

Reagent Disposal – Choosing the Greenest Option

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As one of the world's largest manufacturers of instruments and reagents for water analysis, HACH LANGE has a duty to create the most environmentally friendly system possible for the management of chemical waste resulting from the use of its products. Dismissing less sustainable options, the company has invested heavily in a state of the art environment centre that handles waste reagents, bottles, cuvettes and packaging from all over Europe.

Dirk Kruse is the Scientific and Technical Officer at HACH LANGE's Environment Centre. He says "Our waste management policy is designed to minimise or eliminate the company's impact on the environment and is based on the three Rs – Reduce, Reuse and Recycle."

Background

The accuracy and reliability of environmental analysis is greatly enhanced when reagent quantities are controlled as tightly as possible. HACH LANGE has therefore developed a broad range of tests that employ pre-filled tubes or cuvettes. These tubes are bar-coded and delivered ready-for-use, containing extremely precise amounts of reagent chemicals. An added environmental and cost advantage of this method is the avoidance of unused, spilled or waste reagents in the laboratory.

Once a test is complete, the waste sample, tube and reagents must be handled in the correct manner. A good example of this method is the COD test, for which HACH LANGE supplies millions of tubes worldwide every year. The COD test involves reagents containing tiny amounts of Mercury, Silver and Chromium, so the waste is defined as hazardous and must not enter the sewage/wastewater drainage system. This is also the case for other tests, for example; phosphate, ammonia, nitrates and cuvettes containing acid, alkaline solution and cyanide.



Choosing the Most Environmentally Sensitive Disposal Method

The Environment Centre was designed and built in 1988 following an exhaustive operation to investigate all possible means for handling the waste products.

From an environmental perspective, in-house treatment, recovery and recycling was clearly the best option, although it required a high level of initial capital investment. Nevertheless, HACH LANGE took the decision to invest in a new Environment Centre, designed and built specifically for the purpose of handling waste reagents and associated packaging.

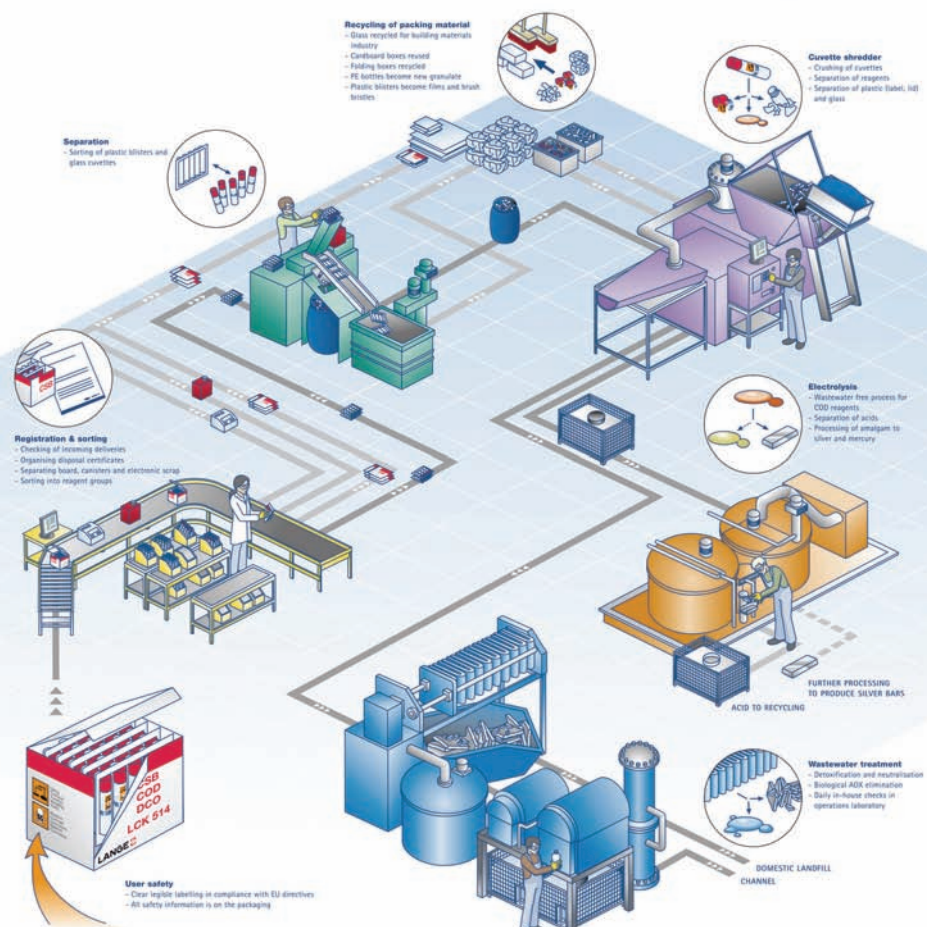
There were many reasons for the decision to invest in the Environment Centre, but the most important of these were environmental.

