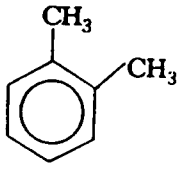
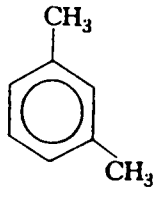
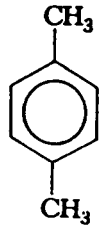
Recommendation from Scientific Expert Group

on Occupational Exposure Limits

for Xylenes

8 hour TWA	:	50 ppm (221 mg/m^3)
STEL (15 mins)	:	100 ppm (442 mg/m^3)
Additional classification	:	"skin"

Substance:

		ortho-xylene	meta-xylene	para-xylene
				
Synonyms	:	1,2-dimethyl-benzene	1,3-dimethyl-benzene	1,4-dimethyl-benzene
EINECS N°	:	202-422-2	203-576-3	203-396-5
EEC N°	:	601-038-00-6	601-039-00-1	601-040-00-7
Classification	:	F; R11 Xn; R20/21 Xi; R38	R10 Xn; R20/21 Xi; R38	R10 Xn; R20/21 Xi; R38
CAS N°	:	95-47-6	108-38-3	106-42-3
MWt	:	106.16		

Conversion factor (20°C, 101kPa) : 4.42 mg/m^3 = 1 ppm

Occurrence/use:

Xylene occurs in 3 isomeric forms, ortho-, meta- and para-xylene. Technical grade xylene is a commercial blend containing 60-70% meta-xylene, 10-25% para-xylene, 10-20% ortho-xylene, 6-10% ethylbenzene and small amounts of other hydrocarbons. Xylene isomers are colourless flammable liquids with a sweet odour. The ortho-, meta- and para- isomers have MPts of -25, -48 and 13.2°C, BPts of 144, 139 and 138°C and vapour pressures of 0.88, 1.1 and 1.2 kPa at 25°C, respectively. They have a vapour density of 3.7 times that of air and are explosive over the range 1.0 - 3.5%. The odour threshold is about 0.5 -1 ppm (2.2 -4.4 mg/m^3).

The production rate of xylenes in the EEC is in excess of 1,000 tonnes per annum. They are produced from crude oil and are used in gasoline, in chemical syntheses and as solvents and thinnners for a wide range of products. Xylenes often occurs together with other solvents. Occupational exposure levels reported recently are generally below 100 ppm (442 mg/m^3).

Health Significance:

Xylenes are well absorbed through the lungs (Riihimäki *et al*, 1979). Liquid xylenes are readily absorbed percutaneously (Engström *et al*, 1977) with small proportions of the vapour being absorbed by this route (Riihimäki and Pfäffli, 1978). No differences in the toxicokinetics or toxicodynamics of the respective xylene isomers have been reported. The majority of studies have been performed on technical grade xylene.

The critical effects of xylene are irritation and CNS effects. Mild irritation of the eye and upper respiratory tract has been reported in some individuals exposed to xylene for 15 - 30 mins at a level of 100 ppm (442 mg/m^3) in volunteer studies (Carpenter *et al*, 1975; Hastings *et al*, 1984). Symptoms of CNS effects also start to occur at exposure levels of around 100 ppm (442 mg/m^3) (Savolainen *et al*, 1979, 1980a+b, 1981; Gamberale *et al*, 1978; Olson *et al*, 1985).

Xylenes have not shown evidence of mutagenicity or carcinogenicity (Bos *et al*, 1981; Haworth *et al*, 1983; Connor *et al*, 1985; Donner *et al*, 1980; NTP, 1986).

Fetotoxicity has been observed in rats exposed to mixed xylene at 200 ppm (884 mg/m^3) (Hass and Jakobsen, 1987). Further research is required in order to establish the relevance of this observation for occupational exposure.

Recommendation:

The studies cited above, indicating a LOAEL of 100 ppm (442 mg/m^3) for mild irritation and possible CNS effects in humans, were considered to be the best available basis for setting exposure limits. An uncertainty factor of 2 was considered to be sufficient because the effects observed at the LOAEL were minimal. The recommended 8-hour TWA for xylene is 50 ppm (221 mg/m^3). A STEL of 100 ppm (442 mg/m^3) is recommended to limit peaks of exposure which could result in irritation. A "skin" notation is also recommended as dermal absorption of liquid xylene could contribute substantially to the total body burden.

At the level recommended, no measurement difficulties are foreseen.

Bibliography:

Principal reference

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Key Studies

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