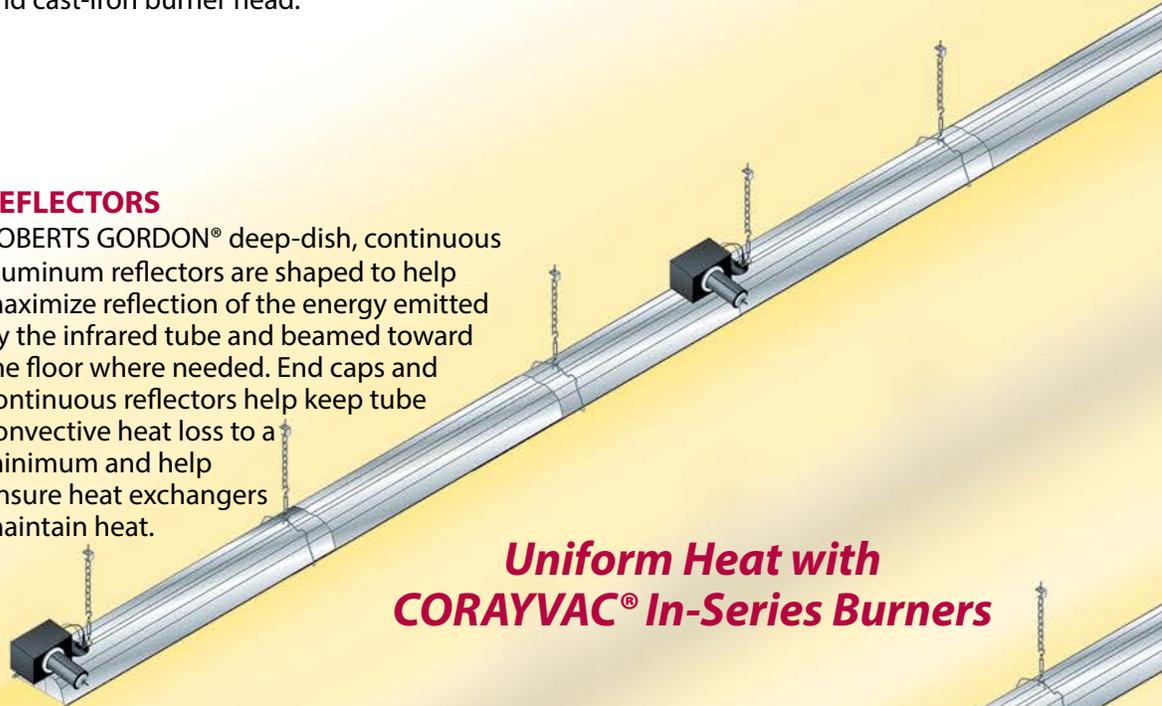
BURNERS-IN-SERIES DESIGN

Located from 10 ft. - 70 ft. (3 m to 21.3 m) apart, CORAYVAC® burners constantly regulate the air-to-gas mixture to achieve the optimum ratio for clean, efficient combustion. Models are available with inputs of 20,000 through 120,000 Btu/h. Features include three-try direct spark ignition, pre-purge, filtered combustion air and cast-iron burner head.



REFLECTORS

ROBERTS GORDON® deep-dish, continuous aluminum reflectors are shaped to help maximize reflection of the energy emitted by the infrared tube and beamed toward the floor where needed. End caps and continuous reflectors help keep tube convective heat loss to a minimum and help ensure heat exchangers maintain heat.

