



SOP: WASTE DISPOSAL & RECYCLING

LIQUID CHEMICAL WASTE

STEP 1:

LIQUID WASTE IN LAB:

Collect HAZCHEM Liquid Waste in RED 10L Jerry cans or 25L Drums in labs. The lab HAZCHEM Waste containers **MUST** be clearly labelled with: a) waste stream or b) colour of 25L PVC Jerry Can it must be decanted/discarded in (can use a colour dotted sticker), c) Group Initials/name.



LIQUID WASTE IN STORE:

1. **YELLOW:** Non-Halogenated
2. **RED:** Halogenated
3. **BLUE:** Inorganic Aqueous

Halogenated waste profile

Halogenated waste refers to halogenated hydrocarbons waste – that is why Chemistry's Halogenated waste falls under organic waste. Thus, Chemistry mainly looks at halogenated organic solvents:

- Chloromethane
- Methylene chloride
- Chloroform
- Carbon tetrachloride
- 1, 1- dichloroethane
- Trichloroethylene
- 1,1,1-trichloroethane
- Perchloroethylene
- Chlorobenzene
- o-Dichlorobenzene
- p-Dichlorobenzene
- Ethylene dichloride
- Chloronitrobenzene
- Ethyl Chloride
- Ethylene dibromide
- Dichlorodifluoromethane



NON-HALOGENATED

HALOGENATED

INORGANIC AQUAEUS

Estimated Components in Halo Waste

1. Chloroform: Methanol
2. Chloroform: Ethanol
3. Chloroform: Ethyl acetate
4. Dichloromethane: Water
5. Dichloromethane: Chloroform



Halogenated Component in Mixture e.g.:

- Chloroform – 50 % by volume
- Dichloromethane – 40% by volume

PS: From some of the documentation it seems that if waste contains <10% halogens (chloride, fluoride, bromide, iodine etc) then is not classified as halogenated waste.

Chemistry will ONLY focus on organic halogenated solvent mixes and the % of halogen solvent in mix.

SOLID WASTE:

1. **RED** RUC (Re-usable Container) - Gloves, small plastics, paper towels, filter paper, biological disinfecting tissue paper, used surgical masks and face cloth masks – discard into in lab.

NOT for pipette tips!!



2. Glass (broken or intact) – **GREEN** 100L open head metal drum in gas cylinder store on level 4.
3. **YELLOW** & **RED** 20L buckets - contaminated or broken glass, Pasteur pipettes/small glass ampoules etc. Clearly labelled with “**BROKEN GLASS**” on it.
4. Biological Waste - RUC or 20L **YELLOW** & **RED** buckets placed in strategic areas for the discarding of biological disinfecting waste.
5. **YELLOW** Sharps Containers – sharps, needles, pipette tips



Ensure sharps, sharp edges, Pasteur pipette tips are facing downwards in container.

6. Metal containers –discarded in 100L open head metal drums – gas cylinder store.
7. Silica, Silica/salts mix, TLC plates – **WHITE** 20L open head plastic buckets
8. Organic crystal (with or without metal) vials, HPLC vials - **WHITE** 20L open head metal drums
9. Spillage kit waste – **BLUE** lever open head 50L plastic drums – waste disposal method to be determined by the Safety Officer.



10. Recycle:

- 25L and metal/plastic drums – to be tripled rinsed & either discarded as chemical waste or to be recycled.
- 2.5L clean, empty intact amber glass + plastic bottles

Recyclables to be stored in the old outside flammable.

Arrange with Kimix, Protea Chemicals, Scienceworld for pick-up.

STEP 2: Once HAZCHEM waste containers are 80% full it must be emptied in the **CORRECT** Jerry coloured/labelled can at the satellite station in either in:

- a) dedicated Fume Hood or
- b) Flammable Solvent Store.

- 25L recycle drums are also acceptable to discard liquid waste in.
- Jerry cans or 25L drums not to be stored in Labs.

STEP 3: Dispose of HAZCHEM waste in containers, 25L drums or Jerry Cans in the Hazardous Chemical Waste Store (HCWS) in the clearly marked waste drums/containers.

The HCWS can be opened on **Tuesdays and Thursdays between 12h00 – 14h30** for waste disposal.

