Westlab Safety Webinar

Chemical Disposal in School Laboratories.

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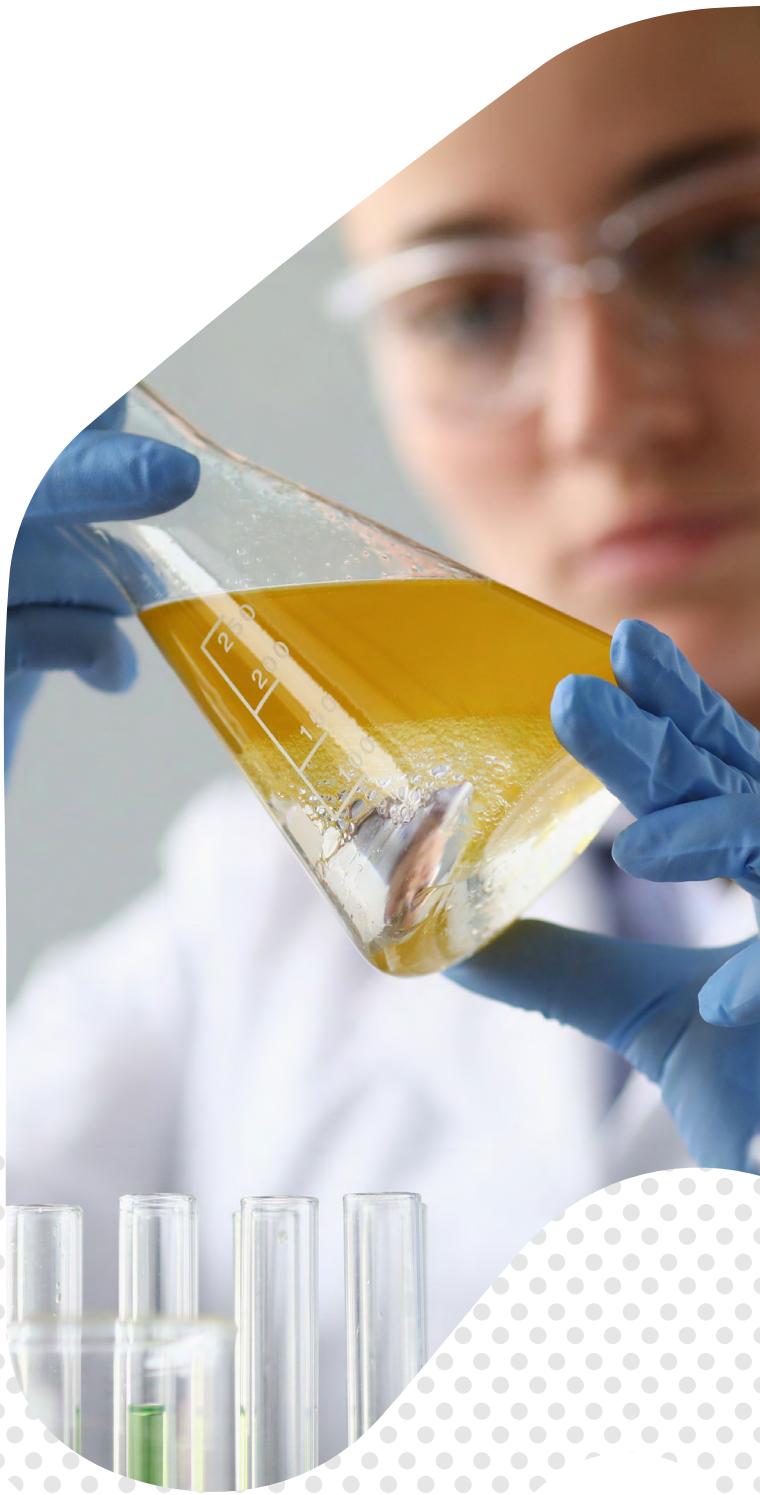
Speaker: Michael Pola

Michael Pola
Michael is a professional chemist with specialised experience in a variety of laboratory settings, including teaching, commercial research laboratories and secondary schools.

He is the Director of Envirostore Chemical Consulting Pty Ltd and practices as an independent consultant.



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This presentation will outline the requirements for safe and compliant disposal of chemicals from school laboratories.

Topics covered:

- the EPA waste tracker,
- correct labelling,
- suitable containers for disposal; and
- the preparation of a manifest.

