

ACHIEVING SUSTAINABLE HEALTH CARE WASTE MANAGEMENT

Part 2 - Green & Safe Technologies for Health Care Waste Management: From Selection & Procurement to Implementation

Tuesday, January 23

9:00 WAT / 11:00 EAT / 15:00 ICT

This three-part webinar series, hosted by UNICEF and GAVI in association with TechNet-21, will orient participants on the key actions needed to address health care waste. Session 2 will focus on selection of green technologies, including autoclaves, microwaves and frictional heat. It will also discuss the operations & maintenance requirements.



Agenda

01. Overview of green & safe technologies (w/ Q&A)

- Types of technologies
- Applicability in different size HCFs
- Technology selection process
- UNICEF Long-Term Agreements for waste treatment technologies

02. Featured manufacturers & technologies (w/ Q&A)

- Bertin – Microwaves with shredder
- Ecosteryl – Microwaves with shredder
- Newster – Frictional heat with shredder
- Tesalys – Autoclaves with shredder

03. Operations & Maintenance requirements and capacity building/ training

01. Overview of green & safe technologies (w/ Q&A)

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- UNICEF Long-Term Agreements for waste treatment technologies

EAPRO Regional LTA on green and safe healthcare waste equipment

Dr. Ridwan Gustiana & Isabelle Cantin | EAPRO Health

January 2024



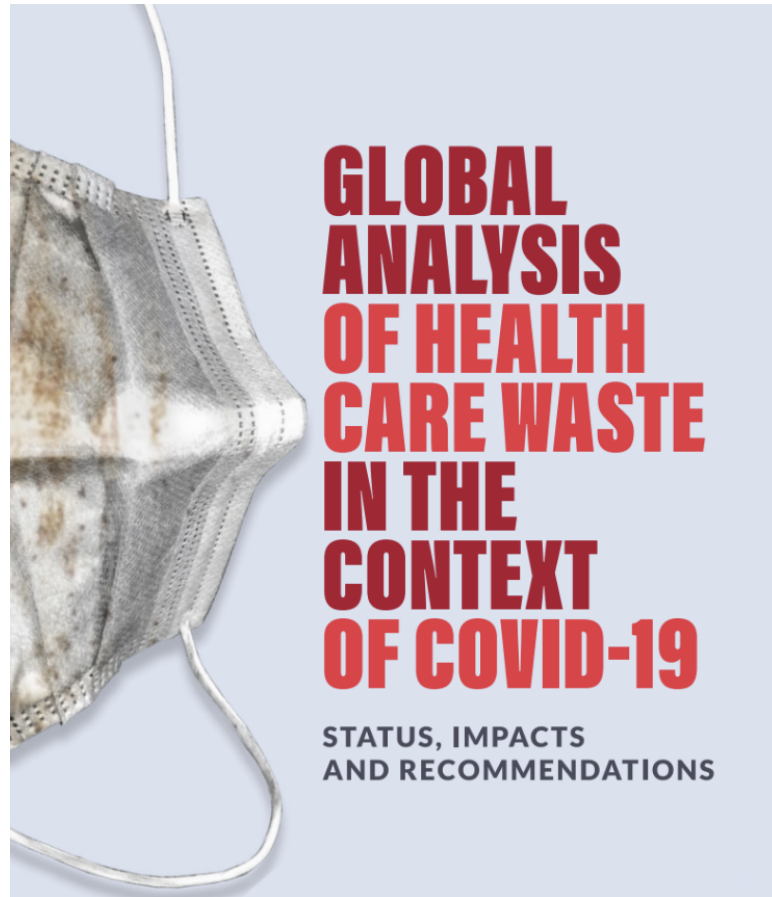


Greener and Safer Healthcare Waste equipment

What motivated UNICEF EAPRO

- COVID-19 context increased the volume of waste to treat
 - Immunization COVID-19 workplans lacked:
 - ❖ Resources
 - ❖ Infrastructures
 - ❖ Tools
 - ❖ Budgets
 - ❖ Green and safe equipment
- Publications from UNICEF and WHO

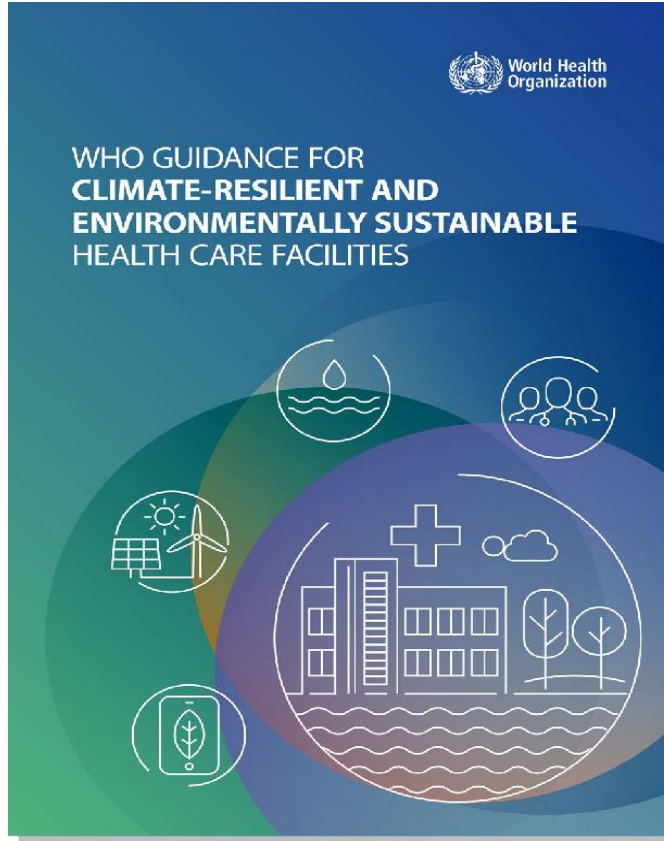
What influenced UNICEF EAPRO on the initiative?



“The ultimate aim should be use of non-burn technologies such as autoclaves” ... (section 4.3.3)

“Over time, non-burn technologies cost less” ... (section 4.3.3)

Climate-resilient and environmentally sustainable health care facilities



WHO guidance, 2023

Section 4.2 of the guidance: “Water, Sanitation and Healthcare Waste Interventions”

“... health care waste management services are essential to quality of care and infection prevention and control in health care facilities. Important advances and commitments in this area have been achieved in recent years.”

“According to WHO, of the total amount of waste generated by health care activities, **15% is considered hazardous**, which may be infectious, toxic or radioactive. Concerns include lack of **proper disposal of syringes, open burning and incineration of health care wastes** with consequent emissions of particulate matter (and in some cases of dioxins and furans, and toxic metals), and unintended release into the environment of pharmaceuticals, or chemical and biological hazards, including drug resistant microorganisms (89).”

UNICEF & WHO COVID-19 vaccination: supply and logistics guidance (February 2021)

unicef 
for every child

COVID-19 vaccination: supply and logistics guidance

INTERIM GUIDANCE
12 FEBRUARY 2021



unicef 
for every child

Section 6 of the guidance:

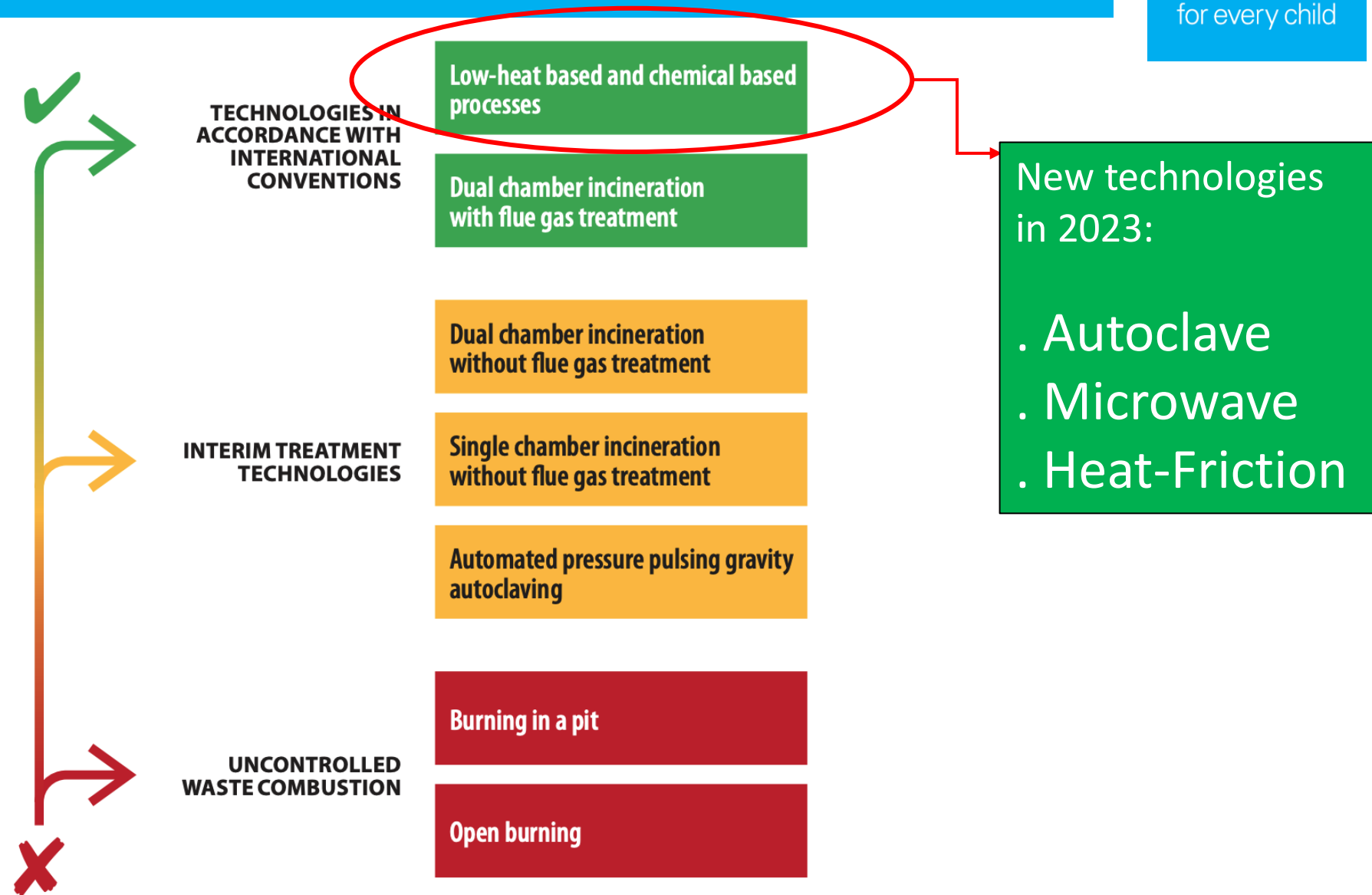
Follow the national guidelines and codes for final disposal – if these are not available:

- Preferably use best available technologies in accordance with the Stockholm Convention, such as decontamination of waste by autoclaving or similar procedures or high-temperature incineration.*

WHO Guide about infectious waste treatment (2019)



<https://www.who.int/publications/i/item/9789241516228>



Establish regional LTA to help countries procure high quality, greener and safer equipment

AIMING AT SOLUTIONS THAT WOULD OFFER:

- ✓ Reduction of unsafe risks to the healthcare workers during waste management operations
- ✓ Reduction of exposure to dioxins and furans to the health workers, their communities and the environment
- ✓ Reduction of waste volumes in health facilities; and
- ✓ Bundled services, such as: installation, training, spare part and 2-yrs warranty of HCW treatment equipment



- April 2022 – Published RFI - 22 Manufacturers and suppliers responded positively
- March 2023 – launched global RFP - 11 Manufacturers responded
- November 2023 – 5 Manufacturers awarded



100%
Electric and
ecological



Procurement process

Results of the long terms agreements (LTA)

10 LTAs awarded to 5 manufacturers

- 5 LTAs for products – including FCA to port or airport, 2 yrs of spare parts and 2 yrs warranty
- 5 LTA for services – including installation, commissioning and training in local languages

Technology	Manufacturer - Brand
Autoclave with shredders	Tesalys - STERIPLUS
Microwave with shredders	Bertin technologies - STERILWAVE AMB Ecosteryl - ECOSTERYL Vertisa Company - PROMED
Heat Friction	Newster Group - Newster

Product list

Each manufacturer was awarded two LTAs:

1. Product & enough spare parts for 2 years
2. Services which include a 2-year warranty, installation, commissioning, and training in local language

Manufacturer name	AMB DIFFUSION-Ecosteryl	Bertin Technologies	Newster System	TESALYS	VERTISA PROMED
Country	Belgium	France	Italy	France	Turkey
Technology	Microwave	Microwave	Heat friction	Autoclave	Microwave
Incoterms - FCA ... (Seaport)	Antwerp-Bruges	Le Havre	Genova Ravenna	Fos-sur-Mer	Izmit Gebze
Incoterms - FCA ... (Airport)	Brussels South Charleroi	Charles de Gaulle	Milano Malpensa Bologna Guglielmo Marconi	Toulouse Blagnac	Esenboga
Item 1 - Model Name	Ecosteryl 75	Sterilwave 100	NW5 STERILIZER	STERIPLUS 40	P50
Capacity kg / h	75 to 100 kg/h	20 kg/h	15 kg/h	10 kg/h	20 kg/h
Item 2 - Model Name	Ecosteryl 75+	Sterilwave 250	NW5+ STERILIZER	STERIPLUS 80	P50-MICROWAVE
Capacity kg / h	75 to 100 kg/h	50 kg/h	20-25 kg/h	20 kg/h	20 kg/h
Item 3 - Model Name	Ecosteryl 125	Sterilwave 440	NW15 STERILIZER	STERISHRED 250	P150-MICROWAVE
Capacity kg / h	125 to 175 kg/h	88 kg/h	40 kg/h	35 kg/h	50 kg/h
Item 4 - Model Name	Ecosteryl 250		NW30 STERILIZER	STERISHRED 700	
Capacity kg / h	250 to 300 kg/h		70-80 kg/h	135 kg/h	

Why are these technologies green and safer?

Technology	Indicative OPEX Cost [USD/kg]
Autoclave	0.14 - 0.33
Microwave (Batch)	0.13
Frictional Heat	>0.13
Incineration	0.27 - 1.6

- All 3 technologies **reduces** methane, carbon and no greenhouse gas emission
 - The investment to procure the product is higher compared to incinerators but the **operation and maintenance cost are lower**
 - The wastewater discharged by these brands are all decontaminated, so reducing the risk for the environment
-
- None of these product necessitate segregation of infectious medical waste it is preferable to mix them
 - The output of the waste treatment processes are either for **recovery or recycling**, and in the worst case a non-hazardous waste for disposal at an authorised landfill.
 - The microwave systems incorporate **advanced safety features** to mitigate any potential risks

All these products can be treated in all technologies from these LTAs

- ✓ Solid and liquid waste
- ✓ Sharps and small metal instruments
- ✓ Expired & used vaccines' vials and pharmaceuticals
- ✓ Small body parts and cultures

UNICEF EAPRO SUPPORT

How to choose the RIGHT technology according to the COUNTRIES' CONTEXT



Guidance and Webinar:

- ✓ A technical guide on how to choose the BEST TECHNOLOGY according to a country' context, such as: availability of water, energy, operational economy and reduction of carbon emission
- ✓ A technical guide on how to procure the products using the regional “Long-Term Agreements”
- ✓ Webinars where each manufacturer will present their product and where best practices will be shared by countries

Thank you.

unicef 

02. Featured manufacturers & technologies (w/ Q&A)

- Bertin – Microwaves with shredder
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- Newster – Frictional heat with shredder
- Tesalys – Autoclaves with shredder



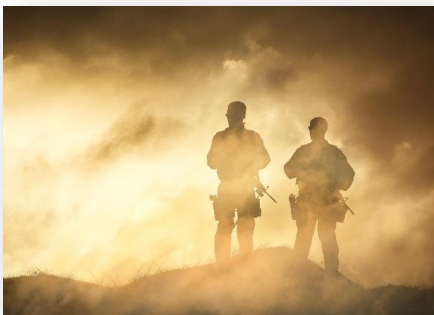
STERILWAVE

**INNOVATIVE SOLUTION
FOR MEDICAL WASTE MANAGEMENT**

“SUSTAINABLE TECHNOLOGICAL SOLUTIONS TO ADDRESSING ADVERSE
EFFECTS OF CLIMATE CHANGE BY THE ARTISTIC WAY”