- Waste disposal will be staggered to prevent gathering at the store and ensure only 2 persons in the store at a time.
- H3D-lab responsible for own waste disposal schedule and disposal at HCWS.

Complete the HAZCHEM Waste Information Sheet (newest version available on Chemistry Health and Safety Vula site) and send it through to Monique Muller @ monique.muller@uct.ac.za by **8h30 morning** of HAZCHEM Waste disposal and to arrange for a disposal time.

- No chemical waste will be accepted at the HCWS if the completed HAZCHEM Waste Information Excel Spreadsheet was not sent through beforehand.
- Waste may ONLY be transported in the Goods Lift (key can be collected & returned to H3D lab). **The use of passenger lift is ONLY acceptable if goods lift is out of order.**
- See path to be taken in Annexure 1 attached.

For any waste disposal emergencies or information or queries you may contact Monique Muller @ Monique.Muller@uct.ac.za or Blommie Filmer @ Blommie.Filmer@uct.ac.za

ONLY Monique & Blommie will have access and keys to the Hazardous Chemical Waste Store (HCWS). Keys are kept at Monique Muller's Office 6.42.

STEP 4: Properly label each HAZCHEM Waste Container (20L, 25L, 50L 100L metal/plastic drums) and clearly indicate when FULL.

Recyclable empty containers/drums - get key from **Monique Muller** or **Sweetness Dyula-Nozewu** (Science Faculty Stores) for P9 "OUTSIDE FLAMMABLE STORE" and place these containers there.

Monique Muller to arrange with Kimix, Protea Chemicals, Scienceworld to collect.

IMPORTANT: these containers need to be tripple rinsed and washed with detergent.



PACKING & LABELLING PROCEDURES

REDUNDANT & UNKNOWN WASTE DRUMS:

Open Headed (OH) 100L or 20L metal or 50L or 20L plastic drums – solid/liquid waste in glass/plastic bottles packed into drums.

- ✓ Complete Waste Disposal Profile & HAZMAT Disposal Sheet and send through to HAZCHEM waste removal company to forward to Vissershok for disposal methods.
- ✓ On receipt of disposal methods - separate waste into the various waste disposal methods as received from Vissershok.
- ✓ Place a Vermiculite layer (5 - 10cm) on bottom of drum and in between packed bottle layers.
- ✓ Chemicals with same waste stream/disposal methods to be placed into same drum/s.
- ✓ Clearly label drums with waste stream and number to correctly complete waste collection sheet.

NORMAL WASTE STREAMS:

- ✓ All blue 50L drums MUST also be labelled on the top of drum lid and on side with white permanent marker pen of what contents are and drum number e.g. HALO 1; NON HALO 1; INORGANIC 1.
- ✓ White drums/buckets and 25L plastic drums to be labelled with permanent marker or sticker on top and/or at sides.

WASTE REMOVAL/COLLECTION:

- ✓ Complete waste disposal sheet (waste stream, size of container/s, number to be collected and replaced) and send 1 week before collection date to disposal company.
- ✓ MUST reflect the number and size of drums per waste stream to be collected.
- ✓ Label containers to be collected with disposal company's completed label sticker. Stick label on the side of the container/drum. See example of a completed label in Annexure 3.

STEP 5: Monique will complete the Waste Collection and Billing Sheet when containers/drums in HWCS are full and are ready for collection by the HAZCHEM Waste Disposal Company and e-mail it 7 days before the planned collection date. CC (blommie.filmer@uct.ac.za) @ Science Faculty Stores plus: penny.louw@uct.ac.za and Sandeeran.govender@uct.ac.za to co-ordinate possible same day disposal.

IF WASTE IS OUT OF THE ORDINARY WASTE STREAMS and $\geq 25L$ – the HAZCHEM Waste Disposal Company needs to take a sample for testing. This may take up to 1 month to be completed.

WASTE STREAMS TO BE AWARDED BY WASTE DISPOSAL COMPANY – VALID FOR 2 YEARS

Samples & test to be completed every 2 years!

STEP 6: After waste collection; a copy of the Waste Manifest and Classification Certificate plus billing sheet must be received. Scan and send e-copy to Blommie Filmer (Blommie.Filmer@uct.ac.za). Keep a copy in the Waste Store/Disposal File.



