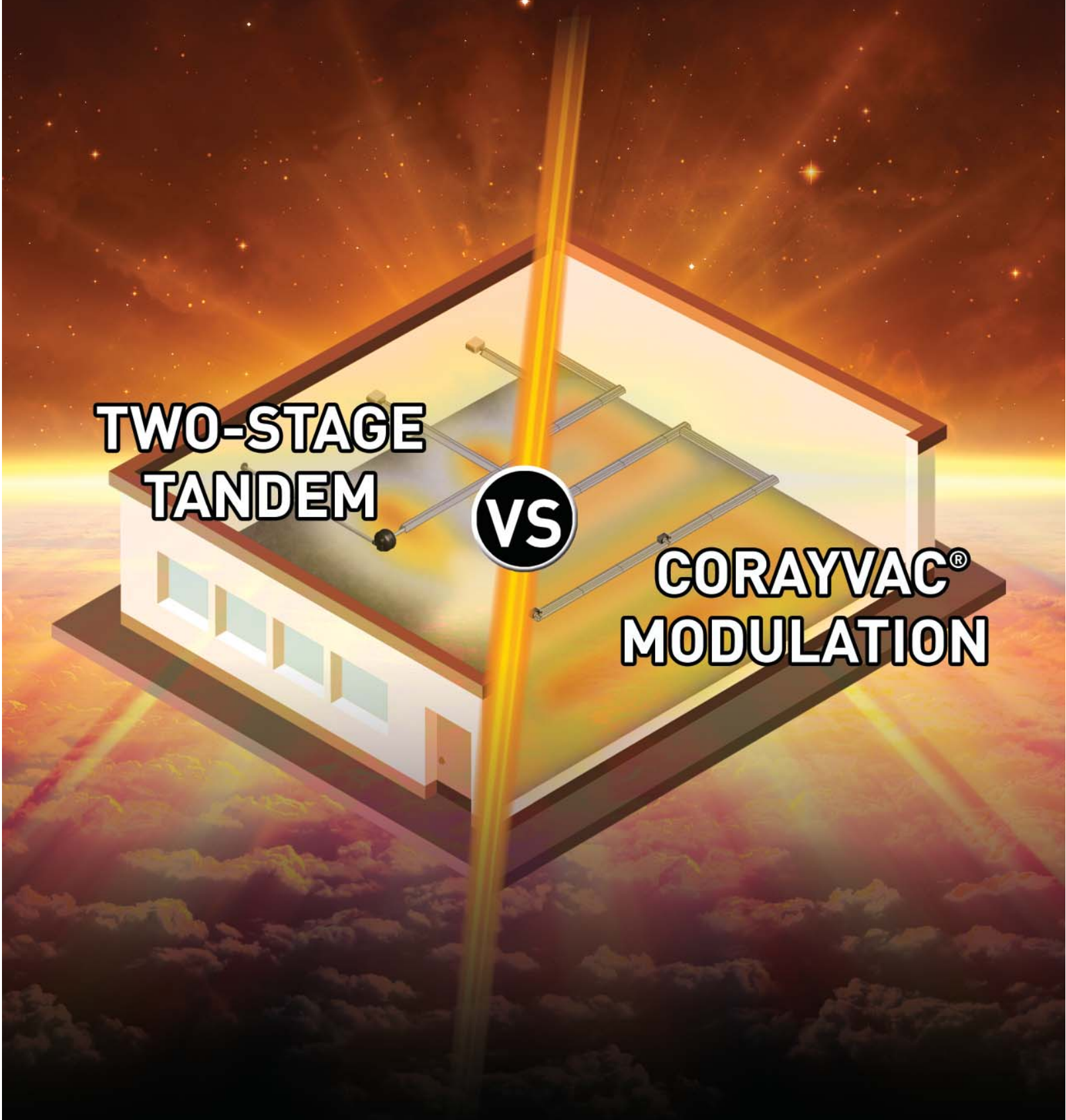
ROBERTS GORDON®
INFRARED HEATING



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Facts About Two-Stage Parallel Heating Systems

Further Investigation Reveals the Proper Way to Maximize Fuel Savings

Conceptually two-stage (or sometimes referred to as "high/low") systems claim to incorporate system modulation, energy savings and improved efficiencies, but the following proves otherwise:

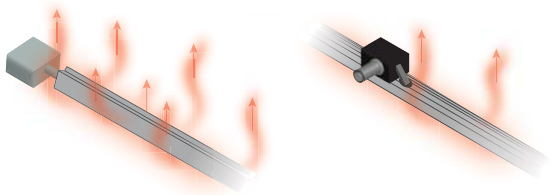
2016 ASHRAE Handbook "HVAC Systems and Equipment" 33.5: "Fuel savings with two-stage firing rate systems may not be realized unless both gas and combustion air are controlled."

