

METHOD FOR ASSESSING LIGHT INTENSITY IN BROILER FARMS

Legal requirement: *“All buildings shall have lighting with an intensity of at least 20 lux during the lighting periods, measured at bird eye level and illuminating at least 80% of the usable area. A temporary reduction in the lighting level may be allowed when necessary following veterinary advice.”* (Directive 2007/43 EU, Annex I, Paragraph 6)

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 that are representative of the distribution of light intensity in the barn. Take into account that the light intensity is generally higher directly under the light source and that 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, i.e. the light intensity measured on 80% of the usable surface of the building has to be at least equal to 20 lux at eye level of the birds.

One way to analyse the data is to:

- Remove the lowest of the five measurements (i.e. taking the regulatory threshold of 80% of the usable area into account).

- Take the average of the four remaining measurements.
- 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.
- 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. Furthermore, a study¹³ investigating the effect on light intensity measurements of the proximity of the measuring points to the illumination source showed 5–7 lux difference in a broiler barn. To compensate for possible inaccuracy of measurements due to differences between lux meters and the fact that light is unevenly distributed in the barn, some Member States accept a reduction in the threshold. For example, the competent authorities in France accept a reduction of 5 lux, resulting in a minimum threshold for the light intensity of 15 lux¹⁴.

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.

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 legal requirement specifies “lux” as the unit 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/>).

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).