

Effective heating systems for poultry houses

*Pancake gas brooders provide radiant heat and require little maintenance.
Photo: Maywick Ltd.*

When outside temperatures drop, sufficient warmth must be provided for a comfortable poultry house environment. Understanding the type of heat required and how it can be generated makes the job of choosing the best heater easier.

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When external temperatures are low, one has to counter heat-loss inside the poultry house.

Generally one must deal with two methods of heat-loss in poultry houses:

- Transmission (via the walls, roof and floor). Heat loss by transmission can be restricted by applying insulation.
- Ventilation. While ventilation is necessary to remove moisture and gases produced by the birds, heat is lost at the same time.

Maintaining the house temperature when it's cold outside means compensating for heat loss. While some heat loss is compensated by warmth generated by the birds, with young birds this will be insufficient, so extra heat production is necessary.

When purchasing a heating system the following factors must be considered:

- investment
- fire risk
- heating costs
- maintenance
- heat distribution
- flexibility
- adjustability
- operation
- capacity.

Heat can be transported in three ways: by conduction (through metal or a wall); by convection (transport by air), and by radiation (e.g. sunrays). Heating systems can be divided in two main groups:

Local or spot heating systems only heat a small area near the birds. Heat transport with these systems is mainly through radiation. These systems are

suitable for use in both open and closed houses. Examples are the gas infra red heater and the pancake.

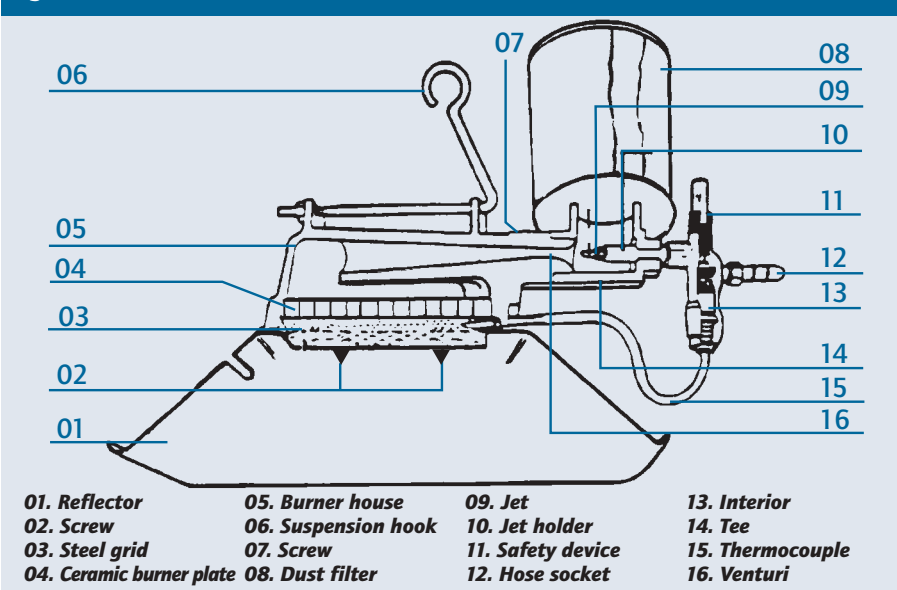
Room heating systems heat the whole room. Heat transport with these systems is often by convection (hot air). These systems are only suitable for use in closed houses.

Gas infra-red heaters

Gas infra-red heaters are available in different types and capacities. The

principle of this kind of heating is as follows: gas is supplied through the injector to the venturi (choke tube). By means of the venturi air is sucked in via an air-filter. The inflammable air-gas mixture flows via the venturi into the burner house. The burner is made of ceramic-stones or metal. The mixture can then be ignited (*Figure 1*). Special heat proof gauze is often placed underneath the burner to protect it and at the same time increase the radiation-effect.

Figure 1 - Gas infra-red heater



Gas infra-red burners produce two kinds of heat: radiation and convection heat, in a proportion of \pm 60-40%. The fact that 60% of the developed heat is radiation heat demonstrates how suitable this heater is for localised heating. Normally these gas heaters are equipped with a thermo-electric safety valve. Points of interest when using infra-red heaters are:

- The air supplied must be clean to avoid soiling the burner which would result in incomplete combustion;
- It is essential to clean the air filters regularly;

General heating advice

Recommended standard temperatures:

Broilers

1st day		32 - 34°C
first week	decrease to	30°C
2nd week	decrease to	26°C
3rd week	decrease to	22°C
4th week	decrease to	20°C

Layers & broiler breeders: 18-24°C

These temperatures must be seen as minimum temperatures.

