



# Using hazardous substances in fibreglass boat building

## This document contains:

This document gives guidance to the employer or health and safety manager of a boat building business about staying safe with the hazardous substances used in fibreglass boat building.

It includes general guidance about how to comply with the hazardous substances legislation (HSNO).

Your specific compliance needs will depend on the specific hazardous substances your business uses and stores.



**Kiwis love their boats and being out on the water – and New Zealand has a well-earned reputation as home to some of the best boat builders in the world. But building boats can require the use of a variety of hazardous substances that must be safely managed. Whether you're doing a new build or making repairs, you need to know about the substances you're using and how to protect your health and the health of your staff.**

When you work with hazardous substances on a daily basis it's easy to take them for granted. But don't. Six-hundred to 900 New Zealanders die from work-related illnesses, like cancer, every year. Many of these deaths are thought to be from exposure to hazardous substances at work. Other serious conditions like asthma, painful skin rashes and damage to the brain are also possible.

Do yourself a favour, learn about the hazards of your substances and protect your health. Your quality of life depends on it.

## Use this document with the Toolbox

Determining which rules apply to your business comes down to what substances you have and how much you have. The Environmental Protection Authority (EPA) developed the Hazardous Substances Toolbox to help you identify and manage the risks of your specific situation.

The Toolbox is a multi-media information package that will help you safely manage your hazardous substances. The package includes a HSNO Calculator to help you work out which key hazardous substance controls (rules) you must follow. You can access the HSNO Calculator through the Toolbox website: [www.hazardoussubstances.govt.nz](http://www.hazardoussubstances.govt.nz).



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## Introduction

### The health and safety rules

The Health and Safety in Employment (HSE) Act and the hazardous substances legislation (HSNO) are laws that work together to keep people safe. The HSE Act aims to prevent harm to all people at a workplace and requires employers to identify and manage the hazards present and take all steps possible to reduce those hazards. The hazards from hazardous substances are no exception.

HSNO aims to protect people, communities and the environment from the harm that hazardous substances can cause.

Hazardous substances may be a single chemical or a mixture (a product) of both hazardous and non-hazardous chemicals with one or more of the following hazardous properties:

- ▶ explosive
- ▶ flammable
- ▶ oxidising
- ▶ toxic
- ▶ corrosive
- ▶ toxic to the environment.

### The person in charge

HSNO assigns duties to the person in charge. This is the person in charge of the part of the workshop that uses and stores hazardous substances.

The person in charge has the following legal responsibilities under HSNO (these are explained in this document).

- ▶ Make sure labels are on all containers and can be read.
- ▶ Get a current safety data sheet (SDS) for each hazardous substance and store them together.
- ▶ Make sure you have the right signs in place.
- ▶ Make sure staff are not exposed to substances above workplace exposure standards.
- ▶ Keep ignition sources away from where flammable substances are used or stored.
- ▶ Provide safety gear and train staff how to use it and be safe with the substances they use.
- ▶ Get the test certificates needed at your business.
- ▶ Be prepared for an emergency.
- ▶ Keep information about how to dispose of substances.
- ▶ Keep tracking records for tracked substances.
- ▶ Report any serious harm to WorkSafe NZ.

## Your health, your future

The hazardous substances used in boat building can permanently damage your health and the health of your staff. They can also reduce your quality of life and affect the relationships you have with your friends and family.

Boat building is an exciting career and the craftsmanship used to create boats and boat parts is outstanding. But no job is worth risking your health. Follow the advice in this document and *Your Practical Guide* in the Toolbox so that you and your staff can do the job well, but go home safely now, and in future.

### The substances

Boat builders use a number of hazardous substances every day, such as:

- ▶ solvents, like turpentine, toluene, acetone, methyl isobutyl ketone, methyl ethyl ketone (MEK), ethanol, methylated spirits
- ▶ epoxy resins, polyester resins and vinyl ester resins
- ▶ hardeners, catalysts, initiators, promoters and accelerators
- ▶ paints
- ▶ adhesives and fillers
- ▶ thinners
- ▶ varnish
- ▶ primers
- ▶ corrosive cleaning and surface preparation substances (such as acids, pickle paste, mould release agents).

All of these substances can affect your health and must be used safely. Some of the most common health effects of the substances used in boat building are described below. More detailed information on the potential harms of your products and how to protect yourself, can be found on the label and safety data sheet for each product.

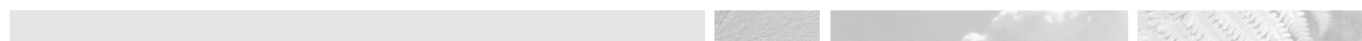
### Epoxy resins

Epoxy resins and some hardeners can cause a range of skin conditions, some very serious that may not totally heal. They can also cause sensitisation resulting in difficulty breathing.

Sensitisation to epoxy resins occurs in two percent of people using epoxy and can occur the first time you use it or it may develop after you've used it for years. It's a permanent condition and will become worse over time with ongoing exposure.