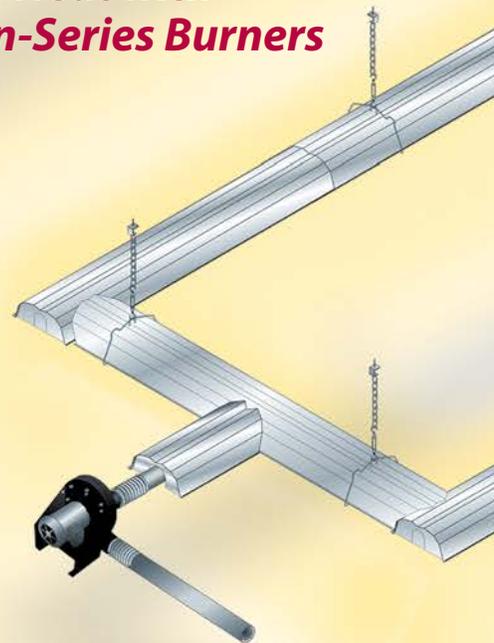


**Uniform Heat with
CORAYVAC® In-Series Burners**



TUBING

The CORAYVAC® system utilizes 4" O.D. (100 mm), 16-gauge tubing. The heat created by the burners is drawn through the tubes, which radiate the warm, gentle, infrared energy. Hot-rolled steel, aluminized steel or double porcelain coated steel tubing are available. Double porcelain coated steel is a cured porcelain coating on the inside and outside surface of the tube, which helps to maximize longevity and minimize corrosion of condensing systems.



VACUUM PUMPS

A vacuum pump draws the heat throughout the entire system. It exhausts products of combustion to the outdoors at temperatures typically below 150° F (66° C). 1/3-hp, 3/4-hp or 2-hp are available for various system sizes and layouts. Up to twelve heaters can be common vented with one vacuum pump. Design flexibility allows side wall venting, even in large buildings.

MODULATING BURNER CONTROLS

Designed for the energy conscious, ULTRAVAC™ Modulating Controls are Roberts-Gordon's energy saving control package. See the ULTRAVAC® pages of this brochure for details. Economical CORAYVAC® modulating controls package and basic controls are also available. See the accessories page of this brochure for details.



COUPLINGS

Heat exchanger tubing is connected together with couplings. Roberts-Gordon offers stainless steel couplings, lined couplings and damper couplings.



Condensing System - Designed to Condense for Optimum Fuel Saving Efficiency.

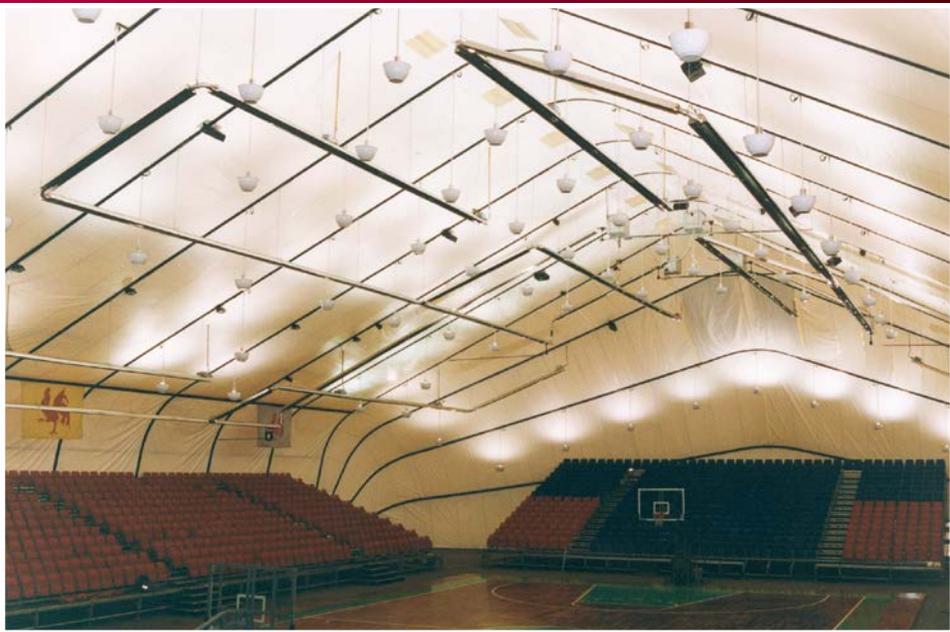
COMBUSTION CHAMBERS

Four types of combustion chambers are available for the CORAYVAC® system: cast-iron, hot rolled steel, aluminized steel and double porcelain coated steel. The heavy-duty, cast-iron combustion chamber can be fitted with schedule 40 pipe throughout the system. Double porcelain coated steel is a cured porcelain coating on the inside and outside surface of the chamber, helping to maximize longevity and minimize corrosion of condensing systems.