INDUSTRIAL GROUP IN HIGH-END INSTRUMENTATION FOR CRITICAL OR SCIENTIFIC APPLICATIONS

PROTECTING ENVIRONMENT, PEOPLE & NATIONS, SCIENTIFIC KNOWLEDGE IMPROVEMENT



**DEFENSE
& SECURITY**



**NUCLEAR
& HEALTH PHYSICS**



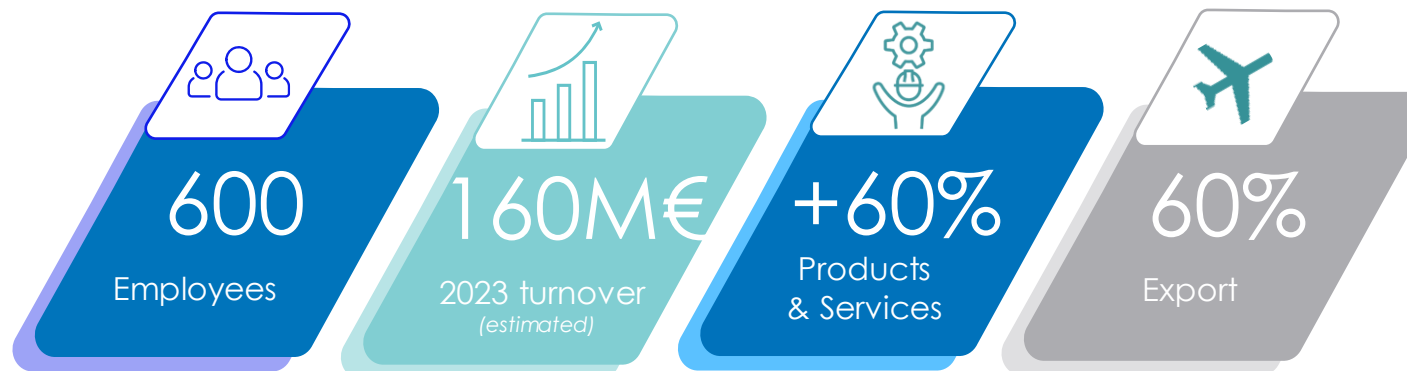
**SPACE
& BIG SCIENCE**



LIFE SCIENCES



**HOSPITAL WASTE
MANAGEMENT**

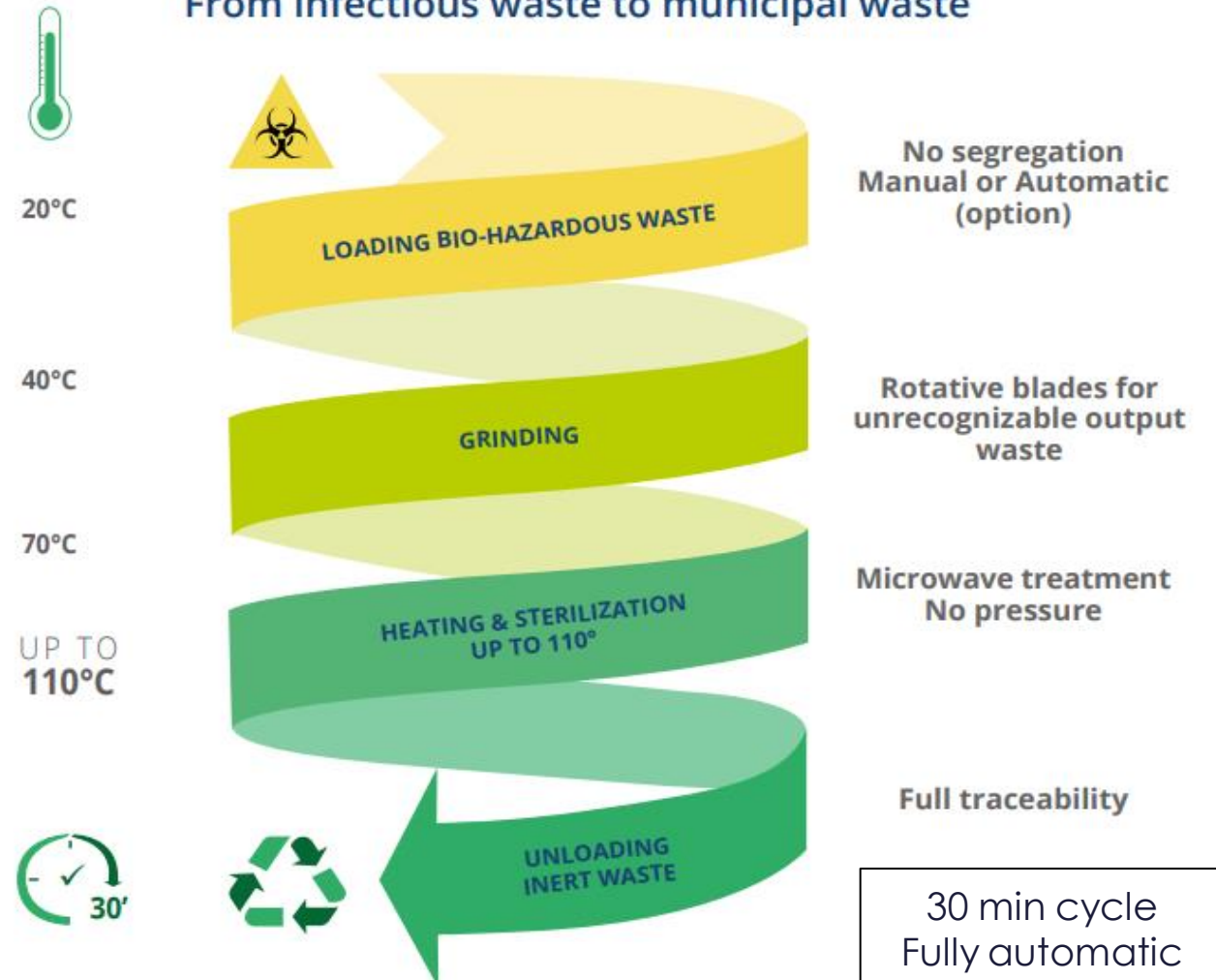


STERILWAVE

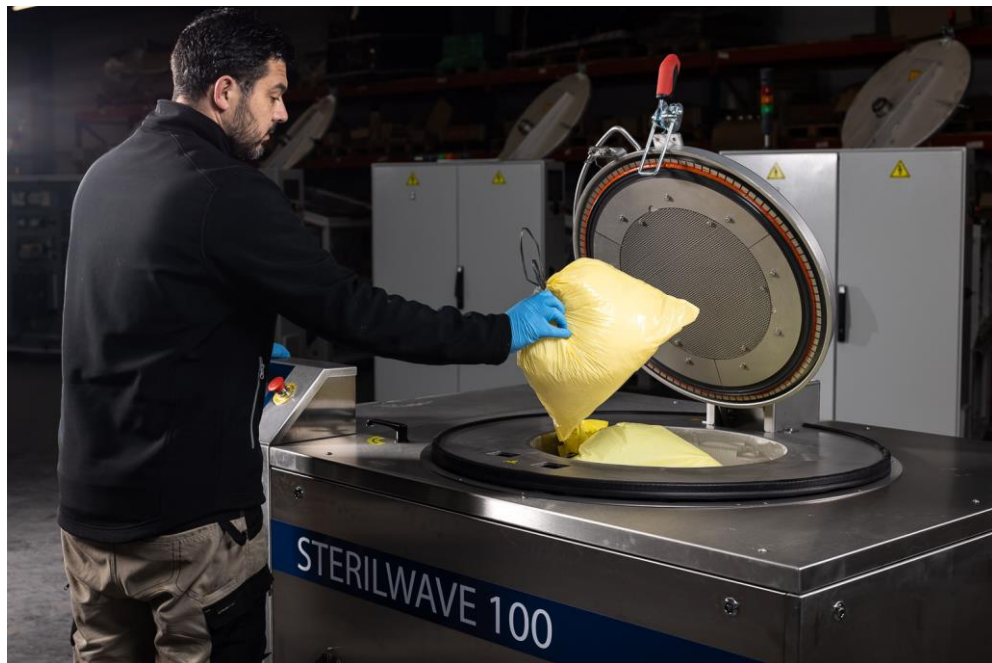
THE NON-BURNING TECHNOLOGY ANSWER



From infectious waste to municipal waste



COMPREHENSIVE DECONTAMINATION SOLUTION: ENSURING DECONTAMINATION ACROSS ALL HOSPITAL WASTE



[Video:](#)

From infectious waste to safe, inert, dry and unrecognizable municipal waste

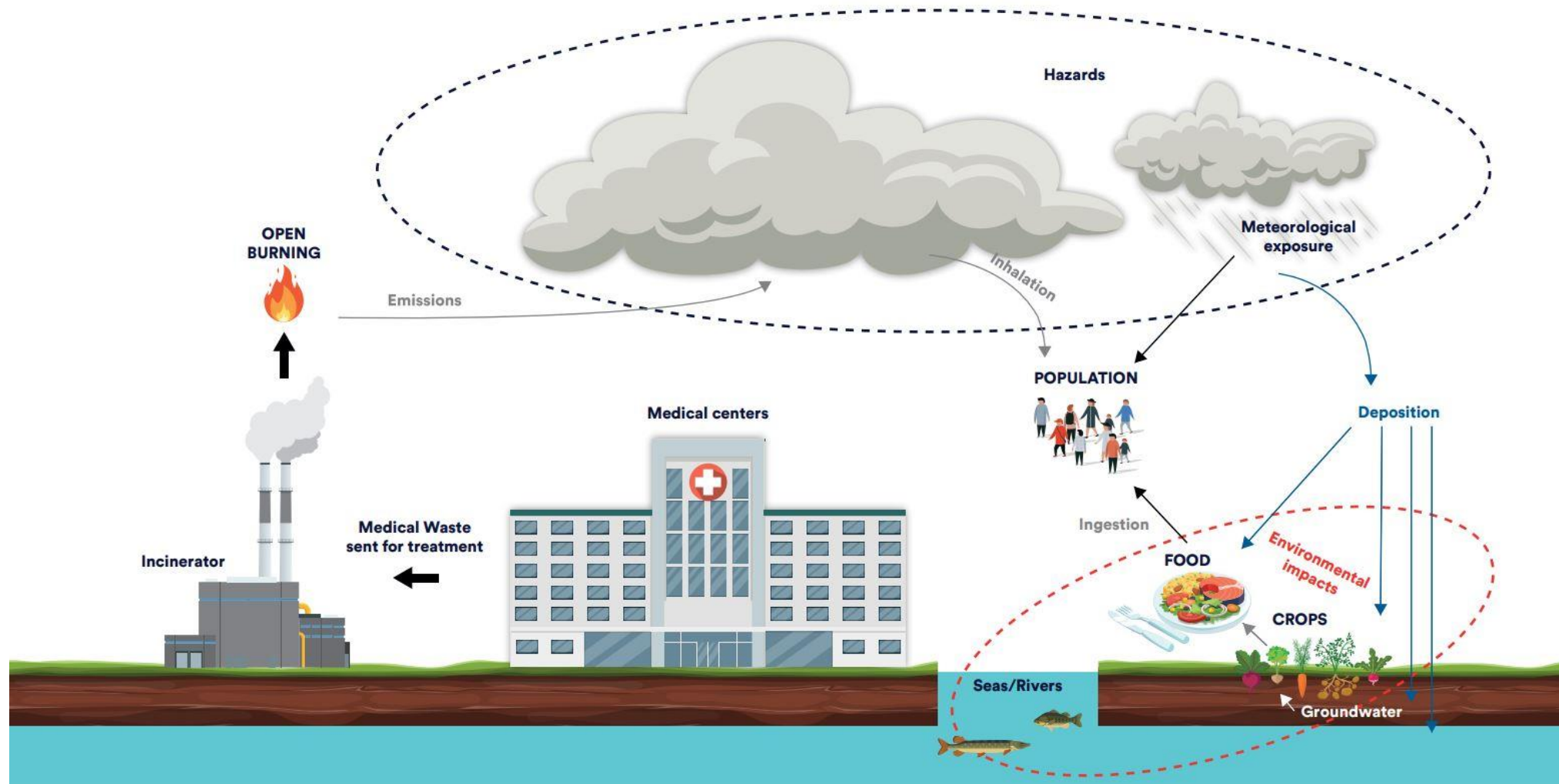


VIDEO

[Video](#)

From infectious waste to safe, inert, dry and unrecognizable municipal waste

GREEN TECHNOLOGY: ENVIRONMENTAL ALTERNATIVE TO INCINERATORS



GREEN TECHNOLOGY: ENVIRONMENTAL ALTERNATIVE TO INCINERATORS

Low energy-consuming system

- ❖ Low electricity consumption: Less than 15kWh
- ❖ No water needed for sterilization
- ❖ No draining system requested
- ❖ No additional external equipment needed (water softener, external shredder system...)
- ❖ HEPA filter included for vapor emission
- ❖ Low green-house emission compared to existing technologies on the market
- ❖ Able to drastically reduce the CO₂ emission compared to current processes



GREEN TECHNOLOGY: ENVIRONMENTAL ALTERNATIVE TO INCINERATORS

Case study Asian Development Bank (ADB)

- ❖ Cambodian hospitals cut CO2 emissions by shifting to Sterilwave systems from incineration, promoting environmental sustainability.
- ❖ A 2020 ADB study found that 42 hospitals using Sterilwave generated 491 tons of CO2 yearly, significantly less than the 2,414 tons produced by incinerators.
- ❖ This shift resulted in a substantial 1,924-ton reduction in CO2 emissions.

	Energy consumption		CO2 emission factor		Medical waste generation in 42 hospitals		Annual CO2e emissions	
	Unit	Unit	Unit	Unit	Unit	Unit	Unit	
Sterilwave	0.8	MWh/t ^(a)	0.8	t CO2e/MWh ^(c)	767	t/a ^(f)	491	t CO2e/a
Incineration	50	L fuel/t ^(b)	3	t CO2e/t ^(d,e)	805	t/a ^(g)	2,414	t CO2e/a
CO2e Emission Reduction benefit							1,924	t CO2e/a



**5 TIMES LESS OF CO2 EMISSIONS
USING STERILWAVE**

GREEN TECHNOLOGY: ENVIRONMENTAL ALTERNATIVE TO INCINERATORS

UNIDO Global call 2022 Winner

STERILWAVE awarded as green and innovative technology solution towards
Net-Zero for Healthcare Waste Management



STERILWAVE: ENSURING SAFETY IN DECONTAMINATION



- No liquid effluent
- Zero environmental impact
- Only requires electricity
- No need for additional resources
- Reduces the carbon footprint
- Recyclable
- Storable



Safe technology

- Mechanical and electronic closed vessel
- Only using atmospheric pressure
- No risk of explosion
- No irradiation risk
- Sterilization in one single vessel
- No skilled operator needed



Highest Standards Compliance

- ISO
- CE
- STAAT III
- NFX 30-501



Global technical expertise

- Trained technical team in every country
- Bertin technical support based in France, USA & Singapore
- +800 installations worldwide

