Laboratory Biological Waste Disposal Guidance

Introduction

The disposal of biological waste is regulated by the Health and Safety Executive, the Environment Agency, the Human Tissue Authority and in some instances the Home Office.

The aim of this guidance is to provide information to enable you to dispose of biological waste safely and comply with the Environmental Permitting (England and Wales) Regulations 2010. It should be read together with the project risk / COSHH / GMO assessment which should state how waste will be treated for disposal and the Laboratory Waste disposal policy.

It is important that the information in this guidance is followed both for your safety and for the safety of others.

If you have any doubts about how to deal with your waste you can speak your line manager, a member of the core facilities team or a member of the SHE Office.

Hazards associated with disposing of Laboratory Waste

1. Failure to destroy pathogenic organisms.
2. Failure to destroy genetically modified organisms
3. Leakage of material from sharps boxes.
4. Leakage of material from split waste bags.
5. Sharps injury due to needles of other items not being placed in the correct receptacle.
6. Pathogenic waste being stockpiled within laboratories.
7. Injury to contractor staff handling caddies.

Problems that could cause rejection of the waste by the waste contractor.

1. Bags being placed in the wrong caddy.
2. Bags and sharps boxes being mixed in the wrong caddy.
3. Caddies being over-filled

Waste Disposal Procedure

The most important step in the disposal of your waste is the correct identification if the waste type and determining whether it needs to be treated prior to disposal.

1. Identify the waste type.

Human Anatomical waste

Human cell lines

Human Biohazard Group 1

Human Biohazard Group 2

Human Biohazard Group 3

Genetically Modified Organisms

Specified Animal Pathogen Order (SAPO) organisms

Non-human Cell Lines

Soft plastic pipettes

Hard plastic pipettes

Tissue culture plastics

Electrophoresis / Western blotting waste

Toxins

2. Does the waste need to be destroyed?

Waste that contains or has been contaminated by the following should destroyed.

Human Anatomical waste

Human cell lines

Human Biohazard Group 2

Human Biohazard Group 3

Genetically Modified Organisms

Organisms listed on Schedule 1 of the Specified Animal Pathogen Order

Toxin

3. Identify the appropriate destruction method

Autoclaving at 134^{o}C

Validated chemical destruction (e.g. Virkon, Bleach, NaDCC)

4. Identify the appropriate disposal method

Non-sharp waste

Offensive waste Tiger stripped bag or Bio-bin

Untreated infectious waste containing chemicals Yellow waste bag or Bio-bin

Untreated infectious waste not containing chemicals Orange waste bag or Bio-bin

Cytotoxic / Cytostatic waste Purple bag or Bio-bin

Anatomical waste Red lidded sharps box or Bio-bin

Sharp waste

Sharps hard plastic pipettes waste Yellow sharps box or Bio-bin

Sharps Cytotoxic / Cytostatic Purple lidded sharps box or Bio-bin

Sharps used to dissect anatomical material Yellow sharps box or Bio-bin

Destruction Methods

The following methods of disposing of biological waste are available within SGUL

Autoclaving on a destruction cycle at 134^{o}C

Chemical treatment using a validated disinfectant

Autoclaving

All Biohazard group 3 organisms and Genetically Modified Organisms (GMO's) at class 3 must be destroyed by autoclaving at 134^{o}C. It is also preferable that Biohazard group 2 and GMO class 2 organisms are treated at 134^{o}C however a validated chemical destruction method can be used.

Toxins should be denatured by treating at 134^{o}C.

Chemical destruction

Certain biological agents including biohazard group 1 and 2 and GMO class 1 and 2 organisms, primary and secondary cell lines, cell cultures, etc can be destroyed using an appropriate concentration of disinfection.

Virkon, Sodium Dichloroisocyanurate (NaDCC), Sodium Hypochlorite or other chlorine releasing agent can be used to destroy material at the end of work. Tests must always be carried out to ensure that the concentration of disinfectant chosen is effective against the material being treated as liquid media containing high concentrations of protein e.g. BSA or blood will reduce the available free chlorine.

