

METHOD FOR ASSESSING LIGHT INTENSITY IN ALTERNATIVE SYSTEMS FOR LAYING HENS

Legal requirement: “*All buildings shall have light levels sufficient to allow all hens to see one another and be seen clearly, to investigate their surroundings visually and to show normal levels of activity.*” (Directive 1999/74/EC, Annex, Point 3)

Description of the method

The method recommended involves measurements of a resource-based animal welfare indicator, namely light intensity. For the measurements to be valid and reliable, the method requires a measuring device, i.e. a lux meter that measures the light intensity in the unit “lux” (e.g. Kimo LX 100).

During the inspection

- Do the measurements when the birds are the least disturbed to avoid dust being stirred up by the birds, as dust will reduce the light intensity.
- If arriving during a dusk/dawn phase, make sure not to start the measurements of light intensity before full light intensity is gained.
- Select five measuring points on the floor that are representative of the distribution of light intensity in the barn.
 - Select measuring points between artificial light sources and not directly underneath (the light intensity is generally higher directly under the light source).
 - Take into account that the intensity of natural light is greater than that of artificial light.
 - Only measure in the usable area, i.e. do not include areas inaccessible to the birds.
- During measurement:
 - Place the sensor of the lux meter at eye level of the birds.
 - The sensor has to point in the direction of the roof.
 - Make sure nothing shadows (e.g. birds, inspector or equipment).
 - Wait until the measuring stabilises before noting the light intensity.

Interpreting the data

Only the competent authorities in the Member States are allowed to interpret the legislation and to decide how to use the measurements of light intensity to verify compliance with the legislation. One way to analyse the data is to take the average of the five measurements and use the mean to decide whether the light intensity complies with the legislation.

Uncertainties/reservations

- Light intensity can vary highly depending on measuring point, so it is extremely important that the measuring points sampled are representative of the barn.
- In multitier systems, the light intensity on the tiers is highly dependent on measuring point due to all the furniture and the embedded light sources. We therefore recommend to only measure the light intensity on the floor. However, this involves a risk, as higher light intensities are often kept at floor level rather than at the tiers to avoid floor eggs. Thus, the proposed method does not per se ensure that the light intensity in the tiers of the system complies with the regulation. A method of how to include measuring points in the multitier system in a valid and reliable way needs to be developed.
- There are differences between models and brands of lux meters in accuracy, so this should be examined before purchasing lux meters. Measurements have been shown to deviate between 1% and 5% from a reference¹. To compensate for possible inaccuracy of measurements due to differences between lux meters and the fact that light is unevenly distributed in the barn, resulting in light intensity measurements being significant dependent on the proximity of the measuring point to the illumination source, some Member States accept a reduction in the threshold (if one is set by the Member State).

Sources

A number of sources have been searched for protocols on how to measure light intensity in poultry barns. These include scientific peer-reviewed articles and documents collected from competent authorities in Member States within EU and from non-EU countries within Europe. The method considered to have the highest validity and reliability, while still being feasible during on-farm inspections, was found in a protocol from the French² competent authorities meant for inspections of broiler farms. The present method has been developed based on this protocol.

¹ Précision de la mesure de lumière. The French Poultry Technical Institute (ITAVI).

² Protocol 'DGAL/SDSPA/2017-998', Direction générale de l'alimentation, Service des actions sanitaires en production primaire, Sous-direction de la santé et de protection animales, Bureau de la protection animale (BPA).

For now, this is the best method available for measuring light intensity during animal welfare inspections that EURCAW-Poultry-SFA can offer. However, there is room for improvements, and methods that are more accurate may be developed and delivered in the future. Furthermore, presently the unit used when measuring light intensity is “lux” which is based on the human perception of the light spectrum. Nevertheless, the domestic fowl perceives light intensity differently than humans due to differences in spectral sensitivity, and poultry, unlike humans, are also able to detect UV-A light. In the future, this may be taken into account when measuring light intensity, as measuring devices that measure the light intensity as perceived by the birds, i.e. chicken lux (clux) or gallilux, are becoming available (e.g. HATO ONE, <https://www.hato.one/>).