1866

Distillates (petroleum), hydrotreated light

MAK Value Documentation

A. Hartwig[1, *], MAK Commission[2, *]

DOI: 10.1002/3527600418.mb6474247yole6418

Abstract

The German Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area has re-evaluated the maximum concentration at the workplace (MAK value) and the Pregnancy Risk Group of hydrotreated light petroleum distillates [64742-47-8].

Critical effect of the vapour phase of hydrotreated light petroleum distillates is CNS depression in exposed subjects. A MAK value of 50 ml/m^3 had been set taking into account the increased respiratory volume at the workplace as compared with volunteers at rest (see List of MAK and BAT Values, Sections I b and I c). For the aerosol phase the critical effect is considered to be the lung toxicity seen in rats and mice. A MAK value of 5 mg/m^3 had been set as the respirable fraction (R). This value is now reaffirmed even considering the increased respiratory volume at the workplace.

Hydrotreated light petroleum distillates had been classified in Pregnancy Risk Group C because the NOAEC for developmental toxicity in rats is 400 ml/m^3, the highest concentration tested. There is no new data on developmental toxicity. This classification is retained even considering the increased respiratory volume at the workplace.

Keywords

distillates (petroleum); dearomatized kerosene; hydrotreated kerosene; hydrogenated light petroleum distillate; prenatal toxicity; occupational exposure; maximum workplace concentration; MAK value; toxicity; hazardous substance

Author Information

[1] Chair of the Permanent Senate Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area, Deutsche Forschungsgemeinschaft, Department of Food Chemistry and Toxicology, Institute of Applied Biosciences, Karlsruhe Institute of Technology (KIT), Adenauerring 20a, Building 50.41, 76131 Karlsruhe, Germany

[2] Permanent Senate Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area, Deutsche Forschungsgemeinschaft, Kennedyallee 40, 53175 Bonn, Germany

[*] Email: A. Hartwig (andrea.hartwig@kit.edu), MAK Commission (arbeitsstoffkommission@dfg.de)

Distillates (petroleum), hydrotreated light

[64742-47-8]

Supplement 2018

MAK value (2015)	**50 ml/m³ ≙ 350 mg/m³ (vapour)**
	5 mg/m³ R (respirable fraction, aerosol)
Peak limitation (2015)	**Category II, excursion factor 2 (vapour)**
	Category II, excursion factor 4 (aerosol)
Absorption through the skin	**–**
Sensitization	**–**
Carcinogenicity (2011)	**Category 3B**
Prenatal toxicity (2011)	**Pregnancy Risk Group C**
Germ cell mutagenicity	**–**
BAT value	**–**

Documentation was published in 2012 (documentation "Distillates (petroleum) hydrotreated light" 2012), followed by a supplement in 2016 (supplement "Distillates (petroleum) hydrotreated light" 2016).

In 2016, the Commission began using a revised approach for assessing substances with a MAK value based on systemic effects and derived from inhalation studies in animals or studies with volunteers at rest; this new approach takes into account that the respiratory volume at the workplace is higher than under experimental conditions. However, this applies only to gases or vapours with a blood:air partition coefficient > 5 and to aerosols (see List of MAK and BAT Values, Sections I b and I c). This supplement evaluates whether the MAK value and the pregnancy risk group for hydrotreated light petroleum distillates need to be re-assessed as a result of the higher respiratory volume at the workplace.

Manifesto (MAK value/classification)

MAK value. The critical effect of the vapour phase is the effect on the central nervous system (CNS) of test persons.

For alkanes in the chain length range C9 to C12, absorption increases with increasing respiratory volume (documentation "Naphtha (petroleum) hydrotreated heavy" 2010). The higher respiratory volume at the workplace of 10 m^3/8 hours in comparison with the respiratory volume of test persons at rest was already taken into consideration when the MAK value was derived for the vapour phase of hydrotreated light petroleum distillates (supplement "Distillates (petroleum) hydrotreated light" 2016).

The critical effect of the aerosol phase is the effect on the lungs of rats and mice.

A MAK value of 5 mg/m^3 R has been established for the respirable fraction in analogy to pharmaceutical white mineral oil (see documentation "White mineral oil, pharmaceutical" 2015). Following re-assessment, it was concluded that the MAK value for pharmaceutical white mineral oil (supplement "White mineral oil, pharmaceutical" 2018) also takes into account the increased respiratory volume, which means that the MAK value can be retained for the respirable fraction of hydrotreated light petroleum distillates.

Prenatal toxicity. Inhalation studies in rats exposed to kerosene or jet fuel A did not report developmental toxicity or systemic maternal toxicity up to the highest concentrations tested of 364 and 395 ml/m^3, respectively. It is likely that the true NAEC (no adverse effect concentration) for developmental toxicity in rats is even higher than 395 ml/m^3, the highest concentration tested in the inhalation studies. Therefore, taking the increased respiratory volume (1:2) into consideration, the NAEC is at least four times as high as the MAK value.

As the limit value is established on the basis of a reversible, acute CNS effect, it is necessary to investigate the potential for developmental neurotoxicity. No corresponding studies have been published. However, it can be assumed that this reversible, acute CNS effect is unlikely to cause permanent damage in the foetus provided that exposure does not exceed the MAK value.

The classification in Pregnancy Risk Group C has been retained for hydrotreated light petroleum distillates because the NAEC for developmental toxicity is higher than 395 ml/m^3, there is no structural alert for teratogenicity, developmental neurotoxicity from reversible, acute CNS effects is unlikely and no lethargy was observed in the dams after exposure to the analogous substance naphtha (documentation "Naphtha (petroleum) hydrotreated heavy" 2010) up to the highest possible vapour concentration of 314 ml/m^3.

completed March 22, 2017