STERILWAVE: OPTIMAL ONSITE SOLUTION FOR HOSPITALS

EFFICIENT

UP TO 8LOG10
MICROBIAL
INACTIVATION

COMPLIANT

WITH ALL
INTERNATIONAL
STANDARDS

LOW RUNNING COST

EASY MAINTENANCE

LOW ENERGY

CONSUMPTION
ONLY ELECTRICITY

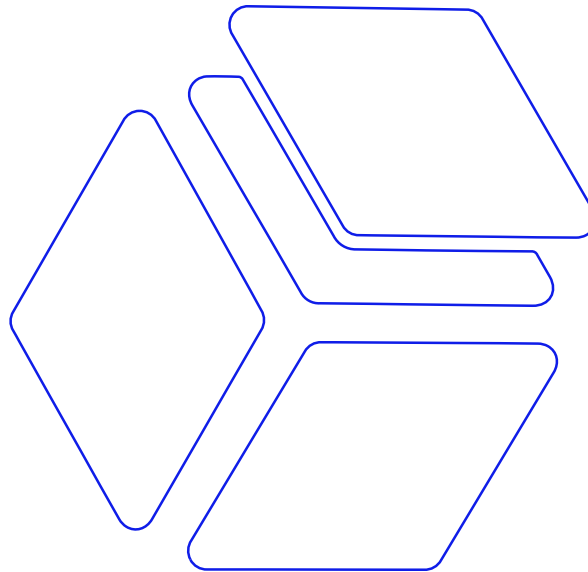
SAFE

NO PRESSURE
NO IRRADIATION RISK
NO CHEMICALS

ECO-FRIENDLY

NO WATER
NO LIQUID EFFLUENT





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www.bertin-medical-waste.com



Environmental Solutions
Since 1947

Innovation in Medical Waste Management

Green & Safe Technologies for Health Care Waste



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Ecosteryl

Expertise since 1947

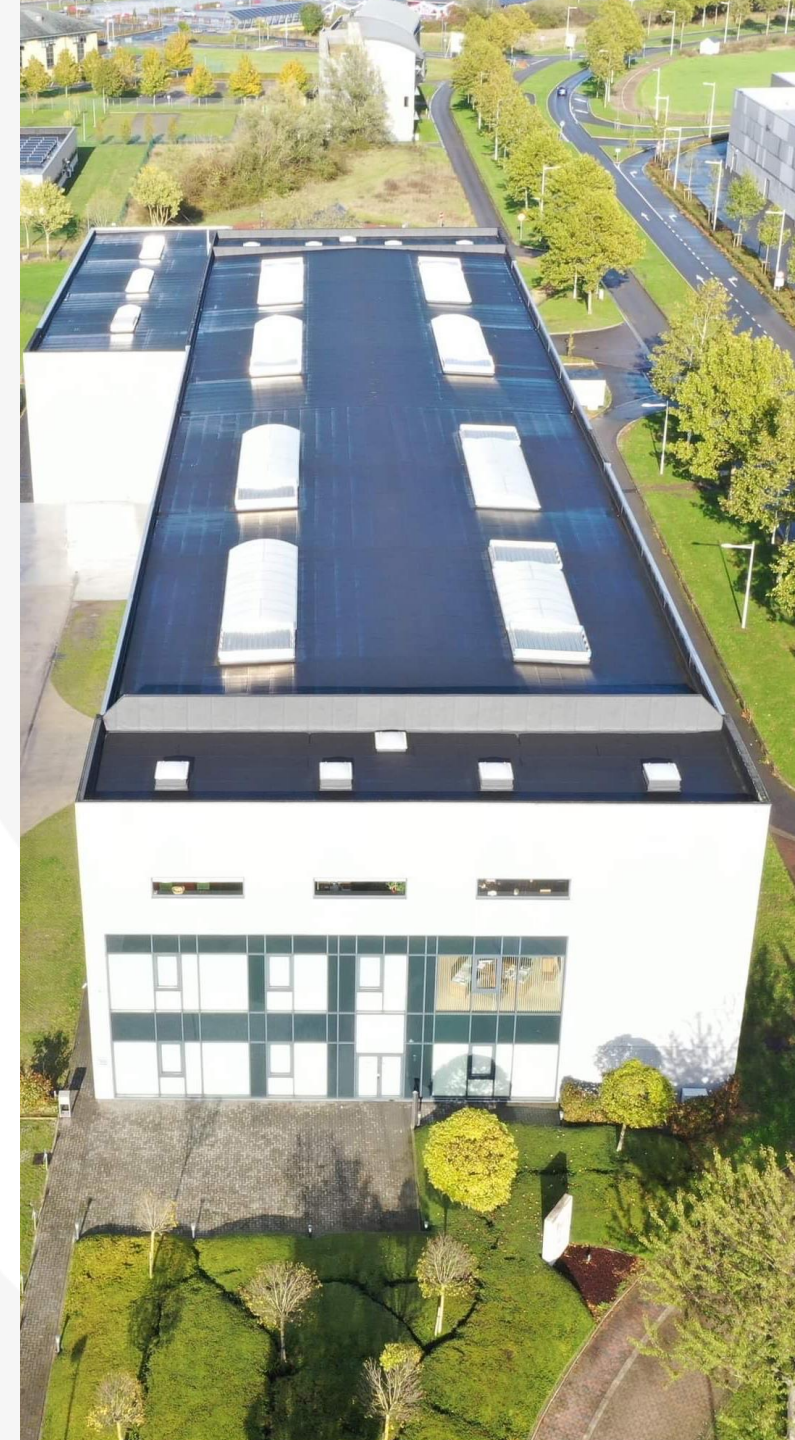
More than 75 years of industrial and manufacturing activities.

Long-lasting relationships

Prestigious partnerships with the **UN, WHO, UNDP, World Bank, JICA** and various **Ministries of Health**.

Circular Economy

Active projects in circular economy initiatives, giving a second chance to valuable materials through recycling, waste to energy.



100% electric decontamination process | [Video](#)

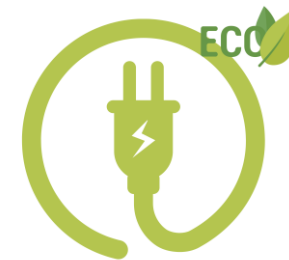


Why is Ecosteryl **green**?



Ecosteryl needs **only electricity** to decontaminate medical waste.

Resource efficiency: no burning, no water, no gas, no steam, no chemicals.
No discharge of pollutants, no fumes, no effluents, no wastewater.



A big advantage of Ecosteryl's process?



A dry and sortable final output

Decontaminated materials can be 100% reused:

Waste to Energy, Recycling and Sustainable Construction

=> Completely avoiding landfilling or incineration

Circular economy, less carbon print



Medical waste



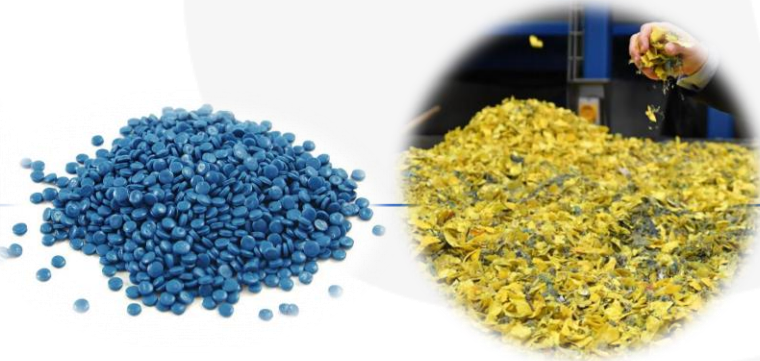
Decontamination by Ecosteryl (Ecosteryl models)



Sortable waste



Recycled waste

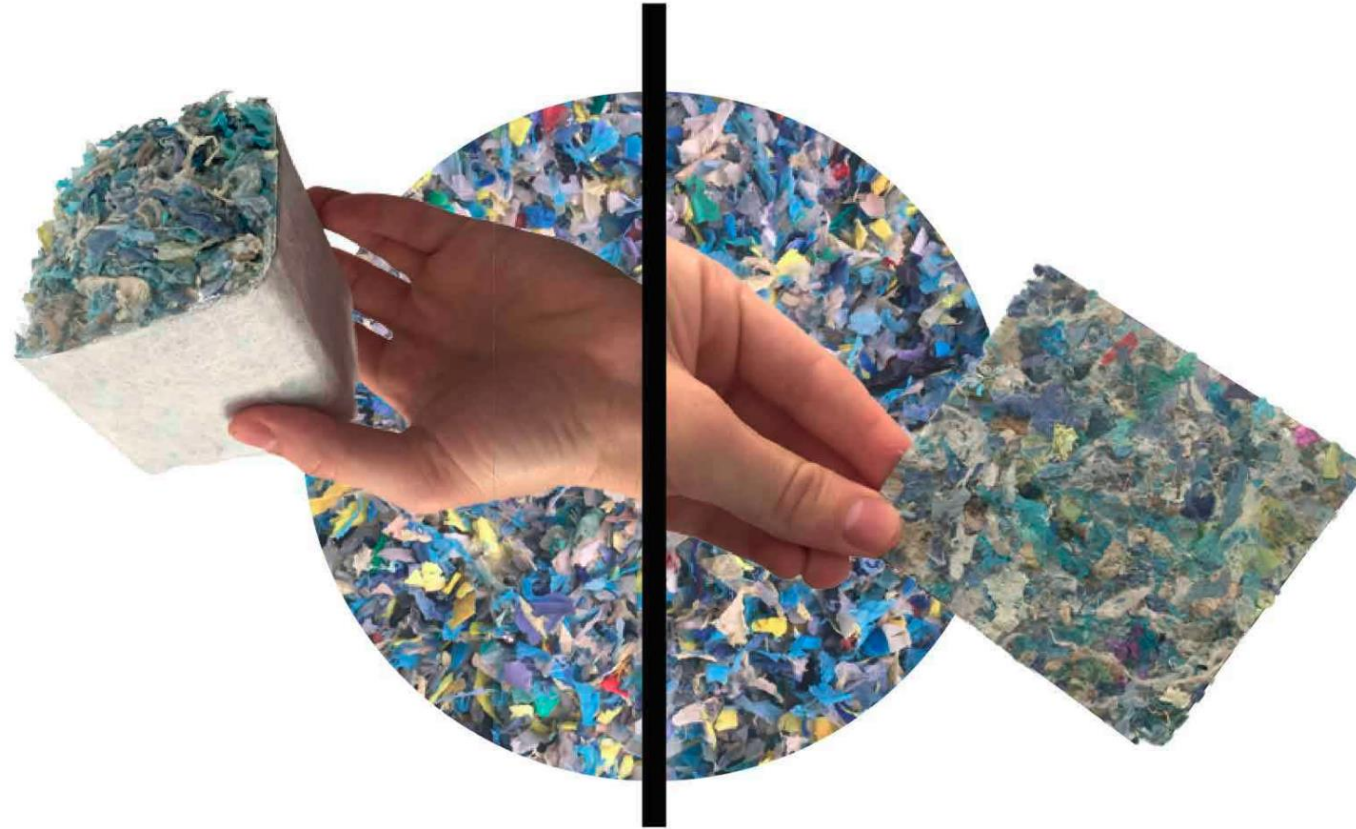


Sorted waste



Sorting center by Ecosteryl (R-steryl model)

Example of use in sustainable construction



and many more to come...



