

# Position Statement

Heat exchangers and condensate management

September 2011

## Background

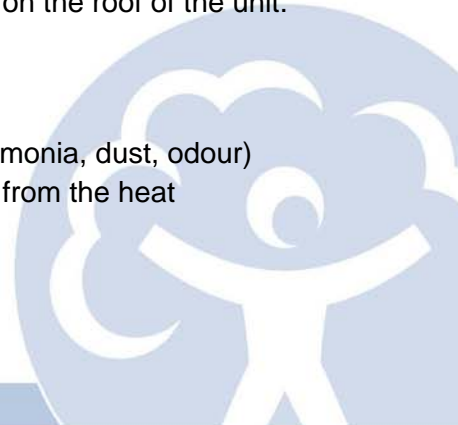
- Increasingly heat exchangers are being installed in poultry housing to recycle the heat lost from the sheds through the ventilation. An air to air heat exchanger enables the hot air exhausted from the building to be passed around a set of ducts through which fresh air is passed. The heat transferred enters the building at above ambient temperature.
- During the initial phase of a crop cycle the sheds are heated and the temperature is maintained to ensure optimal growth conditions for the chicks. Heating is usually supplied via LPG or oil fired space heaters within the sheds.
- One manufacturer claims that a heat exchanger can reduce fuel consumption and CO<sub>2</sub> emissions associated with heating the sheds, by around 50%.
- The heat exchangers are usually turned off when the birds are of a sufficient size and weight not to require additional heat input. This is normally around day 21 of a standard broiler rearing regime. After this point the farm operator needs to increase the ventilation to ensure the birds do not overheat.



Fig 1. Warmed fresh air is fed into the shed roof space via the insulated pipe. Stale air from the shed is drawn from the side of the building and expelled via the black stack on the roof of the unit.

## Emissions from the heat exchanger

- Emissions from the heat exchanger include both the stale air (ammonia, dust, odour) from the poultry sheds and a condensate / wash water discharge from the heat exchanger itself.



- The heat exchanger provides the minimum ventilation for the poultry house for the first 14 days of the crop the cycle.

## Condensate and wash water

- Condensation forms on the air ducts when the warm humid air from the shed cools. If there is significant temperature differential, and the exhaust shed air contains enough moisture, a “dew point” will be reached, and water will form on the pipes. This condensate may contain high levels of N, depending on how long it remains in operation during the crop cycle.
- The condensate also traps a proportion of the dust particles that have settled in the ducting. Analysis of the condensate from a number of heat exchangers has shown high levels of ammoniacal nitrogen, nitrates, biological oxygen demand, chemical oxygen demand, and suspended solids. It can also contain chemicals which are residues from cleaning and disinfecting products, which are pollutant substances as defined by the Environmental Permitting Regulations (EPR) 2010, and range in type and concentration. As such the discharge of condensate to a soakaway will require a site specific groundwater risk assessment to determine if it is permissible.
- To maintain optimal performance, some heat exchangers have a misting system to clean the ducts and remove dust. There is also a filter pad on some designs, that need cleaning or replacing at the beginning of each cycle.

## Position for EPR poultry units

Providing the Operator meets **all** of the following criteria, the addition of a heat exchanger at an EPR poultry unit can be agreed in writing with the site officer, without the need for a variation of the permit.

1. The Operator must notify the site officer in writing **before** its installation.
2. Condensate from the heat exchanger **must** be collected in a specific tank or wash water tank and treated in the same manner as the wash water from the poultry housing at the end of the crop cycle.
3. The operation and maintenance of the heat exchanger is in accordance with manufacturer’s instructions.

Where the Operator proposes to direct condensate either to soakaway or to the drainage system, the Operator must apply for a normal variation using the standard EPR application forms. The variation application must contain the appropriate information to demonstrate the discharge is acceptable. This will include an analysis the condensate as well as an assessment of the risk to the underlying groundwater.

Environment Management Technical Services

customer service line  
03708 506 506

incident hotline  
0800 80 70 60

floodline  
0845 988 1188

[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)