Lower Thermal Efficiency

FACT: The thermal efficiency at low fire is 2% lower than the thermal efficiency at high fire.

High/low heaters only reduce the gas flow in the low mode; **combustion airflow remains unchanged.** This causes a diluted inefficient combustion with increased energy losses up the chimney. Independent certified testing thermal efficiency of 79.82% at full input and thermal efficiency of 77.86% at low fire.

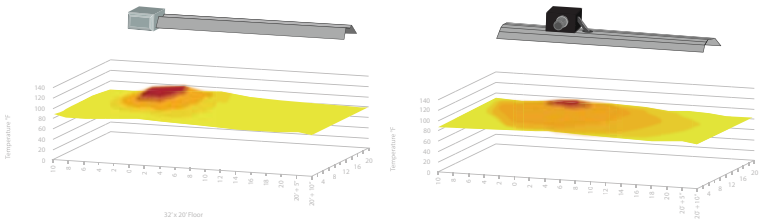
Operating at low fire the majority of the heating season will increase operating costs.



Lower Radiant Efficiency

FACT: The radiant efficiency of a two-stage heater at low fire can be 6.85% lower than the radiant efficiency of a heater at high fire.

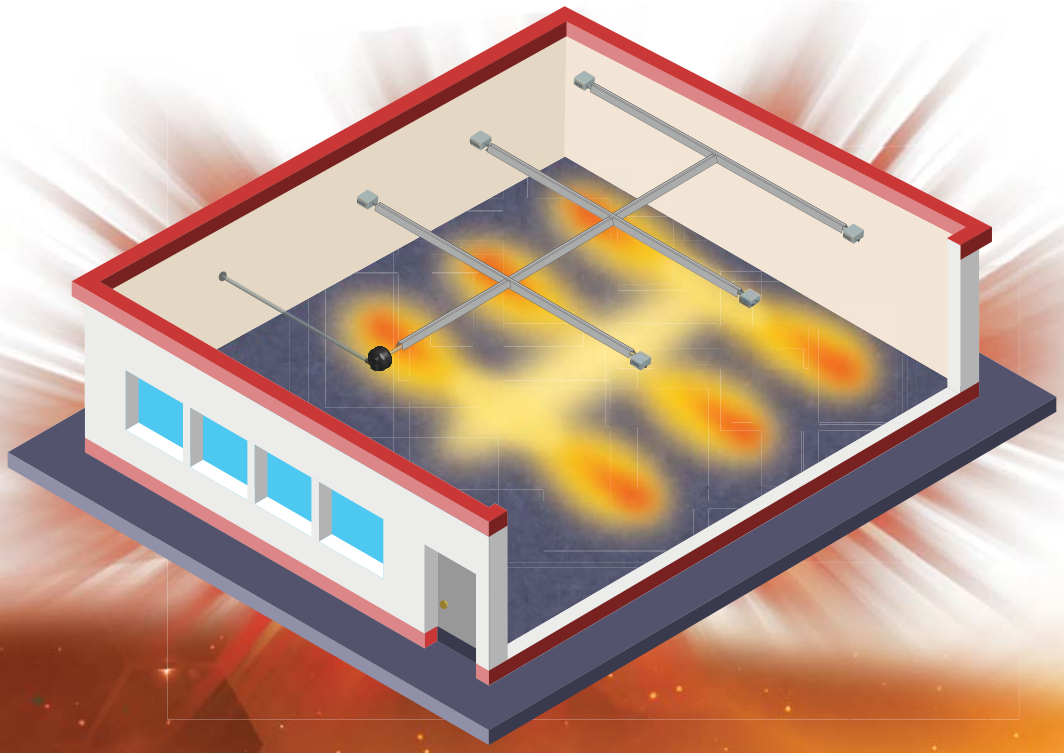
As stated earlier, two-stage systems only reduce the gas flow in the low mode, combustion airflow is unchanged. Independent testing verified the following: **Excess air in the heat exchanger** causes a reduction in overall tube temperatures, translating into a reduction in radiant efficiency.



Two-Stage Parallel System:

A good concept, but inefficient

Parallel systems, also referred to as "Tandem Burner Design" systems, are engineered systems that consist of multiple burners connected to a common manifold. Because the large majority of heat is located at the burner, this design struggles to maximize heat distribution and provide an even radiant charge, resulting in an uneven heat distribution.



