

# Packaged Rooftop Units With Hot Gas Reheat Dehumidification



The Arcoaire® tradition of delivering reliable, economical comfort that customers can trust continues with our Packaged Rooftop Units With Hot Gas Reheat Dehumidification system. As a direct result of more cost-effective systems, these packaged rooftop units are currently being implemented in expanded applications, many of which require the highest degree of indoor comfort and humidity control.

Maintaining indoor space humidity levels can be increasingly difficult depending on the time of year, location of the installation, and the ability of the equipment to provide reliable, flexible operation to meet indoor part load sensible and latent load requirements. Standard rooftop performance often cannot meet these variable requirements, as the unit's sensible heat ratio is typically fixed and the unit is generally controlled from sensible loads only via thermostat.

The Packaged Rooftop Units With Hot Gas Reheat Dehumidification system is an all-inclusive factory-installed option, available on most Arcoaire light commercial rooftop units. It meets the demand for a cost-effective, yet flexible and high performing, solution to these humidity and part load issues.

The innovative Packaged Rooftop Units With Hot Gas Reheat Dehumidification system expands the envelope of operation of our unitary rooftop products to provide unprecedented flexibility in year-round comfort conditions.

### How It Works

Using a simple space thermostat and humidistat input, the Packaged Rooftop Units With Hot Gas Reheat Dehumidification system changes the refrigerant flow by adjusting the position of the refrigerant solenoid valves. There are three modes of operation: Normal, Sub-Cooling and Hot Gas Reheat. For units with two refrigerant circuits, each circuit can operate in each of the three modes independently, giving the unit the ultimate flexibility to satisfy space temperature and humidity loads.

### Normal Mode (HGSV closed, LLSV open)

When there is a call for cooling only, the dehumidification system is inactive and the refrigerant circulates per a typical packaged system.

### Sub-Cooling Mode (HGSV closed, LLSV closed)

During part load conditions when the room temperature and humidity are above the set point, the unit will initiate the sub-cooling mode of operation—a call for cooling and dehumidification.

In this mode, the liquid refrigerant leaves the condenser and is routed through the unit's coil, downstream of the condenser, and then through the evaporator. The indoor air stream passes over the evaporator first then over the unit's coil, further sub-cooling the refrigerant. This highly sub-cooled refrigerant is then fed to the evaporator coil, creating a colder evaporator coil surface. At the same time, the air leaving the evaporator is partially reheated to prevent over-cooling of the space.

Because the supply air temperature is approximately 5 to 7 degrees higher than normal supply air temperatures, the end result is a conditioned space that is cooled and significantly more dehumidified, but not over-cooled. This additional mode of operation also helps eliminate short cycling of the rooftop unit and improves space temperature and humidity control.