### Polyester resins

Polyester resins can include large amounts of styrene. During the application of the resin, large amounts of styrene may be released. Styrene is toxic to your internal organs and irritates the skin and eyes. It is also suspected of causing cancer and harming an unborn child.



## Solvents

Solvents such as acetone, MEK and toluene are used every day in boat building.

Long-term exposure to solvents can permanently damage your health. Solvents can cause personality changes, sleep disorders, memory loss, damage to internal organs such as the kidney, liver and brain, fertility problems and harm an unborn child. Exposure can also cause a loss of sexual function and mood swings.



Research has shown that exposure to solvents can cause hearing loss by damaging nerves in the ear. Exposure to both solvents (such as styrene and toluene) and noise can have an additive effect on hearing loss.

## Peroxides

Unsaturated polyester resins are often cured by organic peroxides, such as methyl ethyl ketone peroxide (MEKP). Peroxides are very corrosive and can severely burn the eyes, nose, throat and airways. The damage to your eyes can be permanent. If you use these substances at your workshop, you must have emergency eyewash facilities available where the substances are used and stored.

## Fillers, adhesives and paints

### Isocyanates

Many fillers, adhesives, paints, sealers and other products contain isocyanates. Exposure to isocyanates causes asthma and spray painters are at a high risk of developing it.

Check the ingredients on the label and the safety data sheet of your substances and talk to your staff about the importance of protecting themselves. Look for ingredients that include the words *isocyanate*, **polyisocyanate** or **diisocyanate**. For example:

- TDI (toluene diisocyanate)
- MDI (methylene diphenyl diisocyanate)
- hexamethylene diisocyanate.

Isocyanates enter the body when you breathe in the fine spray mist. After spraying, even if you can no longer see any paint mist you can still breathe in isocyanates and solvent vapours. Staff using products containing isocyanates **must** wear air-fed respirators.

See the approved code of practice *Safe use of isocyanates*. Search the name of this code on the WorkSafe website [www.business.govt.nz/worksafe](http://www.business.govt.nz/worksafe).

### Antifouling paints

Antifouling paints can be toxic to the people applying them and can cause cancer, damage internal organs such as the liver

and kidneys, damage your central nervous system and harm an unborn child. You need to protect yourself when applying or removing the paint. You should wear chemical resistant gloves, coveralls, goggles and respiratory protection.

## Cleaners

Acids and bases are used for cleaning and preparing surfaces. These substances are corrosive. Corrosive substances can cause chemical burns to your skin or permanently damage your eyes. Vapour from corrosive substances can burn your mouth, nose and respiratory tract.

## Take action to protect your health

### Prepare an inventory

The first step to managing your hazardous substances is to make a list of everything you have.

The Hazardous Substances Toolbox provides you with a template and instructions for preparing an inventory – see [www.hazardoussubstances.govt.nz/workbook](http://www.hazardoussubstances.govt.nz/workbook).

The best way to manage your hazardous substances is to keep the amounts onsite as low as possible and just order them as needed. This can save you money by reducing waste (from leftover product) and reducing compliance costs.

### Identify hazards

#### Read the label

Every hazardous substance container must be labelled. The label must inform the user of the product's hazards and how to protect themselves.

Manufacturers and suppliers must sell substances that are correctly labelled, but you must make sure that the label stays on the container and continues to be readable. If you, or anyone else at your business, decants product from one container into another, both the original container and the container the product is being decanted into **must** be labelled. *The 'sniff test' is not acceptable – it causes totally unnecessary exposure!*



If you find an unlabelled substance on your site, treat it as hazardous. If you are unable to identify it, dispose of it using a hazardous waste disposal company.

Unlabelled substances may confuse people about what product they are using and could result in them not taking the necessary safety precautions.

Before using a substance, always read the label so that you know the possible harms and how to protect yourself. The information below lets you know what to look for on a product label.

### Signal words

You may see signal words like WARNING or DANGER on the label of the hazardous substances you use. WARNING is used for less dangerous substances while DANGER is used for the most dangerous ones.

Substances imported from Australia may use the signal words CAUTION, POISON or DANGEROUS POISON. CAUTION is used for the least dangerous while DANGEROUS POISON is used for the most dangerous substances.

### Hazard statements

Hazard statements may also be on the label. These statements alert you to the harm that the product can cause, for example MAY CAUSE MILD SKIN IRRITATION.

### Precautionary statements

Precautionary statements are phrases on the label that describe what you should do to reduce or prevent harm from hazardous substances, for example, KEEP OUT OF REACH OF CHILDREN, or, USE ONLY OUTDOORS OR IN A WELL-VENTILATED AREA.

### Symbols on the labels

Product labels sometimes have symbols (pictograms) on them to warn you about the harmful properties of the product. Use the information below to find out what these symbols mean so that you know the harms of the product before using it.



