

APPENDIX C-2 – TABLE 2 (ANSI Z136.1)

Typical Laser Classification - Single-Pulse Small-Source Lasers

Wavelength (μm)	Laser Type	Wavelength (μm)	Pulse Duration (s)	Class 1 (J)	Class 3b (J)	Class 4 (J)
Ultraviolet						
0.180 to 0.400	Excimer (ArF)	0.193	20×10^{-9}	$\leq 2.4 \times 10^{-5}$	} > Class 1 but ≤ 0.125	} > 0.125
	Excimer (KrF)	0.248	20×10^{-9}	$\leq 2.4 \times 10^{-5}$		
	Neodymium: YAG	0.266	20×10^{-9}	$\leq 2.4 \times 10^{-5}$		
	Q-switched (Quadrupled)					
	Excimer (XeCl)	0.308	20×10^{-9}	$\leq 5.3 \times 10^{-5}$		
	Nitrogen	0.337	20×10^{-9}	$\leq 5.3 \times 10^{-5}$		
	Excimer (XeF)	0.351	20×10^{-9}	$\leq 5.3 \times 10^{-5}$		
Visible						
0.400 to 0.700	Rhodamine 6G (Dye Laser)	0.450-0.650	1×10^{-6}	} $\leq 1.9 \times 10^{-7}$	} > Class 1 but ≤ 0.03	} > 0.03
	Copper Vapor	0.510, 0.578	2.5×10^{-9}			
	Neodymium: YAG (Doubled) (Q-switched)	0.532	20×10^{-9}			
	Ruby (Q-switched)	0.6943	20×10^{-9}			
	Ruby (Long Pulse)	0.6943	1×10^{-3}			
Near Infrared						
0.700 to 1.4	Ti: Sapphire	0.700-1.000	6×10^{-6}	$\leq 1.9 \times 10^{-7}$	} > Class 1 but ≤ 0.033	} > 0.033**
	Alexandrite	0.720-0.800	1×10^{-4}	$\leq 7.6 \times 10^{-7}$		
	Neodymium: YAG (Q-switched)	1.064	20×10^{-9}	$\leq 1.9 \times 10^{-6}$		
Far Infrared						
1.400 to 10 ³	Erbium: Glass	1.540	10×10^{-9}	$\leq 7.9 \times 10^{-3}$	} > Class 1 but ≤ 0.125	} > 0.125
	Co: Magnesium-Fluoride	1.8-2.5	80×10^{-6}	$\leq 7.9 \times 10^{-4}$		
	Holmium	2.100	250×10^{-6}	$\leq 7.9 \times 10^{-4}$		
	Hydrogen Fluoride	2.600-3.000	0.4×10^{-6}	$\leq 1.1 \times 10^{-4}$		
	Erbium	2.940	250×10^{-6}	$\leq 5.6 \times 10^{-4}$		
	Carbon Dioxide	10.6	100×10^{-9}	$\leq 7.9 \times 10^{-5}$		
Carbon Dioxide	10.6	1×10^{-3}	$\leq 7.9 \times 10^{-4}$			

* Assuming that both eye and skin may be exposed, i.e., 1.0 mm beam (area of limiting aperture = 7.9×10^{-3} cm²).
 ** Class 3b AEL varies from 0.033 to 0.480 J corresponding to wavelengths that vary between 0.720 and 0.800 μm.