

Tube Radiant Heating for Farms

From RVR

Advantages of the Re-Verber-Ray Radiant Tube Heating System



Lower Running Costs – Studies have shown that the two stage Re-Verber-Ray radiant heating system can provide running cost savings of up to 40% compared with other systems.

Fast Pre-Heat – Warm Air Heaters can take up to 36 hours to preheat a poultry house prior to chick placement. A radiant tube heater can raise floor temperatures within a 3-hour time period.

Dryer Floors and Lower Humidity – Heat is sent directly from the heating tube surface to the floor and birds. The litter will absorb the radiated heat, evaporate moisture and be drier than with conventional heaters. This improves productivity and reduces problems such as hock burn.

Lower Ammonia Levels – A warm dry floor will reduce ammonia generation. Less ammonia and a warm comfortable growth environment results in improved bird production.

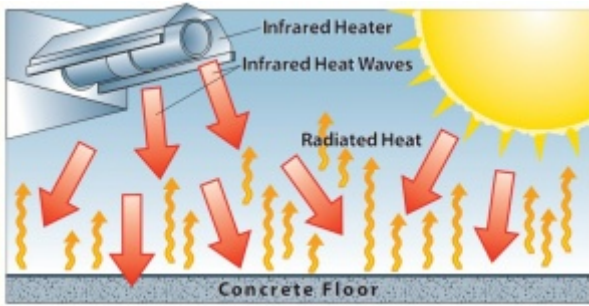
Lower CO2 Levels – The combustion products are removed from the poultry house resulting in lower CO2 levels. This contributes to bird comfort and improves productivity.

Reduced Maintenance – The combustion circuit of the Re-Verber-Ray heaters is room sealed so that contamination of the equipment with dust and other debris is prevented. This results in reduced maintenance requirements.

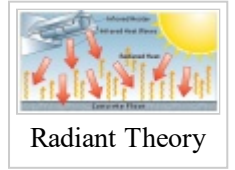
Principle of Operation

Adequate heat control is of utmost importance in the raising of poultry. A constant temperature is needed to guarantee the health of the birds.

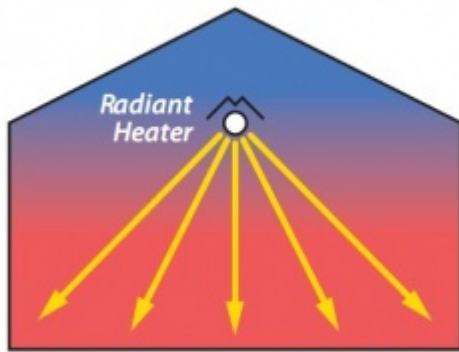
Radiant tube systems burn LPG or natural gas to generate heat. A gas burner is located inside a long metal tube. The outer tube surface reaches temperatures of up to 550°C and the heat from the bottom of the tube is sent directly to the floor. Heat from the top of the tube hits a reflector surface and is redirected down to the floor where it is needed.



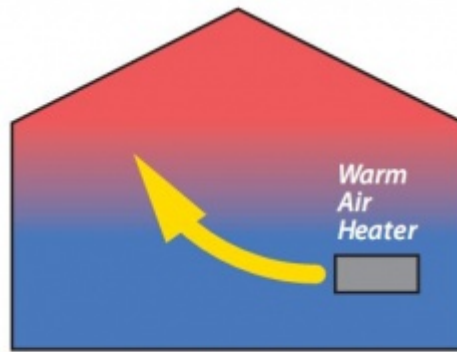
The radiant heat travels directly to the floor without having to heat the air in the poultry house. This is the same method by which radiant heat travels 93 million miles from the Sun to warm the Earth! Radiant heat is transferred to heat surfaces (floors, walls, birds etc.). Cooler air moving against these warm surfaces will pick up heat and warm the space to an adequate temperature.



Radiant Theory



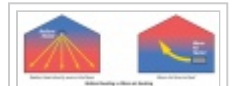
Radiant heat directly warms the floors



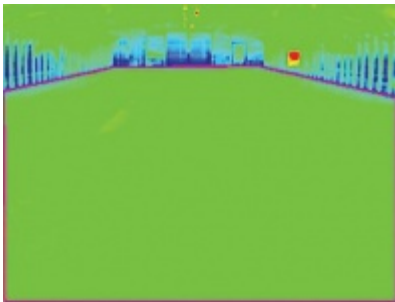
Warm Air Rises to Roof

Radiant heating vs Warm air heating

Thermographic images showing heat distribution in Poultry houses with different types of heating systems



Radiant Heating vs Warm Air Heating



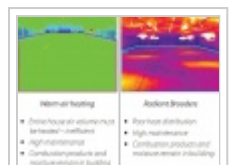
Warm air heating

- Entire house air volume must be heated – inefficient
- High maintenance
- Combustion products and moisture remain in building