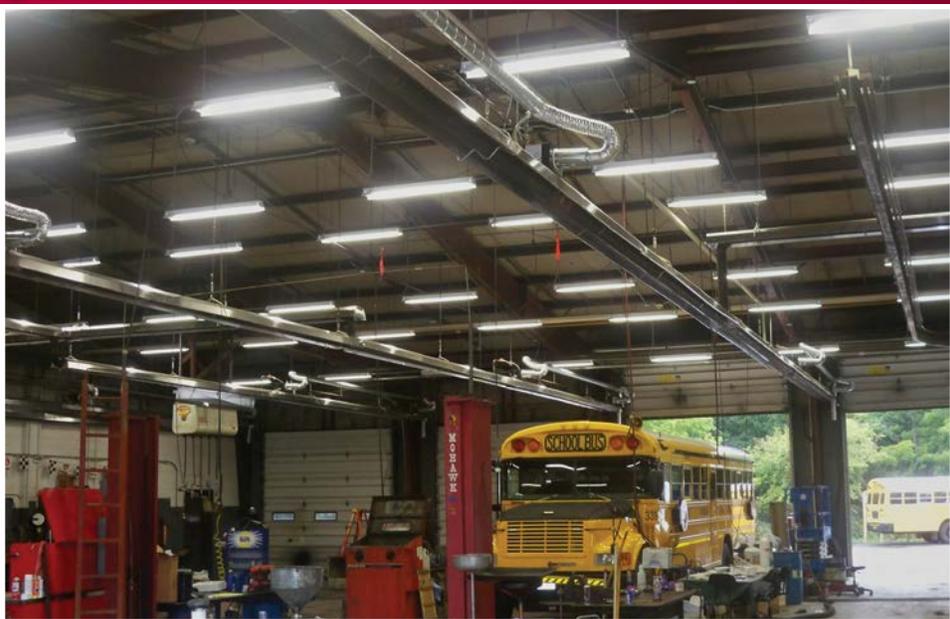




Warehouses / Distribution Centers



Sports Facilities



Vehicle Repair Shops

CORAY

For a Wide

Industrial and Com

*CORAYVAC® can heat and cool
as well as provide separate
control for t*

*CORAYVAC® CLASSIC SF h
systems available for
repair fo*

Machine Shops

Distribution Centers

Auto Dealerships

Vehicle Service Shops

Bus Garages

Fire Stations

Farm Buildings

Stores

Package/Parcel Hubs

Swimming Pools

Zoo

4Vac[®]

**Range of
Commercial Buildings**

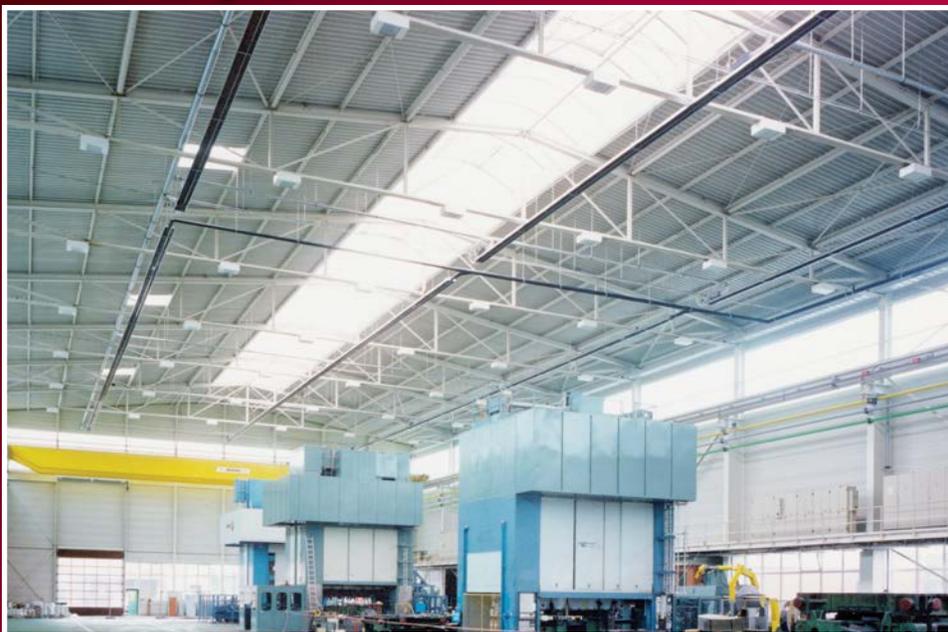
*Heat the entire building evenly,
maintain zone temperature
throughout the building.*