Flammable



Oxidisers



Gases under pressure



Corrosive



Acute toxicity



Long term health hazards



Less severe acute health hazards



Toxic to the environment

## Get a safety data sheet (SDS)

The best way to learn about the dangers of hazardous substances is to check the SDS of each substance. If you don't have a SDS, or the one you are using is more than five years old, get a new one from your supplier.

You need an up-to-date SDS for every hazardous substance at your workshop. SDSs contain important information about first aid, storage, cleaning up spills and what safety gear should be worn by people using that product.

Store your SDSs together in a place that is accessible to anyone that might need them. They can be stored in paper copy or electronically in a folder on your computer but must be available within 10 minutes. Don't assume that you'll be able to find the SDS you need online – you won't have time to search for the right information during an emergency.

You can find more information about what to look for on the SDS and the label in the chapter called *Hazardous Substance Information in Your Practical Guide*.

## Protecting people from hazardous substances

Once you know what substances your staff are exposed to you need to take action to prevent and control that exposure.

Safety gear, like gloves and respirators, don't protect health 100%. Even when you are wearing the right gear and it's been fitted properly, you will still be exposed to some substances. Safety gear, or personal protective equipment (PPE) as it's often called, is your last line of defence. You must first explore ways of getting rid of hazardous substances or keeping them away from your staff.

### Get rid of hazardous substances

Getting rid of hazardous substances and replacing them with ones that aren't hazardous is the most effective way of protecting your staff because it prevents them from being exposed. Check your hazardous substances store and ask yourself whether you need all of the substances you have. Think about whether the job could be done another way without hazardous substances.

### Substitution

Substitution is when you swap hazardous substances for ones that are less hazardous but still do the same job. Your supplier may be able to advise you on whether there are safer products available.

For example, you may be able to replace some corrosive cleaners with non-corrosive cleaners. You could also reduce the risk of fire by replacing solvents with a flashpoint of less than 21°C with solvents with a flashpoint of 55°C or higher. This information will be on the safety data sheet.

If you can't substitute, you may be able to use safer forms of products, such as purchasing the gel form of a product rather than the liquid form.



Photo taken at Alloy Yachts in Auckland

### Isolate the use of hazardous substances

The next best way to protect health is to keep people away from the substances when they are used. For example, resin infusion and vacuum infusion technology reduces contact with resin and styrene vapours by up to 40%.

Another way of isolating staff is to have spray painters work different hours so that other staff aren't exposed to the sprayed substances. However, it's important to remember that while this protects staff not involved in spray painting, the people spraying must be protected by the minimisation techniques discussed below.



If possible, roll or brush on paints and other hazardous substances rather than spraying. This greatly reduces exposure. Long handled rollers also minimise mist production.

### Minimise the risk

#### Ventilation – clear the air

You need effective ventilation systems in your workshop to reduce your staff's exposure. Make sure that your ventilation systems are frequently maintained and function according to the manufacturer's specifications.

#### Safety gear or personal protective equipment (PPE)

Read the safety data sheet for each substance to find out what safety gear is best suited for that product. If this doesn't contain the information you need, talk to your chemical supplier.

#### Gloves

Substances can enter the body through the skin so it's important that your staff wear gloves whenever they are working with hazardous substances.

Heavy-duty chemical resistant gloves or nitrile gloves will be suitable for most tasks in your workshop. Polyvinyl alcohol (PVA) and laminated film gloves are recommended for continuous contact with unsaturated polyester resins.

Latex gloves won't protect you from all of the substances used in your workshop and may "melt" when they come into contact with some substances. Cotton and leather gloves are not chemical resistant.

#### Respirators

Cartridge respirators filter out hazardous substances and other contaminants from the air you breathe. The filter in the respirator needs to be specific to the contaminant. A dust mask, for example, will provide no protection against solvent vapours. Talk to your safety supplier about the substances used in your workshop and ask them to provide you with respirators that meet the AS/NZS 1715 standard and are fit-for-purpose.



Over time the filters in respirators get used up and lose their ability to filter the contaminants out of the air. Replace filters frequently and remind staff to keep their respirators in sealed containers away from contaminants.

Respirators must fit the person wearing them properly or they won't reduce exposure. People with facial hair may not get a proper fit with cartridge respirators.

Staff using products containing isocyanates must wear air-fed respirators as these provide better protection than a cartridge respirator. The best air-fed respirators have a loose-fitting helmet or hood that can be used by people who wear glasses or have facial hair. Use clear plastic tear-away sheets to protect the respirator lens from the paint spray.

#### Eye protection

Eye protection is required for most boatbuilding activities. Wear a full-face mask when using corrosive substances, such as hardeners.



Photo taken at Alloy Yachts in Auckland

### Other protective gear

You should wear closed toe shoes in boat building workshops and overalls or coveralls to cover your clothes. The hazardous substances you use can seep into your clothes so if you don't keep your coveralls at work, you will take the hazardous substances home to your family. Children are much more susceptible to the effects of hazardous substances than adults.