GLASS, SHARP and BIOLOGICAL WASTE CONTAINER REMOVAL

Please note that dedicated Departmental Assistants (DAs) will assist in the removal of these containers from labs.

Their duties i.e. to waste removal are as follows:

1. Remove broken glass bins and sharps containers. It **will not** be removed if left open (it is the responsibility of the students and staff to close the lids).
2. They do not remove RUCs - YOU need to remove these yourself!

If you have any concerns, please contact their supervisors: Roxanne Mohunlal, Dalielah Jappie and Claire Lawrence-Naidoo.

RE-USABLE CONTAINERS (RUCS):

- This is a 90L **RED** square container with a red bag liner.
- The RUCs collection – Science Faculty Stores on level 4, PD Hahn Bldg.
- What do you need to do when the RUC is full? It **WILL NOT** be tolerated in the HWCS.
 - a) Your group/area need to ensure that the bag is cable-tied closed.
 - b) The used RUC with cable tied bag must be dropped off in Science Faculty Stores on level 4, PD Hahn Bldg and stacked in front of roller door in gas cylinder store.
 - c) The RUCs collections are arranged for every Tuesday – thus ensure your full RUCs are taken over by latest on the Monday afternoon.





CHEMICAL WASTE STORAGE & STORAGE AREAS

1. **HOUSEKEEPING RULES:** Keep storage area and equipment used Neat & Clean with No Chemical Spillages & Residues.
2. **Group Storage Area ID labels – MUST BE neat & easy to identify!**
3. Handle all chemicals or laboratory waste as HAZCHEM Waste.
4. **KEEP IN MIND**

Storage period may not be more than 90 days for the following hazard ratings and weight:

- i) Hazard Rating 1 (**Extreme Hazard**) – 10kg
- ii) Hazard Rating 2 (**High Hazard**) – 100kg
- iii) Hazard Rating 3 (**Moderate Hazard**) – 1000kg
- iv) Hazard Rating 4 (**Low Hazard**) – 10 000kg

Toxicity Criteria LD₅₀(mg/kg)	Ecotoxicity LC₅₀ (mg/kg)	Hazard Rating
Mammalian	Aquatic	
<5	<1	HR1
5 < 50	1 < 10	HR2
50 < 500	10 < 100	HR3
500 < 5 000	100 < 1 000	HR4

These are found in the SDSs and you will take the Hazard Rating with the lowest LD or LC₅₀.

HAZARDOUS CHEMICAL CLASSES

- ① **Class 1 = Explosives**
- ① **Class 2 = Gases: compressed, liquefied or dissolved under pressure**
- ① **Class 3 = Flammable Liquids**
- ① **Class 4 = Flammable solids or substances**
- ① **Class 5 = Oxidizing substances and organic peroxides**
- ① **Class 6 = Poisonous (toxic) and infectious substances**
- ① **Class 7 = Radioactive substances**
- ① **Class 8 = Corrosives**
- ① **Class 9 = Miscellaneous dangerous substances**



HEALTH & SAFETY ISSUE

1. Store HAZCHEM Waste Containers within secondary containers such as a plastic spill tray. Hazardous wastes must be stored with secondary containment so that spills cannot reach sink, hood or floor drains.
2. Incompatible hazardous wastes must be segregated to prevent reaction. Segregation methods include storing in separate cabinets, storing in separate hoods or storing in separate secondary containment containers such as buckets or tubs/trays.

