

LCO₂ WASHING PROCESS AS A PROCEDURE FOR COMPLIANCE THE LEGALLY REGULATED MEASURES FOR THE PROTECTION OF FIREFIGHTERS FROM HAZARDOUS SUBSTANCES

In the course of their typical work, firefighters are exposed to hazardous substances to a very considerable extent. Firefighters must be comprehensively protected from these hazards and provided with the appropriate personal protective equipment (PPE). But that is not where the responsibility to firefighters does not end there!

For example, firefighters are exposed to permanent exposure to harmful polycyclic aromatic hydrocarbons ("PAHs") or asbestos by wearing PPE without using the LCO₂ washing process. The LCO₂ washing process can ensure compliance with regulatory requirements.

A / THE LEGAL FRAMEWORK

The legal framework in which the fire department operates is diverse. The main addressee is the respective fire department operator, as defined in the state fire laws. The obligations thus affect the municipalities that maintain professional fire departments and volunteer fire departments, as well as the operators of company fire departments. Regardless of which legal framework is applicable to the fire department in question, the protection of firefighters is always paramount and must be comprehensively ensured. Violations by the operators of the fire departments against the legal protection obligations can have serious consequences.

I. Occupational Safety and Health Act

The Occupational Health and Safety Act applies to members of professional and plant fire departments and comprehensively obliges fire department operators to prevent work-related accidents and health hazards. As a basic obligation, the Occupational Health and Safety Act stipulates in Section 3 (1) that the necessary measures must be taken to ensure the safety and health of employees. The effectiveness of the measures must be constantly monitored and improved.

II. Ordinance on Hazardous Substances

The obligations of the Ordinance on Hazardous Substances (GefStoffV) apply to all activities in which employees may be exposed to hazards to their health from substances, mixtures or products. Due to its wide scope of application, it applies to professional fire departments, volunteer fire departments, compulsory fire departments and company fire departments. The GefStoffV defines the specific measures to be taken when handling hazardous substances or being exposed to them in an occupational environment. The protective measures must correspond to the state of the art in order to ensure effective protection of firefighters.

III. Accident prevention regulations

In addition, the accident prevention regulations, in particular DGUV Regulation 49 "Fire departments", apply by law to volunteer fire departments and compulsory fire departments. In § 3 and § 15, these regulations make it unambiguously clear that the fire department is responsible for the protection of firefighters.

IV. Technical rules

Technical rules such as the Technical Rules for Hazardous Substances (TRGS) must also be observed. They specify the legal requirements of the GefStoffV and reflect the state of the art for certain sub-areas. TRGS 500 "Protective measures", for example, describes the protective measures for activities involving hazardous substances.

B/ DUTIES TOWARDS FIREFIGHTERS

I. The minimization requirement under hazardous substances law

One of the core obligations of occupational health and safety that every fire department operator must observe is the minimization requirement set out in § 7 (4) of the Ordinance on Hazardous Substances (GefStoffV):

"The employer shall exclude hazards to the health and safety of employees during activities involving hazardous substances. If this is not possible, he shall reduce them to a minimum."

The fire department operator is obligated to comprehensively protect firefighters from hazards. If he cannot exclude a hazard – such as in firefighting – he must reduce the hazard to a minimum. Minimum is what is possible according to the state of the art. The more serious the hazard – such as cancer – the more far-reaching the measures to be taken.

II. Extensive obligations for activities involving carcinogenic substances

The fire department operator is subject to strict regulations for activities in which employees are exposed to carcinogenic substances. Among other things, he must inform and educate the fire department employees comprehensively about the hazard and the countermeasures taken. In addition, he must keep an exposure register and retain it for a period of 40 years if the employees are exposed to PAHs during the performance of their activities.

C/ THE PROTECTIVE EQUIPMENT

I. The PPE as a source of danger

Hazardous substances are released during fire incidents. Most recently, a study conducted by the Heyrothsberge Institute for Fire and Disaster Protection for the Standing Conference of the Ministers and Senators of the Interior of the Federal States showed that PAHs are also involved.

It has been proven that PAHs have a high carcinogenic effect and are also skin-resorptive. The relevant EU Regulation 1272 / 2008 and the EU Directive 2004 / 37 / EC on the protection of workers from the risks related to exposure to carcinogens or mutagens at work therefore classify PAHs as carcinogenic. Contamination with PAHs must therefore be avoided. In this respect, TRGS 551 emphasizes that even in the case of "small-area and short-term skin contact with PAHs (...) there is a high risk through skin contact."

State-of-the-art PPE that is used properly reduces the risks to firefighters in the field. However, it becomes massively contaminated when used during a fire incident and thus becomes a source of danger itself. Recent studies confirm that after use, significant concentrations of PAHs can be detected in the outer fabrics as well as the membranes of the PPE. PAHs can be absorbed by the body to a considerable extent via contact between the PPE and the skin when the PPE is used again.

II. Protection from hazards emanating from the PPE through LCO₂ cleaning.

The fire department must ensure that contaminated PPE does not pose a risk to firefighters. He fulfills his basic obligation only if the PPE provided is also properly cleaned and no additional danger emanates from its use. The contamination in use of contaminated PPE must be reduced to the possible minimum. The Heyrothsberge Institute for Fire and Disaster Protection confirmed that pure wet washing, even if carried out in accordance with the Robert Koch Institute's specifications for disinfection, only removes PAHs to a very limited extent.

In contrast, studies from the USA and evaluations from Germany and Belgium show that LCO₂ cleaning effectively removes PAHs. LCO₂ cleaning as an extractive process therefore represents the state of the art. According to the minimization requirement, firefighting personnel must therefore ensure that PPE is cleaned in this way. At the same time, this process does not negatively affect the special reflectivity of the protective clothing, which must be given according to DIN EN 469:2007 or DGUV Rule 105-003, as it does with a negatively impaired as is the case with wet washing.

III. Comprehensive duty to inform

Due to the high carcinogenic effect of PAHs, firefighters must be comprehensively informed about the hazards and protective measures. This applies in particular to hazards that may emanate from PPE. The fire department provider must inform firefighters about the hazards posed by contaminated PPE, what measures (e.g., cleaning, repair) he has taken to protect them, and how these minimize a hazard according to the state of the art. This includes information about residual contamination remaining after wet cleaning and the associated hazards. In this way, each member of the fire department must be enabled to recognize that or whether the most effective measures have been taken and the fire department's carrier is in compliance with the law.

D/ RESPONSIBILITY OF THE FIRE DEPARTMENT CARRIER

Violations of occupational health and safety regulations can be punished as administrative offenses. Within the scope of application of the GefStoffV, a fine of up to EUR 50,000 can be imposed. It is sufficient if the obligations were violated negligently, i.e. if the danger could have been recognized with due care.

In addition, such violations of the law may also give rise to criminal offenses. If the necessary protective measures are not taken and this leads to illness or even death, this can result in criminal liability under the Criminal Code for negligent bodily injury (Section 229 of the Criminal Code) or negligent homicide (Section 222 of the Criminal Code). The occupational health and safety regulations also contain specific criminal provisions.

The range of punishment is up to five years imprisonment.

E/ CONCLUSION

In summary, it should be noted that fire department providers are required, both for the protection of firefighters and to avoid liability risks, to constantly provide PPE that is maintained in accordance with the state of the art and from which no health hazards emanate. In particular, this requires effective cleaning of carcinogenic substances such as PAHs. The process must be state of the art. This is ensured in the case of LCO₂ purification.