

Above Ground Fuel Storage on Farms

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This good practice guide will help farmers comply with the health, safety and environmental laws for above ground fuel storage.

ACKNOWLEDGEMENTS

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ABOVE GROUND FUEL STORAGE ON FARMS: KEY POINTS FOR THE PERSON IN CHARGE OF THE FARM

**Give people handling the fuel safety
information**

**Make sure everyone handling the fuel
knows the hazards and how to keep safe**

**Have procedures for managing fuel-related
emergencies**

**Get test certificates and keep them
up-to-date.**

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INTRODUCTION

Petrol and diesel are hazardous substances. They are regulated by the *Hazardous Substances and New Organisms Act 1996* and supporting regulations (HSNO).

Storing and using petrol and diesel creates workplace hazards that could harm employees, family and others living or working nearby. Therefore, petrol and diesel are also regulated by the *Health and Safety in Employment Act 1992* (the HSE Act).

HSNO requires a person in charge to manage hazardous substances at all workplaces that store or handle them. On a farm, this will normally be the farm owner or manager. They must make sure the farm complies with all the rules set under HSNO.

The person in charge must:

- > make sure people handling the substances are trained or supervised
- > make sure information is available to the people handling the substance via container labels, safety data sheets (SDS) and signs
- > make sure procedures are in place to deal with any potential emergency involving hazardous substances
- > get the necessary test certificates and keep them up-to-date.

They should also identify all hazardous substances on the farm and keep an inventory.

This good practice guide is designed to:

- > help farmers make their above ground farm fuel storage comply with safety and environmental laws and controls
- > help farmers manage fuel storage hazards.

This good practice guide applies to any person, group or organisation that supplies or stores, or intends to supply or store fuels above ground on farms.

It applies to farms that are at least four hectares in size and its main purpose is agricultural. It does not apply to golf courses or parks.

It provides a guide to the relevant HSNO regulations and controls for fuel supply and storage.

Some of the recommendations in this guide exceed the minimum HSNO controls.

A glossary is available at Appendix A.

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RISKS

IN THIS SECTION:

- 2.1 Health risks
- 2.2 Environmental risks

This section provides information about the health and environmental risks of petrol and diesel.

2.1 HEALTH RISKS

Petrol contains aromatic hydrocarbons. You can smell them in petrol vapours. Glues and solvents also contain these harmful substances. They are toxic, and people shouldn't breathe them in.

The short-term effects of petrol vapours are dizziness, feeling sick, headaches and vomiting, like getting drunk from alcohol. People affected by petrol vapours should leave the area and avoid driving or operating machinery.

Do not use petrol to remove grease, paint or glue from your hands, and avoid getting petrol on your skin. Petrol causes skin problems (dermatitis) and rashes. Hydrocarbons pass through your skin and enter your bloodstream, adding to the toxic effects.

If petrol gets on your skin, wash with soap and water.

Long-term effects of exposure to petrol could include brain or nervous system damage, and a higher chance of getting leukaemia, a cancer of the blood or bone marrow.

Diesel can cause dry or cracked skin if you often get it on your skin. It can also irritate your eyes. The vapours can cause eye, nose and throat irritation if you breathe them in. Diesel may cause cancer.

Your fuel supplier must provide a SDS. Read the SDS for advice on how to treat health problems from fuel exposure or seek medical advice.

2.2 ENVIRONMENTAL RISKS

Farm fuel storage must comply with the *Resource Management Act 1991* (RMA). Check with your council for the specific fuel storage conditions for your region.

Spilt or leaking fuels can pollute soil or waterways. You could be prosecuted for fuel spills or leaks, and have to pay fines and the costs of cleaning up the spill or leak. These will cost more than the lost fuel.

Keep your farm fuel tanks in good order so you don't contaminate the ground. Take care when positioning fuel tanks to prevent fuel leaks or spills entering waterways.

