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TECHNICAL REPORT

colour inside

Safety of laser products –
Part 3: Guidance for laser displays and shows

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FOREWORD

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IEC TR 60825-3 has been prepared by IEC technical committee 76: Optical radiation safety and laser equipment. It is a Technical Report.

This third edition cancels and replaces the second edition published in 2008. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) updates and provides additional terms and definitions relating to laser displays and shows;
b) adds information on exposure hazards and biological effects;
c) updates and provides additional safety criteria from a technical perspective of equipment and installations;
d) updates and provides additional safety management guidance for designers, installers, operators and performers;
e) adds guidance on identifying and managing laser display risk, including laser effect exposure risk categories to aid management;

f) adds guidance on the management of incidents and accidents;

g) adds guidance on exposure assessment, highlighting evaluation and measurement difficulties, and providing guidance on undertaking measurements.

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

Draft	Report on voting
76/662/DTR	76/692/RVDTR

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 Report is English.

A list of all parts in the IEC 60825 series, published under the general title *Safety of 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/standardsdev/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- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Laser products are used to create visual lighting effects for the purposes of entertainment. IEC 60825-1 considers the hazard classification and engineering requirements of laser products, while IEC TR 60825-14 provides general user guidance for the safe use of laser products.

The laser power needed to produce visually effective theatrical or artistic displays in large spaces such as theatres, arenas, or architectural sites is great enough to pose a severe accidental exposure hazard, even when personal exposure is very brief. For this reason, IEC TR 60825-14 states that only laser products that are Class 1, Class 2 or visible-beam Class 3R should be used for demonstration, display or entertainment purposes in unsupervised areas. Only under carefully controlled conditions and under the control of a trained experienced operator can laser products of higher classes be used for visual entertainment.

This document expands upon the principles considered in IEC TR 60825-14, providing specific technical guidance appropriate for the safe use of laser products used for the purposes of visual entertainment.

SAFETY OF LASER PRODUCTS –

Part 3: Guidance for laser displays and shows

1 Scope

This part of IEC 60825, which is a Technical Report, gives guidance on the planning and design, set-up and conduct of laser displays and shows that make use of high power lasers emitting output between 380 nm and 780 nm.

This document does not include the display or demonstration of scientific, medical or industrial laser products that can be used in an exhibition environment for example. However, several of the principles in this document could be relevant. This document provides recommendations for safety for those laser displays or demonstrations that are shows, artistic displays, advertising or light sculptures, or museum pieces used to demonstrate optical principles, etc.

Laser products available for use in a domestic environment or for use by people who cannot be expected to have received a suitable level of training are typically limited to Class 1, Class 2 or visible-beam Class 3R. Therefore, the use of such equipment is outside the scope of this document.

Image projectors that were assigned a Risk Group in accordance with IEC 62471-5 [1][1] or laser illuminated luminaires employing lamps meeting the criteria of 4.4 of IEC 60825-1:2014, are not within the scope of this document.

This document contains safety criteria for the protection of the public or persons in the vicinity of laser displays in the course of their employment.

This document is intended to be used by those who:

– design, manufacture, assemble, install or operate laser products that are Class 4, Class 3B, or non-visible beam Class 3R for display and entertainment purposes;
– operate arenas, theatres, music festivals, TV studios, planetaria, discotheques or other places where such laser products are installed and operated; or
– are responsible for reviewing the safety of such equipment, installations or displays.

This document is a code of practice for the design, installation, operation and evaluation of the safety of laser light shows and displays, and the equipment employed in their production. This document is also intended for persons who modify laser display installations or equipment.

In some countries, there are specific requirements, such as government permissions or notifications of shows, or prohibitions, such as against laser scanning of spectators.

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1 Numbers in square brackets refer to the Bibliography.

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, *Safety of laser products – Part 1: Equipment classification and requirements*