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

GB/T 7247.13-2018

**Safety of laser products -- Part 13: Measurements for
classification of laser products**

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Foreword

"Safety of Laser Products" is divided into the following sections.

--- Part 1. Equipment classification, requirements;

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

--- Part 3. Laser display and performance guide;

--- Part 4. Laser shield;

--- Part 5. Producer checklist for GB 7247.1;

--- Part 8. Guidelines for the safe use of medical laser equipment;

---Part 9. Maximum allowable exposure to incoherent light radiation;

--- Part 12. Security of free-space optical communication systems for information transmission;

--- Part 13. Classification measurement of laser products;

--- Part 14. User Guide;

--- Part 17. Safety in the use of passive optics and fiber optic cables in high power fiber optic communication systems.

This part is the 13th part of "Safety of Laser Products".

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

This part replaces GB/T 7247.13-2013 "Safety of laser products - Part 13. Classification measurement of laser products".

The main technical differences between this part and GB/T 7247.13-2013 are as follows.

- Added the definition of ultrashort pulse lasers (see 3.13);
- Modified the classification process (see Chapter 6, Chapter 6 of the.2013 edition);
- Revised the content of the table sightseeing source (see 7.5.1, 7.5 of the.2013 edition);
- Modified the content of the scanning laser (see 7.4.3.2, 7.4.2.1 of the.2013 edition);
- Added method for determining the angle of incidence of any source (see 7.5.3.4);
- Increased the measurement conditions for hazard assessment (see 7.7.3);
- Increased the content of the scan angle multiplication factor (see 7.8.9);
- Modified Appendix A, added examples (see Appendix A, Appendix A of the.2013 edition);
- Added Appendix B. Common Conversions (see Appendix B).

This section uses the translation method equivalent to IEC TR60825-13:2011 "Safety of laser products - Part 13. Laser products

Class measurement.

This section has made the following editorial changes.

- Modified the definition of ultrashort pulse laser in the original text, by the original text "capable to emit pulses shorter than 100fs and contains considerable

The spectral composition of the laser. "" changed to "laser capable of emitting pulses shorter than 100 ps and containing considerable spectral components"

Device. " (see 3.13);

- Added "Note. For ultrashort pulses, use other suitable instruments to measure" (see 7.6.2).

1 Scope

This part of the Safety of Laser Products provides radiation measurement or analysis for manufacturers, testing organizations, safety personnel and others.

The practical guidance is based on the measurement and analysis method of laser energy emission level established in GB 7247.1-2012. The test described in this section

The volume program is intended as a guide for the classification of laser products. It is acceptable if other programs are better or more suitable.

This section provides information for calculating the reachable emission limits (AELs) and maximum allowable exposures (MPEs) due to the calculation of these limits.

Some parameters also depend on other measurements.

This section applies to lasers, including extended sources and laser arrays. Users of this section should pay attention to the relatively stricter method,

The procedures for observing conditions for expanding light sources in this section may produce more conservative results.

Note. The assessment of more complex light sources continues and will be agreed as an internationally accepted approach.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article.

Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB 7247.1-2012 Safety of laser products - Part 1. Equipment classification, requirements (IEC 60825-1..2007, IDT)

3 Terms and definitions

The following terms and definitions as defined in GB 7247.1-2012 apply to this document.

3.1

Angular velocity angularvelocity

The speed of the scanned beam, in radians/second.

3.2

Beam profile beamprofile

Radiation distribution of the beam cross section.

3.3

Beam beam waist beamwaist

The minimum diameter of an axisymmetric beam.

Note. For non-axisymmetric beams, there may be a beam waist at different distances from

the source along each spindle.

3.4

Charge coupled device charge-coupled device

CCD

Self-scanning semiconductor imaging devices utilizing metal oxide semiconductor technology (MOS), surface storage, and information conversion.

3.5

Critical frequency

Used to discriminate the pulsed laser repetition frequency for continuous wave (CW) models during laser hazard assessment. Repeat frequency is higher than this frequency

At the time of the rate, the pulsed laser can be processed in a continuous wave (CW) model.

3.6

Gaussian beam profile Gaussian beam profile

The contour of the laser beam when operating in the lowest order transverse mode (TEM₀₀).

Note. The Gaussian beam profile may also be obtained by a non-TEM₀₀ laser beam passing through the beam shaping optics.

3.7

Measuring aperture measurement aperture

The aperture used to classify the laser to determine the power or energy of the AEL laser relative to each class.

3.8

Pulse repetition frequency pulse repetition frequency

PRF

The number of pulses generated per second, in Hertz (Hz).

3.9

Q switch Q-switch

A device that produces narrow pulse width, high peak power laser pulses by enhancing the performance of the laser medium for storing and releasing energy.

3.10