03/

HSNO REQUIREMENTS FOR FUEL STORAGE ON FARMS

IN THIS SECTION:

- | | |
|---------------------------------------|--|
| 2.1 Separation distances | 2.7 Training and approved handlers |
| 2.2 What to do in an emergency | 2.8 Signs |
| 2.3 Emergency response plans | 2.9 Tank labelling |
| 2.4 Safety data sheets (SDSs) | 2.10 Location test certificates |
| 2.5 Fire extinguishers | 2.11 Stationary container system (tank) test certificates |
| 2.6 Secondary containment | |

HSNO Regulations provide certain duties for both the person in charge at the workplace and the fuel supplier, including supplying information, emergency response plans and signs.

Some of the HSNO controls, or rules, only apply if you store fuel over a set amount. Tables 1 and 2 show this. This guideline explains how to follow these rules.

AMOUNT OF PETROL STORED ON A FARM >4HA (LITRES)	FUEL SUPPLIER MUST SUPPLY SAFETY DATA SHEETS	FARMER MUST HAVE SAFETY DATA SHEETS (PERSON IN CHARGE)	APPROVED HANDLERS	FIRE EXTINGUISHERS (NUMBER)	SIGNS	EMERGENCY RESPONSE PLANS	SECONDARY CONTAINMENT	LOCATION TEST CERTIFICATE	STATIONARY CONTAINER SYSTEM TEST CERTIFICATE
5	Yes	Yes							
50	Yes	Yes		1					
100	Yes	Yes		1					
200	Yes	Yes		2					
250	Yes	Yes		2	Yes				
1,000	Yes	Yes		2	Yes	Yes ¹	Yes ¹		
2,000	Yes	Yes	Yes	2	Yes	Yes	Yes	Yes	
2,500+	Yes	Yes	Yes	2	Yes	Yes	Yes	Yes	Yes ²

Table 1: HSNO requirements for petrol

¹ If the fuel is stored so that a spill will not endanger buildings, streams or water bodies, these requirements are only needed if you store 2,000 litres of petrol.

² Or 50 litres if the petrol is stored in an above ground tank that is connected to a stationary engine.

AMOUNT OF DIESEL STORED ON A FARM >4HA (LITRES)	FUEL SUPPLIER MUST SUPPLY SAFETY DATA SHEETS	FARMER MUST HAVE SAFETY DATA SHEETS (PERSON IN CHARGE)	FIRE EXTINGUISHERS (NUMBER)	SIGNS	EMERGENCY RESPONSE PLANS	SECONDARY CONTAINMENT	STATIONARY CONTAINER SYSTEM TEST CERTIFICATE
1	Yes	Yes					
100	Yes	Yes					
200	Yes	Yes					
250	Yes	Yes					
500	Yes	Yes	2				
1,000	Yes	Yes	2	Yes	Yes ³	Yes ³	
2,000 ⁴	Yes	Yes	2	Yes	Yes	Yes	
5,000	Yes	Yes	2	Yes	Yes	Yes	Yes ^{5, 6}

Table 2: HSNO requirements for diesel

3.1 SEPARATION DISTANCES

Fuel storage and handling is hazardous because petrol and diesel are flammable. You can control these risks by storing fuels securely and safely.

Separation distances are the minimum distances required between fuel stores and other properties or activities. The separation distances for petrol in this guide allow petrol storage on farms without a location test certificate. You can reduce these separation distances if you get a location test certificate.

See section 3.10 for details of location test certificates and how much petrol you can store without a location test certificate.

IGNITION SOURCES

Ignition sources are anything that could ignite fuel vapours from the storage area. You must store fuel so that:

- > petrol is over 15 metres away from an ignition source
- > diesel is over six metres away from an ignition source.

³ If the fuel is stored so a spill will not endanger buildings, streams or water bodies, these requirements are only needed if you store 2,000 litres of diesel.

⁴ For above ground diesel tanks installed before 1 April 2004, this figure is 2,500 litres.