Recommended standards for heating capacity:

2-8 kcal/hr/chicken (depending on climate)
= 2.3 - 9.3 W/chicken.

- Begin preheating the house well before chickens arrive (12-24 hrs).
- Clean all heaters directly after use and prepare them for the next batch of chickens.
- Protect chickens from draughts: use chicken guards made of a closed material, not wire mesh.

- Only use chains to suspend the heaters;
- Protect the heaters when the house is cleaned by covering in plastic.

Infra-red heaters offer several advantages. They work well as both a space heater and a localised heater; they require a low investment; and all the heat generated is delivered to the area where the heater has been installed.

Infra-red heaters also possess some disadvantages. Regular inspection and cleaning is required to avoid incomplete combustion: failure to do so increases the risk of fires and CO₂ production. Furthermore during the summer the heaters can get in the way, and adjusting the heating capacity is difficult.

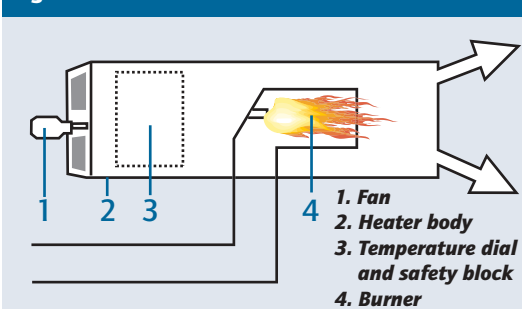
A variety of devices is available to regulate the temperature of these burners, ranging from a manually operated mechanical gas-cock to a high-tech automatic regulation device.

In general the climate in poultry houses is very dusty and this can hinder efficient operation of the burner. To keep the burner clean, air can be supplied by means of a fan and a pipe. The capacity of infra red burners can vary from 350 - 6,000 W.

Pancake heaters

These gas brooders are equipped with a ceramic heating-element which ensures an equal spread of the temperature under the hood. They can be fuelled with butane, propane, or natural gas. The brooders are equipped with a thermostat to set and maintain the required temperature.

Figure 2 - Hot air blower



When used with day old chicks, the brooder is positioned above the litter. Different heat zones will exist on the heated floor surface, and the birds will select a spot where they feel comfortable.

Raising the brooder results in a larger heated circle on the floor. Doing this means the brooder also acts to a greater extent as a space heater, and to a smaller extent as a floor heater. The pancake heater is designed to be a radiant heater which heats the radiated subjects and not the air through which the radiation takes place. While the brooder is in operation almost no maintenance is required apart from removal of dust from the combustion air inlet of the main burner and from the surroundings of the pilot burner. Generally this only needs to be done when the birds are being changed. The capacity of a pancake heater is approximately 7,000 - 9,000 W.

Room heating systems

Examples of room heating systems are hot air blowers and central heating systems.

Hot air blowers blow heated air into the poultry house by means of a high-pressure fan. This causes strong air movement, resulting in good heat distribution throughout the house. Blowers can operate on natural gas (propane/butane), oil and electricity (Figure 2). Positioning of the blower(s) is important to obtain an equal temperature throughout the house.

In houses up to \pm 35-40 metres in length, the heater(s) is usually located in the front of the house. In a longer house one must install heaters at different positions. The capacity of a hot-air blower varies from 3,000-300,000 W. Because blowers produce convection heat this system is not suitable for open houses.

Central heating systems heat water using a burner, after which it is pumped to the rooms to be heated. In these rooms heat will be transferred to the ambient air by means of radiation, convection and conduction. The water serves as a means of heat transportation. In poultry houses the heat is usually thrown out by means of pipes installed along the walls of the house. Sometimes polyethylene pipes are installed in the floor. In this case, the heat is transferred by means of conduction. Generally, a central heating system is very expensive. This system is not suitable for open houses. ■