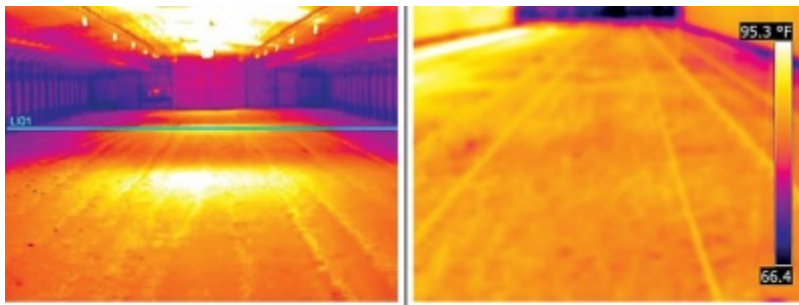


Radiant Brooders

- Poor heat distribution
- High maintenance
- Combustion products and moisture remain in building



Thermographic images of Heat

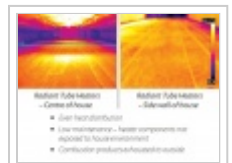


Radiant Tube Heaters
– Centre of house

Radiant Tube Heaters
– Side wall of house

- Even heat distribution
- Low maintenance – heater components not exposed to house environment
- Combustion products exhausted to outside

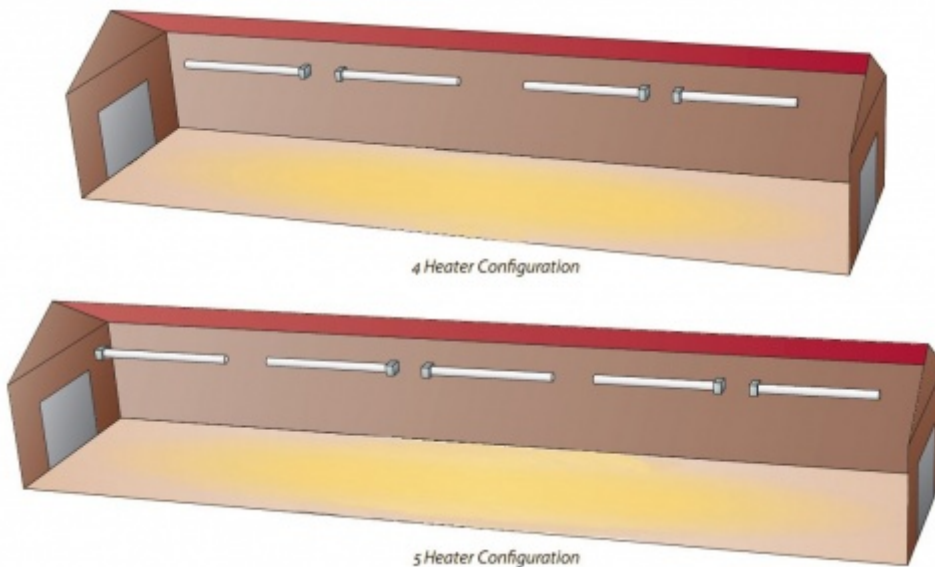
A radiant tube heater is different from a warm air heater or conventional brooder because of how heat is transferred to the birds. Warm air heaters heat the air and depend on moving it past the birds. Heat is transferred by convection. The problem with this method is that heated air naturally rises as it becomes warmer and less dense. The warmest air rises to the ceiling while the chickens need heat on the floor. In order to heat the air around the chickens to about 34°C the entire volume of air in a house must be heated to an even higher temperature. The high rate of ventilation means that most of the heat escapes outside and is not fully utilised. This isn't an efficient use of expensive fuel.



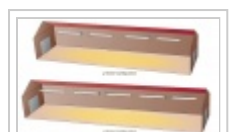
Thermographic images of Heat Distribution

Floor Plans

A typical floor plan for a Poultry House is shown below. Heaters are mounted along the centre line of a building.



Heater Specifications



Floor Plans

Model	Capacity (kW)	Control	Mounting Height (m)	Length (mm)
EHL 100 / 60	29.4 / 16	Two Stage	2.5 – 3.5	12500
EHL 125 / 60	36.6 / 17.6	Two Stage	2.5 – 3.0	12500

Radiant Tube Heater Mounting

Center Mounting

The radiant tube heaters are mounted as a single row of tubes in the centre of the house. This ensures even and symmetrical heat distribution.



Side Wall Mounting

The radiant tube heaters are mounted at the ceiling, but within 3m of a sidewall. The reflector is turned to an angle. The radiant heat waves transfer across the house and warm the floor. Temperature variations across the house are as little as 2°C.



Center
Mounting

Retrieved from "http://www.rvr.ie:900/index.php?title=Tube_Radiant_Heating_for_Farms"



Side Wall
Mounting