⁵ Or 60 litres if the diesel is stored in an above ground tank that is connected to a burner.

⁶ Or 500 litres if the diesel is stored in an above ground tank that is connected to a stationary engine.

IGNITION SOURCE	EXAMPLE	FURTHER INFORMATION
Naked flames	<ul style="list-style-type: none"> > fires > incinerators > tools like welders > smoking – no smoking within 15m of petrol storage 	
Electrical appliances	<ul style="list-style-type: none"> > fittings like switches, lights, three-pin plugs and switchboards > electrically-powered tools or machines > electric fences and electric fence controllers 	
Running engines	<ul style="list-style-type: none"> > engines such as compressors or freezer motors 	Switch vehicle motors off when delivering fuel, or when filling from the storage tank. You can make an exception if you use approved fuel dispensing equipment.
Communications equipment	<ul style="list-style-type: none"> > cell phones > portable electronic devices (PEDs) > other communication equipment 	Make sure PEDs are intrinsically safe or zoned for use in hazardous atmospheres. Otherwise, leave the equipment in a safe place.
Sparks from tools	<ul style="list-style-type: none"> > grinders or tools that could cause sparks, like metal drills 	
Static electricity	<ul style="list-style-type: none"> > A large static electricity build-up will release a spark, which can cause a fire 	Reduce static electricity build-up by earthing the fuel tank. Metal tank supports provide good contact with the earth. If tanks don't have metal supports, always earth them with an earthing rod.

Table 3: Examples of ignition sources

OTHER SEPARATION DISTANCE REQUIREMENTS

All fuel must be stored:

- > at least six metres from other hazardous materials, for example: oxidisers, fertilisers, poisons
- > at least six metres away from flammable materials, for example: hay, LPG, other fuels
- > so that spills can't contaminate stock feed
- > so that spilt fuel can't touch any heated surfaces
- > to avoid accidental vehicle crashes
- > so that spills will not pollute streams, lakes or waterways
- > so that spills will not endanger buildings.

Petrol and diesel also have specific storage requirements, depending on how they are stored.

	ABOVE GROUND TANK	DRUMS
Petrol	at least 20 m from any area of regular habitation or high intensity land use kept outside	at least 15 m from any area of regular habitation or high intensity land use kept outside or in a well-ventilated building
Diesel	at least 20 m from any area of regular habitation or high intensity land use 6 m from farm sheds kept outside	at least 15 m from any area of regular habitation or high intensity land use 6 m from farm sheds kept outside or in a well-ventilated building

Table 4: Fuel storage requirements on farms

Areas of regular habitation or high intensity land use include places where people live, buildings made of flammable materials and high-density traffic routes.

Examples include:

- > houses and sleepouts
- > schools

- > staff accommodation
- > smoko rooms
- > wooden buildings, packing sheds, cool storage or hay sheds
- > other hazardous chemical stores
- > roads or railways.

