

Management of potentially infectious waste

French expertise helping to tackle a
global public health challenge



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France has always been an innovator in the biomedical waste sector

In the 1980s in France, just like in most countries around the world, each hospital had its own incinerator and burnt its own biomedical waste in it. Most of these incinerators were highly polluting (a source of dioxin and furan emissions), and were spread throughout the country and provided neither safe destruction of waste nor any protection of the population and the environment.

In the interests of health and environmental safety, French legislation introduced in the 1990s, recognized as the strictest in the world, prohibited the use of these polluting incinerators and set up a process for the safe sorting, packing, storage, transport and treatment of biomedical waste. This is why all French hospitals have ceased to use their incinerators and turned to innovative and cleaner technology.

Treating infectious waste: a global challenge

Getting reliable and **environmentally friendly waste treatment solutions.**

The global situation is alarming

All around the world, waste generated by the healthcare sector is poorly managed, due to cost or lack of proper monitoring of the treatment process, resulting in irreversible consequences for the environment and public health.

The WHO estimates that 40% of cases of hepatitis and 12% of cases of HIV around the world are due to poorly managed infectious biomedical waste.

The model based on incineration is still widely used and international institutions such as the World Health Organization and the NGO, Health Care Without Harm, recommend the widespread use of alternative and environmentally friendly solutions.

French products for global markets

French specialists in the sector are offering innovative solutions for the routine on-site management of biomedical waste, providing reliable tracking and treatment which is monitored and environmentally friendly, while considerably reducing the cost of management for healthcare organizations.

French technology is recognized as being the most innovative, offering the lowest maintenance and operating costs of any global market, whilst complying with French standards (NFX 30-503-1), the strictest in the world.

21% of waste generated by the healthcare sector is considered dangerous and may be infectious, contain harmful chemicals or be radioactive.

€500,000,000 This is the estimated value of the global market for the treatment of biomedical waste with >80% going via collection service providers.

0,2 to 3Kg is the average quantity of dangerous waste generated by each hospital bed per day.

42% of institutions have no suitable systems in place for the safe disposal of biomedical waste.
(*inquiry covering 24 countries, 2015, WHO/UNICEF).

Infectious biomedical waste

Healthcare, laboratory and research facilities (hospitals, clinics, medical centers, laboratories, healthcare/biotechnology industries, hemodialysis clinics, etc.) all generate biomedical waste. This may be solid or liquid waste posing a significant risk to staff, the general public and the environment (risk of infection, hazardous or toxic chemicals, radioactivity, etc.). As a result, this must be treated differently to normal household waste. There are several different types:



Infectious biomedical waste contaminated with blood or other bodily fluids, infectious agents used in laboratories, by patients or disposable items.



Anatomical waste made up of human tissue and organs or bodily fluids.



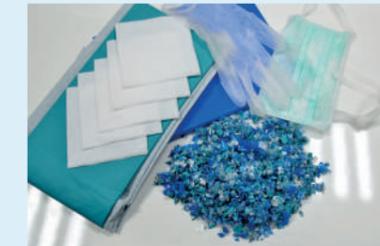
Effluent and potentially infectious liquids, waste liquids from sinks, basins and showers in infection-control areas such as laboratories and decontamination showers.



Sharp objects such as syringes, needles and scalpels, etc.



Potentially infectious liquid waste (drip bags, blood sample vials, blood bags, etc.).



Other high-risk biomedical waste



Chemical products such as solvents used in laboratories or disinfectants.



Obsolete or broken medical devices, considered professional electrical and electronic equipment waste (pro. WEEE).



Radioactive waste generated by radiotherapy treatments or radioactive diagnostics equipment.

