

*Recommendation from Scientific Expert Group  
on Occupational Exposure Limits  
for 5-Methylheptan-3-one*

8 hour TWA	:	10 ppm (53 mg/m <sup>3</sup> )
STEL (15 mins)	:	20 ppm (107 mg/m <sup>3</sup> )
Additional classification	:	-

Substance identification:

5-Methylheptane-3-one

Synonyms : Ethyl amyl ketone, EAK, amyl ethyl ketone

CH3CH2COCH2CH(CH3)CH2CH3

EINECS N° : 208-793-7

EEC N° : 606-020-00-1      Classification      R10 Xi; R36/37

CAS N° : 541-85-5

MWt : 128.2

Conversion factor (20°C, 101kPa) : 5.33 mg/m<sup>3</sup> = 1 ppm

Occurrence/use:

5-Methylheptan-3-one (EAK) is a colourless liquid with an agreeable penetrating odour which resembles the essence of apricots and peaches. It has a MPt of -56.7°C, a BPt of 160.5°C, a vapour pressure of 0.3kPa at 25°C and has a saturation concentration in air of 0.26% by volume. The odour threshold concentration is reported to be about 5 ppm (27 mg/m<sup>3</sup>).

EAK occurs naturally in certain fungal species and is a medium volume solvent with a production rate of less than 1000 tonnes per annum in the European Community.

It is used as a solvent for nitrocellulose-alkyd, nitrocellulose-maleic and vinyl resins.

Health Significance:

The SEG discussed and reviewed ethylamylketone on the basis of the health risk assessment carried out by the Dutch Expert Committee for Occupational Standards, together with the additional information given by a member of the group.

The SEG considered the experimental data available to be limited because of the complete lack of long term animal data and the very limited experience with humans.

EAK shows, in different species (rat, mouse, guinea pig), a relatively low acute toxicity by oral administration (LD50: 3500, 3800, 2500 mg/kg). The data on acute toxicity via inhalation are incomplete. On the basis of LC10 values for rats (8 hour LC10 of 3400 ppm, 18 g/m<sup>3</sup>) and mice (4 hour LC10 of 3480 ppm, 18.5 g/m<sup>3</sup>), EAK shows a comparable acute toxicity to 2-heptanone via inhalation.

Pure EAK causes mild irritation to the eyes of laboratory animals and moderate irritation to the skin of rabbits. No sensitizing properties could be detected in guinea pigs (Sharp, 1978). Tests with EAK on 25 human volunteers caused no irritation of the skin in a 48h closed-patch test (2% in petrolatum), nor sensitizing properties to the human skin (Opdyke, 1974). However, exposure of volunteers to 5, 25, 50 or 100 ppm (27, 133, 266, 533 mg/m<sup>3</sup>) for 5 minutes resulted in:

- no symptoms at 5 ppm (27 mg/m<sup>3</sup>)
- mild nasal irritation in susceptible subjects at 25 ppm (133 mg/m<sup>3</sup>)
- irritation of the eye, nose and throat at 50 ppm (266 mg/m<sup>3</sup>)
- strong local irritation, headache and nausea at 100ppm (533mg/m<sup>3</sup>) (Shell, 1958).

Although no information was available on the toxicity of EAK following repeated exposure, the

SEG decided provisionally that the target organ/critical effect is nasal irritation. Results of repeated exposure tests are expected to be available later from work currently under way.

Recommendation:

Although very limited the Shell human volunteer data was considered to be an acceptable basis for setting the limits. The recommended 8 hour TWA is 10 ppm (53 mg/m<sup>3</sup>). A STEL (15 mins) of 20 ppm (107 mg/m<sup>3</sup>) is also recommended.

At the levels recommended, no measurement difficulties are foreseen.

Bibliography:

Dutch Expert Committee and Nordic Expert Group (1989): Basis for an Occupational Health Standard 7/8-Carbon chain aliphatic monoketones. A.A.E. Wibowo, Arbete och Halsä, p. 1-45

Opdyke, D. L. J. (1974). Fragrance raw materials monographs: Ethylamylketone. Food Cosmet. Toxicol., 12, 715.

Sharp, D. W. (1978). The sensitization potential of some perfume ingredients tested using a modified Draize procedure. Toxicology, 9, 261-271.

Shell Industrial Hygiene Bulletin SC: (1958), 57-99.