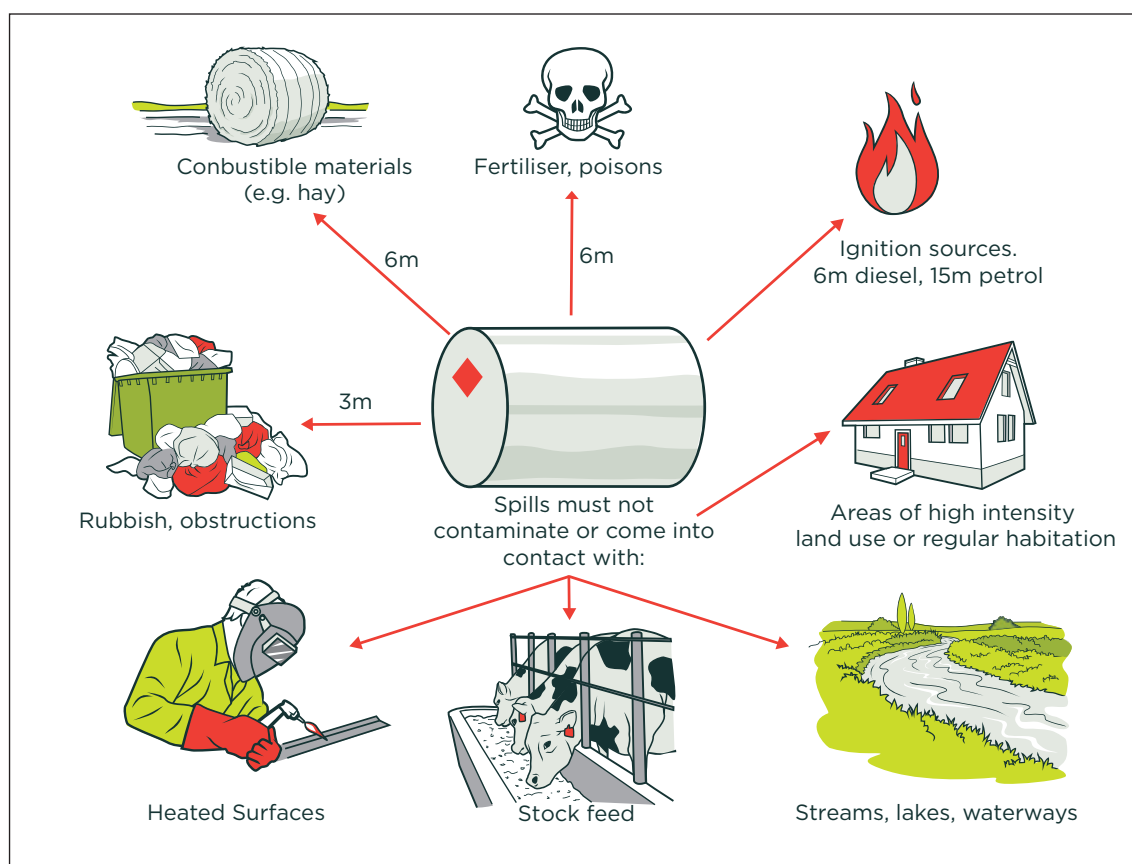


Figure 1: Required fuel storage distances

3.2 WHAT TO DO IN AN EMERGENCY

If fuel spills or leaks, the prime concern is the safety of nearby people. If anyone is injured, make sure they receive first aid or medical treatment.

If it's safe, stop the spill or leak at the source.

Then:

- > Stop the fuel escaping to drains or waterways.
- > Clean up the spill (if safe).
- > Contact your fuel supplier or council about getting rid of contaminated material.

Tell your local council about fuel spills, especially if it endangers a waterway. Most councils have an emergency pollution hotline; this should be recorded on the emergency response plan.

With petrol spills, take special care not to do something that could ignite petrol vapours. For example, don't use communications equipment within 50 metres of a petrol spill or 25 metres of a diesel spill (as stated in the *New Zealand Fire Service Dangerous Goods Emergency Response Guide*).

If there is a fire, raise the alarm — phone the Fire Service.

- > Fight the fire only if you think it's safe to do so.
- > Make sure people are in a safe area.
- > Do not put yourself at risk.

3.3 EMERGENCY RESPONSE PLANS

You must have an emergency response plan if you store:

- > over 2,000 litres of fuel in drums or tanks
- > over 1,000 litres of fuel in a place where a spill could endanger buildings or water bodies.

Also, section 6 of the HSE Act requires employers to develop workplace emergency plans.

WHAT IS AN EMERGENCY RESPONSE PLAN?

An emergency response plan has all the information you need to respond to a fuel emergency.

To comply with HSNO, an emergency response plan must:

- > describe all the reasonably likely emergencies involving fuel storage
- > describe what to do in each likely emergency
- > identify people with responsibilities in each emergency, and what they have to do
- > describe where to find the information and equipment needed to respond to each emergency
- > state how to contact emergency services.