### Hot Gas Reheat Mode (HGSV open, LLSV closed)

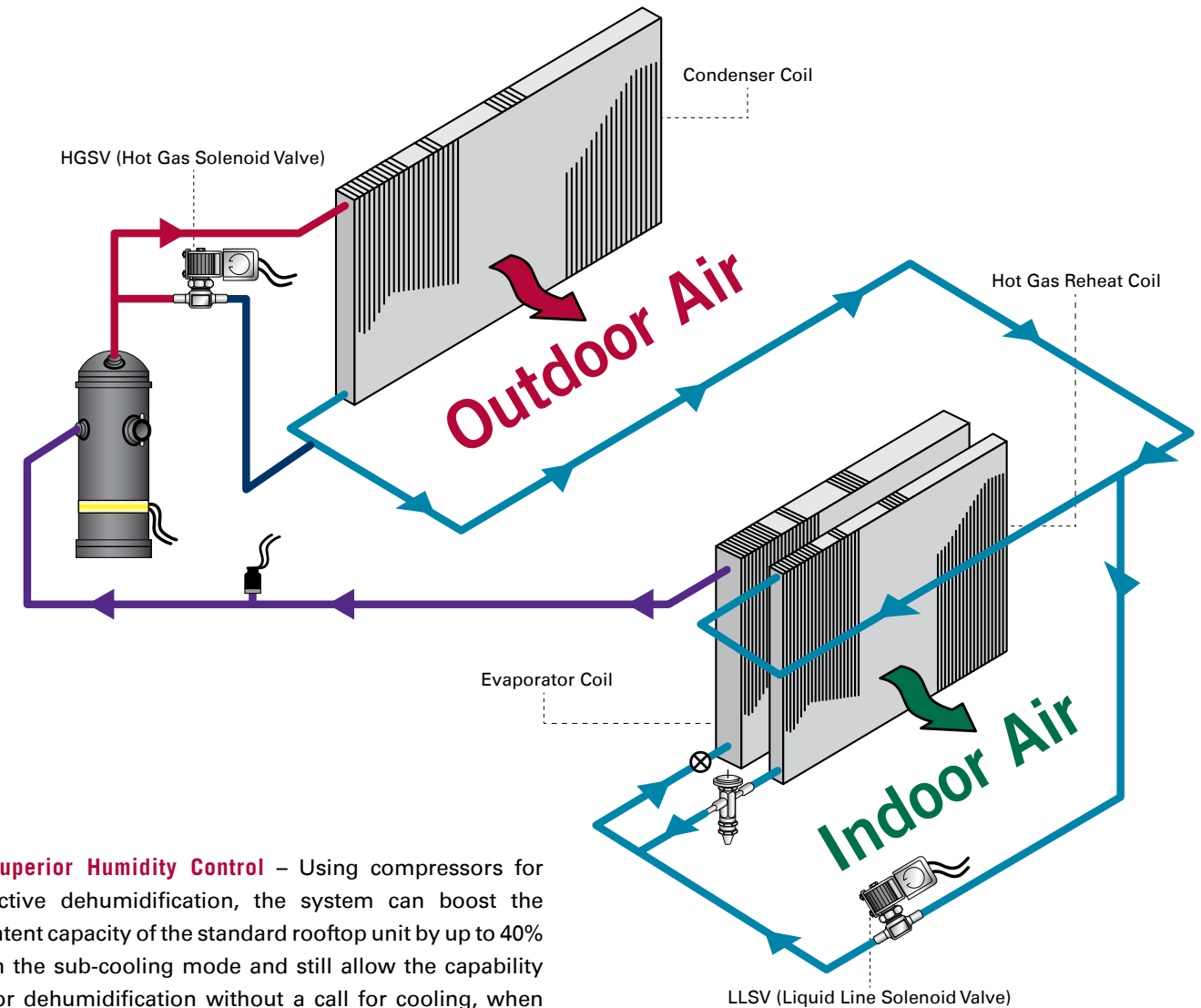
When there is a call for dehumidification without a call for cooling, a portion of the hot gas from the compressor bypasses the condenser coil and is fed into the liquid line. At this point, it is mixed with the sub-cooled refrigerant leaving the condenser coil.

This two-phase mixture is routed through the unit's coil and then the evaporator. Additional sub-cooling of the refrigerant occurs in the coil, and when this refrigerant is fed into the evaporator, the result is a colder coil surface.

The air is cooled and dehumidified as it flows across the evaporator. It is then reheated to neutral conditions by the unit's coil.

### Features & Benefits

The Packaged Rooftop Units With Hot Gas Reheat Dehumidification system provides a greater degree of operational flexibility and enhances humidity control for consistently maintaining year-round indoor comfort temperature and humidity levels with a packaged rooftop unit.



**Superior Humidity Control** – Using compressors for active dehumidification, the system can boost the latent capacity of the standard rooftop unit by up to 40% in the sub-cooling mode and still allow the capability for dehumidification without a call for cooling, when required by the space.

**Factory Installed & Warranted** – The Packaged Rooftop Units With Hot Gas Reheat Dehumidification system is a factory designed, tested and installed option, specifically engineered for optimum performance and reliability with Arcoaire rooftop units. The system is backed by the rooftop unit's factory warranty. An optional extended warranty is available (U.S. only).

