

YEAR ROUND CONTROL, REGARDLESS OF AMBIENT CONDITIONS (-40°F / 110°F)



Challenge

An indoor horticultural environment (IHE) is typically operated year round. Equipment used in conditioning the IHE must be able to meet the load demands of the room, regardless of the outdoor ambient temperature.

The IHE is also not like a comfort conditioned space, where outdoor conditions typically dictate the indoor load profile (i.e when it is cold outside, the space is heated; when it is hot outside, the space is cooled). The IHE's load profile is mainly determined by internal factors, including the number of plants in the room, watering cycle, lighting schedule, transpiration rates and more.

These factors make the IHE's load profile largely independent of outdoor ambient conditions. Generally, IHEs require considerably more dehumidification and reheat capabilities than comfort conditioned spaces. They are expected to be kept at precise temperatures throughout all 8,760 hours of the year.

Operating throughout the entire year is highly demanding for typical comfort conditioning HVAC equipment. Equipment not designed for all local outdoor conditions throughout the year can encounter problems such as liquid slugging, oil migration, overheated compressors and motors and leaking condensate into the unit or building. The IHE requires equipment that is capable of precision year round operation in the most extreme ambient conditions.

Solution

The SolutionAir GRW's unique refrigeration circuiting provides full cooling, dehumidification and reheat performance even when outside conditions are as low as -40 °F (-40 °C) and as high as 110 °F (43 °C).

Specifically, the SolutionAir GRW is equipped with:

- + Low ambient condensing that can provide full cooling, dehumidification and reheat to outdoor ambient conditions of -40 °F (-40 °C).
- + A marine-grade aluminum cabinet that has been CFD-designed to protect against internal condensation and reflects over 70% of all UV and infrared radiation to reduce heat gain, which includes:
 - 3.5" R14 cabinet walls, floor and roof
 - Patented double thermally broken panels and frame components
 - Low leakage cabinet design
 - Spot heaters in electronics and control cabinets
 - Permanent fastening system with no dissimilar metal fasteners
 - 158 °F (70 °C) rated condensing fan motors capable of overspeed operation and oversized four-row condensing coils for operating in high ambient conditions
- + A HGRH system that is designed for the indoor horticultural application.

Hot Gas Reheat System

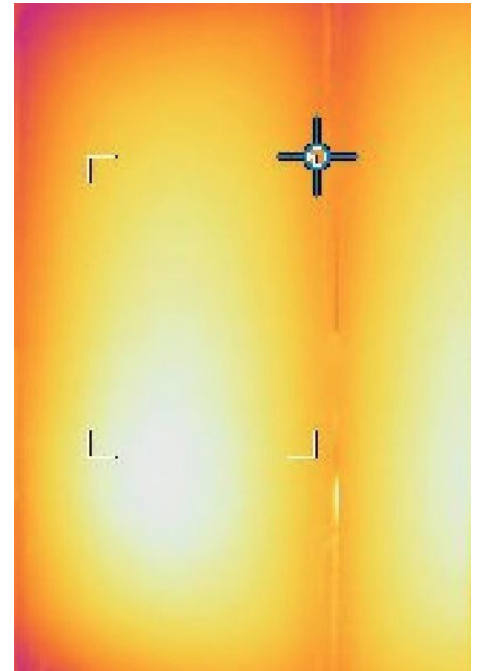
The SolutionAir GRW is capable of discharging air at up to 25 degrees above the entering air temperature to offset the evaporative cooling from the plants and to keep the environment at the desired temperature and humidity levels automatically and without the use of supplemental heat.

The value of this HGRH system to the growing business is significant. For 10,000 CFM, running 12 hours a day of lights off, 10 extra degrees of useable reheat would have a value of nearly \$14,000 a year, if it offset electric reheat at \$0.10 per kwh. 10 degrees being a fraction of the 20-30 extra degrees that the GRW will supply that may be needed in many applications.

HGRH applied to the SolutionAir GRW unit allows a grower to precisely control to the desired indoor air conditions while significantly reducing operating costs.

Cabinet Thermal Performance Testing

- + Thermal imaging shows the effectiveness of our patented double thermal breaks in maintaining uniform temperature across panel joints, thus reducing cold spots where unwanted condensation can occur.



Thermal imaging of cabinet wall panel joints. The seam is located between the two warmer (white) panel centers.

