Certificate ensures quality and prevents health damage and environmental violations in PFAS cleaning

by David Pronk and Kees Kappetijn

"Workplace accidents, health damage, and environmental violations at tank cleaning companies." **In September 2024, the Dutch newspaper NRC reported on issues in the world of tank cleaning. Tank cleaning is necessary not only for tanks containing hazardous substances but also for tanks with foam-forming agents. The world is in the midst of a foam transition: the current fluorine-containing firefighting foam is being replaced by a new, fluorine-free variant. Preventing contamination of the new fluorine-free foam with residual PFAS is crucial. This can be achieved through high-quality cleaning. Delivering quality and preventing health and environmental damage are key objectives of the cleaning process. These objectives are now secured in an assessment guideline. This guideline has been developed in the Netherlands, with support from industry, service providers, and regulators, but is applicable worldwide.**

Assessment Guideline

Until recently, there was no certification for cleaning processes involving PFAS-containing firefighting systems. But that has changed. A project group consisting of cleaning organisations, the chemical industry, fire brigades, environmental agencies, laboratories, and waste processors came together to develop a quality framework for cleaning processes. This quality framework is completed with a certificate and is known as an assessment guideline (BRL). A BRL is developed by the market, accepted by the authorities, and assessed by an independent certification body. For the BRL PFAS cleaning, Kiwa is the organisation that oversees the cleaners who work according to the BRL.

The BRL sets the framework but does not prescribe the cleaning process. The market can decide how to flush, how often to flush, and what products to use. The cleaner, therefore, determines the cleaning process. The BRL provides guidelines for the cleaning process to achieve the goal: a safe, risk-resistant, cost-effective, and high-quality cleaning process.

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Foam Transition

The foam transition is necessary because fluorine-containing firefighting foam has been used for decades. Industrial companies have large quantities of firefighting foam stored in stationary firefighting systems and vehicles. For public fire services, the foam is mainly stored in foam firefighting vehicles and tank trucks. For several years now, it has been evident that the poly- and perfluoroalkyl substances (PFAS) in this firefighting foam have very detrimental long-term effects on humans and the environment. Its use is now nearing an end. Industrial companies and fire services are rightly transitioning to new foam.

There are several reasons why a foam transition must be carried out carefully. Firstly, to prevent PFAS from entering the environment—and human bodies. PFAS break down very slowly, if at all, and are difficult to remove. The substances spread quickly and easily, accumulating in plants, animals, and humans. PFAS are toxic, so this accumulation is harmful.

Secondly, careful execution is essential because the European Union is introducing a total ban on the sale and use of fluorine-containing firefighting foam. The European Chemicals Agency (ECHA) has set a limit of 1,000 parts per billion (ppb) of PFAS in firefighting foam (and for some specific substances, the limit is even stricter). Fluorine-containing foam will soon be banned. The authorities will oversee the careful execution of this foam transition.

A careful foam transition presents several challenges. Fluorine-containing foam cannot simply be replaced with fluorine-free foam on a given day. In many cases, the fluorine-containing foam has been stored in foam tanks for many years. This means that the foam tank, and possibly other parts of the firefighting system, are contaminated with PFAS. PFAS not only accumulate in plants, animals, and humans but also in firefighting systems. Depending on the material of the tank/pipes, it is difficult to remove.

When fluorine-free foam is stored in the system, "old" PFAS will eventually be released from the system. These PFAS will mix with the new foam, resulting in the fluorine-free foam no longer being fluorine-free and, therefore, unusable. The foam transition would then need to be repeated.

Cleaning

You only want to carry out the foam transition once. Besides selecting and purchasing a new foam concentrate, suitable for different scenarios and substances, parts of the firefighting system may need to be adjusted or replaced. The old foam must be disposed of, and changes must be documented in reports such as fire brigade reports, operational plans, and fire analyses. All of this should be done in consultation with the authorities and the insurance company.

Thus, the foam transition must be executed with care to prevent residual PFAS from contaminating the new fluorine-free foam. This is achievable by cleaning the firefighting system. An adequate cleaning process can remove residual PFAS. The market has developed various cleaning processes, offered by different companies. Some use (heated) water, while others use water and a cleaning agent.

As a customer, you want to know which cleaning process works, and whether it is safe and effective. You do not want to use a process that leads to scattered PFAS, causing environmental or health issues. There is therefore a need for guaranteed quality. In a quality system, quality is demonstrated by a certificate. A certificate that works in a free market is therefore necessary.

Assessment Guideline

The certificate sets the framework for the cleaning process, which is not limited to just cleaning. The entire cleaning process consists of four parts, each with its own guidelines. These are:

1. Scope and initial data;
2. Cleaning and execution;
3. Sampling and analysis;
4. Waste and disposal.

Firstly, the scope and initial data are framed. It is important to determine which parts of the firefighting system will be cleaned. This can involve the entire system or just the tank, for example, when the system has hardly been used and the foam has not left the tank. The objective must also be set: which limit values will be used, and which laws and regulations must be met? The BRL aligns with the limit values set by ECHA and does not include independent values.

Secondly, guidelines are set for the cleaning process, mainly focusing on environmental and health regulations, such as the use of personal protective equipment. The setup of the cleaning process itself is not standardised; different processes are possible.

Customers can decide whether to use a high-quality, long-term cleaning process or a faster, perhaps more efficient, one. But in all cases, the process must be safe and effective.

Thirdly, guidelines are set for sampling and analysis. To determine and demonstrate that the PFAS limit values have been met, samples must be taken. Environmental and health regulations for sampling have also been established, along with knowledge requirements for the operating personnel, and guidelines for the packaging, shipping, and analysis of the samples.

Finally, guidelines are set for the storage, disposal, processing, and documentation of waste. The goal is for cleaners to demonstrate that waste does not enter the environment but is stored, transported, and processed by recognised companies. To demonstrate this, a record of the waste should be kept. This is important because processing capacity is very limited. There are only a few processors, all located abroad. Waste, such as rinse water, will always need to be stored for some time before it can be transported and processed. Cleaning companies must handle this carefully and ensure that these activities are covered by the company's permits.

Safety, Quality, and Cost Efficiency

If a cleaning company operates within the set guidelines, it can be certified by an independent certification organisation after an inspection. A new inspection is conducted each year. In this way, cleaners can demonstrate that they have established a safe and effective cleaning process. The authorities, such as the Inspectorate for the Environment and Transport and environmental agencies, can refer to certified cleaners when cleaning is included in permits or decisions.

The result is that companies can be confident that PFAS have been responsibly removed, transported, and processed from firefighting systems. The new fluorine-free foam will not be contaminated with PFAS, ensuring it remains fluorine-free. This means that the foam transition only needs to be carried out once and is executed as cost-effectively as possible. Whether there will be no contamination from residual PFAS over time will need to be determined by further research. However, using the BRL guarantees a professional work process, with no requirement for repetition. Finally, the BRL ensures that PFAS are properly removed from firefighting systems, protecting both people and the environment.

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