

26 Lasers

26.1 Equipment containing lasers should be properly identified with a laser product classification. This classification should be based on the laser radiation level energy-accessible during operation, per the applicable standard or regulation. The laser product classification, applicable standard, and the certification file number (where appropriate) should be documented on a Laser Data Sheet (format in Part 1 of Appendix 7) that is provided to the user.

NOTE122: A Class 1 label may be required in some jurisdictions, but is not currently required in the United States.

~~26.1.1 The laser energy (or power), wavelength, and temporal mode (continuous wave or pulsed) should be identified in the documentation to the user.~~

~~26.1.1.1 If pulsed, the pulse repetition rate, pulse duration and description of the pulse waveform should be identified in the documentation provided to the user.~~

~~26.1.1.2 For Class 3b or 4 embedded laser systems, the above information and the physical location of the laser sources within the product should be identified in the documentation provided to the user and in the maintenance manual.~~

26.1.1 As an alternative to completing a Laser Data Sheet, the equipment manufacturer may provide the information that is specified on the Laser Data Sheet in another format. The information should be organized so the user can easily read and understand it.

26.1.2 Equipment should not exceed the laser product classification of Class 2; however, individual lasers may exceed this classification prior to integration into the final equipment assembly.

26.1.3 Equipment and lasers should be labeled according to the appropriate standards (e.g., IEC 60825-1, 21CFR 1040.10).

NOTE 1: A Class 1 product label may be is required in some jurisdictions, but is not currently required in the United States.

NOTE 2: The laser product classification for some equipment is ~~will~~ be Class 1 or 2, even though an embedded laser is of higher hazard classification.

26.1.4 Equipment suppliers should provide maintenance or service task information in the documents provided to users for equipment that requires access to laser radiation in excess of the maximum permissible exposure (MPE).

26.1.4.1 The information for these tasks should be documented on a Laser Data Sheet (See Appendix 7.) in the documents provided to users and should include the accessible laser and beam parameters (A7-2), laser control measures (A7-3) and personal protective equipment (A7-4) for each laser or task requiring this access.

EXCEPTION: In the case of proprietary beam parameters, an acceptable alternative is to provide the nominal ocular hazard distance (NOHD) results (according to IEC 60825 or its equivalent) for each task requiring access above the MPE.

EXCEPTION: If a laser system is a stand-alone laser product delivered as a component or spare for laser equipment, the laser system supplier's responsibility for Laser Data Sheet information is limited to that which applies specifically to the stand-alone laser product and not the integrated laser equipment.

26.1.5 The physical location of the embedded laser sources and access points within the laser product should be identified in the documents provided to users.

26.2 Equipment, including beam diagnostic or alignment tools, should be designed to prevent injury from all lasers during normal operation, and should minimize the risk of injury during maintenance or service. Potential exposures should be controlled in the following order of preference:

26.2.1 Engineering controls (e.g., enclosures, shielding, filters, use of fiber optics to transmit energy, interlocks).

26.2.2 Temporary enclosures or control measures for maintenance, service, and non-routine tasks.

26.2.3 Administrative controls (e.g., written warnings, standard operating procedures, labeling).

26.2.4 Personnel protective equipment.

NOTE 1: Temporary enclosures and personal protective equipment are considered to be administrative controls, because they require human action to implement.

NOTE 2: Certain classes of laser products are regulated around the world. Regulations and licensing requirements may cover activities such as importing, exporting, distributing, demonstrating, installing, servicing, and using these laser products.

26.3 The equipment supplier should provide the following in the operation and maintenance manuals:

- A description of laser related hazards present during operation, maintenance, or service, and methods to minimize the hazard;
- Justification for any procedures that require a laser controlled area and the dimensions of this hazard zone;
- Administrative controls used in maintenance and service activities; and
- A description of the necessary personal protective equipment.

26.4 The following detailed information should be available to an evaluator:

- Justification for when engineering controls are not feasible to limit exposure during operation or maintenance tasks, and how administrative controls provide equivalent protection (See Section 26.2); and
- Documentation showing compliance with an appropriate international laser product safety or industry standard, or the national standard of the country of use.