Efficient Waste Management

Outside of HACH LANGE, most laboratory waste is transferred to treatment facilities that handle a wide variety of hazardous materials. As such, it is not possible for such facilities to operate as efficiently as the HACH LANGE plant because of the diversity of chemicals in the waste.

Responsible disposal - helping users and the environment

Investment in the environment is one of our top priorities. From user-friendly cuvettes to detailed product labelling and environmentally responsible disposal. Used reagents and instruments are professionally recycled at the HACH LANGE Environment Centre in Germany.



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The creation of an in-house facility also provides the ability to adjust the treatment and recycling process to meet changing needs. This means that if there is a change in the chemical component or packaging material of any of the tests, the waste management process can be adjusted accordingly.

Incineration is Not a Solution – It is Part of the Problem

Some companies relinquish their responsibility for waste treatment by sending waste reagents to incinerators. HACH LANGE does not support this action for environmental reasons. Incineration generates greenhouse gas emissions and other toxic gases such as dioxins. These emissions are generated by burning materials that could have been recycled. Importantly, incineration does not miraculously remove the toxic heavy metal component of the waste; it simply converts it into liquid or solid toxic waste.

A further problem with incineration is that, as a quick and easy solution, it serves as a deterrent to reuse and recycling which are by far the preferred environmental options.

Low Carbon Footprint

By creating one large central European facility, HACH LANGE is able to minimise the environmental and financial costs of transport. This is achieved by consolidating enormous numbers of waste 'packages' into one large container. For example, in the UK, waste is collected at one location until a full 40ft container is ready for transport to Germany. This avoids the transport of large numbers of small samples and drastically reduces the carbon footprint of the whole operation.

How it Works



10,000 COD cuvettes are used to create one silver bar

On arrival at the Environment Centre, the reagents are weighed and sorted. Packaging is either recycled or reused and the remainder is sorted into four main waste groups: cyanide-containing reagents; acid-containing reagents; mercurial reagents and AOX-containing reagents.

Liquid reagents are separated and both glass and plastic containers are cleaned, crushed and separated for subsequent recycling.

Mercurial reagents are treated in an electrolysis plant which is wastewater free.

Both silver and mercury are isolated as an amalgam and processed into precious metals and the silver is formed into silver bars (one bar is created from 10,000 COD cuvettes) which are returned to some (lucky) customers.

Cyanide-containing wastewater is detoxified with hydrogen peroxide and neutralised with calcium hydroxide; the resulting sludge is passed through a chamber press and the treated water is purified with active carbon.

AOX-containing reagents are handled by a biological wastewater treatment plant.

Summary

Looking back, Dirk Kruse says "In 1988 environmental issues were not as prominent as they are today, so it was a bold decision for HACH LANGE to invest in a bespoke waste management centre. However, this facility has become an enormous benefit for our customers because most of them have an environmental protection policy and the ability to reuse and recycle their waste reagents is a clear demonstration of best practice."

Looking forward, the HACH LANGE company operates a rigorous continuous improvement policy, so whilst Dirk is rightly proud of the fact that over 75% of waste material entering the Environment Centre is currently recycled or re-used, he naturally plans to increase this figure even further.

