

Position Paper

Exposure limits values (ELVs) for artificial optical radiation in Directive 2006/25/EC

The need for action by the European Commission to revise ELVs in line with well-established scientific findings

The Directive 2006/25/EC of the European Parliament and of The Council of 5 April 2006 *on the minimum health and safety requirements regarding the exposure of workers to risks arising from physical agents (artificial optical radiation)* {19th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC} includes two Annexes containing risk assessment criteria and ELVs for "Non-coherent optical radiation" – Annex I and "Laser optical radiation" – Annex II.

The criteria and ELVs for non-laser (incoherent) optical radiation adopted in Annex I were mainly based on state-of-the-art scientific findings in this area, collected and compiled by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and presented in two publications:

- 1) [Guidelines on limits of exposure to ultraviolet radiation of wavelengths between 180 nm and 400nm](#) (incoherent optical radiation) published in 2004.
- 2) [Guidelines on limits of exposure to broadband incoherent optical radiation \(0.38-3 µm\)](#) published in 1997.

Today, it has been 17 years since the Directive was published in 2006, and already 26 years since the establishment of the ELV criteria and values adopted therein, which were issued by ICNIRP in 1997. During the period of time following the publication of the Directive, new scientific studies on the effects of incoherent visible and infrared radiation from 0.38 to 3 µm on human eyes (retina, cornea and lens) have emerged. These research results carried out after 1997, in particular on thermally induced injury to the retina, led to the need to revise the ELVs. The changes also concern photochemically induced retinal damages, the so-called Blue-Light Hazard (BLH), but also thermal hazards to the cornea and the lens. After ICNIRP had analysed these novel findings, new criteria and ELVs in this spectral range (significantly different from those previously adopted) were agreed and published in 2013 ([ICNIRP Guidelines on limits of exposure to incoherent visible and infrared radiation](#)).

Although 10 years have passed, no action has been taken at the European Union level to revise the risk assessment criteria and ELVs included in Annex I of Directive 2006/25/EC. It is important to note that the exposure levels according to ICNIRP 2013 are lower than those provided in the Directive that are based on ICNIRP 1997 which means that the new criteria are in most cases less restrictive. Therefore, EU member states cannot change the criteria in their own countries on their own without amending Annex I of Directive 2006/25/EC, because the

Directive adopts more restrictive criteria as minimum health and safety requirements (in accordance with Article 251 of the Treaty and Preamble (point 6) to Directive 2006/25/EC).

A similar situation exists for lasers (coherent optical radiation). ICNIRP revised their "[Guidelines on limits of exposure to laser radiation of wavelengths between 180 nm and 1,000 \$\mu\text{m}\$](#) " in 2013, too. However, the ELVs in the Directive 2006/25/EC represent the knowledge of the previous ICNIRP Guidelines from 1996 and 2000. In contrast, the updated ELVs were included in the EN 60825-1:2015 that addresses product safety changing in some cases to a more restrictive and in some cases to a less restrictive level. Consequently, companies can no longer use the standardized laser classes for risk assessment at workplaces as they are based on different ELVs with regard to the Directive. For every industrial laser application, a complex measuring procedure is necessary for each laser device like a manufacturer of laser equipment has to do once before placing the device on the market. Nowadays, laser devices are omnipresent in industry, for example, used for cutting, welding, 3D printing but also in the medical or scientific sectors. All of these workers are "protected" by partly obsolete ELVs. Thus, a huge number of companies and employees can benefit from a ELV revise in the Directive.

A procedure should be established to adjust the laser ELVs according to the state of the art research in order to avoid gaps between product limit values and exposure limit values for safety at workplaces causing an unnecessary burden for European companies.

According to Directive 2006/25/EC Article 10.2. "Amendments to the Annexes of a strictly technical nature in line with b) technical progress, changes in the most relevant harmonised European standards or international specifications, and new scientific findings concerning occupational exposure to optical radiation, shall be adopted in accordance with the procedure laid down in Article 11(2)."

In view of the above, as representatives of the national occupational safety and health research institutes cooperating within the "Partnership for European Research in Occupational Safety and Health" (PEROSH) network, we strongly recommend that the European Commission takes action to align the requirements listed in Annex I and II of Directive 2006/25/EC with the new scientific findings concerning occupational exposure to visual and infrared radiation, published by a reliable body such as ICNIRP.

This paper has been prepared as part of the ongoing cooperation with some individual members of PEROSH - a network of 14 Occupational Safety and Health Institutes (www.perosh.eu) so as to more forcefully advocate attention to the problem of outdated exposure limit values for artificial optical radiation.

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