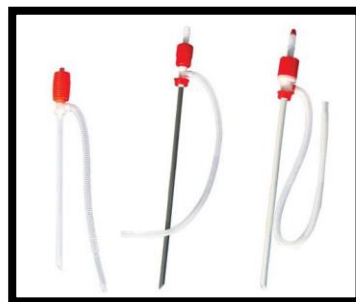


3. Lids must always be on HAZCHEM Waste containers and properly closed.
4. The pressure relieve “valves” on Jerry Cans may be kept open in storage area. NOT when transporting it to e.g. the HCWS.
5. Ensure only the waste of the same chemical waste stream is discarded in that specific HAZCHEM Waste container.
6. Ideally DO NOT store more than 100 litre HAZCHEM Waste/group in laboratory or satellite areas.
7. All research groups MUST have PROPERLY waste stream labelled plastic Jerry Can Containers.
8. Jerry Can Containers need to be cleaned externally each time after it has been emptied.
9. When handling/disposing/decanting any liquid waste – wear proper PPE:
 - a) Closed toe (preferably made of impermeable material) shoes/boots
 - b) Where needed – wear a respiratory mask with correct cartridges (specifically protecting against organic & acid fume & silica inhalation)
 - c) Where needed wear splash proof or enclosed goggles and where possible a face shield as well
 - d) Wear gloves resistant to halogenated solvents - preferably long nitrile gloves
 - e) Inspect trolleys/mode of transport of containers to ensure that they can carry weight and that it is still in a good, non-rickety order and wheels and trays not buckling under weight and that a high force is not needed to push/pull trolley.
 - f) Transport all chemicals, including waste bottles/containers in secondary containers to assist to prevent spillages or that can assist to contain spillages.
 - g) Ensure there is a chemical spillage kit (stocked) in or close to each storage area e.g. inside and outside laboratory/storage area.
 - h) Ensure your path is clear of any obstacles when transporting waste containers out of lab or to satellite stations.
10. When decanting HAZCHEM Waste ensure you are decanting it in correct container/drums.
11. As far as possible use ergonomic techniques for lifting & placing down, moving and decanting heavy containers.
12. If the Chemical Spill kit was used, please ensure it is replenished by informing Monique (Monique.Muller@uct.ac.za) immediately after an incident occurred.
13. In case of a spillage ensure that an incident report form is completed.
14. Report any obstructions on path or ramp on outside of building on route to HCWS to Monique Muller.



HEALTH & SAFETY ISSUE

15. To decant liquids into 10L, 25L Jerry Cans or 50L drums use **ONLY** a funnel or hands pump/syphons that will withstand that specific waste stream. **DO NOT** try to pour via free hand especially from the full heavy container/drum.



HCWS COLLECTION

1. All waste disposal containers/drums must be marked on top.
2. The waste disposal company and disposal label with info need to be placed on one side for collection.
3. Containers (25 and 50L drums) to be filled not higher than 5 - 10cm from the top.
4. Drums need to be labelled with waste disposal company label a day before collection takes place.

