Laser Control Measures

TABLE III:6-9. ENGINEERING CONTROL MEASURES FOR THE FOUR LASER CLASSES [ANSI Z 136.1 (1993)]

	---------- Class ----------					
Control measures	**I**	**IA**	**II**	**IIIA**	**IIIB**	**IV**
Protective housing	X	X	X	X	X	X
Without protective housing	-- LSO shall establish alternate controls --					
Interlocks on protective housing	a	a	a	X	X	X
Service access panel	b	b	b	b	b	X
Key switch master	_	_	_	_	·	X
Viewing portals	_	_				
Collecting optics	_	_				
Totally open beam path	_	_	_	_	X	X
Limited open beam path	_	_	_	_	X	X
Remote interlock connector	_	_	_	_	·	X
Beam stop or attenuator	_	_	_	·	·	X
Activation warning system	_	_	_	_	·	X
Emission delay	_	_	_	_	_	·
Class IIIB laser controlled area	_	_	_	_	X	_
Class IV laser controlled area	_	_	_	_	_	X
Laser outdoor controls	_	_	_	_	X	X
Temporary laser controlled area	b	b	b	b	_	_
Remote firing & monitoring	_	_	_	_	_	·
Labels	_	X	X	X	X	X
Area posting	_	_	·	·	X	X

Administrative & procedural controls	–	X	X	X	X	X
Standard operating procedures	–	–	–	–	·	X
Output emission limitations	–	–	–	--LSO determines--		
Education and training	–	–	–	X	X	X
Authorized personnel	–	–	–	–	X	X
Alignment procedures	–	–	X	X	X	X
Eye protection	–	–	–	–	·	X
Spectator control	–	–	–	–	·	X
Service personnel	b	b	b	b	X	X
Laser demonstration	–	–	X	X	X	X
Laser fiber optics	–	–	X	X	X	X

Key:

X	=	Shall.
a.	=	Shall if embedded Class IIIA, Class IIIB, Class IV.
b.	=	Shall if embedded Class IIIB or Class IV.
–	=	No requirement.
·	=	Should.
	=	Shall if MPE is exceeded.

Control Measures: Overview

1. There are four basic categories of controls useful in laser environments. These are engineering controls, personal protective equipment, administrative and procedural controls, and special controls. The controls to be reviewed here are based upon the recommendations of the ANSI Z 136.1 standard.

1. Important in all controls is the distinction between the functions of operation, maintenance, and service. First, laser systems are classified on the basis of level of the laser radiation accessible during operation. Maintenance is defined as those tasks specified in the user instructions for assuring the performance of the product and may include items such as routine cleaning or replenishment of expendables. Service functions are usually performed with far less frequency than maintenance functions (e.g., replacing the laser resonator mirrors or repair of faulty components) and often require access to the laser beam by those performing the service functions. The safety procedures required for such beam access during service functions should be clearly delineated in the laser product's service manual.