The aim is to provide the information needed to ensure a pain free disposal experience for the user and for the disposal contractor.

The guest speaker, Michael Pola offers a clear and pragmatic approach based on his extensive experience in chemical waste disposal.

Michael is a professional chemist who after working for many years in the chemical disposal industry has specialised experience in a variety of laboratory settings, including teaching, commercial research laboratories and secondary schools. He is the Director of Envirostore Chemical Consulting Pty Ltd and practices as an independent consultant.

Envirostore Chemical Consulting has been managing small scale chemical waste disposals for many years, especially for school laboratories on the East Coast of Australia, SA. Envirostore currently concentrates on servicing Laboratories in Victoria.

Schools have unique issues regarding chemical disposal when compared to a commercial laboratory. Laboratories can be multidisciplinary and include chemistry, bio, food and environmental science. They use a range of chemicals in the workplace and consequently must deal with and employ safe methods of chemical waste disposal for a variety of chemicals. Some of these can be hazardous if not handled correctly and with caution. For example, a chemical known as SAP (Sayers Allport Poison) an insecticide or pesticide designed to eradicate rabbits and crows on farms, contains 4% white phosphorus or yellow phosphorus and is fatal when consumed.

Suitable Containers for Disposal

Many laboratories use 5 litre Winchester containers for containing used chemicals, although in school laboratories 2½ litre Winchesters are more common.

The question is often asked: "**What is defined as a chemical waste?**"

To clarify this, chemical waste includes redundant chemicals, chemicals no longer being used, empty chemical containers, waste from practical classes or any materials used to clean up chemical spills. The Dangerous Goods class must be taken into account when dealing with all levels of chemical waste, from schools to industrial use.

The Dangerous Good classification is a primary factor in safe waste handling and the method of disposal depends on the chemical or physical properties contained in the waste itself. For example, a Winchester empty of acetylene is categorised as a Class 3 Dangerous Good. Simply labelling the container as 'waste' does not assist in correct chemical disposal, and counts as a dangerous practice for all concerned.

Waste chemicals must be handled in exactly the same way as a Dangerous Good in the laboratory setting, and as an overall safety practice. The properties don't just change because it has become waste! Waste acetylene is still a flammable liquid and waste nitric acid is still a Class 8 Dangerous Good and handling the waste accordingly is crucial to safe handling, particularly when presenting laboratory waste to a professional disposal contractor. Waste from school laboratories is called reportable priority waste and it is essential that a school laboratory should always prescribe their industrial waste.

The EPA Waste Tracker

The term industrial waste means such chemicals must be disposed of under an approved process. Contractors who transport industrial waste must use a vehicle with an Environmental Protection Authority (EPA) permit, and the transport carrying Dangerous Goods must go directly to an EPA licensed premises for treatment. In Victoria this is a regulated requirement – where a licensed premises receives industrial waste, it must be transported in an approved vehicle and both the vehicle, and the receiving premises must be registered with the EPA. The licenses and Permits are now called Permissions in Victoria at least. Industrial waste must also be carefully tracked using a waste tracker which records where the discarded material came from, where it is going and how it got there. This is undertaken by registering online on the EPA Portal, preparing a tracking certificate, and engaging a licensed contractor which is a legal requirement in all states of Australia.

Correct Labelling

The two biggest problems encountered not only with schools but also with disposers are one, correct labelling and two, the use of second-hand containers. Approved containers such as Winchesters should be used for all chemical waste and are available in two types, plastic and glass; and each should be appropriately labelled and constantly checked. The use of domestic containers such as wine, methylated spirits and milk bottles should always be avoided as they present the biggest problems during disposal methods. Schools in particular regularly use the incorrect containers for chemical waste purposes. All chemicals should be treated according to the Dangerous Goods class applied, with no ambiguous labelling and indicate clearly what is in the container as well as the correct chemical formula.

Labels must be unambiguous and provide complete information as to the contents of the container. The label should not consist of just a chemical formula without the chemical name being present. It cannot be assumed that everyone can read a formula. A label showing only CH3CH2SH may be anyone's guess what the actual chemical is. Also, the label should not be an exercise in subterfuge such as "This belongs to Barry- don't touch" or a code such as "solution number R2335a".

