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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 7247.12-2026

**Safety of laser products - Part 12: Safety of free space optical
communication systems used for transmission of information**

激光产品的安全 第12部分：用于信息传输的自由空间光通信系统的安全

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is Part 12 of GB/T 7247 "Safety of Laser Products". GB/T 7247 has the following parts published.

---Part 1: Equipment Classification and Requirements;

---Part 2: Security of Optical Fiber Communication Systems (OFCS);

---Part 3: Guide to Laser Display and Performance;

---Part 4: Laser Protective Shield;

---Part 5: Producer's Checklist for GB/T 7247.1;

---Part 8: Guidelines for the Safe Use of Lasers in Human Application;

---Part 9: Maximum Permissible Exposure to Incoherent Light Radiation;

---Part 12: Security of Free-Space Optical Communication Systems for Information Transmission;

---Part 13: Classification and Measurement of Laser Products;

---Part 14: User Guide.

This document is equivalent to IEC 60825-12:2022 "Safety of laser products - Part 12: Free-space optical transmission" Security of communication systems.

The following minimal editorial changes have been made to this document.

---Notes have been added to the scope, and information from GB 44703 has been added to the references;

---Includes the errata from IEC 60825-12:2022/COR1.2024.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Machinery Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Standardization of Optical Radiation Safety and Laser Equipment (SAC/TC284).

Introduction

GB/T 7247 "Safety of Laser Products" is proposed to consist of the following parts.

---Part 1: Equipment Classification and Requirements. Due to the wide range of wavelengths, energies, and pulse characteristics involved in laser beams, their use...

At the same time, the degree of potential hazard varies greatly, and laser products cannot be simply classified using uniform safety limits. The aim is to classify laser products according to...

An assessment of the degree of light radiation hazard of instruments and laser products is conducted to determine control measures.

---Part 2: Security of Optical Fiber Communication Systems (OFCS). Based on reasonably foreseeable failure conditions [such as cable breakage, optical...] [Fiber optic connector detachment (disconnection), etc.] are categorized based on the degree of exposure to light radiation. This is intended to extend the enclosed transmission characteristics...

The nature of the location is used to specify the corresponding level of danger at the accessible location in order to determine the appropriate safety precautions.

---Part 3: Guidelines for Laser Displays and Performances. This section outlines guidelines for the use of Class 3B and Class 4 laser displays in theater projection and stage performances, and similar settings.

Light products, during laser operation, any exposure exceeding the maximum permissible level of biological effects and harm to the human eye and skin.

The Maximum Power Emission (MPE) analysis is provided to clarify the responsibilities of on-site design, installation, operation, and performance personnel, as well as risk management and assessment.

Estimate the risk to reduce it.

---Part 4: Laser Protective Shielding. This section defines permanent and temporary shielding measures used to enclose the working area of laser processing machines (e.g., during maintenance and repair periods).

Technical requirements for laser protective screens (both indoor and outdoor) and dedicated laser protective screens to prevent personnel around the processing area from being exposed to laser radiation.

harm.

---Part 5: Producer's Checklist for GB/T 7247.1. This is intended to provide a reference inspection procedure for ensuring...

Verify whether the product conforms to the classification and requirements of GB/T 7247.1 for equipment, and enhance the enforceability and usability of GB/T 7247.1 in use.

Operability.

---Part 8: Guidelines for the Safe Use of Lasers in Human Applications. This section aims to guide the integration of safe laser use into medical laser practices.

Practice, establish safety procedures, preventive measures, and personnel control measures, and strengthen the system for all personnel involved in laser use.

The necessity of security framework and training.

---Part 9: Maximum Permissible Exposure to Incoherent Light Radiation. This section aims to provide the permissible exposure limits for artificial light sources irradiating humans in the 180nm~3000nm range.

When exposing the eyes and skin, the MPE limit for controlling the amount of light radiation exposure.

---Part 12: Security of Free-Space Optical Communication Systems for Information Transmission. Aimed at providing wavelength ranges from 180 nm to 1 mm.

Internal guidelines for the manufacture and safe use of laser products and systems for point-to-point or point-to-multipoint free-space optical data transmission.

The goal is to protect people from the potentially dangerous light radiation produced by FSOCSs.

---Part 13: Classification and Measurement of Laser Products. This aims to provide emission levels of laser output energy according to GB/T 7247.1.

Measurement and analysis methods are provided, along with a classification guide for laser products.

---Part 14: User Guide. This section outlines requirements for users employing laser products beyond Class 1 and Class 2, aiming to assist laser manufacturers...