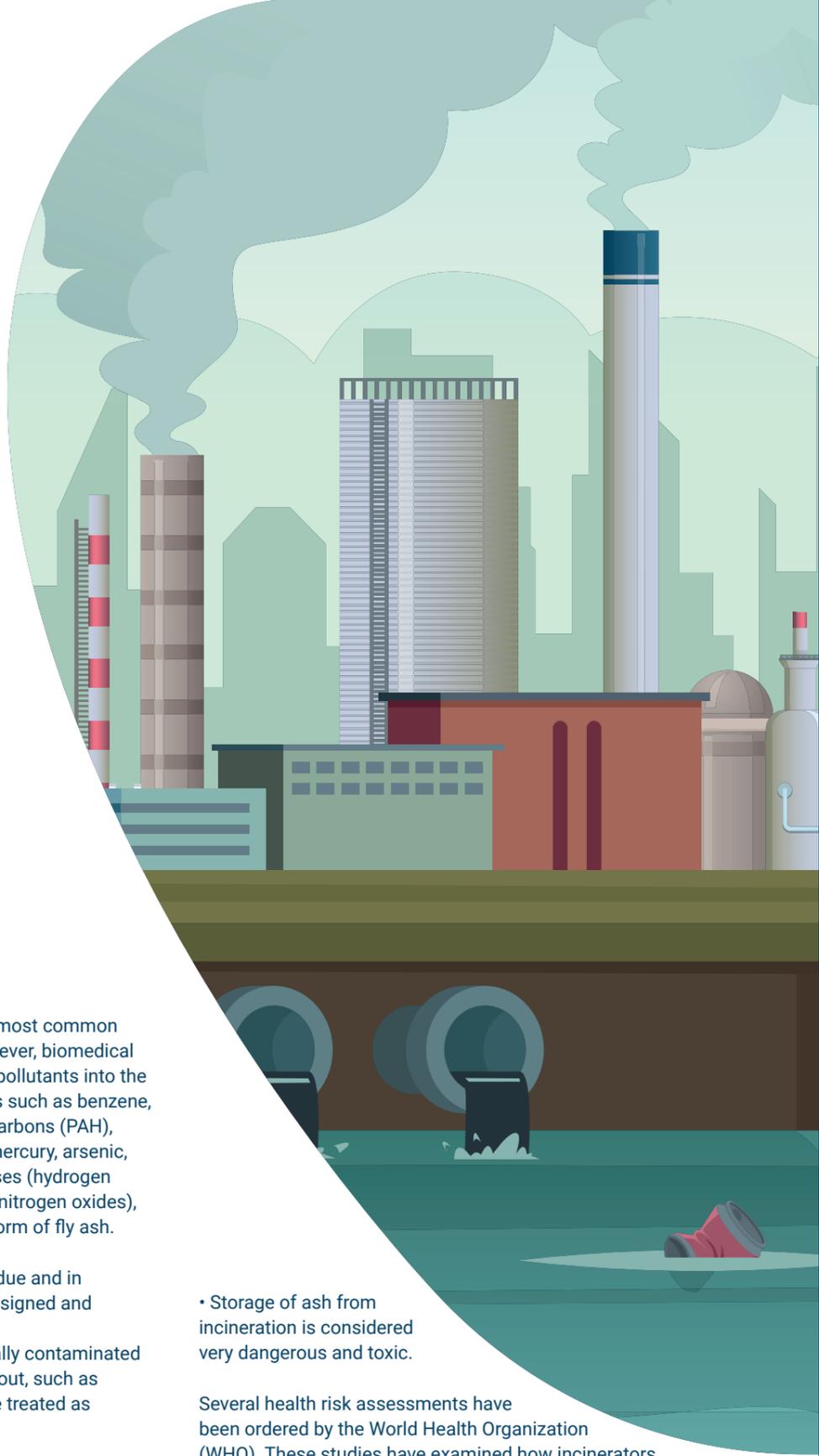


Pharmaceuticals such as expired medicinal products.

NFX 30-503-1 the strictest standard worldwide

The French standard governing pretreatment technology used to disinfect contained infectious biomedical waste (NFX 30-503-1) is recognized as the strictest and the most demanding in the world.

The French technology for neutralizing biomedical waste described in this document is wholly certified by the French National Metrology and Testing Laboratory (LNE) and has been fully subjected to the most rigorous and demanding evaluation testing, guaranteeing its users the most effective choice of process.



Incineration: a polluting and incomplete method

For a long time, incineration has been the most common method for treating infectious waste. However, biomedical waste incinerators expel a wide variety of pollutants into the atmosphere, including organic compounds such as benzene, chlorophenols, polycyclic aromatic hydrocarbons (PAH), vinyl chloride and dioxins, heavy metals (mercury, arsenic, cadmium, chromium, lead, etc.), acidic gases (hydrogen chloride, hydrogen fluoride, sulfur dioxide, nitrogen oxides), carbon monoxide and particulates in the form of fly ash.

