



## Incubation in high humidity climates

### Why is humidity important?

Moisture loss during incubation is essential to chick quality and performance. The egg needs to lose between 10.5-12.5% moisture from point of lay to 18 days of incubation.

### How moisture leaves the egg

After lay, water vapor travels through the semi permeable eggshell membrane, then through the pores of the shell and into the environment. The greater the difference in humidity between the internal environment of the egg (saturated) and the external environment, the faster moisture will leave the egg.

If there is too much moisture in the environment around the egg due to high humidity, chick quality will be compromised.

In temperate climates, even when the atmospheric humidity is high, air temperatures are relatively low, so heating the air for the purpose of incubation automatically lowers the relative humidity.

However, in hot humid (tropical or sub-tropical) climates it is necessary to remove the excess humidity from the air before it is delivered to the incubators.

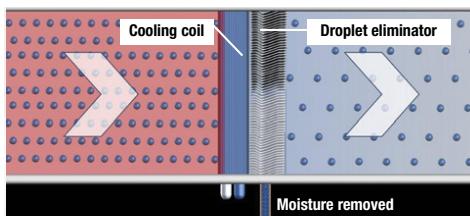
### How do we remove moisture from the air?

Ideally, we want to supply air with an absolute humidity of  $13.4\text{g/m}^3$ . At  $15.7^\circ\text{C}$  air cannot hold more than this amount, so if the air is cooled down to  $15.7^\circ\text{C}$ , the excess moisture will condense and can be removed from the air (Fig. 1).

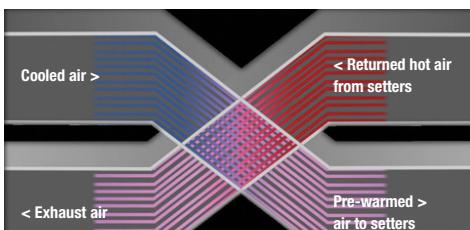
Because the air travels through HVAC system at high speed, it is usually necessary to chill the air using cooling water at  $10-11^\circ\text{C}$  to ensure enough moisture is removed.

Then, the air needs to be re-warmed to prevent cold spots in the machines while ventilating. This can be done with a cross plate heat exchanger (Fig. 2).

These use the hot return air from the setter to re-warm the now dry air, prior to delivery to the setter room. An auxiliary heater may also be used for supplementary heat, as necessary.



**Figure 1** Cooling the air with a coil and droplet eliminator.



**Figure 2** Cross plate heat exchanger.