

When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions,

$$\frac{C_1}{T_1} + \frac{C_2}{T_2} + \dots + \frac{C_n}{T_n}$$

exceeds unity, then, the mixed exposure should be considered to exceed the threshold limit value. C_i indicates the total time of exposure at a specified noise level, and T_i indicates the total time of exposure permitted at that level. Noise exposures of less than 90 dBA do not enter into the above calculations.

Impulse or impact noise

It is recommended that exposure to impulsive or impact noise should not exceed 140 decibels peak sound pressure level.

Ultraviolet Radiation*

These threshold limit values refer to ultraviolet radiation in the spectral region between 200 and 400 nm and represent conditions under which it is believed that nearly all workers may be repeatedly exposed without adverse effect. These values for exposure of the eye or the skin apply to ultraviolet radiation from arcs, gas, and vapor discharges, fluorescent, and incandescent sources, but do not apply to ultraviolet lasers** or solar radiation. These levels should not be used for determining exposure of photosensitive individuals to ultraviolet radiation. These values should be used as guides in the control of exposure to continuous sources where the exposure duration shall not be

less than 0.1 sec.

These values should be used as guides in the control of exposure to ultraviolet sources and should not be regarded as a fine line between safe and dangerous levels.

Recommended values

The threshold limit value for occupational exposure to ultraviolet radiation incident upon skin or eye where irradiance values are known and exposure time is controlled are as follows:

- 1 For the near ultraviolet spectral region (320 to 400 nm) total irradiance incident upon the unprotected skin or eye should not exceed 1 mW/cm² for periods greater than 10³ seconds (approximately 16 minutes) and for exposure times less than 10³ seconds should not exceed one J/cm².
- 2 For the actinic ultraviolet spectral region (200–315 nm), radiant exposure incident upon the unprotected skin or eye should not exceed the values given in Table 8 within an 8-hour period.
- 3 To determine the effective irradiance of a broadband source weighted against the peak of the spectral effectiveness curve (270 nm), the following weighting formula should be used:

$$E_{eff} = \sum E_{\lambda} S_{\lambda} \Delta_{\lambda}$$

where

E_{eff} = effective irradiance relative to a monochromatic source at 270 nm

E_{λ} = spectral irradiance in W/cm²/nm

S_{λ} = relative spectral effectiveness (unitless)

Δ_{λ} = band width in nanometers

- 4 Permissible exposure time in seconds for exposure to actinic ultraviolet radiation incident upon the unprotected skin or eye may be computed by dividing 0.003 J/cm² by E_{eff} in W/cm². The exposure time may also be determined using Table 9 which provides exposure times corresponding to effective irradiances in μ W/cm².

TABLE 8
RELATIVE SPECTRAL
EFFECTIVENESS
BY WAVE LENGTH

Wavelength (nm)	TLV (mJ/cm ²)	Relative Spectral Effectiveness S_{λ}
200	100	0.03
210	40	0.075
220	25	0.12
230	16	0.19
240	10	0.30
250	7.0	0.43
254	6.0	0.5
260	4.6	0.65
270	3.0	1.0
280	3.4	0.88
290	4.7	0.64
300	10	0.30
305	50	0.06
310	200	0.015
315	1000	0.003

* See Notice of Intended Changes, Page 1106

** See Laser TLVs