Pathogens can also be found in solid residue and in the exhaust gases expelled from poorly designed and incorrectly operated incinerators. Furthermore, bottom ash residue is generally contaminated with organic compounds which can leach out, such as dioxins and heavy metals and this must be treated as dangerous waste.

Biomedical waste incinerators are a source of various problems:

- Atmospheric pollution from incinerators emitting, amongst other things, dioxins, furan, mercury and heavy metals which are harmful for the environment and public health.

- Storage of ash from incineration is considered very dangerous and toxic.

Several health risk assessments have been ordered by the World Health Organization (WHO). These studies have examined how incinerators are being operated and what dioxin and furan emissions are being declared.

Amongst other things, these studies have revealed the risks of birth defects, cancers, hormone disrupters, respiratory complications, etc.!

Alternatives to incineration, innovative French techniques

Treatment of infectious biomedical solid waste (and contained liquid waste)

For the treatment of infectious biomedical solid waste (and infectious biomedical liquid waste held in suitable containers), there are alternative thermal treatments to incineration available, called "low-temperature treatment" using dry or moist heat.

This decontamination technology must be combined with other mechanical methods such as separation or shredding to destroy the pathogens. Shredders increase the heat transfer rate and expose more of the waste's surface area to the heat. Mechanical methods alone cannot be used for infectious waste and sharps.

Thermal treatments that do not involve integrated shredders do not penetrate the waste and are not suitable for the treatment of infectious biomedical waste.

In France, compliance with the standard NFX 30-503-1 (one of the strictest in the world) in terms of effectiveness of microbial treatment and shredding, along with the environmental impact of decontamination processes involving potentially infectious waste, must be proven. This is why French suppliers of infectious biomedical waste treatment systems feature strongly in international markets and are renowned worldwide for

Treatment of infectious liquid effluent

For effluent generated by laboratories performing analysis or research, P2, P3 & P4 biosecurity facilities, autopsy rooms or mortuaries, anatomical pathology laboratories or decontamination airlock showers (for CBRN incidents), it is fundamental to be able to neutralize potentially infectious biological pathogens.

We recommend treating such effluent on-site before it is released into public wastewater systems and thereby avoid any risk of environmental contamination or infection.

Thermal Treatment

Potentially infectious liquid effluent can be sterilized by raising its temperature to 134°C thereby destroying all micro-organisms.

Disinfection and neutralization using chemical processes.

Treatment using chemical processes can ensure pathogens are inactivated with a disinfectant and the effluent is therefore neutralized. Output pH control is required in order to validate treatment of the outgoing effluent before it reaches public wastewater systems.

French operators in the management of potentially infectious waste



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For more than 60 years, Bertin Technologies has been known as one of the most innovative French companies offering high-value technological solutions in the Environmental, Defense, Nuclear, Aerospace and Healthcare sectors.

Through its brand STERILWAVE, Bertin offers a complete range of ultra-compact potentially infectious waste treatment solutions with capacities of 20-80 kg/hour. Covered by several patents, the STERILWAVE process is completely automated and combines shredding and sterilization using microwave technology in a single vessel which complies with the strictest safety regulations in the world. Using no water or steam and producing no liquid effluent, Sterilwave equipment offers waste decontamination using microwave technology which guarantees safe and effective waste treatment without any pressurization. Using only electricity as a power source, this microwave technology produces a dry waste end-product with no biological risk which can be released into standard household waste channels, can be repurposed and also offers opportunities for the circular economy.



www.ecodas.com

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Ecodas is the global pioneer in biomedical waste treatment.

ECODAS has perfected a patented, innovative and fully automated process which shreds and then uses steam to sterilize infectious biomedical waste. This process combines shredding and sterilization in a single sealed and compact vessel, requiring no intermediate waste handling. Sterilization occurs after shredding, at high temperature (138°C), and under high pressure (3.5 bar), in compliance with hospital sterilization requirements. No pathogens are able to withstand such temperature conditions. The final product is therefore made up of sterilized shredded material similar to household waste which can be released into urban waste recycling channels. Furthermore, the initial volume of waste is reduced by 80%.