Any chemical information of importance, such as the concentration of a mineral acid or whether a liquid is flammable liquid should be on the label. A common example is phenolphthalein solution which is usually dissolved in ethanol but looks water white. It is necessary to make it clear that the phenolphthalein is a solution in ethanol (a class 3 flammable liquid!). It is not possible to put too much information on a label whilst the opposite is certainly also true.

Mineral acid concentration is also important to notate e.g., the difference between 1% sulphuric acid and 90% sulphuric acid, which is vital for a correct treatment disposal process.

Use of Second-Hand Containers

A common fault of Schools is to use second-hand chemical containers for disposal. Historically, Darkrooms used to dispose of the now defunct dark room photography solutions such as developer and stop baths by putting them in orange juice and milk bottles. This is a bad practice, and a proper dangerous goods container should be used. Waste is often stored into these second-hand containers, but the practice is not suitable for safe transport and disposal and is not at all recommended. Even the use of old Winchester 2.5 litre glass or plastic bottles is not encouraged unless it can be ascertained that the waste is suitable for that container and the label is changed. The wrong label is sometimes more dangerous than a deficient label. If a second hand container must be used, it is essential to at least change the label.

Responsible waste companies employ good practices and will supply schools and industry laboratories with the appropriate Dangerous Goods containers to use in the correct manner and should not supply 20 litre containers as they are too heavy to lift. Supply of a 10-litre container is preferable. Many waste companies do not charge for the supply of bottles, they simply charge for the disposal of the contents. It is important to consolidate all liquid wastes into an industry compliant container and label accordingly.

The question arises: **What can be consolidated together?**"

There are only a few rules, the simplest being, that flammable liquids and organic solvents can be consolidated, and generally any solvent can be added to another without fear of explosion or ignition.

Solvents such as alcohols, esters, oils (both vegetable and hydrocarbon), organic liquids (like kerosene and thinners), glycerine, dilute acetic acid etc can all be consolidated.
There is rarely any chemical reaction if organic peroxides and isocyanates are avoided. These are encountered in resin kits for the peroxides, usually polystyrene resins and the isocyanates that are used in two-part paints such as automotive paints. Your school may have an automotive or spray-painting facility that uses polyurethane coatings.

Organic solvents can be combined together in a single container, saving cost on disposal since there is a fee per container.

Another rule, when disposing of aqueous wastes is to match the pH. Acids and alkalis with alkalis. Caution should be taken with nitric and nitrates as they can easily create a chemical reaction. The solvents (Class 3 flammable waste) are the easiest to dispose of with the simplest process to follow.

Where there are bottled preserved specimens (rats, turtles etc.), the preservative is usually formalin and/or ethanol. Many schools have disposed of these due to the formalin and the dangers it could possibly pose to students, staff and the environment. These are however a common disposal item and often don't contain formalin is this day and age.

This picture shows the most common situation where general laboratory chemicals need to be disposed of. Often the colour of the lids has a significance but that varies between manufacturers.

Significantly it's a responsible action to track and account for all waste chemicals that leave the laboratory once that they have served their use, and particularly, to note who is the producer, recipient and trader, and the destination. The ideal is to register (Victoria offers this service) as a waste producer through the EPA portal. Old documentation is not transferable to this register so a new account must be established, where a user name and password is sent within a couple of days to a new user. It is noted that school districts are not categorised as businesses, so therefore a disposer must apply a code to the waste, which in the majority of schools is T100. This code covers all acids and alkalis and indicates where the waste originates - either from a laboratory, research institution or schools in general. Drop down lists on the portal clearly display the address, amount, transporter, treatment type and the waste receiver. The disposer or the school can go to the portal and register the school in exactly the same way as a business does when requiring chemical waste disposal.

The Preparation of a Manifest

When the time comes to generate the waste generation method, first arrange the waste collection with the appropriate waste contractor, proceed to the online tracker and establish the account and register. At this stage the app will generate a trade certificate or the transporter can create it on the client's behalf. At this time all disposers are encouraged to register responsibly before engaging a transporter, which includes all schools and businesses that generate chemical waste - even if a collection is only required once or twice a year.

This picture shows larger scale disposal that can be quite common. These larger scale containers come in the form of kegs and carboys. They safely hold dangerous substances, have a 25-litre capacity and are stable because they sit heavily.

There are also small-scale collections as below, usually from schools as in a Class 8 cabinet, where the stored substance has aged significantly, and unsealed dropper bottles are used as containers.