*Heavy duty, high efficiency
specialty fuel vehicle
facilities.*

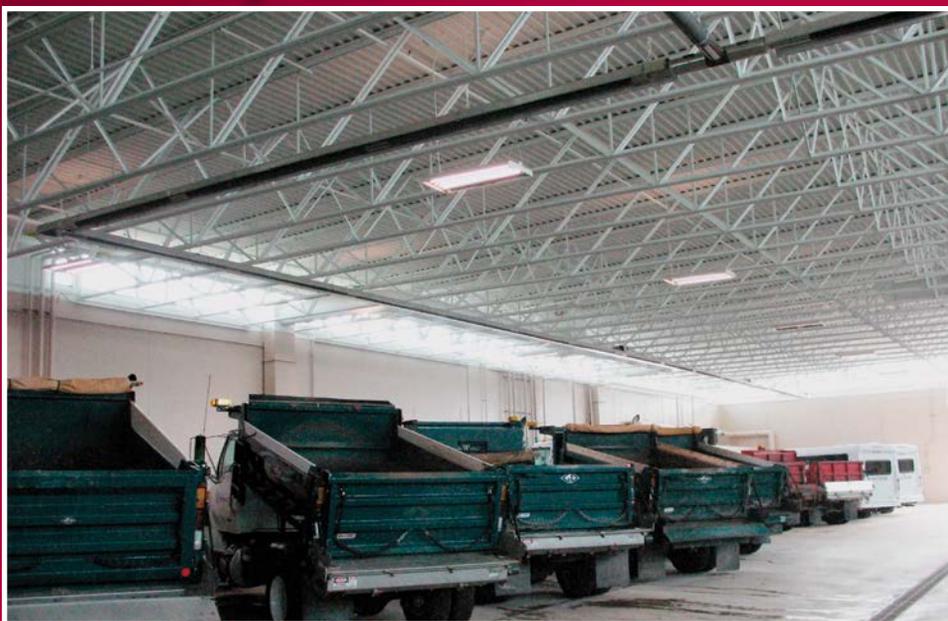
- Metal Buildings**
- Loading Docks**
- Auto Body Shops**
- Truck Terminals**
- Parking Ramps**
- Sports Facilities**
- Workshops**
- Showrooms**
- Restaurants**
- Hockey Rinks**
- Animal Confinement Buildings**



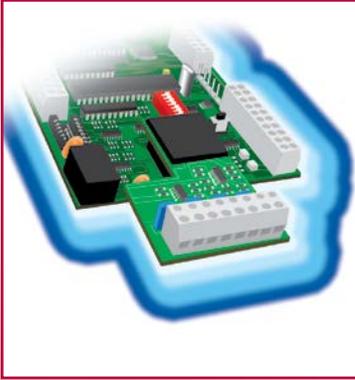
Aircraft Hangars



Manufacturing Plants



Equipment and Vehicle Storage Garages



Featuring fuel to air linkage technology, ULTRAVAC™ is a micro-processor based controls package designed to modulate CORAYVAC® systems. The controls provide proper modulation by varying system vacuum and adjusting gas and combustion air according to the indoor/outdoor temperatures and building heat loss. Matching system input to the building heat loss helps reduce heater cycling and temperature set point overshoot. ULTRAVAC™ helps increase the system efficiency and helps maximize fuel savings. The controls fully modulate burners between 60% and 100% of the burner's maximum rated input.

With the combined strengths of CORAYVAC® and ULTRAVAC™, buildings can be designed for comfort without the worry of high heating bills.

BURNER MODULATION FOR REDUCED FUEL AND ELECTRICAL USAGE

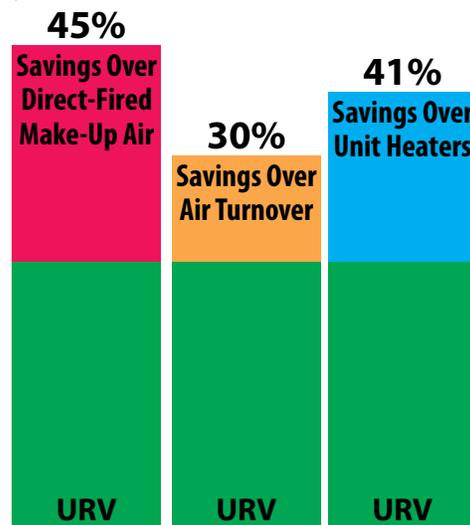
CORAYVAC® burners are equipped with a zero pressure regulator, which alters the amount of vacuum applied to the burner, thereby varying burner input. Altering vacuum also varies combustion air supplied to the burner. Since the fuel and air are changed proportionately, proper, efficient combustion can be achieved throughout the modulation range.

