

Handling of substances and mixtures

Chemistry is everywhere - especially in the manufacturing industry. Whether a company manufactures rubber ducks or high-performance components for the aerospace industry, speciality chemicals such as detergents, solvents and a wide range of additives are indispensable. The good news is that even though chemicals have a reputation of foul odors and frequent hazards, very few chemicals actually explode. The bad news is that they are accompanied by an invisible cloud of regulations, laws and specialised workflows.

A peculiar sequence of events takes place in hundreds of thousands of companies in Germany. At first, a single employee is, often by chance, given the task of managing the legal requirements. Soon, each department has its own processes to fulfil the requirements of occupational health and safety and material compliance - and no one has a clear idea who does what. Eventually people start to accept the inevitable: a company that works with chemicals needs to manage the handling of substances and mixtures across departments and through standardised processes.

There are two different perspectives that need to be taken into account. One is to look inwards. 'What needs to be done so that an employee can handle this hazardous substance safely? Hazardous substance management in a company includes the selection of a substance suitable for the intended purpose, its procurement and finally its appropriate use,' explains Katrin Meier-Kirchner, who advises companies on these issues. There is also an external perspective. 'Materials compliance, on the other hand, is about making the finished product safe for the general public and the environment,' says the chemist. 'You have to prove that the device is in accordance with health and environmental standards from the smallest component onwards.'

At first glance, these topics appear to be entirely different, but they present companies with very similar challenges. There are extensive legal requirements for both: on one hand there are regulations such as the Chemicals Act (Chemikaliengesetz) or the Technical Rules for Hazardous Substances (Technische Regeln für Gefahrstoffe, TRGS) for the handling of substances in the company, and European regulations such as REACH on the other determine which substances can be placed on the market. These each give rise to very practical questions as to how legal requirements are implemented within the company and in its own processes. Finally, a company must document which substances it uses and places on the market in a way that complies with regulations.

However, the legal requirements are not only confusing, they can also change over time. A very recent example is PFAS, the fluorinated 'forever chemicals'. Regulations banning these materials are currently being discussed at European level. Depending on what the resulting legal framework ultimately looks like, this will have different consequences for the industry. Companies using fluorine-containing chemicals will have to check whether the new regulations concern the materials they use at all or whether it is possibly covered by other laws such as regulations dealing with persistent organic pollutants (POP).

Even a newly regulated substance will not be banned immediately. There might be a transitional period of several years or even exemptions - these are crucial knowledge for companies. 'To give an example, we keep one of our customers up to date about which of the substances they use may be affected by future regulations,' explains Meier-Kirchner. 'This allows the customer to act anticipatory and replace one substance with another, for example.'

This substitution of substances, replacing one chemical with a less problematic one, is one of the statutory obligations of companies - both in terms of environmental impact and occupational health and safety.

Substitution obligation presents companies with particular challenges. In most cases, one chemical can only partially replace another one and the changeover also requires changes to work processes. Above all, however, such a replacement requires considerable chemical and process engineering expertise, which is not available in many companies.

In general, many companies lack the chemical knowledge and often also the capacity to meet the extensive requirements for handling substances and mixtures, explains Fabian Schüler, Managing Director of Materiales and himself a polymer chemist. 'This applies less to the chemical industry itself. BASF, for example, doesn't really need our help. It is generally companies that produce something that has nothing to do with chemistry, but use chemicals in production, that face this problem.'

Meier-Kirchner adds that the complex chemicals legislation in particular is difficult to handle for companies not familiar with the subject. 'Companies come to us, for example, when they need support with risk assessments for chemicals or are required to draw up operating instructions for hazardous substances: how do I have to work with these chemicals, what protective equipment do I have to wear?' In addition, there are documentation obligations such as safety data sheets, which companies not only have to keep for their employees - but also for the customers to whom they pass on their products.

In fact, many companies already have a great deal of experience and specialised knowledge in dealing with substances they have been using for a very long time. However, this knowledge is often spread across different departments and can only be partially utilised in order to respond to new legislative requirements - particularly in matters of product-related environmental protection. 'We worked for one company, for example, where the individual aspects of material compliance had already been addressed in various departments,' reports Meier-Kirchner. 'But there was a lack of communication between the departments about how the cross-departmental process actually works, from information input through to product design. They needed support to ensure that the existing processes were brought together to form a good environmental management system.'

This is all the more important because different laws and documentation requirements apply in the major markets of the EU, Asia and the USA. A company that wants to have access to all markets needs to deal with these different regulations and, ideally, takes them into account as early as the product design stage.

New laws can take effect not only in new markets, but also quite simply when a new type of application opens up. For example, if a company wants to use an existing consumer product in the food sector, a whole class of complex new regulations apply. Most of them are much stricter than the regulations for consumer goods.

Using chemicals in the company and its own products in compliance with the law is a challenge that should not be underestimated, especially for smaller companies. Above all, however, operational hazardous substance management as well as product-related environmental protection and material compliance is by no means something that you implement once and then your work is done. On the contrary, the safe handling of substances and mixtures is more of an ongoing process, emphasises Materiales Managing Director Fabian Schüler.

'Sometimes you have to intervene in an existing system or create completely new structures,' explains the chemist. But even in a functioning system, there is always a need for adaptation. 'A regulation may have changed or a new substance may be used in production, meaning that processes have to be adapted. And then, of course, there is the accompanying documentation, such as creating safety data sheets, for which you also need expertise and capacity.'