Whilst correctly labelled, this method of storage has become a problem due to vapour leakage and inefficient containment. Reactions between chemicals can easily occur, and it's important to discourage the use of glass top bottles for this very reason.

For example, concentrated nitric acid can seep from this type of container and react negatively with another acid. There are two different types of Class 8 Dangerous Goods, acids and alkalis, but there is no delineation between Class 8.1 and Class 8.2, although some schools name them 8.1 and 8.2 which does indicate difference. The dangerous Goods code 7.6 still has both acids and alkalis as dangerous good, so this is a good idea. They are incompatible for storage, and not suitable to house in a cabinet together. There must be a physical separation to ensure longevity and safety, and sometimes plastic dividers are used to provide separation in the middle of the cabinet, where there can be acids on one side and alkalis on the other, otherwise two different cabinets are preferable.

In terms of storage, stoppered glass bottles are very ineffective and problems such as fugitive acidic vapours arise. A tray of soda ash (Hydrous sodium carbonate) placed inside the cabinet can help with this as it absorbs any smell fugitive acidic vapours. Metal cabinets are unsuitable for acid storage as the metal is corroded by acidic vapours. Generally, a typical disposal involves the removal of glass tops and dropper bottles which leak and are poor storage solutions.

Disposal into the Waste System

A common question is how to dispose of chemicals down a sink. Whilst highly unadvisable, there still exist under sinks and sink traps which aid disposal into the sewer. This is now generally illegal unless a trade waste agreement is in place, but these are usually designed for large volume producers and schools would not normally register for this. Schools can also however, be culprits in sink disposal as a result of previously installed sink traps. When wishing to empty chemical waste down a sink, the usual process is to contact a local sewage authority such as Valley Water, Robert Water or Hunter Valley Water, who may advise that this kind of disposal is acceptable if the waste is diluted correctly.

In the broader scheme, a sewer is a treatment system that relies on bacteria and microorganisms to treat sewage twice over. If a chemical substance happens to kill the treating bacterium then the system fails to accomplish the task. Bacteria is very vulnerable to copper and silver; nickel, cadmium and mercury are also heavy metals and they're poisonous, so dilution in these cases is a poor approach. **DILUTION IS NOT THE SOLUTION TO POLLUTION HERE**. None of these substances or heavy metals should enter a sewerage system as if multiple disposers are doing it there is no real dilution occurring in the sewer anyway.

Rather convert them to an insoluble substance (easy to do) or treat it as prescribed waste and have it disposed of the correct way. Any low pH, or any acidic liquid should also not enter a sewer, as acid will attack and erode the concrete pipes. Under sink traps were generally placed under a sink in a dark room and are now being phased out; they were used as the first in a series of traps before all waste the waste was sent to a sewer. The waste passed through a trap with calcium carbonate or limestone chips and then as the baffle filled up flowed into multiple other traps. This meant that waste could sit in a trap for some length of time emitting nasty smells, and anything acidic that could cause a problem would be neutralised by the calcium carbonate.

However, since Dark room waste is usually alkaline, calcium carbonate will not neutralise that and consequently, the traps usually installed at the insistence of the local sewage authority in dark rooms were ineffective. The point is, don't put chemicals down the sink even when there is a trap present, as doing this will only antagonise or put the sewage system at risk.

The under-sink traps hence rarely achieved the hoped for “pre-treatment” of acid wastes going to the sewer. They fill up with grease and sludges which coats the chips and rendering them ineffective in the event that some acids were possibly poured into the sink. Many schools have removed the traps and introduced chemical handling practices so that acidic wastes are disposed of to the chemical disposal man along with the other wastes.

In summary- no waste to the sewer unless it is supposed to go there. Use the normal disposal services and don't use the under-sink traps as they achieve very little other than odours and they were never designed to treat any chemical wastes other than mineral acids.

Wastes requiring Special Handling

Medical waste requires special handling; in school or pathology laboratories this would include tissue dissections, bacteria growth on a Agar dish or body tissue. In medical rooms waste includes bandages and band aids and classed as infectious/ medical waste, which requires general disposal by high temperature incineration. Live bacteria plates can be hazardous and should be sterilised by autoclaving or chemical sterilisation using chlorine ethanol before disposal. Sharps, syringes, and dissection materials should be efficiently disposed of as they can be dangerous and should go straight into a yellow sharps medical waste bin - never into general rubbish, for incineration.