Autoclaves

Use of autoclaves

Laboratory waste that is to be autoclaved, including GMO's, pathogenic organisms or toxins, must be treated on a destruct cycle at 134^{o}C. The length of time required to ensure destruction of the material should be given in the lab protocol. At a minimum, material should be autoclaved for 30 minutes.

121^{o}C is normally used to for sterilisation.

The types of metal boxes used for autoclaving bags and other items are a local decision and should be considered during the preparation of the project risk assessment as the volume of material may vary depending on the experiment.

Location of autoclaves

An autoclave is available in room 2.042 corridor 3 2nd floor Jenner Wing a SAL autoclave is available for use in room 2.119 2nd floor Jenner Wing. Training in the use of the machines should be obtained from Joanna Nolan (extn 0139).

Sources of sharps boxes, Bio-bins and bags for waste disposal

Sharps Boxes

Seven and 22.5 Litre sharps boxes can be obtained from Site Services.

- Red lidded sharps boxes are available for anatomical waste
- Purple lidded sharps boxes are available for cytotoxic / cytostatic waste
- Yellow lidded sharps boxes are available for pathogenic or GMO contaminated waste or certain chemicals

Bio-Bins

These can be ordered directly from Econix www.econix.co.uk or from Fisher Scientific.

One litre, two litre, five litre, 6 litre Pipette suitable for pipettes and 30 litre bins are available. The bins are made of cardboard and are lined with different coloured plastic waste disposal bags. Bio-bins cannot be autoclaved.

- Purple lined bio-bins are available for cytotoxic / cytostatic waste
- Red lined bio-bins are available for anatomical waste
- Yellow lined bio-bins are available for untreated pathogenic or GMO contaminated waste
- Orange lined bio-bins are available for untreated pathogenic or GMO contaminated waste
- Tiger stripe lined bio-bins are available for offensive waste or treated pathogenic or GMO contaminated waste

The Bio-bin 6Ltr Pipette can be used for disposing of hard serological pipettes. The smaller bins can be used for loops, swabs and pipette tips.

Waste bags

The different coloured waste bags can either be ordered from Site Services or via Science Warehouse.

Autoclave bags can be order via Science Warehouse. Polypropylene bags that are resistant to 134^{o}C must be used for the destruction of pathogenic or genetically modified organisms. HDPE bags are normally only resistant to 121^{o}C.

Tags for Waste bags

The tags for sealing the waste bags and labelling sharps boxes or Bio-bins can be obtained from the core facilities staff Yvette Bland, Ian Connoley or Penny Lympany

Disposal of bags, boxes and Bio-bins

Waste disposal bags

All bags must be tagged with the tag that is being used by the laboratory in which you are working. You must write your name and extension number on the bag before disposing of it in a caddy.

Sharps boxes

These must be sealed by making sure that the lid closure engages with the flap on the box. All four corners on the rectangular boxes should firmly click onto the corners of the base. The lids should click firmly onto the circular base.

You should tag the box and then write your name and extension number on the sharps box before disposing of it in a caddy.

Bio-Bins

These must be assembled as shown on the side of the Bio-box. Take care not to exceed the maximum indicated weight otherwise the Bio-bin will spilt. You must tag the box and then write your name and extension number on the sharps box before disposing of it in a caddy.

Waste Stream Poster

A poster providing guidance for the disposal of bags and boxes in the different waste streams, which are identified by colour, is available at the end of this document for printing and displaying in the laboratory.

Caddy Signs

All caddies within Jenner and Hunter Wing used for biological waste disposal are positioned below wall mounted signs. The information on the signs ***must*** be followed as it is possible that the caddy lid colours may change.

Caddies must never be over-filled as the waste contractor will not remove them. If caddy is full contact the estates helpdesk on extn 1234 option 2 and request another caddy.

Waste must never be left on top of a caddy or on the floor beside a caddy. The bags will not be removed by the cleaning contractors.

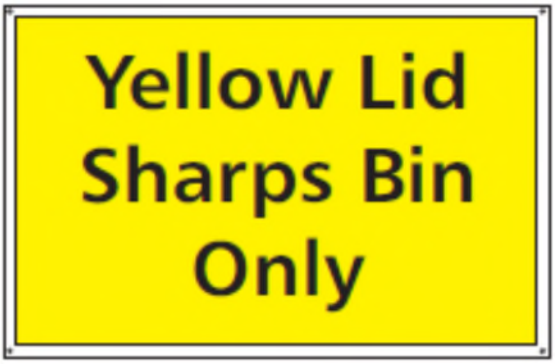
Caddies for Yellow Clinical waste bags

These caddies are yellow but may be yellow with an orange lid

Only yellow bags should be placed in these caddies.