More information about protecting health can be found in the *Keep safe with hazardous substances* chapter in *Your Practical Guide*.

## Training

The law requires that you properly train your staff about the substances they use. They need to understand both the harm that the substance can cause and how to protect themselves.

Staff need to know that not wearing their safety gear is against the law and that taking shortcuts with safety can put their health and also the health of their workmates at risk.

### Checklist for training staff

- Does your staff member know the harms that can be caused by each substance they use?
- Do they know what safety gear to wear when using each substance and what other controls should be used?
- Have they been provided with the right safety gear and do they know how to look after it properly?
- Do they know how to wear the safety gear correctly?
- Do they know how to safely use and store the substances they use including whether some substances are incompatible?
- Do they know what to do if they spill the substance?
- Do they know what to do if they are splashed with the substance or if it gets in their eyes?
- Do they know what to do if there is an emergency involving hazardous substances at your workplace?
- Are you available to answer their health and safety questions?

If English is the second language for any of your staff, make sure you take extra time to talk to them about the risks. You also need to make sure that they can read the label of the products they are using.

Some of your staff will also need further training and to be certified as an approved handler (see page 14).

## Review your controls

You need to frequently review the measures you've put in place to control exposure to make sure they work effectively and that your staff are protected. Reviewing control measures may include air monitoring as well as monitoring staff blood and urine for contaminants.

Monitoring helps you determine:

- the controls and protective equipment needed, and
- if the control measures and personal protective equipment you have in place are working effectively.

The results of air monitoring must be compared to workplace exposure standards (WES). A WES refers to the level of a substance in the air that is believed to be safe for nearly all workers repeatedly exposed, day after day, to that substance. The values are usually based on exposure over eight hours, 15 minutes or, in some cases, instantaneous exposures. Monitoring hazardous substances in the air and comparing the results to a WES should be done by a specialist, such as an occupational hygienist.



Many WESs are based on exposure over eight hours. This means that staff working shifts longer than eight hours may be exposed to substances that are above the WES. In some cases a correction is needed to take into account other work patterns. Search the WorkSafe NZ website for "Workplace Exposure Standards and Biological Exposure Indices" for more information.

### Health monitoring

If your staff are using products containing isocyanates or lead you are legally required to monitor their health each year. You may also want to monitor their health for solvent exposure.

Health monitoring may include lung function testing (to assess for asthma), skin allergy testing and neurological testing. Questionnaires may also be used to determine whether any of your staff are showing symptoms of central nervous system damage from solvent use.

Health monitoring should be done by a health service provider such as an occupational health nurse or general practitioner with a qualification in occupational health.

## Fire and explosion hazards

Because of the types of substances used and the tasks performed, boat building workshops are at risk of fire.

This section of the document will give you an indication of what you need to be aware of when you are reviewing the health and safety processes and procedures at your business.

### Flammable substances



Most hazardous substances used in boat building workshops are flammable liquids such as:

- acetone and other solvents
- solvent based products, like paints, lacquers, and primers
- flammable resins
- promoters and accelerators for polyester resins.

Flammable liquids release flammable vapours. These vapours can build up in a workshop and, if ignition sources aren't managed properly and ventilation isn't sufficient, can ignite resulting in a fire or explosion. The vapours can also travel significant distances, taking the explosion risk with them.

Flammable fluids like thinners, solvents and fuels can accumulate static charges when they are flowing and can be ignited by static electricity. Extra care should therefore be taken when decanting flammable liquids. *Your Practical Guide* provides you with more detailed information on how to safely decant a substance – see the chapter called *Store Hazardous Substances Safely*.

Because of the chance of fire, it's essential that your staff understand the dangers of working with flammables and know what to do if something goes wrong.

### Resin exotherm

When too much resin (epoxy or polyester) is mixed and not used in time it starts to generate its own heat, rapidly increasing the curing process. This causes an exothermic reaction where the resin bubbles, boils and cracks giving off toxic fumes and creating a fire risk. Exothermic resin needs to be covered in water to keep it cool while it cures to stop a fire from starting.



There will be other flammable substances used in your workshop that are not mentioned here. You need to know the hazards of the substances you use and store. Refer to the label and safety data sheet to find out the hazards and keep your inventory up-to-date.

### Hardeners, catalysts and initiators



Unsaturated polyester resins are cured by catalysts or initiators, such as MEKP. MEKP is an organic peroxide and increases the risk of fire because it releases oxygen when heated. Organic peroxides are very sensitive to temperature increases and must be stored in a cool, dark place. Epoxy resins may also use peroxides as curing agents.

Peroxides are extremely dangerous. Contact between peroxides and flammable material can cause a fire or explosion.

## Building types for boat building workshops

Flammable substances pose a risk of fire to neighbouring properties. Business owners must minimise these risks by ensuring the separation distance and the fire rating of their building complies with HSNO.

Solvents, flammable paints, lacquers, varnishes and primers, and some resins will all have flammable liquid classifications. There may be other flammable substances used in your boat-building workshop. Check your inventory and find the HSNO classification for each product.