Why is Ecosteryl safe ?



Remote monitoring:
Decontamination is under permanent control.



Automatic operations:
reduced operator manipulation.



Effective decontamination method:
leaving no areas untreated.



Approved technology:
by health authorities for more than 20 years in more than 60 countries.



Our medical waste treatment solutions



Our portfolio corresponds to the needs of all sizes of **hospitals** (on site) and **service providers** (off site).

75



From 75kg/h to 100kg/h
Up to 1500kg /day

75+



From 75kg/h to 100kg/h
Up to 1500kg /day

125



From 125kg/h to 175kg/h
Up to 3500kg /day

250



From 250kg/h to 300kg/h
Up to 7000kg /day

Let's talk about medical waste



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Newster's Sustainable Solutions for the Treatment of Medical Waste

Ledina Hyseni¹

¹ Project Manager

 newster®
The new age sterilization

www.newstergroup.com

One company for all infectious
waste disposal needs

Pioneers in ecological waste
management solutions



Newster for over 25 years designs and manufactures
sterilizers for the treatment of healthcare waste.

How is Newster contributing towards an **ecological hospital** ?



Imagine your ecological hospital

A 360 ° innovative solution for solid and liquid healthcare waste management.



Medical Laboratories
PURA LAB

1) All medical wards



NW5
NW15
NW50

2) Departments of infectious diseases and autopsy rooms



SWT
ASW



I-GENICO₃

NW FRICTIONAL HEAT TREATMENT TECHNOLOGY

WHO Recommended Waste Management Technologies

1. Thermal Based Treatment Technologies

- i. Frictional Heat Treatment Technology
- ii. Microwave
- iii. Autoclaving

2. Other Treatment Technologies

- i. Chemical Treatment
- ii. Biological Treatment

No POPs emissions

newster. **NW**

Newster's Frictional Heat Treatment enables hospitals to process hazardous solid waste in a sustainable and cost-effective way.

The Newster infectious solid waste sterilization cycle is based upon a mechanical breakdown (impact and friction) of the waste inside a closed vessel in slightly negative pressure.

The waste is heated up to 149 ± 1 °C to achieve a microbial inactivation of 6log10 reduction of *G. Stearothermophilus* spores (**STAATT Level IV – StAATT Level IV**).



newster. **NW5**
15 kg/h



newster. **NW15**
30 kg/h



newster. **NW30**
70 kg/h

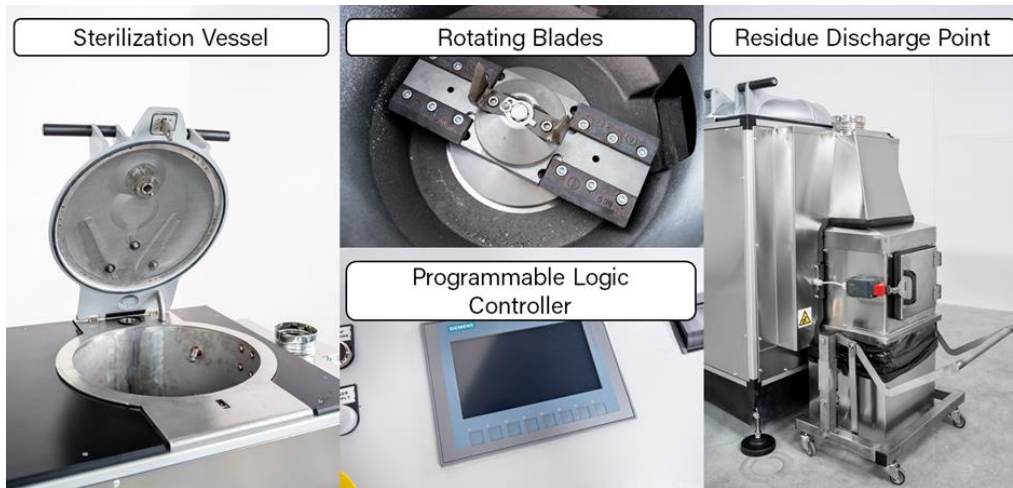


newster. **NW50**
100 kg/h

Newster's Frictional Heat Treatment: How it works

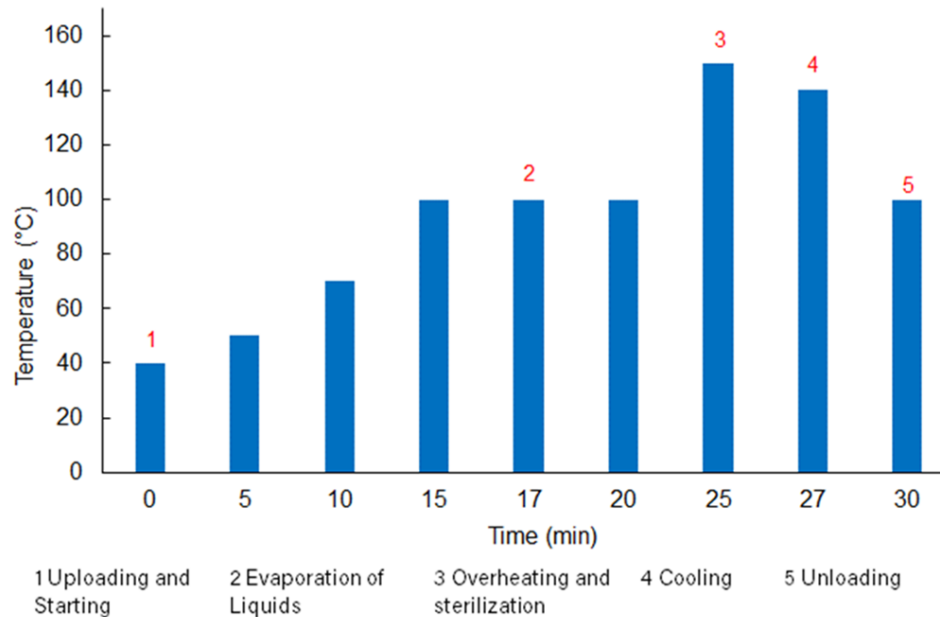


Newster's treatment of hospital solid waste systems is carried out in a single depression chamber without risks for the environment and for the operator. No chemicals are used. The temperature inside the chamber is accurately measured in real-time by patented sensors during the cycle. The duration of the exposure to heat and the cycle parameters are controlled by a PLC.



During the cycle, the **system automatically generates a printed report**, which the operator attaches to the worksheet at the end of each cycle. **Sterilization can be proven by microbiological analysis** of the residue and by efficacy tests using biological indicators containing *Geobacillus Stearothermophilus* spores with a concentration of 10^6 .

Newster's Frictional Heat Treatment: How it works



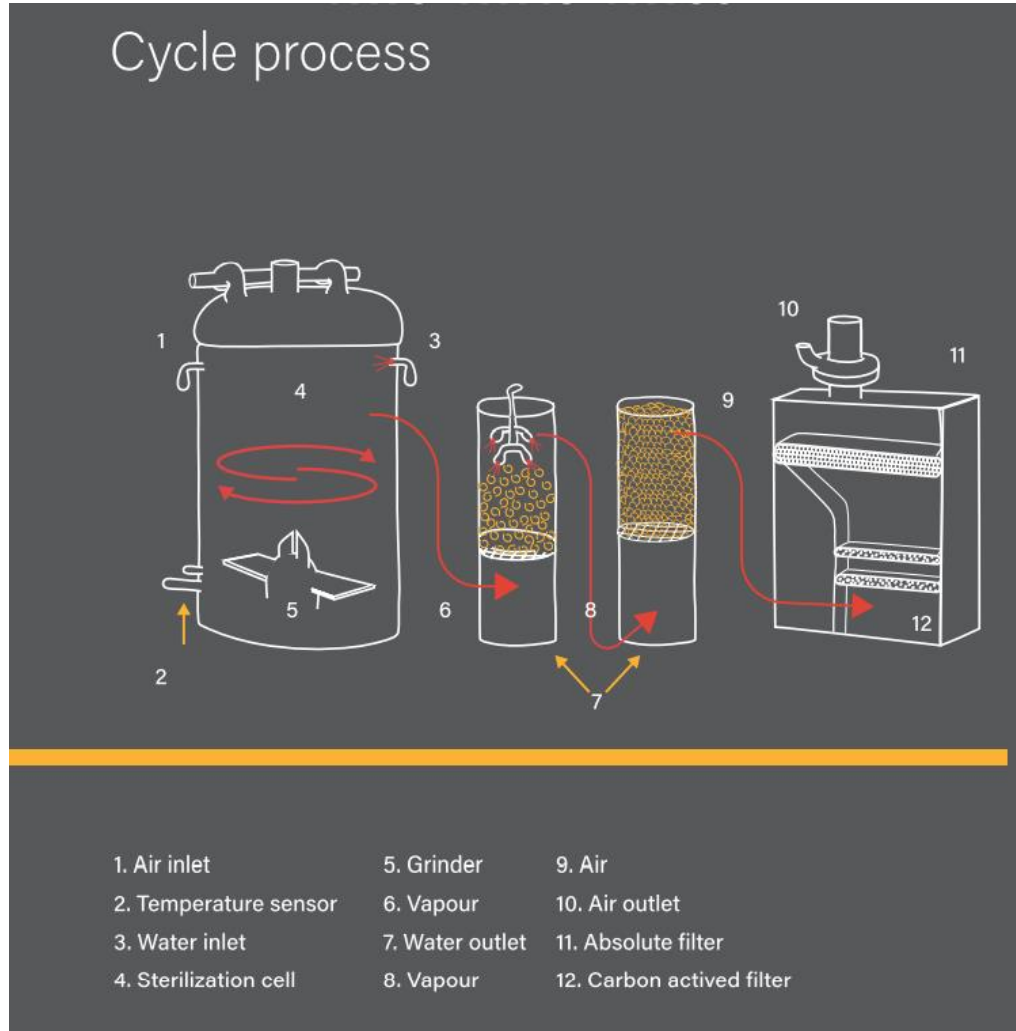
Stage 1 of bio medical waste sterilizer: loading and starting

To begin the process, the **operator loads the chamber with healthcare solid waste**, closes the lid, and presses the cycle start button. Inside the closed sterilization chamber, in negative pressure, a **powerful rotor fitted with stainless steel blades finely shreds the waste by impact and friction**.

Stage 2: evaporation of liquids

As the material is roughly shredded, speed and **temperature increase to 100°C**, and the **evaporation phase starts**. The temperature remains steady until all the humidity has evaporated. **The emissions respects are fully compliant with the highest environmental standards**.