**Consistent Comfort** – System flexibility allows the rooftop unit to maintain both indoor temperature and humidity comfort conditions consistently year-round.

**Maximum Flexibility** – Using three operational modes for each circuit, the system is better able to adapt to peak and part load outdoor temperature and humidity conditions. This results in up to 35% more moisture removal capability than typical conventional hot gas reheat systems and the ability to operate without any restrictions on the unit's normal airflow range.

**Cost-Effective** – Available as a factory-installed option on most light commercial rooftop products, the Packaged Rooftop Units With Hot Gas Reheat Dehumidification system provides a cost-effective packaged alternative for meeting latent load intensive applications and variable Sensible Heat Ratio (SHR) requirements. System installation costs are simplified and minimized by using a humidistat device with a thermostat for combined temperature and humidity sensing in the space.

Not available on Packaged Heat Pump models.

## Typical Applications

The Packaged Rooftop Units With Hot Gas Reheat Dehumidification system provides a greater degree of operational flexibility and enhances humidity control for consistently maintaining year-round indoor comfort temperature and humidity levels with a packaged rooftop unit. Benefits include:

**Health Clubs** – Shower areas and human perspiration can cause uncomfortable and higher humidity space conditions. In addition to human discomfort, these conditions can propagate the growth of mold and mildew.

**Schools** – Due to variable student occupancy with constant changes in ventilation air change requirements in each classroom, the proportion of latent load may be high and humidity may rise. High humidity levels can damage computer equipment or building structural materials. In addition, students entering and leaving classrooms may result in a variation in latent load for each room, which requires maximum part load dehumidification control.

**Convenience Stores & Supermarkets** – High humidity levels can cause inefficient operation of freezer and refrigeration systems. Over-cooling can cause significant discomfort for customers.

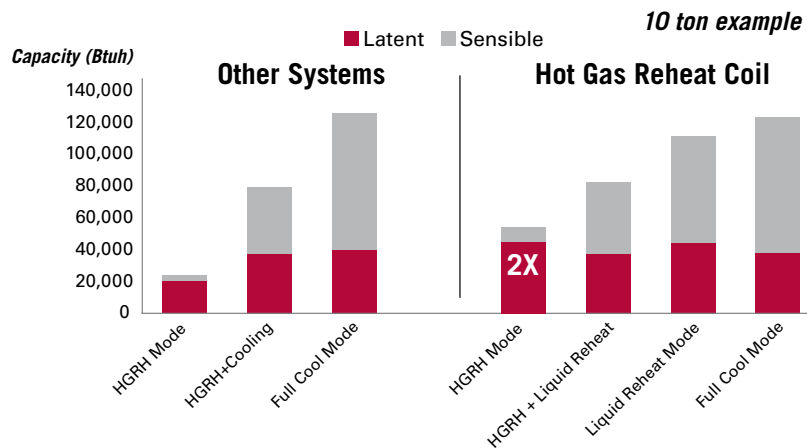
**Restaurants** – The high degree of variable occupancy, along with kitchen areas of restaurants that have many humidity producing activities, such as dishwashing and cooking, can easily result in humidity control problems and over-cooling by conventional packaged rooftop units.

**Churches** – Like schools, the high degree of variable occupancy and ventilation requirements can result in humidity control problems and over-cooling situations by a conventional packaged rooftop unit.

**Humid Climates** – In climates along the coast, when the temperature drops the outdoor wet bulb temperature may remain the same or higher. This results in a need to reduce the sensible capacity but yet provide more latent capacity to prevent humidity levels from increasing in the space.

## Unique Operation of the Hot Gas Reheat Coil

### Hot Gas Reheat Coil – Stages of comfort control



All systems tested and listed by the appropriate agencies.



As part of its commitment to quality, the manufacturer reserves the right to change specifications on its products without notice. Illustrations and photographs in this brochure are only representative. Some product models may vary.

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