The classification of these substances and the amount you have in open containers will determine what type of building your workshop needs to be.

If you need information about the HSNO classification system, see the chapter called *Hazard Classifications, Approvals and Controls* in *Your Practical Guide* in the Toolbox.

### Flammable classifications

Acetone	3.1B
Toluene	3.1B
MEK	3.1B
Some resins	3.1C



## Workshops using small quantities

If your business has no more than the following quantities in use:

- 60 litres of 3.1A or 3.1B substances in aggregate, or
- 250 litres of 3.1C substances.

You must meet the following requirements:

- Six metres in all directions from where flammable substances are open and used the building must be constructed of fire resisting materials (such as tin, not wood).
- The whole building must be occupied by the same organisation – not have separate businesses in the building.

Other HSNO requirements discussed throughout this document will also need to be met.

## Workshops using large quantities

If you have more than 60 litres of 3.1A, 3.1B substances or more than 250 litres of 3.1C substances in use, then your building must meet the requirements of a type 1, 2 or 3 building.



### Building types

#### Type 1

- The floor, walls and ceilings have minimum 60/60/60 fire resistance rating.
- The doors open towards the outside of the building or room and are self-closing.
- Any windows are compliant with NZS 4232.2 1988 *Fire Resisting Glazing Systems*.
- No part of the building is occupied as a dwelling.
- A secondary containment system with a capacity of at least 100% of the total pooling potential is required.

#### Type 2

- Type 2 buildings have the same requirements as type 1, except that the fire resistance rating of the floor, walls and ceilings is at least 120/120/120.

#### Type 3

- Type 3 buildings have the same requirements as type 1, except that the fire resistance rating of the floor, walls and ceilings is at least 240/240/240.

## Help with building requirements

Your test certifier will be able to help you work out whether your building meets these requirements. Territorial authorities can also provide advice about building requirements as they check these requirements as part of the building/resource consenting process.

## Safe storage

### Separate incompatibles

Not all hazardous substances can be stored together safely. Some substances will cause a fire or explosion if they come into contact with each other. These substances are said to be *incompatible* and it's important they are stored separately to prevent the substances mixing if a leak or spill were to occur.

The safety data sheet for a substance will tell you which substances or substance types it should be kept away from. The table below gives you general information:

Hazardous substance type:	Keep away from:
Flammable gases (class 2.1.1)	Flammable aerosols (class 2.1.2); flammable liquids (class 3); class 4 substances; oxidising substances or organic peroxides (class 5).
Flammable liquids (class 3)	Flammable gases and aerosols (class 2); class 4 substances; oxidising substances or organic peroxides (class 5).
Oxidising substances (class 5.1)	All other types of chemicals (including organic peroxides).
Organic peroxides (class 5.2)	All other types of chemicals (including oxidisers).



**Remember!** Always store your organic peroxides away from other substances.

## Storing flammable substances

Flammable liquids should be stored separately from flammable gases and flammable aerosols, flammable solids, oxidising substances and organic peroxides.

Your building type and separation distance will determine the amount of flammable substances you are allowed to store in the building.

You can store up to 250 litres of flammable substances in an approved cabinet as long as each container is less than 20 litres in size.

The cabinet must conform to the standard set out in *AS1940: The storage and handling of flammable and combustible liquids* – ask your safety supplier for help.



Photo compliments of Dangerous Goods Compliance Limited

You can store up to 750 litres of flammable substances in three separate cabinets as long as the cabinets are on the ground floor of a building and each cabinet is separated by at least three metres. This separation distance is required in order to reduce the fire load, as there will be flammable vapour surrounding the cabinets.

## Hazardous substance stores

Very large amounts of flammable substances, such as drums of unopened flammable resins, need to be kept in a hazardous substances store that is outside and separate to your work area.

Generally, your store must be secured from unauthorised access and have a secondary containment, or bunding system, in place. Your store should be well-ventilated and have the appropriate signs to warn people about the presence of hazardous substances.

Whether your store needs to be built out of materials with a particular fire-resisting rating will depend on the types of substances you store and the amounts that are stored. The types of substances and the amounts stored will also prescribe the distance your store must be from the boundary of your site.

Contact a test certifier or hazardous substance safety consultant to help you. Remember they will need an accurate inventory of the maximum amounts of all of the substances stored and used at your business at any time.

## Storing organic peroxides

Your organic peroxides must be stored away from all other hazardous substances, especially your flammable substances and any strong acids or caustics.

Store organic peroxides in areas that are:

- well ventilated
- out of direct sunlight and away from other heat sources – check the label for specific temperature requirements
- supplied with suitable spill clean-up equipment and materials
- free of ignition sources such as open flames, hot surfaces and spark-producing tools and devices
- labelled with suitable warning signs.

Organic peroxides must not be stored on wooden shelves or shelves made of any other combustible material.

Keep the amount of organic peroxides you have as low as possible. Only people who know how to safely use and store peroxides should be allowed access to the storage area.

