ARTICOLO TECNICO

CORTEM GROUP
To be sure to be safe.

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EWL SERIES LED LIGHTING FIXTURES AND FLOODLIGHTS EXEMPT FROM PHOTOBIOLOGICAL RISK

What the photobiological risk is and its assessing criteria

Cortem Group, always committed to technological innovation and safety of people and environment, submitted the LED EWL series lighting fixtures and floodlights to the test for the photobiological risk, as provided by IEC 62471, EN 62471 and CEI EN 62471 standards currently in force, and by the Legislative Decree N° 81 of April, 9th 2008 which introduced the risk assessment.

These standards, as well as providing guidance for the photobiological safety evaluation, define the exposure limits (EL), the measurement techniques and the classification scheme for the evaluation and control of photobiological risks.

The IEC 62471 standard contains several construction requirements related to the ANSI/IESNA RP-27.2 standard which is valid in North America.

From the test reports, resulted that EWL series, both in the version without optics, with standard beam of 120°, and in the versions with optics concentrating the light beam, are fully compliant with the requirements of the **"Exempt Group"**.

1. What the photobiological risk is

LED light sources (excluding LASER regulated by specific legislation) can cause, according to the exposure, damage to the operators' skin and eyes (retina and cornea). The regulations identify the following sources of photobiological risk:

• UV rays

• Light blue

• Infrared radiation (IR).

2. Exposure Limits (EL)

The people, closed to light sources, should not be exposed to levels exceeding the limits laid down by IEC 62471 standard in order to avoid health risks. The values for exposure limits (EL), listed in the rules, have been taken from various ICNIRP guide lines *(International Commission on Non-Ionizing Radiation Protection)*, which, in turn, are based on the best available information from experimental studies.

The limits of exposure for people refer to continuous sources, in which the exposure duration is not less than 0.01 ms and for a period not exceeding 8 hours. They are used as a guideline in the exposure control.

3. Measurement techniques

The measurement techniques are part of the evaluation against the exposure limits and the allocation of risk classification.

The lighting fixtures are fed and taken to the functional scheme in order to have a significant measurement and meets the test parameters provided in the reference standard.

4 The classification scheme

As shown in the table below, the lighting equipment is classified into four risk groups:

RISK GROUP	TYPE OF RISK
Exempt Group	The requirements for the classification of "Exempt Group" are those that the lighting fixtures do not generate any photobiological hazard if: - no risk of actinic ultraviolet (Es) with exposure of 8 hours (30.000s); nor - a danger near UV (E_{UVA}) by the 1.000s (about 16 min), nor - a hazard of blue light for the retina (L_B) within 10.000s (about 2.8 h), nor - a thermal hazard for the retina (L_R) within 10s, nor - an infrared radiation hazard for the eye (E_{IR})) within the 1.000s. Therefore, the lighting fixtures that meet the above mentioned requirements belong to the “Exempt Group”, as well as the lighting fixtures that emit infrared radiation without a strong visual stimulus (e.g., less than 10 cd/m2) and do not constitute a danger to the retina in the near infrared (*L*IR) within 1.000s, are also classified in the “Exempt Group”.
Group 1	The requirements for the classification of the "Group 1" are that the risk is not present during the normal use, that the required values for the "Exempt Group " have been exceeded but that the following values are respected: - no risk of actinic ultraviolet (E_s) with exposure to 10.000s, nor - a danger near to UV (E_{UVA}) within 300s, nor - a hazard for the retina of blue light (L_B) within 100s, nor - a thermal hazard for the retina (L_R) within 10s, nor - an infrared radiation hazard for the eye (E_{IR}) within 100s. Therefore, the lighting fixtures that meet the aforementioned requirements belong to the Group 1 (Low Risk), as well as the lighting fixtures that emit infrared radiation without a strong visual stimulus (e.g., less than 10 cd/ m2)

	and do not constitute a danger for the retina in the near infrared (*L*IR) within 100s, are also classified in Group 1 (Low Risk).
Group 2	The requirements for the classification of the "Group 2" (moderate risk) are that is not present a hazard due to the aversion to bright light sources or due to thermal discomfort, that the limits for the "Group 1" have been exceeded but that the following values are respected: - no risk of actinic ultraviolet (E_s) with exposure of the 1.000s, nor - a danger near UV (E_{UVA}) within 100s, nor - a hazard of blue light for the retina (L_B) within 0.25s (aversion response), nor - a thermal hazard for the retina (L_R) within 0.25s (aversion response), nor - an infrared radiation hazard for the eye (E_{IR}) within 10s. Therefore, the lighting fixtures that meet the above mentioned requirements are included in Group 2 (moderate risk), as well as the lighting fixtures that emit infrared radiation without a strong visual stimulus (e.g. less than 10 cd/m2) and do not constitute a danger to the retina in the near infrared (*L*IR) within 10s, are also classified in Group 2 (moderate risk).
Group 3	The classification of the "Group 3" (High Risk) is attributed to lighting fixtures that may be a danger even for the momentary or brief exposure and then, if the limits defined for the Group 2 have been exceeded (moderate risk), these lighting fixtures are classified in Group 3 (high risk). The use of these lamps is not allowed for normal lighting.

In the event that a lighting equipment falls into a risk group, all the necessary precautions must be taken: the equipment must be installed at a specific distance from the operator, relevant information may be included into the user manual and maintenance manual and a specific label may be put on the lighting fixture.

In the design or purchase phase, we invite you to make a careful assessment even of these aspects of risk preferring only photobiological safe products.