The bin is removed with your other chemical wastes. Autoclaved items should be wrapped and have a disclosing tape attached to it and around the outside as proof that the correct temperature and pressure has been achieved. A high pressure or temperature result on the tape should show yellow and black stripes which confirms that the treatment has been effective. Regarding disinfectant or chemical sterilisation, the most common material used is a liquid chlorine, such as sodium hypochlorite pool chlorine which is highly effective. When using alcohol to sterilise and pure ethanol or methanol is not available, it must be at 75% concentration to work effectively. The disposer should not be given live bacteria to remove.

Radioactive waste is unique to school waste disposal, and generally consists of a TCR panel that amplify T cell receptors alpha/beta/gamma/delta sources. In these cases, it is necessary to know how to shield according to radiation safety, which is: to observe time, distance and shielding, and not assume that these precautions will work for all three. For example, lead is only effective for gamma sources (Cobalt 60), beta is shielded with aluminium and alpha shielded with anything solid. Time distance shielding is essentially reducing the time of exposure; which at each metre away from the source the activity decreases by quarters - the inverse square rule. Distance and shielding are the most efficient ways to manage radioactive waste, and a radiation meter should be in constant use to measure the effectiveness of shielding.

Mercury is found in switches, barometers, manometers and thermometers and eventually becomes a disposal item for schools. If mercury spills there is no requirement to evacuate, the simple approach is to soak up mercury with a spill kit that includes a sponge and a specialised container. Alternatively, zinc granules will form an amalgam and the spill can then be physically swept up - avoid using sulphurs as a cleaning agent as it will only expand the material. Waste mercury should not be held in a coffee jar designed to hold 250 grams of coffee. 250 grams of mercury is about an inch, and has a density of 14, so one lead unit to a mercury unit will weigh 14 kilos.

In relation to waste consolidation, Class 3 alkalis will mix safely with each other as will acids. Disproportionate reactions will occur if any acidic liquid is mixed with nitric acid. When mixing to reduce disposal costs, Envirostore Consulting offers free chemical advice on how to mix waste safely. Don’t mix solid waste together, keep it in the original containers. Be aware of dangerous chemicals such as formic acid at 90% concentration which will form carbon monoxide and explode the bottle. Sodium hypochlorite which is a solar pool chlorine, goes off with time, turns into a sludge and remains reactive. Avoid touching yellow phosphorus and white phosphorus which is poisonous and burns very hot. Toluene and other aromatic solvents should not be present in any laboratory.

Envirostore Chemical Consulting provides a list on the website regarding undesirable and dangerous chemicals that should be disposed of responsibly and safely.

Questions.

Can you store white copper solutions in one container?

Yes, but with caution. If a copper nitrate solution acidifies it may emit a brown gas which is nitrogen dioxide. It is advisable to keep nitrate separate. Assuming that they're all a common metal (copper), doesn't mean they can mix together. Apart from copper nitrate; copper sulphate, chloride and others can go in one container.

Can I put mercury into a waste collection, specifically elemental mercury?

Yes, mercury can be included, although leaks should be prevented. When disposing of mercury or an item containing a leak, it should be bagged in plastic or housed in a plastic container for removal.

Regarding hand sanitiser, how do we dispose boxes of outdated product at a school? What's the safest way to dispose of it?

Hand sanitiser contains 75% maximum ethanol or isopropanol. In gel form it will have thickening agents in a solution of water. Sanitiser is categorised as Class 3 because of the alcohol content and should be disposed of as a Class 3. Large amounts of sanitiser can be reclassified as it doesn't go out of date very quickly. It can be reused as long as it remains unseparated.

How does EnviroStore Chemical Consulting calculate the cost of chemical disposal?

The size of the container and the contents are first assessed and the charge is calculated according to units of 500 grams or less. Container disposal is included as it too must be eliminated due to chemical contamination. A full 500-gram container will be charged at the per kilo rate, as will all the waste within. 10 litre carboys are cheaper at only $2.00 a kilo which amounts to $20.00 each. 20 litre carboys will be charged at a higher rate per kilo. Lab bottles will cost about $6 to $12.00 each.