Make sure you inspect your storage areas regularly for any damaged or leaking containers. Containers that have been damaged or dropped need to be moved outside away from the rest of the substances so they don't heat up and explode.



Methyl ethyl ketone peroxide (MEKP) decomposes over time giving off a gas. MEKP is sold in containers with specially vented lids. Do not use any other type of lid on the container.

## Hazardous atmosphere zones

Because of the large number of flammable substances used in boat building you will likely need to establish hazardous atmosphere zones at your workplace.

A hazardous atmosphere zone identifies an area where flammable vapours may be present where flammable substances are used or stored. You must take special precautions within the zone to prevent flammable vapour from igniting.

The dimensions of each zone depend on several factors including the types and quantities of hazardous substances and the quality of the ventilation in place.

All ignition sources must be removed within a hazardous atmosphere zone. Potential ignition sources include naked flames, sparks from grinding and welding, and hot surfaces. There's more information about ignition sources in *Your Practical Guide* in the chapter called *Store Hazardous Substances Safely*.

Electrical equipment must have a suitable rating for the zone or be kept away from areas where flammable vapour might build up. If you aren't sure whether your electrical equipment has a suitable rating or is at a safe distance from a hazardous atmosphere zone, get advice from a competent person such as a registered electrical inspector. You will need an electrical certificate from an electrical inspector every four years to certify that you are managing your hazardous atmosphere zones safely.

The HSNO Calculator will help you work out whether you need to establish hazardous atmosphere zones.

### More information

Australian/New Zealand standard AS/NZS60079.10:2009 *Explosive Atmospheres*

HSNO code of practice 37 – *Hazardous Atmosphere Zones*  
[www.epa.govt.nz](http://www.epa.govt.nz), search for HSNO COP 37-2.

## Controlled zones

You may also need to establish a controlled zone. A controlled zone is a defined area around the location where flammable or oxidising substances are stored or used. The controlled zone is set to protect the public from the harmful effects of hazardous substances. Potential harmful effects must be reduced or prevented within the controlled zone. In the case of a boatbuilding workshop, the main risk to the public is harm from a fire or explosion.

Every controlled zone is different and will depend on a variety of factors including:

- the amount of flammable or oxidising substances stored at your workplace
- the flammability of the substances
- the type of storage, whether the hazardous substances are stored in tanks, drums, packages or cylinders and whether they are stored inside or outside
- the construction of the buildings and the neighbouring environment.

Generally, you will need to establish a controlled zone if you need a location test certificate (see page 14 for information about location test certificates). Talk to your test certifier if you are unsure about what to do.

## Emergency preparation

### Fire extinguishers

HSNO requires you to have fire extinguishers at your workplace if you store amounts of flammable substances over specified limits.

Because of the amount of flammable substances used in boat building workshops, you are likely to need two fire extinguishers close to where your substances are used and stored.



You also need to make sure that:

- Your fire extinguishers are easily accessible and close to your flammable substances – within 30 metres
- Your fire extinguishers are of a sufficient standard. Generally, a fire extinguisher with a 30B rating will be suitable for your needs. Ask your equipment supplier for help.

Fire extinguishers may be used to put out fires when they first start and before they reach your hazardous substances to prevent a more serious situation from occurring. However, if there is any risk of a more dangerous situation occurring, the building should be evacuated and the fire service called on 111.

## Spills

### Be prepared

You must be able to contain spills of hazardous substances. The safety data sheets for each of your substances provide information about cleaning up spills.

**If you have any concerns about cleaning up a spill call 111 for help.**

### Small spills

For small spills, a spill kit might be sufficient to contain the spill. You can purchase spill kits from safety stores, or you can make a kit to suit your needs.

Generally, your spill kit should contain:

- safety gear like overalls, gumboots, gloves, goggles and respirators
- spill handling equipment like a shovel, but be aware that metal shovels could spark, which could be dangerous when you are cleaning up flammable substances
- spill containment equipment like drain guards or barriers, drip pans

- ▶ absorbent material like absorbent pads, charcoal, sand (note that sawdust is not a suitable absorbent for flammable substances because it provides a fuel if a fire were to start)
- ▶ a leak-proof disposal container for waste once the spill is cleaned up.

Tell your staff where the spill kit is stored and how to use it.

### Large spills

Large spills of flammable substances release large amounts of flammable vapour into the air and can be very dangerous. The vapour can ignite easily from any nearby ignition source.

The area should be isolated from ignition sources, evacuated and care should be taken when cleaning up the spill.

**If you are in any doubt, call the fire service for help – 111.**

### Secondary containment (bundling)

Secondary containment ensures that liquid substances can be contained if they leak or spill from the container they are stored in.

Your approved cabinet for flammable substances should have secondary containment in case any of the containers leak.

Secondary containment for above-ground tanks and drums is commonly in the form of a compound with bund walls.

You can work out whether you need bunding in place by using the HSNO Calculator.

