Table 2.2

Exposure limit values for laser exposure to the eye — Short exposure duration < 10 s

Wavelength [a] [nm]		Aperture	Duration [s]						
			10^{-13} - 10^{-11}	10^{-11} - 10^{-9}	10^{-9} - 10^{-7}	10^{-7} - $1{,}8 \cdot 10^{-5}$	$1{,}8 \cdot 10^{-5}$ - $5 \cdot 10^{-5}$	$5 \cdot 10^{-5}$ - 10^{-3}	10^{-3} – 10^{1}
UVC	180 - 280	1 mm for t<0,3 s; $1{,}5 \cdot t^{0,375}$ for 0,3<t<10 s	$E = 3 \cdot 10^{10} \cdot [W\,m^{-2}]$ See note [c]		$H = 30\ [J\,m^{-2}]$				
UVB	280 - 302				$H = 40\ [J\,m^{-2}]$:	if $t < 2{,}6 \cdot 10^{-9}$ then $H = 5{,}6 \cdot 10^{3}\, t^{0,25}\ [J\,m^{-2}]$ see note [d]			
	303				$H = 60\ [J\,m^{-2}]$:	if $t < 1{,}3 \cdot 10^{-8}$ then $H = 5{,}6 \cdot 10^{3}\, t^{0,25}\ [J\,m^{-2}]$ see note [d]			
	304				$H = 100\ [J\,m^{-2}]$:	if $t < 1{,}0 \cdot 10^{-7}$ then $H = 5{,}6 \cdot 10^{3}\, t^{0,25}\ [J\,m^{-2}]$ see note [d]			
	305				$H = 160\ [J\,m^{-2}]$:	if $t < 6{,}7 \cdot 10^{-7}$ then $H = 5{,}6 \cdot 10^{3}\, t^{0,25}\ [J\,m^{-2}]$ see note [d]			
	306				$H = 250\ [J\,m^{-2}]$:	if $t < 4{,}0 \cdot 10^{-6}$ then $H = 5{,}6 \cdot 10^{3}\, t^{0,25}\ [J\,m^{-2}]$ see note [d]			
	307				$H = 400\ [J\,m^{-2}]$:	if $t < 2{,}6 \cdot 10^{-5}$ then $H = 5{,}6 \cdot 10^{3}\, t^{0,25}\ [J\,m^{-2}]$ see note [d]			
	308				$H = 630\ [J\,m^{-2}]$:	if $t < 1{,}6 \cdot 10^{-4}$ then $H = 5{,}6 \cdot 10^{3}\, t^{0,25}\ [J\,m^{-2}]$ see note [d]			
	309				$H = 10^{3}\ [J\,m^{-2}]$:	if $t < 1{,}0 \cdot 10^{-3}$ then $H = 5{,}6 \cdot 10^{3}\, t^{0,25}\ [J\,m^{-2}]$ see note [d]			
	310				$H = 1{,}6 \cdot 10^{3}\ [J\,m^{-2}]$:	if $t < 6{,}7 \cdot 10^{-3}$ then $H = 5{,}6 \cdot 10^{3}\, t^{0,25}\ [J\,m^{-2}]$ see note [d]			
	311				$H = 2{,}5 \cdot 10^{3}\ [J\,m^{-2}]$:	if $t < 4{,}0 \cdot 10^{-2}$ then $H = 5{,}6 \cdot 10^{3}\, t^{0,25}\ [J\,m^{-2}]$ see note [d]			
	312				$H = 4{,}0 \cdot 10^{3}\ [J\,m^{-2}]$:	if $t < 2{,}6 \cdot 10^{-1}$ then $H = 5{,}6 \cdot 10^{3}\, t^{0,25}\ [J\,m^{-2}]$ see note [d]			
	313				$H = 6{,}3 \cdot 10^{3}\ [J\,m^{-2}]$:	if $t < 1{,}6 \cdot 10^{0}$ then $H = 5{,}6 \cdot 10^{3}\, t^{0,25}\ [J\,m^{-2}]$ see note [d]			
	314								
UVA	315 - 400				$H = 5{,}6 \cdot 10^{3}\, t^{0,25}\ [J\,m^{-2}]$				
Visible& IRA	400 - 700	7 mm	$H = 1{,}5 \cdot 10^{-4}\, C_E\ [J\,m^{-2}]$	$H = 2{,}7 \cdot 10^{4}\, t^{0,75}\, C_E\ [J\,m^{-2}]$	$H = 5 \cdot 10^{-3}\, C_E\ [J\,m^{-2}]$		$H = 18\ t^{0,75}\, C_E\ [J\,m^{-2}]$		
	700 - 1 050		$H = 1{,}5 \cdot 10^{-4}\, C_A\, C_E\ [J\,m^{-2}]$	$H = 2{,}7 \cdot 10^{4}\, t^{0,75}\, C_A\, C_E\ [J\,m^{-2}]$	$H = 5 \cdot 10^{-3}\, C_A\, C_E\ [J\,m^{-2}]$		$H = 18 \cdot t^{0,75}\, C_A\, C_E\ [J\,m^{-2}]$		
	1 050- 1 400		$H = 1{,}5 \cdot 10^{-3}\, C_C\, C_E\ [J\,m^{-2}]$	$H = 2{,}7 \cdot 10^{5}\, t^{0,75}\, C_C\, C_E\ [J\,m^{-2}]$	$H = 5 \cdot 10^{-2}\, C_C\, C_E\ [J\,m^{-2}]$			$H = 90 \cdot t^{0,75}\, C_C\, C_E\ [J\,m^{-2}]$	
IRB & IRC	1 400 - 1 500	See note [b]	$E = 10^{12}\ [W\,m^{-2}]$ See note [c]		$H = 10^{3}\ [J\,m^{-2}]$				$H = 5{,}6 \cdot 10^{3}\, t^{0,25}\ [J\,m^{-2}]$
	1 500 - 1 800		$E = 10^{13}\ [W\,m^{-2}]$ See note [c]		$H = 10^{4}\ [J\,m^{-2}]$				
	1 800 - 2 600		$E = 10^{12}\ [W\,m^{-2}]$ See note [c]		$H = 10^{3}\ [J\,m^{-2}]$				$H = 5{,}6 \cdot 10^{3} \cdot t^{0,25}\ [J\,m^{-2}]$
	2 600 - 10^{6}		$E = 10^{11}\ [W\,m^{-2}]$ See note [c]		$H = 100\ [J\,m^{-2}]$	$H = 5{,}6 \cdot 10^{3} \cdot t^{0,25}\ [J\,m^{-2}]$			

a If the wavelength of the laser is covered by two limits, then the more restrictive applies.

b When $1\,400 \le \lambda < 10^{5}$ nm : aperture diameter = 1 mm for $t \le 0{,}3$ s and $1{,}5\, t^{0,375}$ mm for $0{,}3\ s < t < 10$ s; when $10^{5} \le \lambda < 10^{6}$ nm : aperture diameter = 11 mm.

c Due to lack of data at these pulse lengths, ICNIRP recommends the use of the 1 ns irradiance limits.

d The table states values for single laser pulses. In case of multiple laser pulses, then the laser pulse durations of pulses falling within an interval T_{min} (listed in table 2.6) must be added up and the resulting time value must be filled in for t in the formula: $5{,}6\ 10^{3}\, t^{0,25}$.