ULTRAVAC™ Controls utilize an energy saving programmable variable frequency drive (VFD) at the vacuum pump resulting in drastic electrical savings compared to a mechanical damper at the pump. The inefficient mechanical damper method of varying system vacuum, increases electrical consumption as the pressure drop across the damper increases.



FUEL SAVINGS*

(CORAYVAC® with ULTRAVAC™ Controls vs. others)

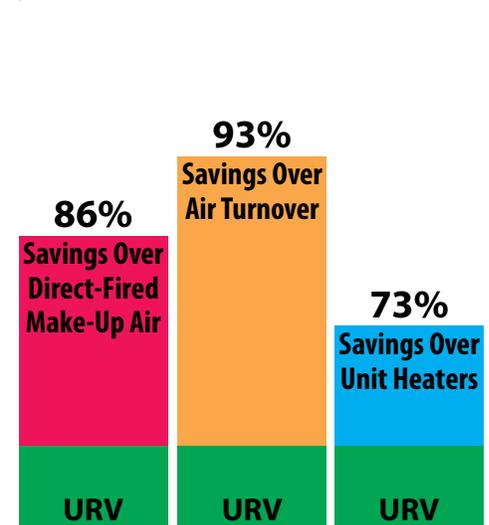


Seasonal Fuel Consumption

*Estimated savings, results may vary.

ELECTRICAL SAVINGS*

(CORAYVAC® with ULTRAVAC™ Controls vs. others)



Seasonal Electricity Consumption

*Estimated savings, results may vary.

CENTRALIZED BUILDING MANAGEMENT

ULTRAVAC™ provides networked and centralized building management from the convenience of your PC!

In addition to significant energy savings, ULTRAVAC™ controls are easy to use. Windows-based software provides simple point and click control and programming that is intuitive and easy to understand.

The software provides a graphical representation feature to show the entire building status at a glance. The controls continuously monitor system status and settings, allowing you to view indoor and outdoor temperatures or alter system settings or programming at any time.



CONNECTIVITY AND INTERFACE CONTROLS

Buildings today demand all sorts of control options based on the user's preference. ULTRAVAC™ controls offer a host of communication options for seamless integration with your controls network to best serve your individual needs:

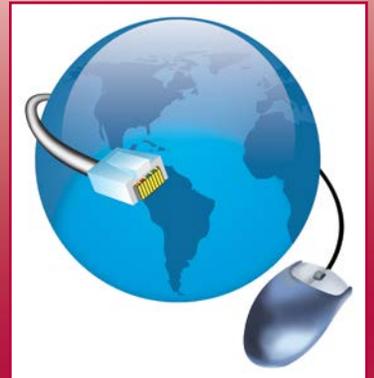


BACnet®: Interface ULTRAVAC™ with other building management control platforms with our BACnet® option.

TCP/IP (LAN): Connect to ULTRAVAC™ via your local area network of computers. Load ULTRAVAC™ software onto any computer on the network and control and view your heating system from your computer.

MODEM: Dial into ULTRAVAC™ from anywhere in the world via modem. Supplied as standard on all central controllers!