## Signs

Because of the large amount of flammable substances used at boat building workshops, you are likely to need signs. The HSNO Calculator will help you to confirm this.

Signs are also important for emergency services when responding to an emergency as they use signs to decide on the course of action they will take and the protective equipment they will wear.

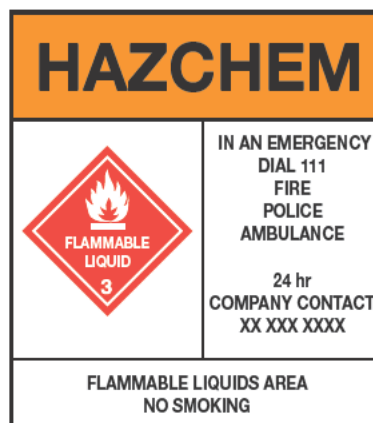
### What to put on your sign

Signs must be made of durable material and clearly show in plain English or in pictograms:

- ▶ That hazardous substances are present.
- ▶ The hazardous property of the substance and the type of hazard of each substance present.
- ▶ Precautions such as 'keep away' or 'no smoking' to prevent unintended ignition, combustion or thermal decomposition of the hazardous substance.
- ▶ Emergency actions such as "Call Emergency Services – Dial 111".

### Sign example – flammable liquids

The following sign warns people that you have flammable liquids onsite:



### Where to post signs

Signs need to be close to where the hazardous substances are stored, but not so close that people don't notice the sign before finding the hazardous substances.

Don't post signs in places where they may be hidden. For example:

- ▶ beside doors or gates that cover the sign when the doors or gates are opened
- ▶ above doors, or anywhere the sign may be concealed by smoke in an emergency.

When hazardous substances are stored inside a building, signs must be posted at each entrance to the building.

If the hazardous substances are in a particular room within a building, the entrance to that room must also have a sign. You must also post a sign at the entrance to the land where the building is located.

If the hazardous substances are located outdoors or in a tank, a sign must be posted immediately next to that area or tank.

## Emergency response plan

Because many of the substances used in boat building are flammable, we recommend having a well-rehearsed emergency response plan in place at your boat building shop.

Your response plan must cover all the emergencies that might arise for the hazardous substances you have and must be practised with your staff.

A good emergency response plan is more than just having a fire drill. Your plan should consider a range of emergencies such as:

- flammable liquid spills – small and large
- flammable liquid fires – small and large – including a fire in your building or a fire in the building next door
- emergency first aid, for example if a person:
  - is splashed with paint
  - gets burnt
  - gets a substance in their eye
- accidental release of toxic gases or vapour
- reaction of incompatible substances
- spill to storm-water drains.

Your emergency response plan needs to be tested at least once a year to check that it works and is effective.

The Toolbox includes a template emergency response plan in a flipchart format.

## Take action

### Good housekeeping improves safety

Workplaces with good housekeeping practices can greatly reduce the risks from hazardous substances. The housekeeping tips below will help you to keep your workplace a safe place.

### Get rid of old products

Get rid of any hazardous substances that you no longer use through a hazardous waste disposal company. The less hazardous substances you have, the less risk there is of something going wrong. This can also reduce your compliance costs.

### Don't leave solvent soaked rags lying around

Solvent covered rags are highly flammable. They can ignite due to static build up in the rag from wiping down surfaces. They also release vapours into the air that you and your staff breathe, increasing everyone's exposure to solvents. Solvent soaked rags should be stored in a proper rag bin purchased from a safety store.

### Put a lid on it!

Keep containers closed when not in use. This helps prevent flammable vapours getting into the air. Properly closing lids can also reduce spills.

### Label your substances

Keep all of your substances in properly labelled containers so everyone knows what's in each container, and how to stay safe when using it. Substances decanted from their original containers must be properly labelled.

### Never store hazardous substances in drink bottles

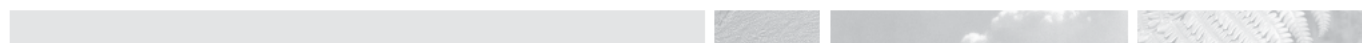
Storing hazardous substances in drink bottles makes it so easy for someone to get confused and drink the substances. This is one of the greatest causes of unintentional poisoning in New Zealand.

### Signs

Use signs around your workshop to let people know that there are flammable liquids present and that precautions need to be taken to prevent ignition.

### Beware of static electricity

Make sure containers are bonded and grounded properly to eliminate static electricity when decanting flammable liquids.



## Test certificates

Boat building workshops will most likely need test certificates in place. A test certificate confirms that you comply with particular HSNO rules.

Test certificates are issued by test certifiers. A test certifier is an independent service provider approved by the EPA. You can find a list of test certifiers on the EPA website, [www.epa.govt.nz](http://www.epa.govt.nz). Across the top of the EPA homepage is a tab called Search our Databases. Place your cursor on that tab and click on HSNO Test Certifiers.