Newster's Frictional Heat Treatment: How it works



Stage 3: reach required sterilization temperature

When the humidity has been eliminated, the **temperature** starts to **rise again** reaching a peak of **150°C**, as required for a **complete sterilization according to STAATT Level IV**. The finely ground waste is **heated to its core** and not only on the surface, for the time required to **completely destroy microorganisms and bacteria**.

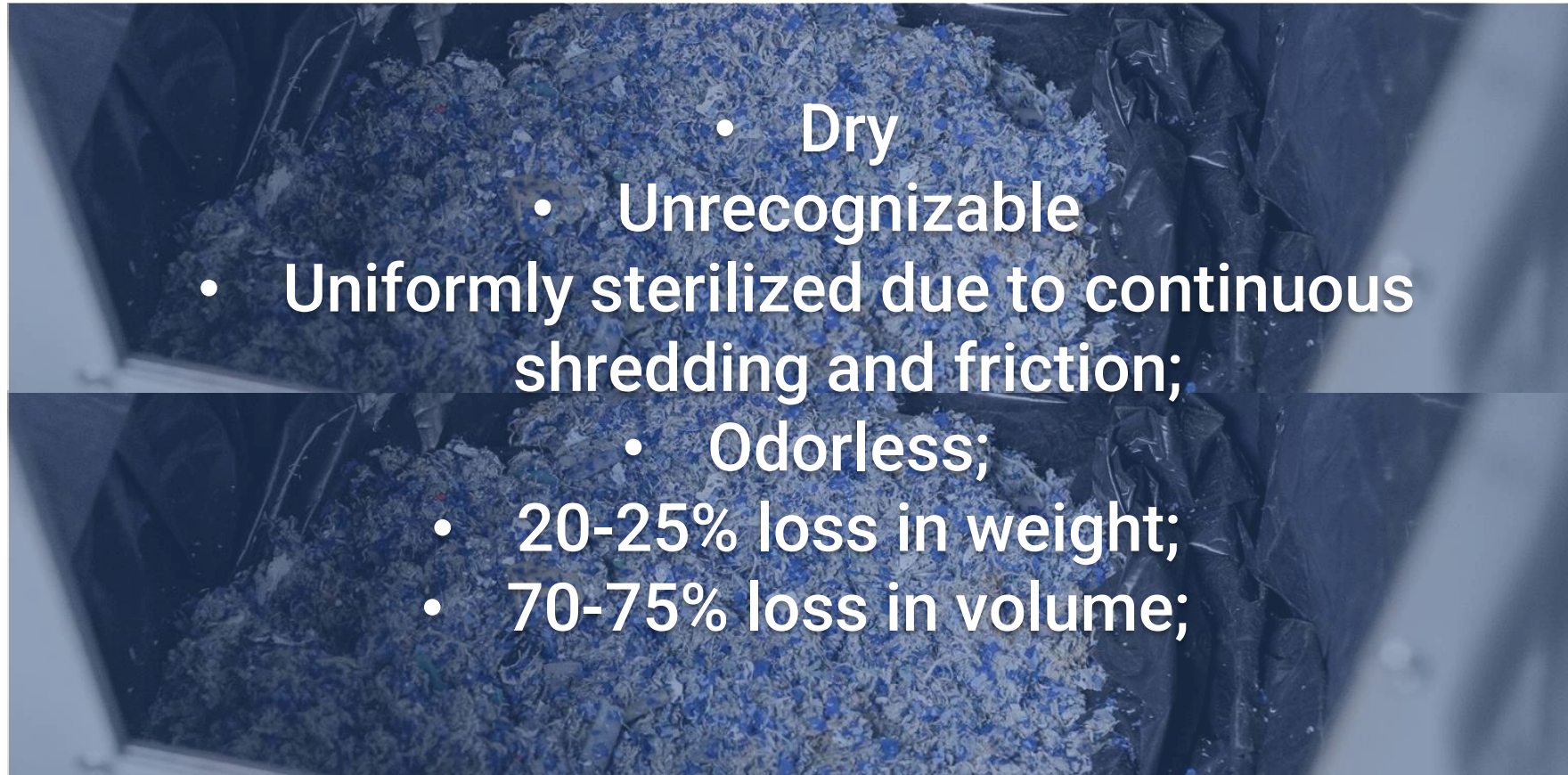
Stage 4: cooling

The **waste is cooled by sprays of water** until it reaches a **temperature of 95°C** necessary for discharge.

Stage 5: unloading

The **cycle is over** and the treated waste is automatically unloaded. The **sterile**, finely ground, dry, and unrecognizable residue is **significantly reduced in weight and volume**.

Frictional Heat Treatment: The Treated Residue



In-sight 4.0 Web App- Remote Machine Monitoring

newster. IN·SIGHT 4.0

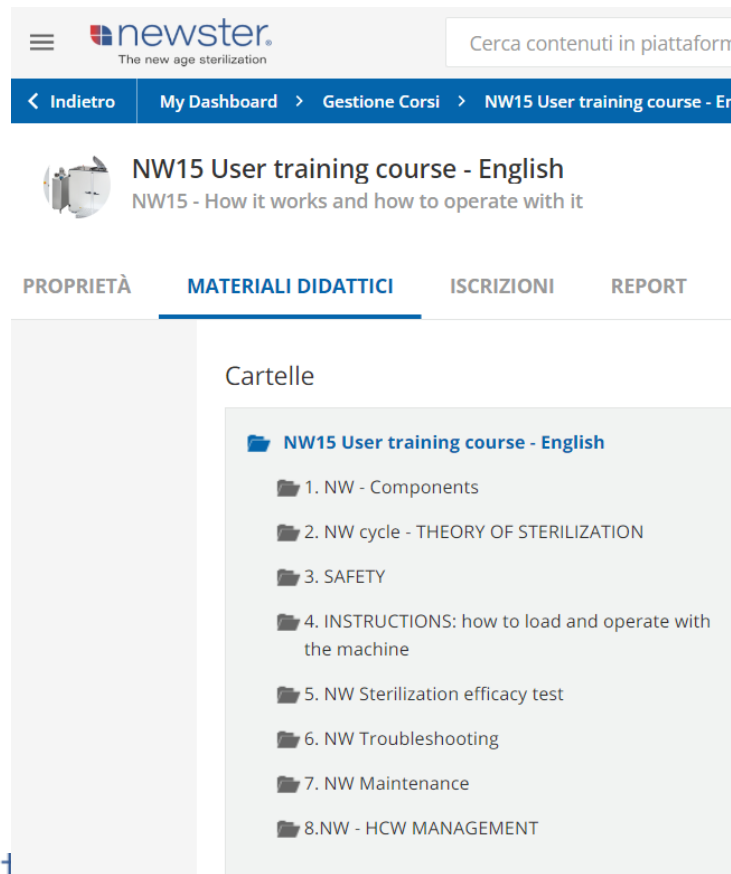
The screenshot displays the user interface for a Newster sterilization machine. At the top left is the 'newster. The new age sterilization' logo. The main header shows 'NW15 SERIAL #534' and a 'Sign Out' link. A left-hand navigation menu includes 'Overview', 'Machine logbook', 'Installation logbook', 'Maintenance', 'Extr. Maintenance', 'OTHERS', and 'Alerts'. The main content area is divided into two columns. The left column lists machine parameters: 'LOCATION: RIMINI - ITALY', 'MODEL: NW15', 'SERIAL NUMBER: 534', 'KEEPING TEMPERATURE: X', 'HEAT EXCHANGER: X', 'WATER RECYCLING: X', and 'LANGUAGE: IT'. The right column features a map of Europe with Italy highlighted in orange.

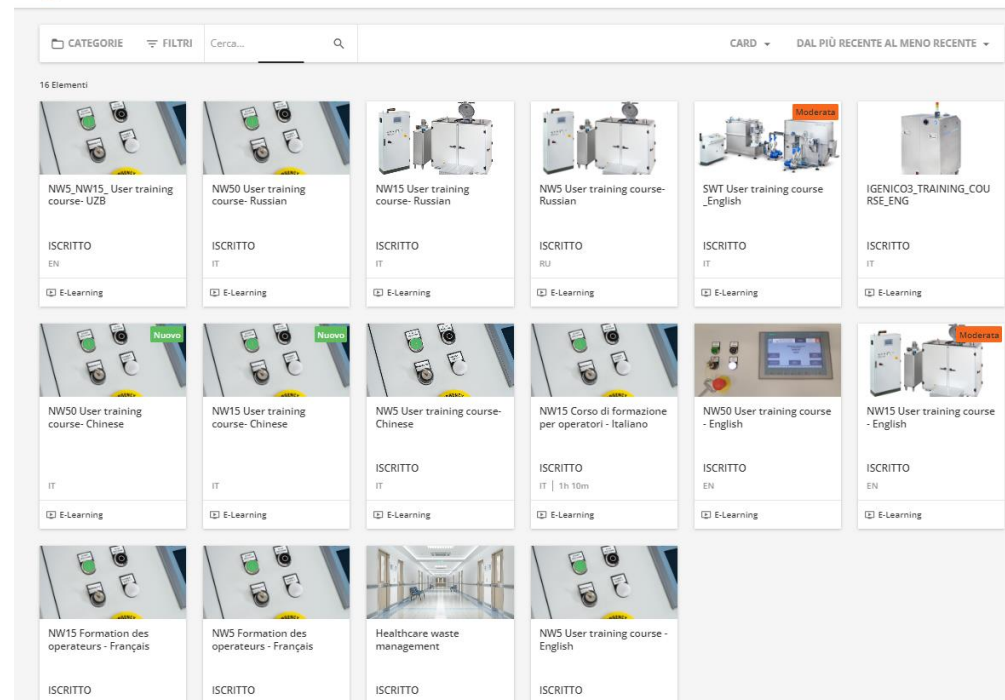
Play video 

In-sight 4.0 does not require direct connections to hospital networks, and a simple internet connection is sufficient. Operators will be able to connect securely through restricted access by providing their username and password.

Promoting a new healthcare culture

Remote Training programs are provided to all staff involved in the use of the equipment and maintenance programs are included as added value the healthcare organizations. Docebo is the e-learning platform used for Newster's remote training.





The Environmental Sustainability of the On-Site Treatment of Medical Waste

The Environmental Benefits

Process Sustainability LCA: Life Cycle Assessment show how the on site treatment of solid waste is more environmentally sustainable than current management practices based on transport to waste to energy plants.

The present analysis was developed in collaboration with Università Politecnica delle Marche (Italy), Department of Life and Environmental Sciences.

The aim is to to assess the environmental sustainability of two possible strategies of infectious hospital solid waste management and, consequently, to verify if their innovative solution is environmentally more sustainable than current practice.



