

*Millennium Signatures*

MARKING SYSTEMS INC.

**CDRH**

**Enclosure Classification Guide**

# LASER SAFETY CLASSIFICATIONS



The Laser Classifications as per ANSI Specification Z136.1 "The Safe Use of Lasers" and guidelines established and regulated by the American National Laser Institute classify the lasers as follows:

### **Class 1**

A Class 1 laser is safe for use under all reasonably-anticipated conditions of use; in other words, it is not expected that the MPE can be exceeded. [Comment: This class may include lasers of a higher class whose beams are confined within a suitable enclosure so that access to laser radiation is physically prevented.]

### **Class 1M**

Class 1M lasers produce large-diameter beams, or beams that are divergent. The MPE for a Class 1M laser cannot normally be exceeded unless focusing or imaging optics are used to narrow down the beam. If the beam is refocused, the hazard of Class 1M lasers may be increased and the product class may be changed.

### **Class 2**

A Class 2 laser emits in the visible region. It is presumed that the human blink reflex will be sufficient to prevent damaging exposure, although prolonged viewing may be dangerous.

### **Class 2M**

A Class 2M laser emits in the visible region in the form of a large diameter or divergent beam. It is presumed that the human blink reflex will be sufficient to prevent damaging exposure, but if the beam is focused down, damaging levels of radiation may be reached and may lead to a reclassification of the laser.

### **Class 3R**

A Class 3R laser is a continuous wave laser which may produce up to five times the emission limit for Class 1 or Class 2 lasers. Although the MPE can be exceeded, the risk of injury is low. The laser can produce no more than 5 mW in the visible region.

### **Class 3B**

A Class 3B laser produces light of an intensity such that the MPE for eye exposure may be exceeded and direct viewing of the beam is potentially serious. Diffuse radiation (i.e., that which is scattered from a diffusing surface) should not be hazardous. CW emission from such lasers at wavelengths above 315nm must not exceed 0.5 watts.

### **Class 4**

Class 4 lasers are of high power (typically up to 500 mW or more if CW, or 10 J cm<sup>-2</sup> if pulsed). These are hazardous to view at all times, may cause devastating and permanent eye damage, may have sufficient energy to ignite materials, and may cause significant skin damage. Exposure of the eye or skin to both the direct laser beam and to scattered beams, even those produced by reflection from diffusing surfaces, must be avoided at all times. In addition, they may pose a fire risk and may generate hazardous fumes.