The ECODAS process is designed for all types of infectious biomedical waste, solid or liquid. The various ECODAS models have a treatment capacity between 20 and 350 kg per hour, suitable for any type of facility producing or handling this type of waste: public and private hospitals, laboratories or service providers. ECODAS also offers sterilization systems for liquid hospital effluent. ECODAS is 100% MADE IN FRANCE. The ECODAS system is used in more than 82 countries around the world.



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STCF Equipements offers management systems for liquid hospital effluent. As a result of its activities, a hospital generates waste which could represent a risk for the environment or public health. In order to respond to such public, health and environmental requirements, STCF Equipements sells and installs treatment stations for hospital effluent. This may be bacteriological, infectious, radioactive or high-temperature, but also CBRN effluent which can occur during serious health emergencies.

Therefore, in order to control the risks of contamination from effluent generated by various hospital services, isolation wards or decontamination facilities, our treatment stations made up of collection and treatment vessels, along with an automated management system, allow you to disinfect and neutralize medical effluent before it can reach public wastewater systems. Our solutions can be adapted to suit the needs of each customer, to any infrastructural limitations and current legal requirements.

Some clients:

- Hôpital Universitaire Bouskoura, Morocco: Laboratory effluent treatment station
- Melun Hospital Centre: Mortuary block effluent treatment station.



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Tesalys is a French manufacturer of on-site shredding and steam sterilization infectious biomedical waste treatment systems.

With a range of systems designed to treat between 5 and 100 kg/hour, TESALYS STERIPLUS™ and STERISHRED® systems are particularly compact, autonomous and ergonomic, for rapid deployment in medical centers, hospitals and clinics of all sizes, laboratories, hemodialysis centers, etc.

TESALYS systems are used in healthcare facilities in more than 60 countries and have been scientifically tested against French standard NFX 30-503-1 and certified by the LNE. TESALYS offers a full range of products for controlling biological risk including TESABOX and TESABAG packaging systems for infectious waste, cryogenic waste storage units and TESATRUCK mobile waste treatment units.



Our actions in the fight against Covid-19

Bertin Technologies

have made their expertise available to China for its management of infectious biomedical waste, with the sale of 20 Sterilwave SW440 neutralization stations (treatment capacity: 80 kg/hour). In France, Sterilwave SW100 "Plug & Play" mobile treatment sites have been installed in COVID-19 test centers in the Bouches du Rhône (13) area around Marseille. Sterilwave solutions are present on every continent and in more than 50 countries. This equipment also shreds and sterilizes all types of infectious hospital waste (including coronavirus waste) through a microwave process.

ECODAS

offers a process particularly suited to treating waste produced during epidemics such as COVID-19, EBOLA, SARS, H1N1. In fact, thermal treatment at 138°C eradicates all micro-organisms including the most virulent viruses. ECODAS has provided equipment for COVID-19 centers in several countries in Africa, Asia, Latin America and Europe. Several ECODAS machines installed in large French university hospitals and treatment centers have been requisitioned for use during the epidemic.

STCF Equipements

developed an innovative Plug & Play product which is modular and autonomous. In this way, isolated areas can benefit from equipment that requires few technical skills to install and can be shipped quickly and easily to the designated site. Hospital technical service personnel can install the equipment without any external help. This system, made up of two treatment vessels and an integrated control system, can perform on-site disinfection and neutralization of effluent generated by any department producing potentially infectious liquid waste.

Tesalys

developed a special "Virus+" program for the treatment of potentially infectious waste with strengthened effectiveness against viruses. This program includes a pre-decontamination phase after shredding at 85°C, lasting 15 minutes, which ensures viruses are destroyed even before the standard decontamination process at 135°C has started. Thanks to their compact size and autonomous operation, Tesalys systems have been rapidly deployed to rural hospitals and installed for use in the fight against Covid-19.

Produced by



Within the French Healthcare system, french actors in the healthcare field (manufacturers, health institutions, research institutes, professional organizations...) are united around a non-profit association and pursue a collective objective:
international promotion of the French healthcare expertise.

Conceived as a network animation tool, French Healthcare Association provides its members with exclusive business, networking and international visibility opportunities.
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FRENCH HEALTHCARE is an innovative "public-private" initiative aimed at bringing together stakeholders in the French healthcare ecosystem (businesses, researchers, healthcare professionals, public bodies, etc.) so they can collectively promote their activities, know-how and technologies around the world.

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