Caddies for Yellow or Orange Lidded Sharps Boxes or Bio-Bins

These caddies are completely yellow.



Only yellow lidded or orange lidded sharps boxes should be placed in these caddies.

Caddies for Orange Clinical waste bags

These caddies are yellow but may be yellow with an orange lid.

Only orange bags must be placed in these caddies.

Caddies for Cytotoxic / Cytostatic Waste

These caddies are yellow but may be yellow with a purple lid.

Only purple and yellow stripped bags containing cytotoxic / cytostatic waste or Purple lidded sharps boxes or Purple lined Bio-bins may be placed in these caddies.

Anatomical Waste caddies

These caddies are yellow but may have a red lid.

Only red lidded sharps boxes or red lined Bio-bins containing definable human anatomical waste must be placed in these caddies.

Keys for Caddies

Keys for the caddies should be available within the local laboratory. If keys are unavailable, a key can be obtained from Ian Connoley or from the SHE office.

Disposal of other waste types

Chemicals

Arrangements for disposing of chemicals should be made with the SHE office. A chemical waste disposal spreadsheet should be completed and e-mailed to the SHE office. The form is available at this link https://portal.sgul.ac.uk/she/forms-1/chemical-waste-disposal-spreadsheet-2014-split-windows-ver2.xlsx

Radionuclides

Arrangements for disposing of radionuclides should be made with the SGUL Radiation Protection Officer Julius Akiyu who can be contacted on 3721.

Waste Electrical and Electronic Equipment (WEEE)

Arrangements for disposing of WEEE should be made with the SHE Office administrator Angela Peterkin who can be contacted on 5365. A WEEE decontamination form must be completed. The form is available at this link https://portal.sgul.ac.uk/she/forms-1/decontamination-certificate

Location of clinical waste caddies

JENNER WING - Floor 2				
Clinical Waste Caddies				
Location:		***Corridor 1*** */ Room 2.002*		
Orange	Purple	Red	Yellow	Offensive
0	1	0	0	0
Clinical Waste Caddies				
Location:		***Corridor*** *6 / JW20 Lift*		
Orange	Purple	Red	Yellow	Offensive
1	0	0	1	0
Clinical Waste Caddies				
Location:		***Corridor 7*** */ Room 2.208*		
Orange	Purple	Red	Yellow	Offensive
0	0	0	1	0
Clinical Waste Caddies				
Location:		***Corridor 10*** */ Room 2.026*		
Orange	Purple	Red	Yellow	Offensive
1	0	0	1	0
Clinical Waste Caddies				
Location:		***Corridor 10*** */ Room 2.141*		
Orange	Purple	Red	Yellow	Offensive
1	0	0	1	0

JENNER WING - Ground Floor				
Clinical Waste Caddies				
Location:		***Corridor 6***		
Orange	Purple	Red	Yellow	Offensive
2	1	0	3	0
Clinical Waste Caddies				
Location:		***Corridor 7*** */ Room 0.224*		
Orange	Purple	Red	Yellow	Offensive
0	0	0	0	1
Clinical Waste Caddies				
Location:		***Corridor 10*** */ Room 0.024*		
Orange	Purple	Red	Yellow	Offensive
0	1	0	1	0

JENNER WING - Basement Floor				
Clinical Waste Caddies				
Location:		***Corridor 1*** */ Street JW19 Lift*		
Orange	Purple	Red	Yellow	Offensive
1	0	0	1	0
Clinical Waste Caddies				
Location:		***Corridor 6*** */ Street JW20 Lift*		
Orange	Purple	Red	Yellow	Offensive
1	1	0	2	0

