

1061. cont'd.

5. b. Semiconductor "lasers", as follows:

Technical Note:

Semiconductor "lasers" are commonly called "laser" diodes.

Note:

The embargo status of semiconductor "lasers" specially designed for other equipment is determined by the embargo status of the other equipment.

1. Individual, single-transverse mode semiconductor "lasers" having:
 - a. An average output power exceeding 100 mW; **or**
 - b. A wavelength exceeding 1,050 nm;
2. Individual, multiple-transverse mode semiconductor "lasers", or arrays of individual semiconductor "lasers", having:
 - a. An output energy exceeding 500 µJ per pulse and a pulsed "peak power" exceeding 10 W;
 - b. An average or CW output power exceeding 10 W; **or**
 - c. A wavelength exceeding 1,050 nm;
- c. Solid state "lasers", as follows:
 1. "Tunable" "lasers" having any of the following:

Note:

1061.5.c.1. includes titanium - sapphire (Ti: Al₂O₃), thulium - YAG (Tm: YAG), thulium - YSGG (Tm: YSGG), alexandrite (Cr: BeAl₂O₄) and colour centre "lasers".

- a. An output wavelength less than 600 nm **and**:
 1. An output energy exceeding 50 mJ per pulse and a pulsed "peak power" exceeding 1 W; **or**
 2. An average or CW output power exceeding 1 W;
- b. An output wavelength of 600 nm or more but not exceeding 1,400 nm **and**:
 1. An output energy exceeding 1 J per pulse and a pulsed "peak power" exceeding 20 W; **or**
 2. An average or CW output power exceeding 20 W; **or**
- c. An output wavelength exceeding 1,400 nm **and**:
 1. An output energy exceeding 50 mJ per pulse and a pulsed "peak power" exceeding 1 W; **or**
 2. An average or CW output power exceeding 1 W;
2. Non-"tunable" "lasers", as follows:

Note:

1061.5.c.2. includes atomic transition solid state "lasers".

- a. Ruby "lasers" having an output energy exceeding 20 J per pulse;
- b. Neodymium glass "lasers", as follows:
 1. "Q-switched lasers" having:
 - a. An output energy exceeding 20 J but not exceeding 50 J per pulse and an average output power exceeding 10 W; **or**
 - b. An output energy exceeding 50 J per pulse;
 2. Non-"Q-switched lasers" having:
 - a. An output energy exceeding 50 J but not exceeding 100 J per pulse and an average output power exceeding 20 W; **or**
 - b. An output energy exceeding 100 J per pulse;
- c. Neodymium-doped (other than glass) "lasers", as follows, with an output wavelength exceeding 1,000 nm but not exceeding 1,100 nm:
(For neodymium-doped (other than glass) "lasers" having an output wavelength not exceeding 1,000 nm or exceeding 1,100 nm, see 1061.5.c.2.d.)
 1. Pulse-excited, mode-locked, "Q-switched lasers" with a "pulse duration" of less than 1 ns **and**:
 - a. A "peak power" exceeding 5 GW;
 - b. An average output power exceeding 10 W; **or**
 - c. A pulsed energy exceeding 0.1 J;
 2. Pulse-excited, "Q-switched lasers" with a pulse duration equal to or more than 1 ns, **and**:
 - a. A single-transverse mode output with:
 1. A "peak power" exceeding 100 MW;
 2. An average output power exceeding 20 W; **or**
 3. A pulsed energy exceeding 2 J; **or**
 - b. A multiple-transverse mode output with:
 1. A "peak power" exceeding 200 MW;

2. An average output power exceeding 50 W; **or**
3. A pulsed energy exceeding 2 J;
3. Pulse-excited, non-"Q-switched lasers", having:
 - a. A single-transverse mode output with:
 1. A "peak power" exceeding 500 kW; **or**
 2. An average output power exceeding 150 W; **or**
 - b. A multiple-transverse mode output with:
 1. A "peak power" exceeding 1 MW; **or**
 2. An average power exceeding 500 W;
4. Continuously excited "lasers" having:
 - a. A single-transverse mode output with:
 1. A "peak power" exceeding 500 kW; **or**
 2. An average or CW output power exceeding 150 W; **or**
 - b. A multiple-transverse mode output with:
 1. A "peak power" exceeding 1 MW; **or**
 2. An average or CW output power exceeding 500 W;
- d. Other non-"tunable" "lasers", having any of the following:
 1. A wavelength less than 150 nm **and**:
 - a. An output energy exceeding 50 mJ per pulse and a pulsed "peak power" exceeding 1 W; **or**
 - b. An average or CW output power exceeding 1 W;
 2. A wavelength of 150 nm or more but not exceeding 800 nm **and**:
 - a. An output energy exceeding 1.5 J per pulse and a pulsed "peak power" exceeding 30 W; **or**
 - b. An average or CW output power exceeding 30 W;
 3. A wavelength exceeding 800 nm but not exceeding 1,400 nm, as follows:
 - a. "Q-switched lasers" with:
 1. An output energy exceeding 0.5 J per pulse and a pulsed "peak power" exceeding 50 W; **or**
 2. An average output power exceeding:
 - a. 10 W for single-mode "lasers";
 - b. 30 W for multimode "lasers";
 - b. Non-"Q-switched lasers" with:
 1. An output energy exceeding 2 J per pulse and a pulsed "peak power" exceeding 50 W; **or**
 2. An average or CW output power exceeding 50 W; **or**
 4. A wavelength exceeding 1,400 nm **and**:
 - a. An output energy exceeding 100 mJ per pulse and a pulsed "peak power" exceeding 1 W; **or**
 - b. An average or CW output power exceeding 1 W;
- d. Dye and other liquid "lasers", having any of the following:
 1. A wavelength less than 150 nm **and**:
 - a. An output energy exceeding 50 mJ per pulse and a pulsed "peak power" exceeding 1 W; **or**
 - b. An average or CW output power exceeding 1 W;
 2. A wavelength of 150 nm or more but not exceeding 800 nm **and**:
 - a. An output energy exceeding 1.5 J per pulse and a pulsed "peak power" exceeding 20 W;
 - b. An average or CW output power exceeding 20 W; **or**
 - c. A pulsed single longitudinal mode oscillator with an average output power exceeding 1 W and a repetition rate exceeding 1 kHz if the "pulse duration" is less than 100 ns;
 3. A wavelength exceeding 800 nm but not exceeding 1,400 nm **and**:
 - a. An output energy exceeding 0.5 J per pulse and a pulsed "peak power" exceeding 10 W; **or**
 - b. An average or CW output power exceeding 10 W; **or**
 4. A wavelength exceeding 1,400 nm **and**:
 - a. An output energy exceeding 100 mJ per pulse and a pulsed "peak power" exceeding 1 W; **or**
 - b. An average or CW output power exceeding 1 W;
- e. Free electron "lasers";
- f. Components, as follows:
 1. Mirrors cooled either by active cooling or by heat pipe cooling;