EXCESS OR EXPIRED CHEMICALS FOR DISPOSAL

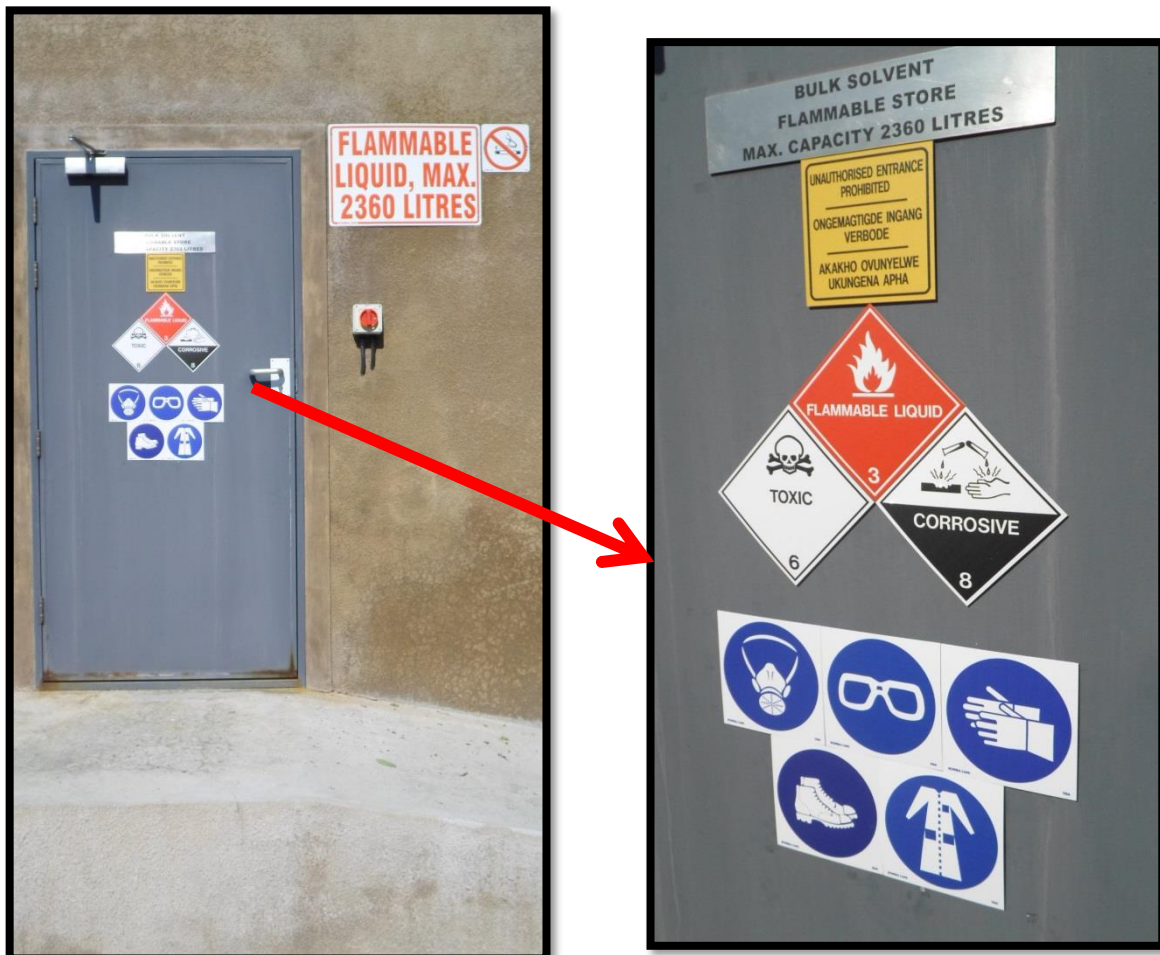
1. If there are small quantities of expired or excess chemicals to dispose of and the waste streams are approved, then it can be disposed normally. Contact Blommie Filmer (blommie.filmer@uct.ac.za) at MCB for solids and Monique Muller (Monique.muller@uct.ac.za) at Chemistry for liquids.
2. HAZMAT Collection cycles will be arranged by Monique Muller every 6 months - June & November of each year.
3. Make a list of all excess and expired chemicals by using the HAZMAT Collection Spread Sheet (placed on Chemistry Health & Safety on Vula).
4. E-mail completed sheet (ONLY columns A to D) to Monique Muller @ Monique.Muller@uct.ac.za
5. Ensure all HAZMAT collection chemical containers are placed together and clearly labelled as HAZMAT items.
6. This may take up to 6 months to be collected!



