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Safety of laser products -
Part 20: Safety requirements for products intentionally exposing face or eyes to laser radiation

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Safety of laser products - Part 20: Safety requirements for products intentionally exposing face or eyes to laser radiation

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IEC TS 60825-20 has been prepared by IEC technical committee 76: Optical radiation safety and laser equipment. It is a Technical Specification.

This Technical Specification is to be used in conjunction with IEC 60825-1:2014.

The text of this Technical Specification is based on the following documents:

Draft	Report on voting
76/766/DTS	76/776/RVDTS

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Specification is English.

A list of all parts in the IEC 60825 series, published under the general title *Safety for laser products*, can be found on the IEC website.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

There is an emerging set of consumer Class 1 laser devices that intentionally directs laser radiation towards a person's eyes, or face, or both to perform a useful function (example: facial or retina or iris recognition, glasses and headsets for augmented reality (AR), virtual reality (VR) and mixed reality (MR), etc.). The nature of these devices is such that in the event of a fault or misuse resulting in excessive emissions, the likelihood of ocular injury can be greater during operation when compared to a device not intended for direct exposure.

This document provides risk-based requirements in the form of a safety-focused failure mode and effects analysis (FMEA) defined in Clause 6 for products that intentionally direct laser radiation towards the user's eyes or face, or both. The purpose of a risk analysis for such laser products is to reduce the risk of potential injury to the eyes or to the face during fault conditions which could occur at any time over the expected useful lifetime of the product.

1 Scope

This document provides radiation safety requirements (normative) and guidelines (informative) for the consideration of faults for Class 1 laser devices with laser radiation directed towards the eyes or face. Requirements for the safety of the nominal emission are not in the scope of this document.

Examples:

– devices with laser light facial or ocular recognition;
– virtual reality headsets or glasses;
– devices with gesture tracking via eye or facial movements;
– driver surveillance cameras;
– full body scanners (including eyes, face, and body).

Products exempted from this document include:

– medical and ophthalmic devices;
– automotive (lidars), lamps;
– laser applications where the laser is used in a professional (non-consumer) setting and is intended for direct or long-time exposure of the eyes or face.

This document provides normative requirements and informative guidelines for:

– radiation safety analysis;
– production-line testing;
– hazard analysis for laser radiation emissions (using a modified safety-focused FMEA approach)

  NOTE all subsequent references to FMEA in this document refers to this safety-focused FMEA approach.

– examples of typical failure modes and mitigation techniques

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60825-1:2014, *Safety of laser products - Part 1: Equipment classification and requirements*

ISO/IEC Guide 51:2014, *Safety aspects - Guidelines for their inclusion in standards*