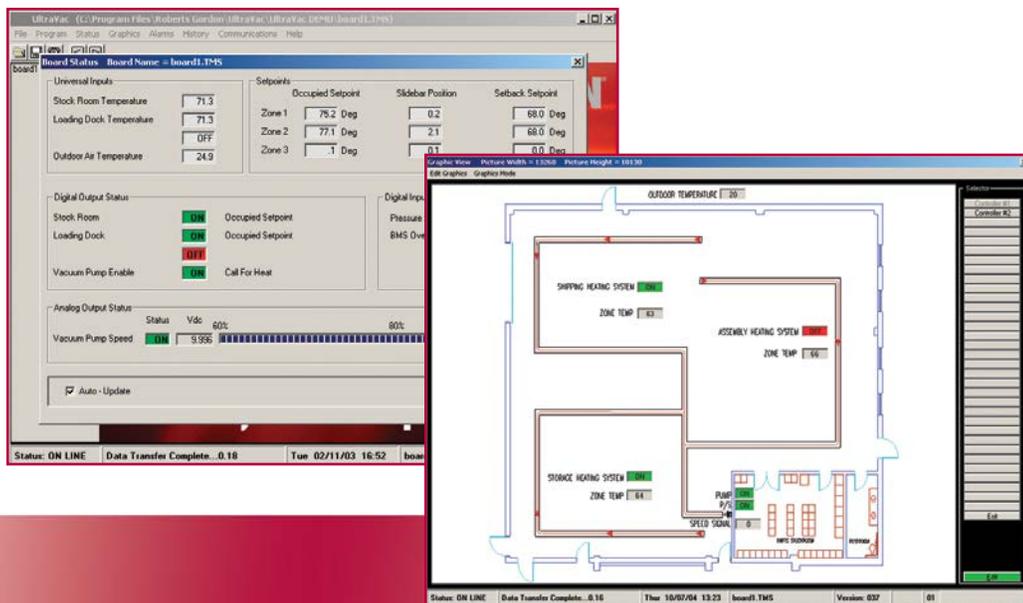
RS-485: Hard wire ULTRAVAC™ directly to your computer.



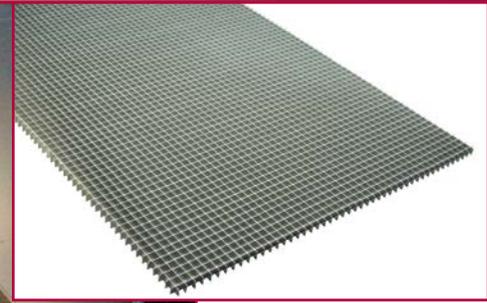
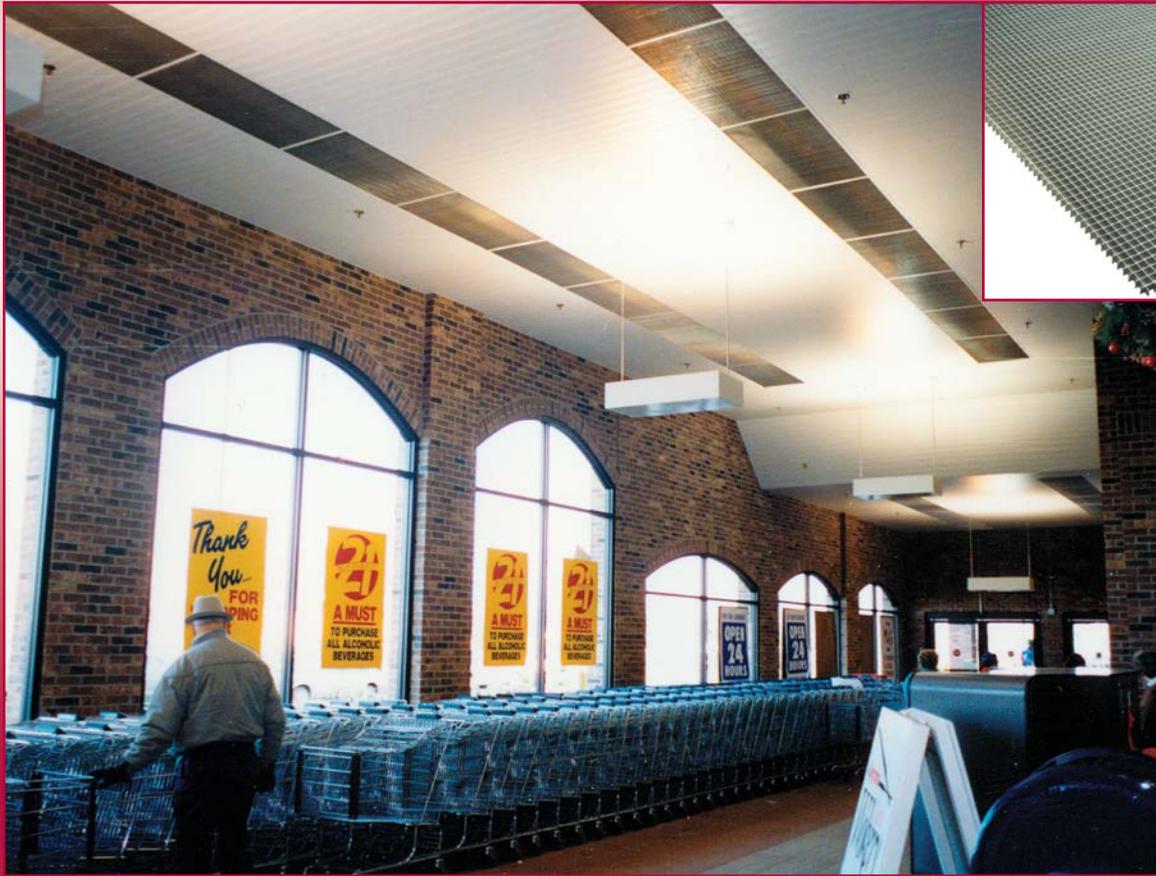
SECURITY AND TAMPER PROOF CONTROL