An emergency response flipchart is included in the *Hazardous Substances Toolbox*.

You can order the toolbox at www.hazardoussubstances.govt.nz.

WHAT DO I DO WITH MY EMERGENCY RESPONSE PLAN?

After preparing the emergency response plan, make a copy available to every person handling the petrol or diesel, and for emergency services. Train every person handling farm petrol or diesel in how to deal with each emergency described on the emergency response plan.

Test the plan once a year, or within three months of a change in the plan (including change of staff). Keep a written record of each test, and the test results. Keep this information for at least two years.

Emergency response plan guidelines for the person in charge

- > Have an emergency response plan if you store over 2,000⁷ litres of petrol, diesel or a combination.
- > Make the plan available to everyone who handles fuel, and train them to manage emergencies.
- > Test the plan at least once a year, and keep a record of each test for at least two years.

3.4 SAFETY DATA SHEETS (SDSs)

Having current SDSs for petrol and diesel and understanding the information they give is essential. SDSs contain useful information about:

- > fuel hazards
- > health effects and first aid
- > storage
- > cleaning up spills
- > the right safety gear
- > what to do in an emergency.

SDS guidelines for the fuel supplier

Fuel suppliers must provide a SDS for each type of fuel they deliver to each farm. If asked by a farm customer, the fuel supplier must provide a current SDS for the fuel as soon as possible.

SDS guidelines for the person in charge at the farm

- > Provide a SDS to any person handling that fuel and make sure they understand it.
- > Store a SDS for each fuel within 10 minutes of the fuel's storage location. Store them in a prominent place within nearby, easily accessible buildings.
- > Make sure any person likely to handle fuel knows where to find the SDS for that fuel.
- > Ask the fuel supplier for a current SDS for each type of fuel delivered to the farm.

3.5 FIRE EXTINGUISHERS

If you store over 50 litres of petrol or 500 litres of diesel, you must have the correct number and types of fire extinguishers. Fire extinguishers must be located within 30 metres of fuel storage, or on a vehicle towing a mobile tank.

Note: Even if lower fuel quantities do not need a fire extinguisher, it is good practice to have at least one compliant fire extinguisher available for emergencies.

HOW DO I KNOW WHICH FIRE EXTINGUISHER IS SUITABLE?

The fire extinguisher must have at least a 30B capability rating. This means it will put out a fire involving a flammable or combustible liquid. You can find the fire extinguisher's capability on its side.

A 2 kg dry powder or a 9 litre foam fire extinguisher with a 30B rating will normally meet this requirement. It is essential to check – not all extinguishers are rated 30B.

⁷ If you store over 1,000 litres of fuel where a spill could endanger buildings or water bodies, you need an emergency response plan.

Fire extinguisher guidelines for the person in charge on the farm

Make sure fire extinguishers are available within 30 metres of fuel storage, but not attached to or under a fuel tank.

For petrol:

- > under 50 litres: no extinguishers (but it is good practice to have at least one)
- > 50 litres to 199 litres: at least one fire extinguisher
- > 200 litres and over: at least two extinguishers.

For diesel:

- > Under 500 litres : no extinguishers (but it is good practice to have at least one)
- > 500 litres and over: at least two fire extinguishers.

You must have the required number of fire extinguishers within 30 metres of every fuel store.

You need secondary containment if you store:

- > over 2,000 litres of fuel in drums or tanks
- > over 1,000 litres of fuel in a place where a spill could endanger buildings or water bodies.

If your diesel tank or tanks were installed before April 2004, you don't need secondary containment if they are over six metres from other fuels and the total tank or tanks' capacity is 2,500 litres or less.

There may be extra local authority regulations (regional or district plan rules) relating to farm fuel storage. Contact your council for further information.

Refer to *Approved Code of Practice 13 (2nd edition): Management of Existing Stationary Container Systems up to 60,000 litres Capacity*, available from the WorkSafe website at www.worksafe.govt.nz.