JENNER WING - Floor 1				
Clinical Waste Caddies				
Location:		***Corridor 4*** */ Room 1.127*		
Orange	Purple	Red	Yellow	Offensive
1	0	0	0	0
Clinical Waste Caddies				
Location:		***Corridor 6*** */ Room 1.148*		
Orange	Purple	Red	Yellow	Offensive
0	0	0	1	0
Clinical Waste Caddies				
Location:		***Corridor 6*** */ JW20 Lift*		
Orange	Purple	Red	Yellow	Offensive
0	0	0	1	1
Clinical Waste Caddies				
Location:		***Corridor 7*** *- Microbiology Lab*		
Orange	Purple	Red	Yellow	Offensive
2	0	0	1	1

HUNTER WING				
Clinical Waste Caddies				
Location:		***Floor: 5*** */ Corridor 3*		
Orange	Purple		Yellow	Offensive
1	0	0	1	0
Clinical Waste Caddies				
Location:		***Floor: 4*** */ Corridor 1A*		
Orange	Purple	Red	Yellow	Offensive
1	0	1	1	0

Waste Streams

Waste must be labelled with the name of the individual sealing the container and sealed with the appropriate tag. The bags or boxes containing the waste should then be placed in the appropriate caddy for that stream. Caddies are placed at various locations on each floor with the waste stream clearly identified by a sign on the wall.

Boxes containing sharps in the yellow or orange stream must be put in separate caddies from bags in that stream. Waste streams must be segregated and not be mixed with the *only* exception being that orange lidded sharps boxes may be placed together with yellow boxes in the same caddy.

Black Stream (domestic/municipal waste)

This colour stream should be used for non-hazardous waste including packaging material.

Bags containing the waste will be collected from offices or from waste bins placed outside laboratories.

Black and Yellow Tiger Stripe Stream (offensive waste sent to deep landfill)

This colour stream should be used for offensive waste, for laboratory waste that is not contaminated by hazardous chemicals* or for waste that has been pre-treated by autoclaving or chemical inactivation followed by draining. Waste in this stream that is composed of hard plastic pipettes or other sharps that could puncture the bag should be enclosed in containers that will prevent the bag being punctured.

Orange Stream (clinical waste to be rendered safe - usually by autoclaving)

In special circumstances waste contaminated with low levels of viable organisms may be discarded in the orange stream for autoclaving off-site. This stream must not be used for pathogenic material or genetically modified organisms†, which should both be inactivated by validated means and then discarded in the black and yellow tiger stripe stream. Waste that is composed of hard plastic pipettes or other sharps that could puncture the bag should be discarded into orange lidded sharps boxes. Any orange bags must be put in caddies for the orange stream.

Yellow Stream (clinical waste contaminated by hazardous chemicals to be incinerated)

This colour stream must be used only for inactivated pathogenic material† that additionally may be hazardous due to its contamination by chemicals or toxins*.

Yellow bags may also be used for hazardous chemical waste from experiments (e.g. acrylamide gels) and for used spill granules. Waste that is composed of hard plastic pipettes or other sharps that could puncture the bag should be discarded into yellow lidded sharps boxes.

Purple Stream (*cytotoxic / cytostatic waste to be incinerated at high temperature)*

Purple and Yellow stripped bags should be used only for soft waste that may be hazardous due to its contamination by either cytotoxic or cytostatic chemicals or drugs*.

Purple lidded sharps boxes should be used for hard plastic pipettes or other sharps that may be hazardous due to their contamination with cytotoxic / cytostatic chemicals*.

Red Stream (anatomical waste to be incinerated)

The red stream is used for definable human anatomical material only.

* The aim is to segregate waste for safe disposal that minimizes risk to handlers at the lowest environmental cost (energy consumption). A risk assessment should be performed to determine whether the extent of contamination of the waste article by any chemical is sufficient to require disposal in a stream other than the black and yellow tiger stripe stream. For example a pipette tip contaminated by a concentrated mineral acid could be hazardous but contamination by the acid at 1mM would not be. Discarding tips with residual contamination by 1mM acid into a stream involving further treatment would be environmentally insensitive.

†In all cases, hazardous pathogenic material or genetically modified organisms should be inactivated by validated means (autoclaving, heat treatment or chemical disinfection) prior to the waste leaving the site. If not additionally contaminated, the inactivated waste should enter the black and yellow tiger stripe stream.