

**Table 10. Control Measures for the Seven Laser Classes**

Engineering Control Measures	Classification						
	1	1M	2	2M	3R	3B	4
Protective Housing (4.3.1)	X	X	X	X	X	X	X
Without Protective Housing (4.3.1.1)	LSO shall establish Alternative Controls						
Interlocks on Removable Protective Housings (4.3.2)	▽	▽	▽	▽	▽	X	X
Service Access Panel (4.3.3)	▽	▽	▽	▽	▽	X	X
Key Control (4.3.4)	—	—	—	—	—	•	X
Viewing Windows, Display Screens and Collecting Optics (4.3.5.1)	Assure viewing limited < MPE						
Collecting Optics (4.3.5.2)							
Fully Open Beam Path (4.3.6.1)	—	—	—	—	—	X NHZ	X NHZ
Limited Open Beam Path (4.3.6.2)	—	—	—	—	—	X NHZ	X NHZ
Enclosed Beam Path (4.3.6.3)	None is required if 4.3.1 and 4.3.2 fulfilled						
Remote Interlock Connector (4.3.7)	—	—	—	—	—	•	X
Beam Stop or Attenuator (4.3.8)	—	—	—	—	—	•	X
Activation Warning Systems (4.3.9.4)	—	—	—	—	—	•	X
Indoor Laser Controlled Area (4.3.10)	—	•	—	•	—	X NHZ	X NHZ
Class 3B Indoor Laser Controlled Area (4.3.10.1)	—	—	—	—	—	X	—
Class 4 Laser Controlled Area (4.3.10.2)	—	—	—	—	—	—	X
Outdoor Control Measures (4.3.11)	X	• NHZ	X NHZ	• NHZ	X NHZ	X NHZ	X NHZ
Laser in Navigable Airspace (4.3.11.2)	X	• NHZ	X NHZ	• NHZ	X NHZ	X NHZ	X NHZ
Temporary Laser Controlled Area (4.3.12)	▽ MPE	▽ MPE	▽ MPE	▽ MPE	▽ MPE	—	—
Controlled Operation (4.3.13)	—	—	—	—	—	—	•
Equipment Labels (4.3.14 and 4.7)	X	X	X	X	X	X	X
Laser Area Warning Signs and Activation Warnings (4.3.9)	—	—	—	—	•	X NHZ	X NHZ

LEGEND: X Shall  
 • Should  
 — No requirement  
 ▽ Shall if enclosed Class 3B or Class 4  
 MPE Shall if MPE is exceeded  
 NHZ Nominal Hazard Zone analysis required  
 • May apply with use of optical aids

**Table 10. Control Measures for the Seven Laser Classes (cont.)**

Administrative and Procedural Control Measures	Classification						
	1	1M	2	2M	3R	3B	4
Standard Operating Procedures (4.4.1)	—	—	—	—	—	•	X
Output Emission Limitations (4.4.2)	—	—	—	—	LSO Determination		
Education and Training (4.4.3)	—	•	•	•	•	X	X
Authorized Personnel (4.4.4)	—	•	—	•	—	X	X
Alignment Procedures (4.4.5)	∇	∇	∇	∇	∇	X	X
Protective Equipment (4.6)	—	•	—	•	—	•	X
Spectators (4.4.6)	—	•	—	•	—	•	X
Service Personnel (4.4.7)	∇	∇	∇	∇	∇	X	X
Demonstration with General Public (4.5.1)	—	•	X	•	X	X	X
Laser Optical Fiber Transmission Systems (4.5.2)	MPE	MPE	MPE	MPE	MPE	X	X
Laser Robotic Installations (4.5.3)	—	—	—	—	—	X NHZ	X NHZ
Protective Eyewear (4.6.2)	—	—	—	—	—	•	X
Window Protection (4.6.3)	—	—	—	—	—	X	X NHZ
Protective Barriers and Curtains (4.6.4)	—	—	—	—	—	•	•
Skin Protection (4.6.6)	—	—	—	—	—	X	X NHZ
Other Protective Equipment (4.6.7)	Use may be required						
Warning Signs and Labels (4.7) (Design Requirements)	—	—	•	•	•	X NHZ	X NHZ
Service Personnel (4.4.7)	LSO Determination						
Laser System Modifications (4.1.2)	LSO Determination						

LEGEND: X Shall  
 • Should  
 — No requirement  
 ∇ Shall if enclosed Class 3B or Class 4  
 MPE Shall if MPE is exceeded  
 NHZ Nominal Hazard Zone analysis required  
 • May apply with use of optical aids

**Table 11a. Summary of Area Warning Signs**

Clause	Title	Classification				Required Statement or Comment
		2	3R	3B	4	
3.5.1	Personnel	X	X	X	X	Some individuals may be unable to read or understand signs
4.3.9.1	Warning Sign Posting	-	X	X	X	Specifies which sign required Caution, Danger, Notice
4.3.9.2	Laser Warning Sign Purpose	-	X	X	X	States the four purposes of warning signs
4.3.9.3	Warning Sign Non-Beam Hazard	X	X	X	X	Must follow requirements of other appropriate documents
4.3.9.4.1	Audible Warning Devices	-	-	X	X	Audible warning should be required for Class 3B and shall for Class 4
4.3.9.4.2	Visible Warning Devices	-	-	X	X	Visible warning should be required for Class 3B and shall for Class 4
4.7.1	Design of Signs		X	X	X	Per ANSI Z535 requirements
4.7.2.1.1	Laser Symbol		X	X	X	Laser sun burst required on all signs per ANSI
4.7.2.1.2	International Laser Symbol					International symbol as specified in IEC 60825-1 is acceptable
4.7.2.2	Safety Alert Symbol		X	X	X	The alert symbol is required on all Caution & Danger Signs
4.7.3.1	Signal Word "Danger"		X	X	X	Specifies when to use "Danger" word and format
4.7.3.2	Signal Word "Caution"		X			Specifies when to use "Caution" word and format
4.7.3.3	Signal Word "Notice"		X	X	X	Specifies when to use "Notice" word and format
4.7.4	Pertinent Sign Information		X	X	X	Specifies the location of words on signs
4.7.4.3	Location of Signs		X	X	X	Specifies location of signs

*Note: Signs and labels prepared in accordance with previous revisions of this standard are considered to fulfill the requirement of the standard.*