### Approved handler test certificate

If you have certain amounts of flammable, oxidising or very toxic substances at your workshop, one or more of your staff may need to be certified as an approved handler.

An approved handler is someone who has specific knowledge and experience about handling very hazardous substances and has received a test certificate from a test certifier.

The HSNO Calculator will help you work out if you need an approved handler.

### Location test certificate

It's likely that your business will need a location test certificate – you can confirm this by using the HSNO Calculator.

A location test certificate certifies that you comply with specified site location rules for your flammable and oxidising substances.

A location test certificate lasts for one year but you can apply for an extension of up to three years in total. Talk to your test certifier about this extension.

### Location test certificate check list

Before issuing a location test certificate, the test certifier will check that you have:

- a list (inventory or manifest) of the type and amount of all of the hazardous substances at your workplace
- a site plan of your workplace showing:
  - all hazardous substance locations
  - hazardous atmosphere zones
  - controlled zones
- fire extinguishers available, if needed:
  - the correct number
  - the correct type
  - located no more than 30 metres from where your oxidising or flammable substances are stored
- stored your hazardous substances safely in areas that can be secured
- stored incompatible substances separately
- a controlled zone established and managed
- hazardous atmosphere zones are established and managed
- an approved handler available, if needed
- procedures in place to prevent a fire from starting if you store flammable or oxidising substances
- signs in place, if needed
- prepared an emergency response plan, if needed
- secondary containment in place, if needed
- the right safety gear and clothing for oxidising substances
- told your local WorkSafe office where your workplace is and what hazardous substances, and amounts of those substances, are used and stored there.

## Site plan

If you need a location test certificate you must have a site plan (or plans) that shows:

- the site boundary
- the location of all hazardous substances present in relation to the site boundary
- controlled zones
- hazardous atmosphere zones
- the scale of the site plan.

It's also good practice to show:

- buildings located within the site boundary
- openings into buildings
- the date the plan was drawn
- the location of emergency response equipment
- site identification, including the address of the site.

## Environmental concerns

Most of the hazardous substances used in boat building can have negative effects on the environment. Make sure that you consider the environment when disposing of hazardous substances and spraying paints outside. You also need to protect storm water drains with drain guards to prevent hazardous substances and hazardous waste from going down the drain.

## Spraying paints outside

Paints, like antifouling paints, lacquers and primers are all toxic to the environment and can harm your health.

Recently the rules for antifouling paints were changed. When applying antifouling paint you must set up a controlled work area to prevent paint leaving the area and damaging the environment or harming bystanders. One approach is to set up tarpaulins that prevent the spray from drifting away. You should set up a controlled work area when you spray other hazardous substances outside.

When spray painting with antifouling paints, you must post signs at every entrance to your controlled work area to warn people.

Signs must be in place from the time you start the work until you have finished. They need to be large enough that they can be read from a distance of at least 10 metres.



A sign must:

- warn that a spray paint application is being carried out
- with paint that is toxic to humans
- identify the person in charge of the application
- state that you cannot enter the controlled work area unless you are wearing the right personal protective equipment.

## Disposal

Boat-building tasks often create leftover hazardous substances. For example, solvent waste can be created from cleaning resin mixing equipment and spray gear.

Never pour hazardous substance waste down the sewer or storm water drains or onto the ground. Get a waste solvent container and, where possible, have systems in place to recycle solvent waste.

Add hardener or catalysts to old resins to cure them so that they can be disposed of as solids rather than liquids.

If you are combining different types of hazardous substance waste, make sure it's safe to mix them.

Because of the potential toxicity of antifouling paint scrapings, new rules require you to collect the paint waste when removing old paint from boats.

All hazardous waste should be collected by a specialist hazardous waste company.

## Disclaimer

This document is guidance only and does not cover every aspect of the law. What you need to do depends on the types and amounts of hazardous substances you use and store. There may also be additional rules set by your local and regional councils that you need to follow.

We have tried to make the information in here as accurate and current as possible. However, it is not a legally defensible document.

If you find any information in this document that you believe may be inaccurate, or you would like to provide any feedback, please email [hsinfo@epa.govt.nz](mailto:hsinfo@epa.govt.nz).

## Further information

### ➤ Your supplier

If you have questions relating to a particular product, check the safety data sheet and talk to your supplier.

### ➤ Your test certifier

Your test certifier can help you comply with the rules that apply to your business. Test certifiers are independent service providers approved by the EPA. Fees apply and may be different between test certifiers.

You can find a test certifiers on the EPA website – [www.epa.govt.nz](http://www.epa.govt.nz) – under the *Search our records* tab.

### ➤ WorkSafe New Zealand

Phone WorkSafe on 0800 030 040.  
[www.worksafe.govt.nz](http://www.worksafe.govt.nz)

### ➤ Environmental Protection Authority

For information on complying with HSNO call our compliance information line: 0800 376 234, or email [hsinfo@epa.govt.nz](mailto:hsinfo@epa.govt.nz).