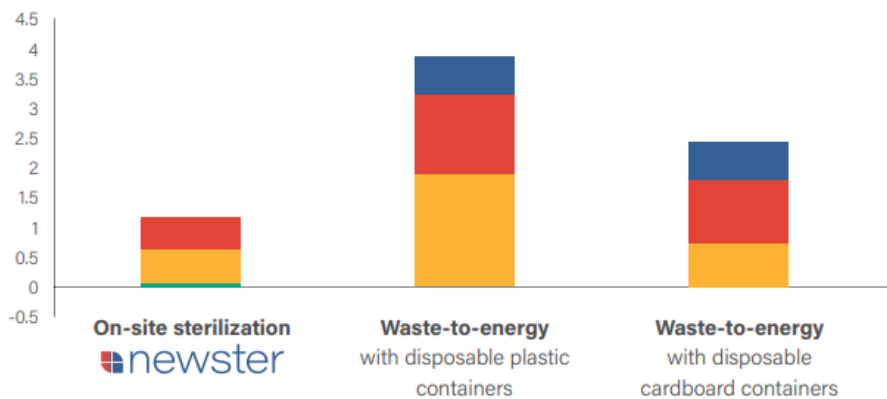
newster. **NW50**



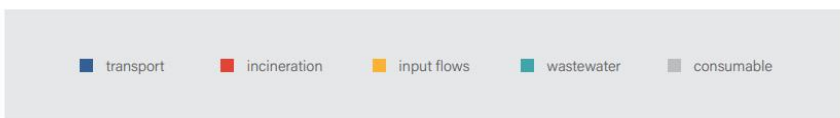
The Environmental Benefits

Environmental Impact [P.E.*]

generated by disposal systems of infectious solid waste



* **Person Equivalent:** number of people having the same impact on one year in Europe.



 **70%**

Reduction of environmental impacts compared to waste-to-energy with plastic containers, thanks to on-site sterilization with Newster technology.

 **50%**

Reduction of environmental impacts compared to waste-to-energy with cardboard containers, thanks to on-site sterilization with Newster technology.



Digital Certifications-

PDT- Life Cycle Assessment as a tool for evaluating the environmental impacts generated by hospital waste

PDT® - Life Cycle Assessment

REAL-TIME DATA

Input/Output : kg of waste treated



50411,37 kg
NET WEIGHT
IN INPUT

Potentially infected medical waste (CER 18.01.03)

Monitoring start date: 11/07/2022

[View history >>](#)



35575,7 kg
NET WEIGHT
IN OUTPUT

Undifferentiated Urban Waste (CER 23.03.01)

Monitoring start date: 11/07/2022

[View history >>](#)

Environmental Performance: Climate Change



20845.16 kg
CO2 EMISSIONS
SAVED

Reduction of the Carbon Footprint calculated by the LCA study and compared to the total waste treated updated in real-time.

Monitoring start date: 11/07/2022

[View history >>](#)

Equivalent to the carbon absorbed by*:



345

Tree seedlings
grown for 10 years



7.2

Tons of waste recycled
instead of landfilled



790

LED bulbs
replacing the traditional ones



The Environmental Benefits



“thank you for
your **ATTENTION**
:)”





AUTOCLAVES WITH BUILT IN SHREDDER FOR THE TREATMENT OF INFECTIOUS HEALTHCARE WASTE

January 2024

Benjamin LOBBE | Tesalys Business Development Manager - Asia Pacific



Member of :





ON SITE TREATMENT OF HEALTHCARE WASTE BY GREEN AND SUSTAINABLE TECHNOLOGY



Made in Toulouse, France

1500 sqm manufacturing footprint,
ISO 9001, CE certification



800 + units installed

Presence in 80 countries -
100 distributors

TESALYS STERIPLUS™ & STERISHRED® RANGES

COMPACT EQUIPMENT FOR SMALL / MEDIUM MEDICAL CENTERS UP TO LARGE HOSPITALS

4 MODELS WITH CAPACITIES FROM 4KG/H
UP TO 100 KG/H



STERIPLUS™ 40
10T /YEAR



STERIPLUS™ 80
20T /YEAR



STERISHRED® 250
70T /YEAR



STERISHRED® 700
150T /YEAR

SERVICES



INSTALLATION



QUALIFICATION



MAINTENANCE

EXAMPLES



STERIPLUS™

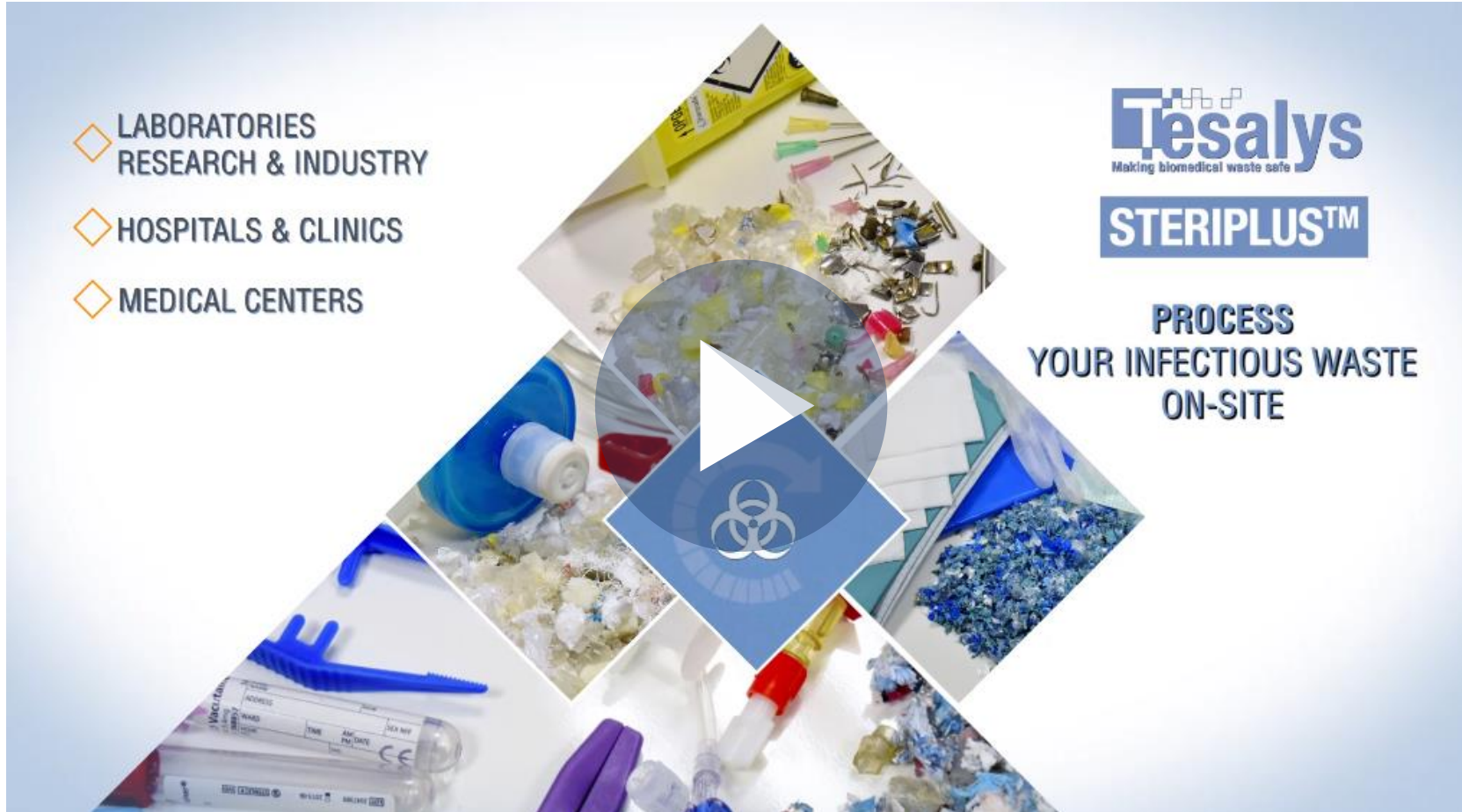
Heart of TESALYS system

- ◇ LABORATORIES
RESEARCH & INDUSTRY
- ◇ HOSPITALS & CLINICS
- ◇ MEDICAL CENTERS

Tesalys
Making biomedical waste safe

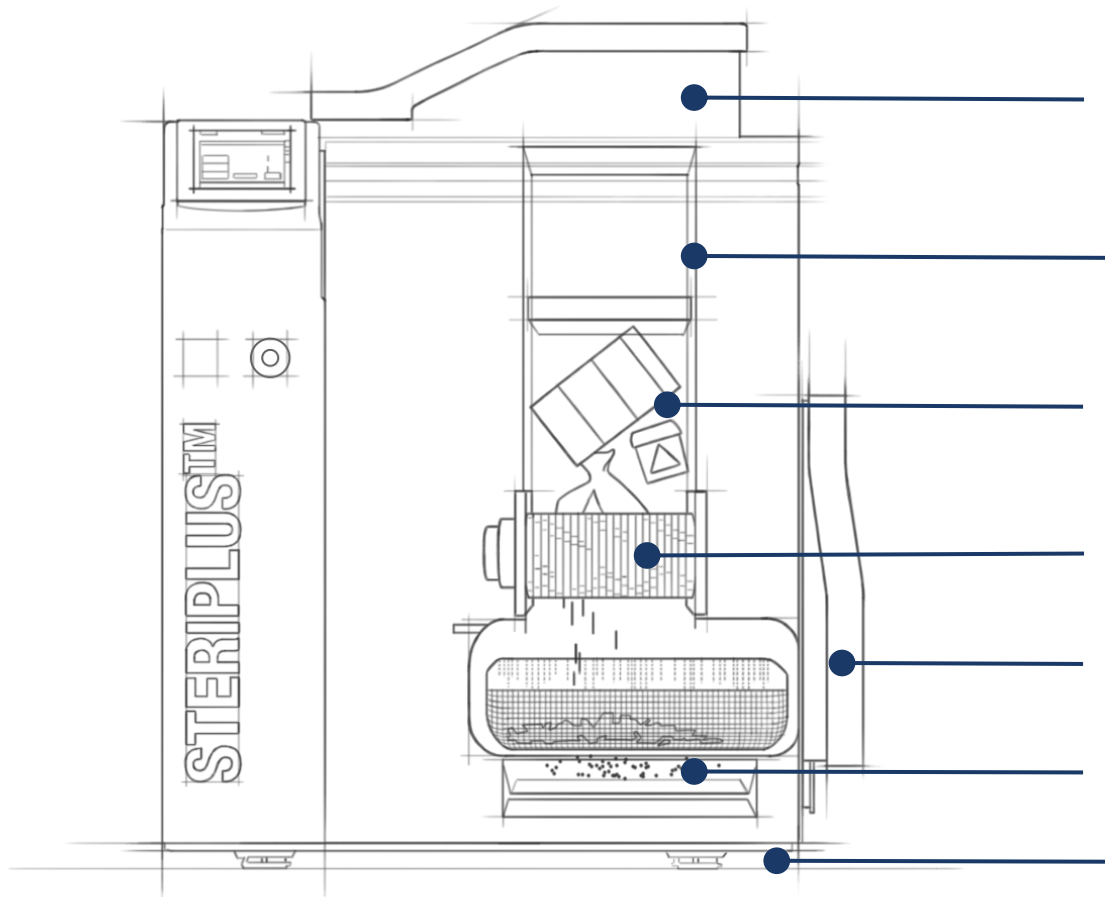
STERIPLUS™

**PROCESS
YOUR INFECTIOUS WASTE
ON-SITE**



INTEGRATED SHREDDER- STERILIZER

Tesalys systems : safety and high performance



Closed & secured system (airtight pressure vessel; no odours; no noise)