ANNEXURE 1: SIGNAGE AT HAZCHEM WASTE STORE

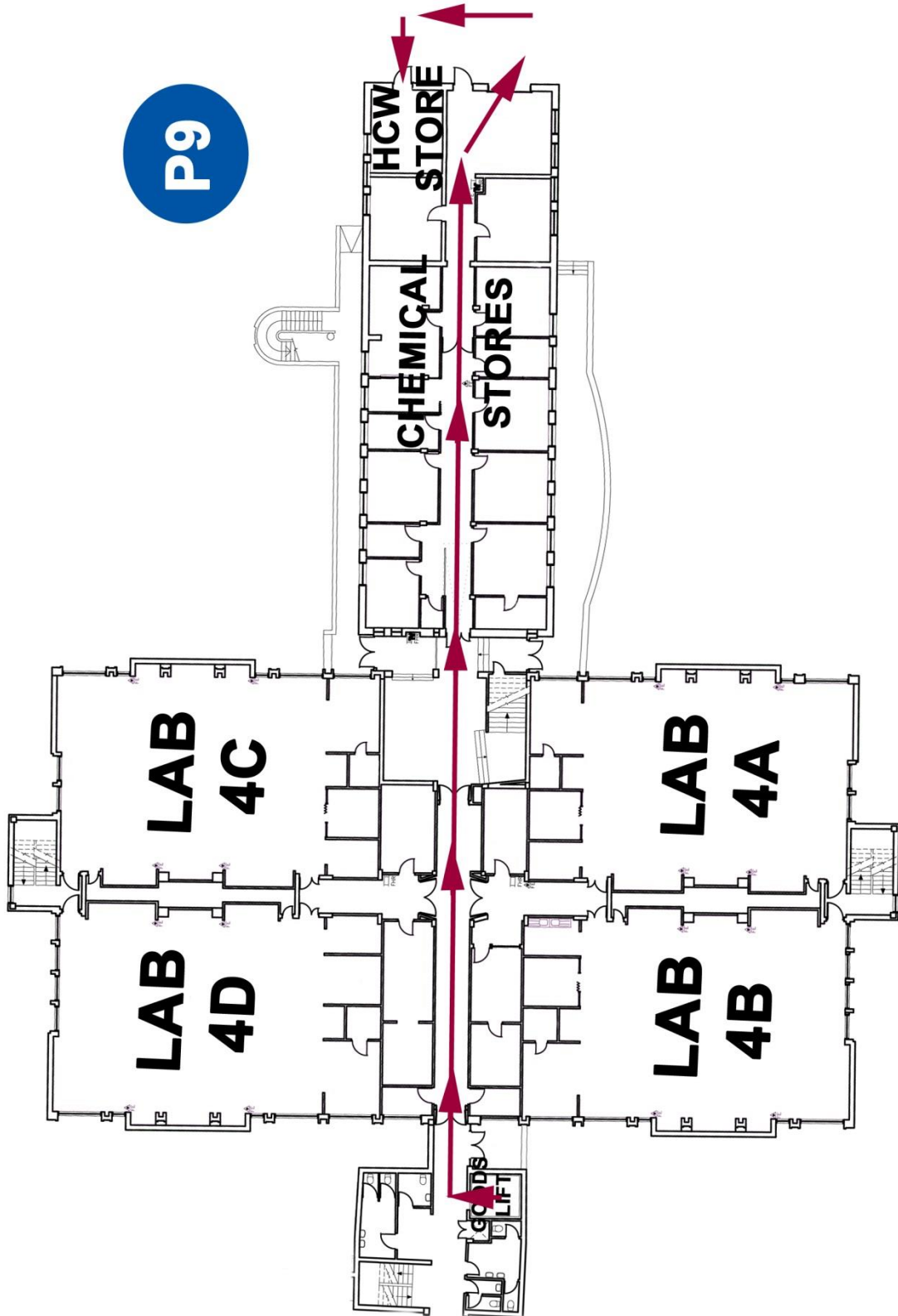
THE FOLLOWING SIGNAGE, INCLUDING EMERGENCY CONTACT NAMES/NUMBERS NEED TO BE ALWAYS PRESENT ON ENTRANCE OF HAZCHEM WASTE STORE. IF NOT PRESENT INFORM MONIQUE MULLER (monique.muller@uct.ac.za) IMMEDIATELY!

THESE MUST BE OBEYED AT ALL TIMES!





ANNEXURE 2: HAZCHEM DISPOSAL PATH PD HAHN LEVEL 4





ANNEXURE 3: HAZCHEM WASTE LABEL

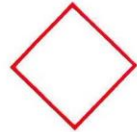
HAZARDOUS WASTE

CUSTOMER NAME UCT-Faculty of Science - Chemistry
TYPE OF WASTE Silica/TLC
VOLUME 50L
DISPOSAL METHOD Trench + 1 bag lime / 50L drum

DATA SHEET NUMBER	MAJOR HAZARD	I.M.D.G NUMBER	F.R.O.T NUMBER	UN NUMBER	S.A.B.S EMERGENCY ACTION CODE
185941	Toxic	6.1	/	3288	/


WASTEMAN
Western Cape
☎ (021) 380-3000

CONTENTS
Silica/TLC





ANNEXURE 4: HAZCHEM WASTE SHEET & WASTE STREAM INFORMATION

DATE

GROUP

Waste Description	Contents	Drum size	No. for disposal
Broken glass + large plastic containers			
HPLC glass bottles with organic samples			
Inorganic aqueous			
Organic halogenated			
Organic non-halogenated			
Organic Solid Waste Crystals - Mixed			
Organic Solid Waste Crystals containg Metal Ions (Inorganic) - Mixed			
Pyridine + Ferriprotoporphyrin XI Liquid			
Pyrridine-2-azo-p-dimethyl analine + nickel nitrate mixture			
Silica			
Silica + Salts Mix			
Silicon Oil			
Solid waste - gloves, small plastics, paper towels etc.			
TCL plates			
Metal Containers			
Vacuum Pump Oil			