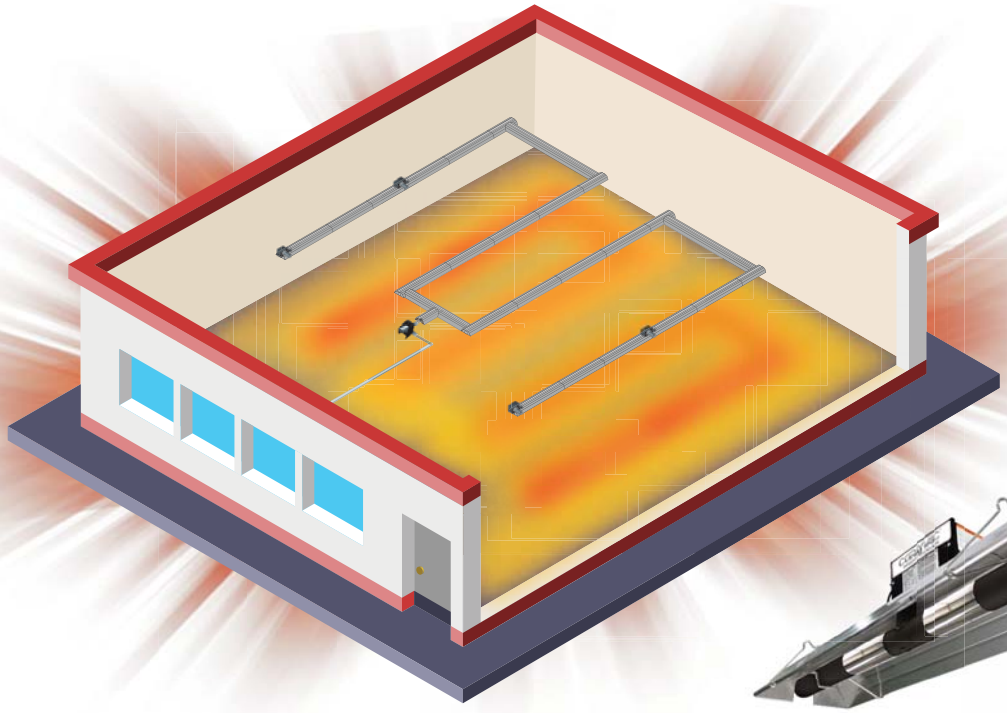
True Heating System Modulation

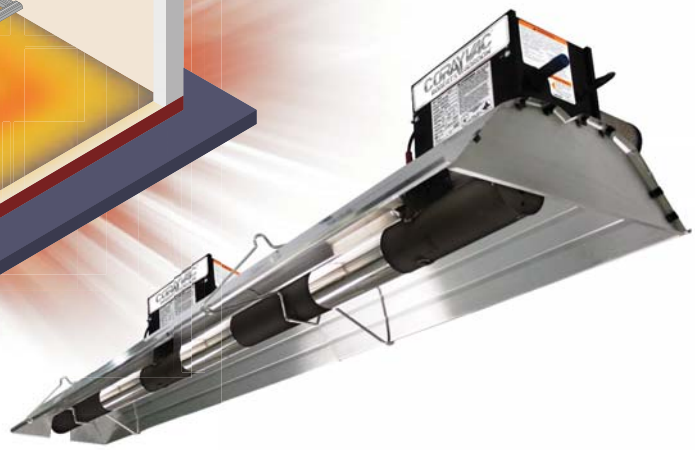
CORAYVAC™ ROBERTS GORDON®

Burners-in-Series System:

Energy efficient, low maintenance, comfortable even heat

A custom engineered system with the ability to be designed to condense, CORAYVAC® burners-in-series heating systems are the only true way to maximize heat distribution to obtain an **even radiant charge**. The unique "burners-in-series" feature distributes heat throughout the system more than any other infrared heating system on the market.