By networking controllers together, ULTRAVAC™ provides centralized control, helping to ensure security and tamper-proof management, as well as efficient operation of the CORAYVAC® heating system.

BACnet® is a registered trademark of ASHRAE. Roberts-Gordon LLC is not sponsored by or affiliated with ASHRAE.

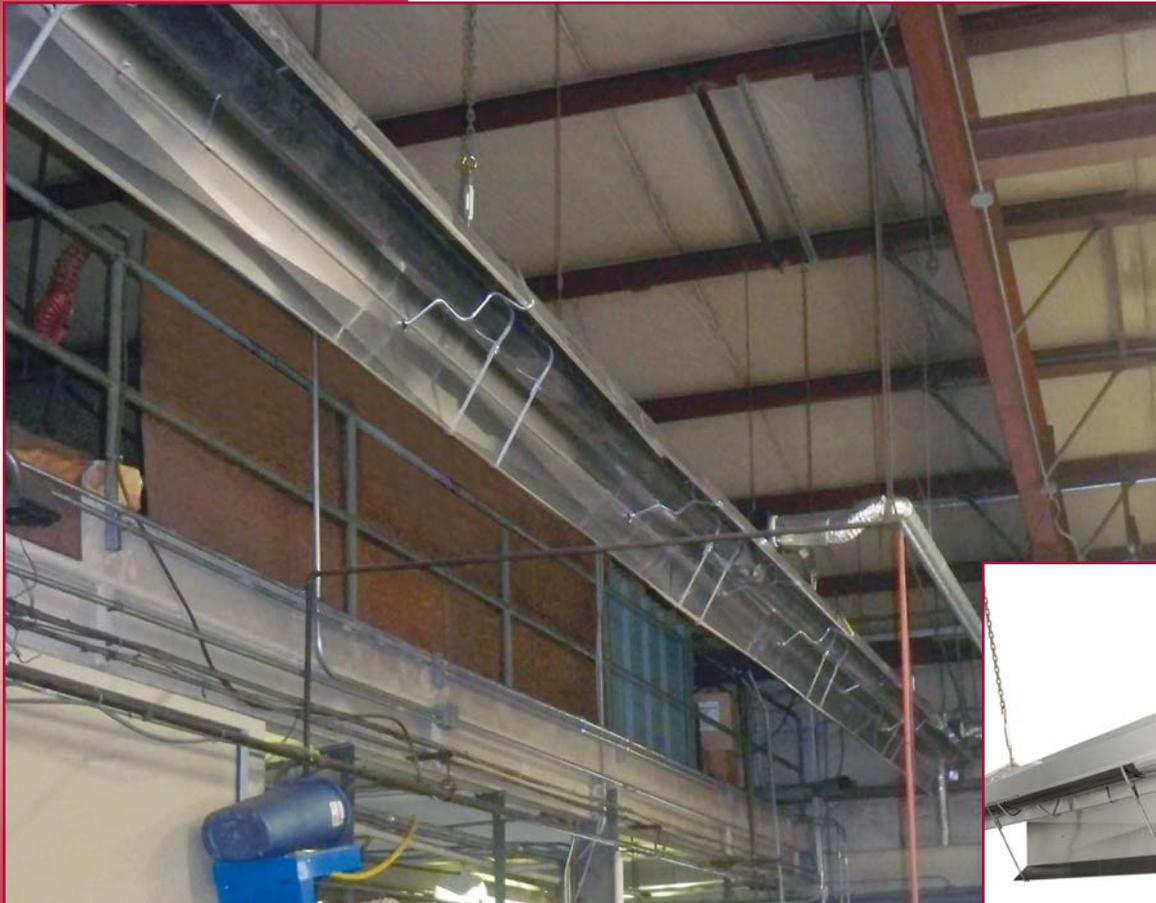


CORAYVAC® High-Efficiency, Condensing Infrared Heating System Accessories



DECO GRILLE

Optional decorative two-foot grille for use with drop ceilings.



SIDE REFLECTOR

Optional side reflector extensions direct heat towards the floor and center of the building when CORAYVAC® is mounted near a wall.





PROTECTIVE GRILLE

Protective grilles conveniently attach to reflectors to cover the radiant tubing. This helps prevent items from coming in contact with the radiant tubes.



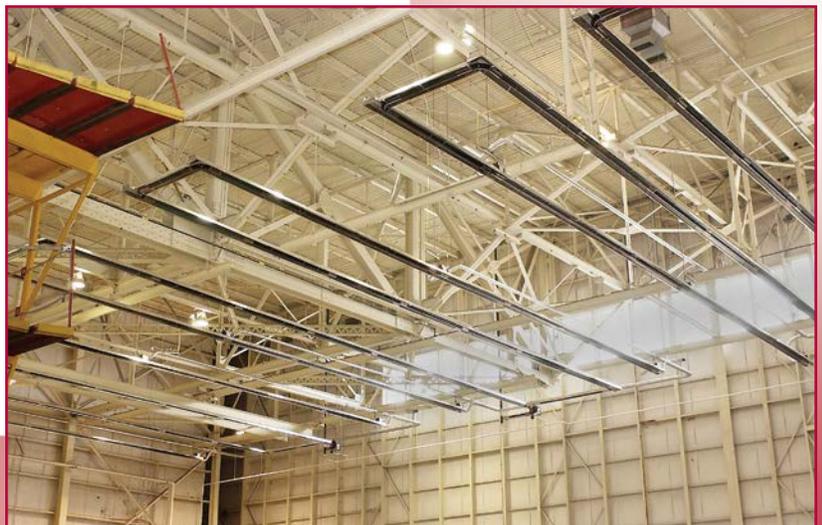
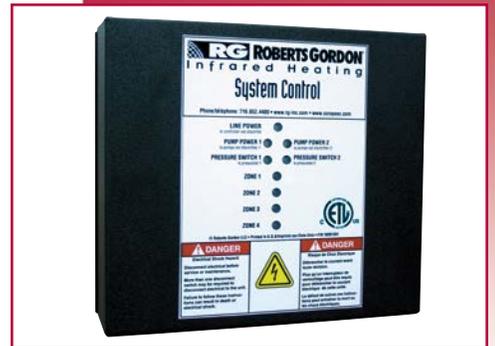
UNIVERSAL SHIELD

Universal shields are aluminum reflectors whose angle and height can be adjusted to direct heat to or away from a desired area. Universal shields are available with or without holes.



CONTROL OPTIONS

In addition to ULTRAVAC™, CORAYVAC® systems can also be controlled by CORAYVAC® modulating controls, a System Control or a relay. The System Control is an electronic control panel capable of controlling up to four zones of burners and two pumps.





Thank You for Your Business!

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Installation Code and Annual Inspections:

All installation and service of ROBERTS GORDON® equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied by Roberts-Gordon LLC and conform to all requirements set forth in the ROBERTS GORDON® manuals and all applicable governmental authorities pertaining to the installation, service, operation and labeling of the equipment. To help facilitate optimum performance and safety, Roberts-Gordon LLC recommends that a qualified contractor conduct, at a minimum, annual inspections of your ROBERTS GORDON® equipment and perform service where necessary, using only replacement parts sold and supplied by Roberts-Gordon LLC.

Further Information: Applications, engineering and detailed guidance on systems design, installation and equipment performance is available through ROBERTS GORDON® representatives. Please contact us for any further information you may require, including the Installation, Operation and Service Manual.

These products are not for residential use.

This document is intended to assist licensed professionals in the exercise of their professional judgment.

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