While the calculations are straightforward, the waste is generally charged by weight. There's also a charge for collection and transport, which is a flat $120.00. There's a minimum charge of $350.00 for Victorian schools in the metro area. Envirostore does not charge more than the quoted price unless extra chemicals are added afterwards. If there are more chemicals to dispose of the price can be checked on the website for the manifest, according to the type of chemical, the size of the container and the amount.

How are metal salts by precipitation reactions disposed of? What chemicals are best to use for precipitations, is there a list??

Precipitation of metals can be induced by sulphide, hydroxide and sometimes carbonate. Best example is Barium Chloride and Barium sulphate. There is no list, it is best to ask! Most metals will precipitate as a hydroxide if you use ammonia or lime (Calcium Hydroxide), being the most common one used in industry. Never use sulphides in an acidic environment because you'll get hydrogen sulphide gas give off.

If there's a combination of salty solutions, can we still use precipitation for disposal?

Yes, although it is necessary to know which salts and metals they are. Hydroxide precipitations are the easiest to use apart from Barium Chloride. Calcium salts which are precipitated with sulphate, Barium sulphate and Calcium Sulphate are insoluble in solution) and are good examples.

What should be avoided in such reactions?

Don't put sulphide, sodium sulphide solutions or some other sulphide solution into anything acidic. Don't put ammonia or calcium hydroxide into anything acidic and make sure that the precipitate is neutral or slightly alkaline.

How is waste identified if not labelled correctly for disposal?

Primary information can be gained from the colour of the chemical. Green and blue salts are obvious as to what they are, as are red salts. White powder is generally unknown and must be identified by using spot tests. Spot tests generally will indicate the type of chemical contained in the salts. So, firstly consider the colour. Copper, Nickel, Manganese, Lead are identifiable that way as are salts, Lead Oxide (Yellow or Orange), Copper Sulphate (Blue), Copper Nitrate (Blue but crystalline), Nickel Salts are green. Otherwise, a series of spot tests such as flame tests and spot tests with specific reagents to work out what they are. We need to know what they are because we need to know what to do with them.

What is the safety space for chemical disposal when on a septic system?

A septic system is a miniature version of a sewerage system. Bacteria science applies to a closed system like a septic. Avoid tipping metals, high or low pH substances, grease and oils and fats into the system. The latter substances will break down but will clog up things in the meanwhile. Also, no detergents or excess phosphates. If you are not sure ask and if not sure don't put it into the septic.

What should be done with iodine complex?

The common advice is just to store them so they can be collected for disposal. This is most likely iodine, iodates or iodine metal you should collect them and keep them for disposal. If they're brown, this means there's elemental iodine present and they can be reduced back to an iodide, which is more soluble with a reducing agent such as sodium thiosulphate. As iodine is a disinfectant it should never be mixed with bacteria.

What's the best way to store lithium chloride? Should it be stored in a desiccator?

Yes. As it is a deliquescent that absorbs water from the air and dissolves in it, it must be kept dry. If it has gone to liquid or claggy, it can be placed into an air oven at 100 and 102 degrees, which will dry it out. Desiccated storage is preferable.

How do you deal with unknown chemical waste?

We run through a series of spot tests to work out what the unlabelled items are. We have a FT- IR spectrometer for the organics and some experienced chemists for the inorganic.

If something is dissolved in 5% ethanol, is it organic solvent waste?

Yes, the flash point doesn't really go away with dilution.

Ester waste where there are only a few drops of ester in 250ml water where does the waste fit?

If the ester was flammable then put it into the organic/ flammable waste stream.

How do we label preserved specimens, especially if the original label has faded?

Usually, the only label on these is the description eg "rat nervous system", or "frog digestion".

Do chemicals have an expiry date? We have some chemicals that I'm sure are over 20 years old!

Some do "go off" over time especially the deliquescent ones but they can be reclaimed via drying in one case, some discolour like nitric or potassium iodide solution. Is a case-by-case decision.

How do I know if my school's a registered waste producer (QLD)?

Someone within the school will have been issued with a password and username-usually and they should be able to advise your registration number.

What about empty bottles - i.e. sebacoyl chloride

Empty bottles that have not been rinsed are considered trackable waste so unless you want to triple rinse with a suitable solvent dispose as waste dispose as for other chemicals wastes.

How we can dispose of a broken mercury thermometer?

You just need to contain the thermometer and hopefully any spilled mercury in either a jar or zip lock bag.

