Methyl Methacrylate
CH₂=C(CH₃)COOCH₃
[CAS No. 80-62-6]
OEL-C: 2 ppm
Occupational sensitizer: Airway Group 2; Skin Group 2

Summary of OEL-C documentation

The TLV of methyl methacrylate (MMA) can be determined if the threshold value is calculated by making respiratory-tract irritation and pulmonary impairment into an evaluation index. From the study by Nishiwaki et al\(^1\), the lowest observed adverse effect concentration (LOAEL) can be determined as 1.4 ppm; however, it is necessary to consider that this observation was made from a small number of samples, and there was a concurrent exposure, such as dust and metal, in addition to MMA. As for the report by Jedrychowski\(^2\) on the number of target people, respiratory symptoms have not been observed, but it is necessary to evaluate a decrease in forced expiratory volume in 1 s (FEV1), as the result of 2.7 ppm becomes the LOAEL. However, this report also has to consider the influence of the styrene exposure and not the MMA exposure alone. From these two papers, it may be concluded that the LOAEL is 1.4 ppm–2.7 ppm if the pulmonary function and the respiratory symptoms are considered to be adverse influence indices. However, these two reports have a limitation of being cross-sectional studies and the possibility of overestimating the effect of MMA.

The study of MMA single exposure is in an article by Marez et al\(^3\), which assumed a pulmonary function and a respiratory symptom as an influence index. In this report, only a slight influence such as the increase in the number of chronic coughs is observed with the arithmetical mean density of 18.5 ppm (9.32 ppm) and 21.6 ppm (11.9-38.5 ppm) in two factories, respectively. Therefore, in the statement of the reasons for this proposal, the committee decided to use the paper by Marez et al. as a ground article. The committee thinks that about 20 ppm, which is the average of 18.5 ppm and 21.6 ppm with LOAEL, should be the agreed-upon number and suggests 2 ppm for OEL in consideration of 10 as the uncertainty factor. Also, based on the rat inhalation study, the no-observed adverse effect level (NOAEL) is regarded as 25 ppm, and having considered the uncertainty factor of 10 for the species difference, the recommended OEL of 2ppm is considered to be appropriate.

With respect to the sensitization substance classification of MMA, the sensitization of skin would be described as belonging to the second group; the respiratory tract would be described as belonging to the second group\(^4\).

Year of Proposal: 2012

References