

# Everything you need to know about light flicker in the poultry house

Light flicker is an often-discussed, but relatively unclear topic and it is time to change that. What is flicker? In short, photometric flicker, further referred to here as 'flicker', is the (rapid) change of the light output of a lamp. It varies between a minimum and maximum value of light output. This difference is also called the peak-to-peak amplitude. The bigger the difference, the higher the flicker. No difference means no flicker, as you can see in Fig. 1.

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The frequency at which the light output varies is also important. The frequency is expressed in Hertz.

Hertz stands for the number of fluctuations in a second. When the frequency is increased, a (larger) change between minimum and maximum will be less visible. When it is high enough, even a flicker ratio of 100% may not be visible to human beings or poultry.

## Percent flicker, flicker index and flicker fusion frequency

In general, there are two ways to quantify flicker. Fig. 2 on the next page shows how to calculate both.

Percent flicker, the easiest one to calculate, just shows the percentage difference between the minimum and maximum value of light output.

The flicker index looks at both the area above the average light output and the area below the average light output. This gives a much better presentation of variations over the entire period and is more difficult to manipulate.

Another interesting tool/unit is the flicker fusion frequency. The flicker fusion frequency is the threshold frequency in Hertz (the amount of flicker per second) above which flicker can no longer be perceived.

The flicker fusion frequency differs for human beings and poultry. When human

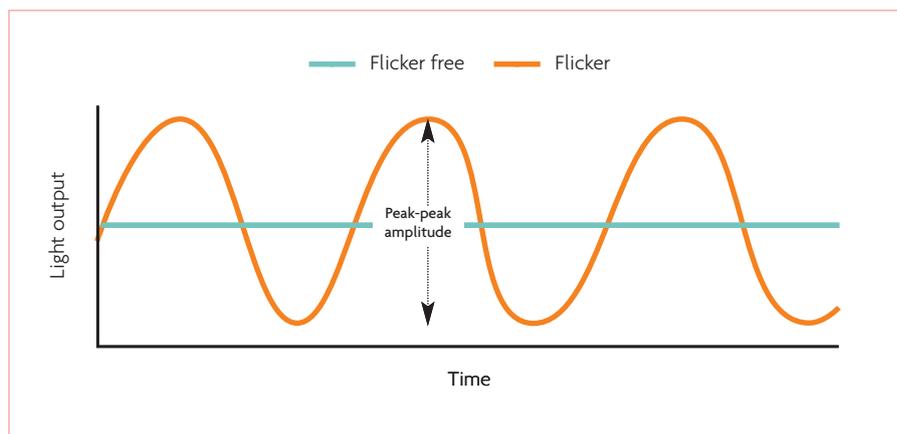


**HATO's flicker-free lighting positively influences animal welfare and performance**

beings perceive light as flicker-free, it may be perceived as far from flicker-free by chickens.

So, what is the amount of flicker that does not affect poultry and what is the correct flicker fusion frequency?

**Fig. 1. Flicker-free vs flicker lighting.**



There is no generally accepted norm for either of these. However, when there is literally no flicker at all, there is no discussion about the correct value needed.

That is why the majority of HATO's lighting solutions are 100% flicker-free. The percent flicker of these products is 0.0% and the flicker index is 0.0.

## The effects of flicker on chickens

Chickens are very sensitive to light. Flicker therefore leads to stress. The cause of this goes back to the origins of poultry. Chickens originally lived in the jungle, where they were prey animals. They had to be continuously on their guard. It is presumed that a flickering lamp gives chickens the impression that a predator bird is hovering above them; this is naturally perceived as a potential threat.

This continuous possible threat increases the birds' stress levels. This stress has different consequences for each type of chicken, which eventually leads to decreasing animal welfare and performance.

## Broilers

Flicker can be a major source of stress for broilers. This can lead to agitation and consequently induce piling. Piling leads to

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wet litter, which causes footpad lesions and breast blisters, with increased mortality as a result.

Since not all chickens respond similarly to stress, a decrease in uniform growth will occur. It also negatively impacts on growth in general.

Since stress can lead to a decrease in feed intake and a higher metabolic energy usage, it will eventually increase feed conversion rates as well.

### Layers

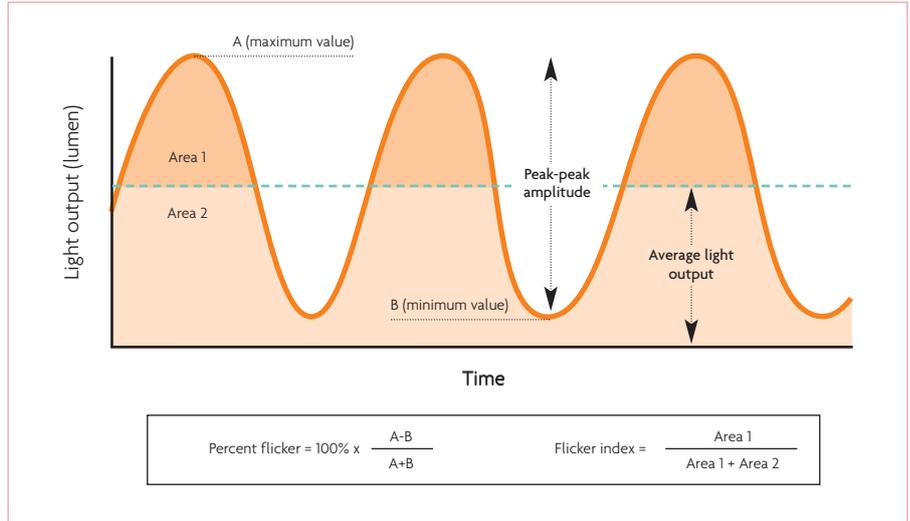
Flicker can be a major source of stress for layers. Stress will have a great impact on the agitation levels of hens.

Agitation can trigger pecking and possibly lead to cannibalism. Piling can occur as well. Both cannibalism and piling will eventually lead to increased mortality.

Stress caused by flicker will also negatively impact on feed intake and egg production. This will result in increased feed conversion rates.

### Parent stock

The effects of flicker on parent stock are comparable to those of layers, which are detailed above.



**Fig. 2. Flicker quantification tools.**

### Conclusion

Flicker stands for the rapid change in light output of a lamp. Besides the rapid change in light output, the frequency of this change is also important. The higher the frequency, the less visible the flickering. The frequency at which it can no longer be perceived is called the flicker fusion frequency.

There is no generally accepted norm for the right amount of flickering or the flicker

fusion frequency. That is why it is important to purchase lighting solutions with a flicker-index of 0.0. 100% flicker-free lighting will positively influence animal welfare and performance.

With more than 40 years of experience, combined with highly trained staff and extensive knowledge, HATO Lighting have been able to perform in-depth research into flicker-free lighting and the majority of their products are 100% flicker-free. ■