True Modulation with CORAYVAC®

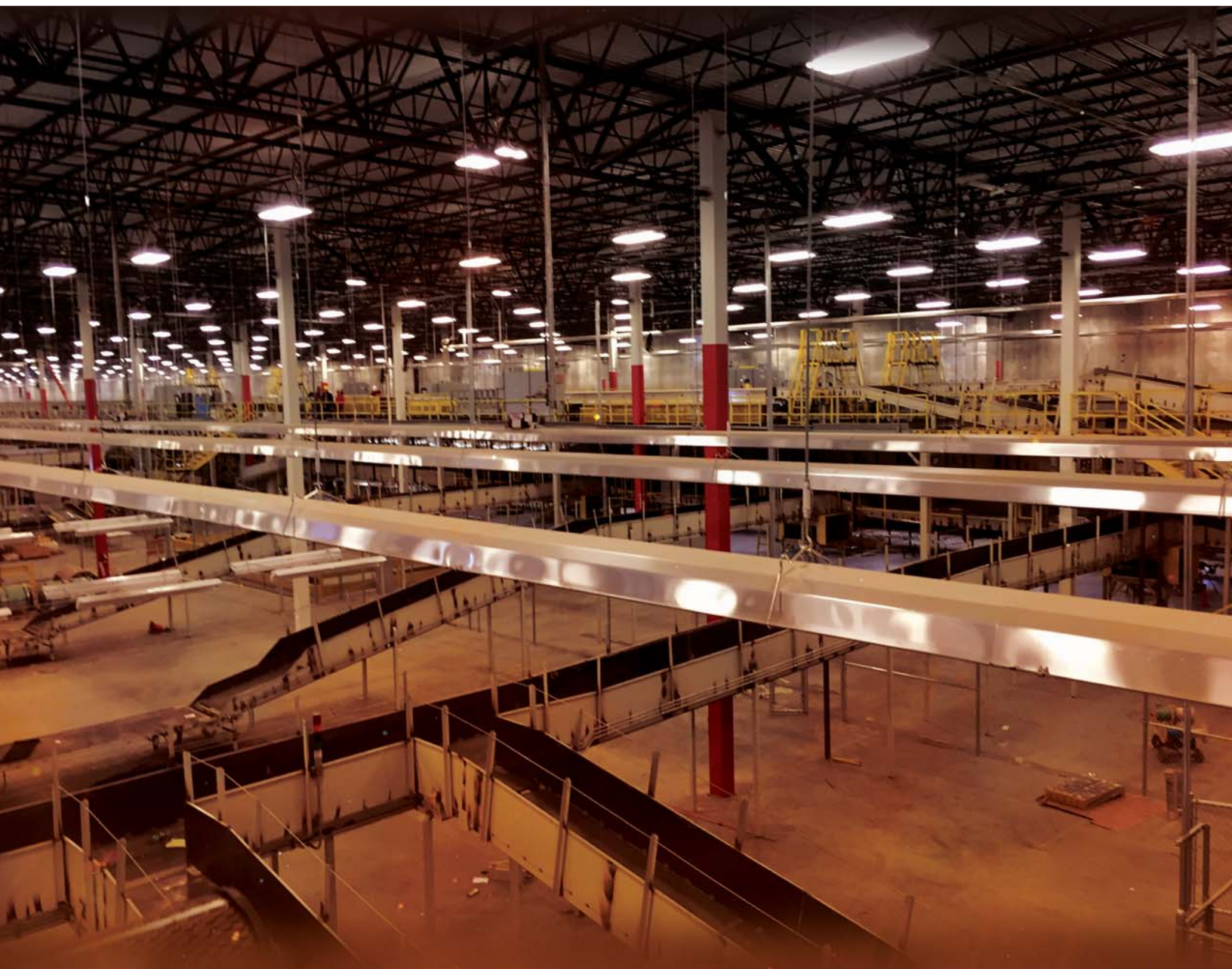
FACT: The only way to properly operate a heater with variable input modes is to carefully control both fuel and air ratios.

CORAYVAC® burners feature a unique "zero pressure regulator" that varies gas input via system vacuum. A variable speed vacuum is incorporated to modulate system pressure. As the vacuum pressure increase and decreases the gas input in the CORAYVAC® burner remains linear while maintaining an even gas/air ratio. Controlling both fuel and air simultaneously provides constant and optimum combustion, thus increasing radiant efficiency and thermal efficiency **as firing rate decreases.** True energy savings and greater thermal and radiant efficiencies can only be realized when using burners-in-series heating systems with continuous modulation.

Our advanced control offerings feature a modulating control algorithm with zoning capabilities for an energy efficient approach that will provide the precise amount of heat when and where it is needed. As the only infrared heating company that modulates based on outside air temperature, the CORAYVAC® modulation algorithm allows your heating system to operate at peak efficiency throughout the entire heating season.

HOW IT WORKS: As outside temperature rises, the system compares the outside air temperature to inside space set points and will modulates appropriately. When temperature outside decreases, the output of the infrared heating system inside will increase.

- **Provides real energy savings** by matching the heating system's input to the building's heat load requirement resulting in longer heater run times, as opposed to frequent heater cycling.
- **Minimizes "intense" feel** during moderate outdoor temperature conditions.
- **Provides more accurate control** over meeting heating demands **by allowing even the slightest change in heater firing rate anywhere** within the 60-100% range.



CORAYVAC™

ROBERTS GORDON®

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