

Risks posed by cooling lubricants

Cooling lubricants - Hazards of oil mist and emulsion mist for health

In the machining of metals in machine tools, cooling lubricants (CL) are used to improve speed, quality and grade of machining. A distinction is made between non-water-soluble cooling lubricants, where an oil base is usually provided with further additives, and water-soluble lubricants, where oil proportion and additives are distributed as emulsion in water.



Both skin contact with CL and inhalation of cooling lubricant aerosols are classified as health hazards. Therefore, a risk assessment shall be carried out by an employer when cooling lubricants are used. As far as health protection is concerned, the very large variety of possible ingredients makes such classification difficult. The VKIS-VSI-IGM-BGHM substance list [2] provides an overview. In some cases, compromises have to be

made. Thus, emulsions of water-soluble CL provide a breeding ground for unwanted microorganisms. This process is countered with biocidal additives, which in turn brings other burdens.

It is usually unavoidable that cooling lubricant aerosols produced in the machining area during the machining process contain even small quantities with dissolved material particles. The particle size distributions of the resulting aerosols with respect to mass usually peak between 1.5 and 2.5 μm [3]. In case of minimum quantity lubrication (MQL), the peaks can also be less than 1 μm . In certain processes, such as various grinding operations, particles are also well above 2.5 μm . Due to heat at the processing point and the evaporation of fine aerosols, some emissions are always present in the gaseous state.

Emissions can leave machines through remaining gaps when the processing room is closed and are later usually present as diffuse burdens on the industrial grounds and in workspaces. In addition, when the doors are opened after the machining process, a very high concentration usually escapes directly into the area where a machine operator is staying for a short time. In order to limit these effects, it is nowadays state of the art that machine tools are equipped with oil mist extractors (often called oil mist separators, emulsion mist separators). Besides, there is still a large number of machines without air filters and significant efforts can be recognized to retrofit them.

Oil mist extraction systems reduce the hazards posed by cooling lubricants

Oil mist extractors generate a negative pressure in the processing area using an integrated fan and clean the extracted air in several filter stages. The cooling lubricant filters thus significantly reduce the discharge

of aerosols and can significantly mitigate the hazards posed by cooling lubricants. Occupational illnesses and sick days can be reduced. In recirculation mode, there is no heat loss. Hengst Filtration offers a wide range of suitable equipment.

[1] [IFA practical aids: KSS portal - risk assessment \(dguv.de\)](#)

[2] [VKIS-VSI-IGM-BGHM substance list \(dguv.de\)](#)

[3] [X 386 \(dguv.de\)](#)

[4] [Tätigkeiten mit Kühlschmierstoffen | DGUV Regeln | Regelwerk | DGUV Publikationen](#)