Water & Energy saving (low electricity consumption & 90% less water consumption than standard autoclaves)

Separate but connected shredding & sterilization chambers: easy & safe access to the waste in case of shredder blockage

Premium shredding efficacy (shredded material 8 -15 mm size)

Loading / unloading through different doors

Segregation of solid & liquid waste (facilitates drying)

Ergonomic & extremely compact

SOME EXAMPLES

HCW BEFORE AND AFTER TREATMENT



Laboratory /
Pharmaceutical waste



Medical centers/wards
(Sharps, needles, used vaccines'
vial)



Hemodialysis / small body
parts



Healthcare waste, PPE
equipment

Up to 85% waste volume reduction

STANDARDS

NFX30-503 : the most strict standard



CERTIFICATIONS



EU DECLARATION OF CONFORMITY

- EU Declaration of conformity – CE (Machinery Directive)
- EU Declaration of conformity – CE (PED Pressure Equipment Directive)

LNE CERTIFICATE

- Certificate of conformity of infectious waste management systems by French MOH

TÜV CERTIFICATES

- Certificate of pressure vessel manufacturer by TÜV (notified body)
- ISO 9001 certificate for Quality Management System by TÜV

LABORATORY TESTING

- Independent laboratory testing according to standards NFX 30-503-1, ISO 17665, ...
- Independent laboratory testing of microbial efficiency (bacteria, viruses including Covid-19,...)

COMPLIANCE

- Approvals from 25+ US States (Florida, New York, North Carolina,...)
- STTAAT Level 4 compliance



Treatment of HCW in developing countries: a public health issue

- Unsafe transportation to uncontrolled dumpsites
- On-site treatment with highly polluting incinerators
- On-site treatment with autoclaves
- Dumping, open burning

ENVIRONNEMENTAL IMPACT STUDY OF TESALYS SOLUTION

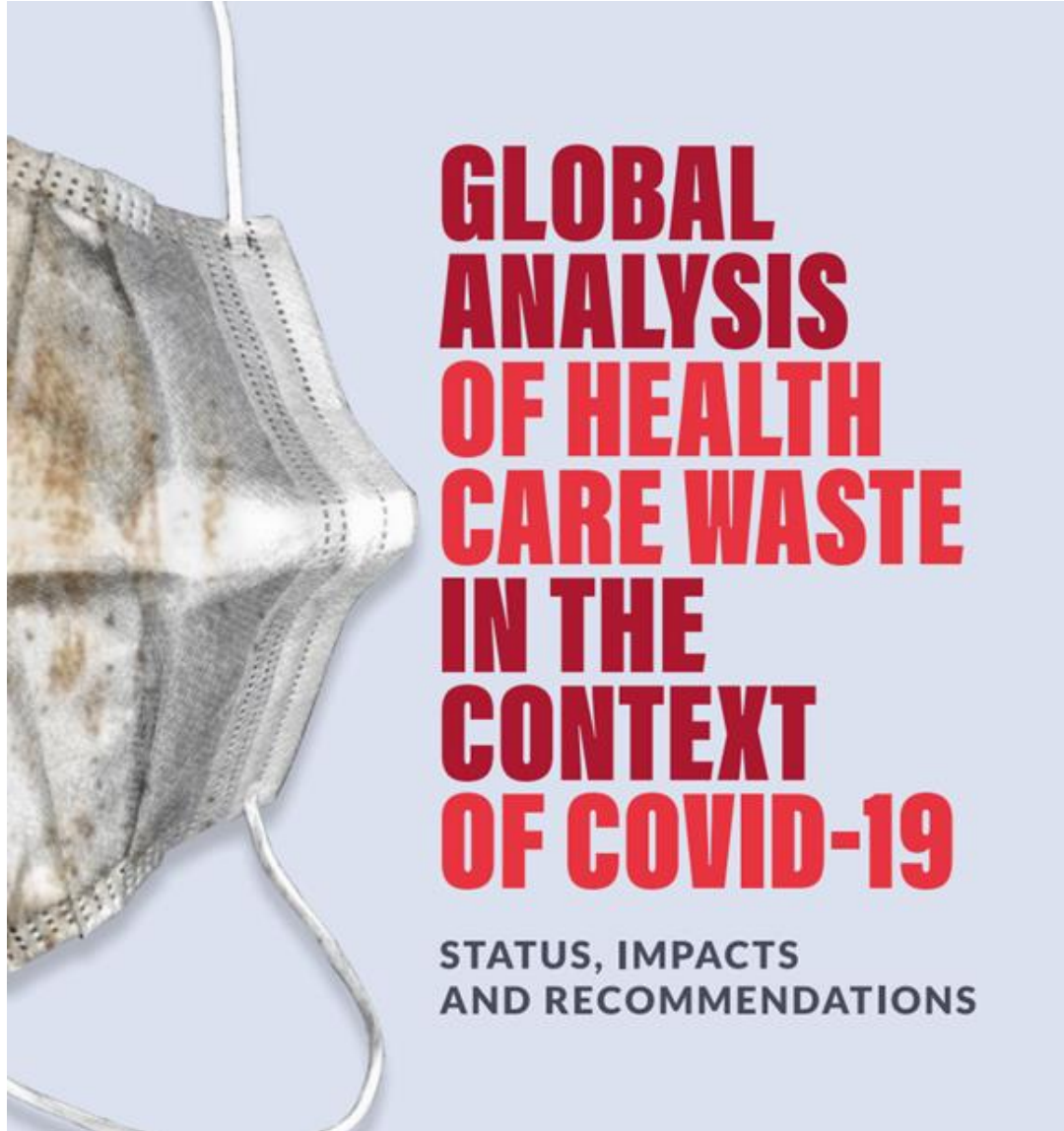
For a 250 bed hospital

On-site treatment vs transport & incineration

110 Tons of equivalent CO2 avoided/year :

Equivalent to the pollution generated by 150 city cars or 1 car
traveling 12 000 times around the world





GLOBAL ANALYSIS OF HEALTH CARE WASTE IN THE CONTEXT OF COVID-19

STATUS, IMPACTS
AND RECOMMENDATIONS

TESALYS ON THE 2022 WHO
GUIDE ABOUT Covid-19 waste
treatment

“

"The ultimate aim should be use of non-burn
technologies such as autoclaves "

"Over time, non burn technologies costless"

TESALYS ON THE NEW WHO GUIDE ABOUT infectious waste treatment



Overview of technologies for the treatment of infectious and sharp waste from health care facilities



management and reduce the environmental impact of such practices are being addressed through climate smart and green health care facility initiatives, vaccine waste reduction efforts and patient safety campaigns.



1. Introduction 5

STERIPLUS™ 40
used by WHO to show small machines
for biomedical waste treatment

A safety margin of 20% should be added to the total to cover fluctuations in waste generation rates.

The amount of waste generated per day (kg/day) should be divided by the number of working hours per day of the waste treatment equipment to achieve the minimum treatment capacity needed (kg/h). If the treatment technology is only operated on specific days (e.g. Monday to Friday) the required capacity can be adapted. The cycle time of treatment technology is defined as the time needed for adding in waste, treating, and removing waste. An additional hour for the start-up of the treatment system should be considered.



3. Selection of treatment technologies 11

STERISHRED® 700
used by WHO to show big machines
for biomedical waste treatment

Installation requirements

- Electricity: 400 Volt
- Water connection
- Quality of water for steam generation: soft water/demineralised water
- Waste water connection
- Compressed air

Figure 5. Autoclaves with internal shredder



Credit: Teuco/Santibet, France

Capacities and consumptions

Capacities of autoclaves with integrated shredding range from 5 to 3000 kg/hour. The cycle time includes the time needed for complete treatment including adding waste, shredding, steam exposure, and waste removal. The tables below provide some examples of capacities and consumption for autoclaves using a built in steam generator and an external steam source. The data are approximate and based on maximum load capacity per cycle, and with standard configuration of parameters.

	2.5	5	10	15
Capacity (kg/cycle)	30	30	30	45
Cycle time (minutes)	1	2.5	4	15
Energy Consumption (kWh/cycle)	5	10	15	85

Data provided by Teuco/Santibet, France. Energy is calculated with a built-in generator.

20 Overview of technologies for the treatment of infectious and sharp waste from health care facilities

Our video presentation
used by WHO to show Autoclaves with internal
shredder

IDEAL FOR SMALL / MEDIUM SIZE HOSPITALS IN REMOTE AREAS

Remote support from France / Asia Office thanks to our 4G & WiFi equipped machines



On site support by our trained & Tesalys certified partners



Smallest all integrated device for small & medium size hospitals



100+ installations performed on islands & remote areas located far from main cities / waste treatment hubs

STERIPLUS™

IDEAL FOR SMALL / MEDIUM SIZE HOSPITALS IN REMOTE AREAS

SOME INSTALLATIONS ASIA PACIFIC



Philippines
Sterishred & Steriplus



Vietnam / Thailand
Sterishred & Steriplus



Malaysia
Steriplus 80



Bangladesh / Mongolia
Steriplus 40



Philippines
Sterishred 700



Cambodia
Steriplus 80



Japan
Steriplus 40



Indonesia
Sterishred & Steriplus

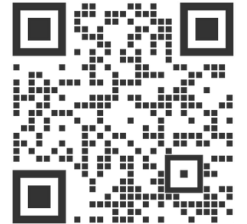
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THANK YOU FOR YOUR ATTENTION !


Resalys
Making biomedical waste safe

03. Operations & Maintenance requirements and capacity building/ training

JOIN
US
NEXT
TIME

TECHNICAL SERIES

ACHIEVING SUSTAINABLE HEALTH CARE WASTE MANAGEMENT



Part 3 - Facility-Level Activities: Managing Health Care Waste

Tuesday, February 20

9:00 WAT / 11:00 EAT / 15:00 ICT

This three-part webinar series, hosted by UNICEF and GAVI in association with TechNet-21, will orient participants on the key actions needed to address health care waste. Session 3 will address facility-level activities including assessments and capacity building required to appropriately managed health care waste.