Would I be correct in presuming there would be separate EPA registrations etc for different states.

Not sure what you mean by registration unless registered as a waste producer. Unless you are transporting waste interstate just register with the local authority.

Can you include a list of the relevant organisations (i.e., VIC EPA equivalents) for each state/territory when you produce the documentation for this webinar?

They are called an EPA with the "A" usually meaning either Authority except in WA. Contact me, I have the exact names if required.

How about haphazard minerals? For example, Serpentine/Serpentinite. Re. "whiskers"

Some of the minerals were one of the asbestos family, or uranium containing (very toxic) or other radioactive minerals e.g., monazite. The geological name should be checked as it's not the same as the chemical name, E.g., Crocidolite is one of the bad asbestos family. Serpentine minerals are not considered toxic or radioactive.

If you can neutralise the chemical, are you still not allowed to pour it down the sink?

Not recommended.

Is pressure tape and a domestic pressure cooker suitable for bacterial waste?

Yes, I would think so.

Why does autoclaved waste need to be collected by waste disposer? Once everything is dead, shouldn't it be ok to go in general waste?

One would think so, but this type of pf waste won't stay sterile for long.

Can autoclaved agar plates be disposed with normal general waste or does this need to be collected as hazardous waste?

See above. It's also for the safety of the waste collector.

I need to know what containers to use for waste. Organic, heavy metal etc.

The dangerous goods approved carboys we can supply are ideal. DG approved containers.

Must we keep sterilised waste (i.e., autoclaved agar plates) for collection by a waste contractor? How do we store it to prevent new nasties from growing? I was under the impression it could go in the bin once it had been sterilised.

See two above. If you can't wait for the plates to be collected then put into the general rubbish but repack them into good packaging, not loose or visible. The rubbish contractor may object.

Is there a way to reduce certain waste and dispose them down the sink or basically everything needs to be collected by waste companies?

You can reduce costs by consolidation of liquids were applicable. One of the biggest costs for waste treaters is the cost of disposal of packaging We generate about 6 cubic meters a week of packaging.

Do you have any recommended Waste Disposal Contractors for Sydney?

Try ETS.

Are there any chemicals (i.e. Class 0) that can be disposed of in a regular waste bin?

Case by case but sand or aluminium carbonate come to mind for starters.

Were you saying the cardboard sharps containers are not acceptable? This is what I got from the council.

If you've ever been pricked by a needle sticking through the side of one of these containers, you won't use them again. I believe they are even illegal (I could be wrong)

Will the Westlab branded chemicals be available to ChemWatch?

All of our SDS are produced by ChemWatch. There is a ChemWatch number specified on the associated Westlab SDS documents.

If the Chem store has years of residue due to poor ventilation, plus mould from recent weather, should this be cleaned professionally?

Mould is a big problem and some health departments from local Councils have been known to issue unsafe occupational process so yes get the store professionally cleaned.

I treat copper waste with NaOH and warm to PPT..... then filter, wrap the solid and dispose in general waste, the Na_2SO_4 down the sink, is this OK?

It would be cupric hydroxide you are precipitating and should go to disposal company.

You mentioned Xylene, should this chemical not be stored or used in a high school lab?

Xylene is an aromatic solvent like benzene and toluene, and these are considered likely or suspected human carcinogens. Toluene has a single methyl group attached to the benzene ring; xylene has two.

Do chemicals have expiry dates?

No general answer, its chemical by chemical and feel free to contact us.

Do your new chemicals have the category on them e.g., 8, 5.1?

As per above, we don't actually put the number on the label, however we do put the Chemical category on it (i.e flammable, oxidising, corrosive etc)

We have a few old chemicals that have absorbed water or become solid. e.g., NaOH &Iron Chloride. What should we do with those?

I would get rid of the ferric its strongly acidic and reactive, sodium hydroxide the same only alkaline. You could add water to the sodium hydroxide and dissolve and reuse but not nice.

What is your recommendation for labelling mixed chemicals from experiments, ie do we just place lots of labels for each of the different chemicals involved, on the waste bottle?

Write everything that goes into the waste bottle if you can.

Recommendations for storage/disposal of sulphur powder suspended in solution?

Sulphur is a class 4.1 flammable solid, what solution is it suspended in? It's not very water.

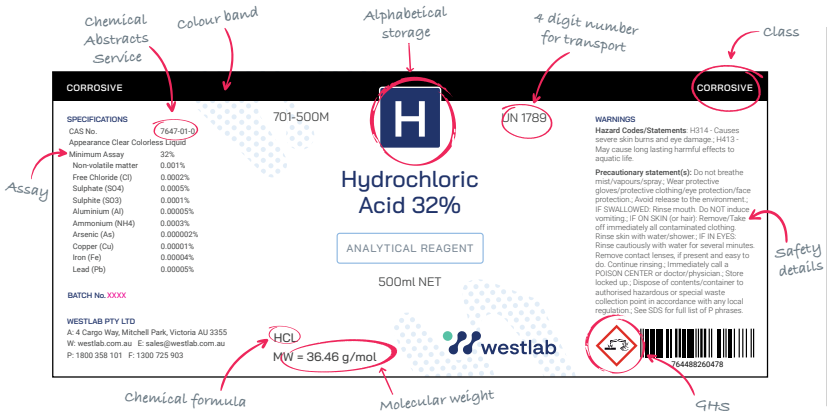
Is there a way to reduce certain waste and dispose them down the sink or basically everything needs to be collected by waste companies?

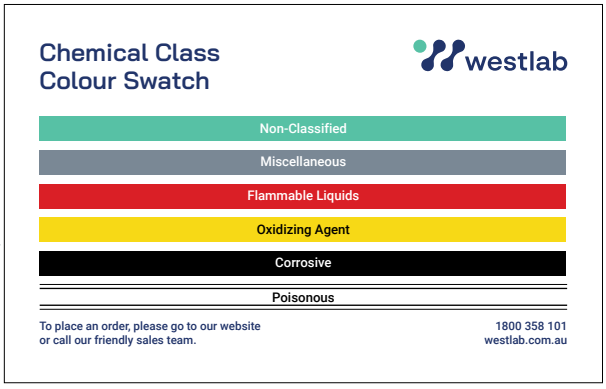
Previous answers as above.

Some helpful hints on precipitation of chemicals?

Your most common precipitants are hydroxide (from ammonia or lime) sulphides, sulphate.

What are the DG classes on all the chemical colour labels on the Westlab chemicals?





Westlab Chemicals

Westlab has released a chemical range that includes the labelling and the packaging of chemicals.

After an Australia wide survey on preferred cabinet requirements, with lab staff, lab techs and lab managers, results showed that labelling was the most desired feature in cabinet supply. By using a colour coding system, at a glance you can see what class the chemical is, and how that ties in with dangerous goods labelling.

Visit this link for more information on the Range of Storage Cabinets:

https://www.westlab.com.au/catalogsearch/result?q=storage%20Cabinets

Discover the Westlab Chemical Range

Discover the wide range of chemicals designed for lab techs

Chemical Storage Cabinets from Westlab

Dangerous Goods storage is available in three different ranges:

1. A Metal Range
2. A non-metal Range.
3. Another non-metal Range especially for Corrosives.

Modulab 4-in-10 Metal Cabinet

Modulab Non-Metal Cabinet

PolyChem Corrosive Cabinet

Mod-U-Lab 4-in-1

This cabinet can be used to store any class of chemical. Westlab actually supplies this cabinet with all the relevant labelling, and then it is again labelled on-site according to your storage requirements. In this range we have five varied sizes, starting with a 30-litre cabinet, 60 litre,100 litre,160 litre and the big 250 litre.

Modular nonmetal cabinet

This modular non-metal cabinet is solely used for Class 9, or corrosive chemicals. These cabinets are made from a high-density polyethylene which gives good longevity when storing chemicals. Nothing in these cabinets can corrode, as it is completely made from polyethylene. None of the hinge pins, or clips are going to corrode, and it offers an excellent lifespan.

The newest range is the Polychem range.

The Westlab Polychem range is Westlab's newest cabinet. This is used as a non-metal cabinet and is made from high density polyethylene.

How does this cabinet differ from the others?

Traditional, flat shelving has been removed and replaced with grapnels tubs, which is a fully injection moulded propylene tub. Once again it is chemical resistant and works as a small spill tray, and able to contain a small amount. This cabinet has a fully bunded bottom, so if anything does spill over the edge of those tubs it gets caught in the bottom.

Acknowledgments to Michael Pola for his contribution to this White Paper.

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