WHAT IS A BUND?

A bund, or compound, is a structure around your fuel store that contains fuel spills or leaks. It is effectively a wall or raised lip around your store.

Bunds must be able to retain spills but drain off any rainwater, such as a valve. Keep the valve closed at all times; only open it to drain uncontaminated water.

Keep the bund clear of leaves and other rubbish. This will help keep it at maximum capacity.

Bunds must be built from a material like concrete or clay, that is:

- > impermeable and resistant to the fuel being stored
- > fire-resistant
- > lined with an extra impermeable layer in areas with light free-draining soil, like sand or pumice.

3.6 SECONDARY CONTAINMENT

Secondary containment is a physical barrier or container which holds fuel from tanks or containers that may leak. Secondary containment includes double skin tanks, drip trays, bunds and sumps. Keep all tanks in good working condition so valves, hoses and dispensers don't leak.

In this section, secondary containment relates to the tank's total capacity to hold fuel, rather than how much fuel is in the tank at any one time.

Secondary containment must be able to hold 110% of the fuel tank's capacity, or the largest fuel tank's capacity if you store more than one tank together.

For tanks that only store diesel, the bund can be made from steel.

DOUBLE SKIN TANKS

A double skin tank's outer skin is the secondary containment system. The outer skin must comply with the secondary containment sizing requirements. These tanks must be designed specifically to store petrol or diesel. Refer to *Approved Code of Practice 24 (2nd edition) Above Ground Stationary Tanks with Integral Secondary Containment* on the WorkSafe site at www.worksafe.govt.nz.

SPILL KITS

A spill kit contains the equipment and materials you need to clean up a fuel spill. You can buy them from safety stores or make your own to suit your needs.

All staff need to know where the spill kit is kept and how to use it.

A spill kit should contain:

- > safety gear, such as gumboots, gloves, overalls, goggles and respirators
- > spill containment equipment, like drip trays, drain guards or barriers
- > spill handling equipment like a broom and plastic shovel - metal ones could cause sparks, which is dangerous when dealing with flammable substances
- > absorbent materials like dry sand, vermiculite, zeolite (cat litter) or spill containment socks
- > a leak-proof container to put the waste in for disposal.

Fuel containment guidelines for the person in charge

Position the fuel store so spills won't endanger buildings or water bodies such as streams or lakes.

You must have secondary containment if you store more than:

- > 2,000 litres of fuel, or
- > 1,000 litres in a location where a spill would endanger buildings or a waterbody.

Diesel tanks in use before April 2004 don't need bunding if they're at least six metres away from other diesel tanks, and the total tank's capacity isn't over 2,500 litres.

Have a spill kit at your fuel store to contain and clean up spills.

3.7 TRAINING AND APPROVED HANDLERS

Under the HSE Act, employers must train employees to do their job safely, or have an experienced person supervise them. Employees must receive information about workplace hazards, where to get safety equipment, and what the emergency procedures are.

People handling and storing fuel must receive training about:

- > petrol and diesel hazards
- > safe fuel use and handling
- > managing spills and other emergencies.

Alternatively, they can work under the direct supervision of someone with suitable training and experience to show them how to work safely.

Under HSNO, if you store over 2,000 litres of petrol you must:

- > make sure an approved handler is available, or
- > secure the petrol with a lock.

Diesel does not require approved handlers.

WHAT IS AN APPROVED HANDLER?

An approved handler is someone who is certified to use petrol or supervise others using it. An approved handler is certified by a test certifier. To become an approved handler, you must show you have practical experience of using petrol and that you know about:

- > petrol and its hazards
- > the operating equipment, safety gear and protective clothing
- > what to do in an emergency
- > the HSNO legislation and how it applies to petrol.

The approved handler may be: the person handling the petrol, someone available on the farm, or someone contactable by telephone. Approved handlers don't have to be on-site at all times, or even employed by the farmer. However, they must be available to give advice or help when needed, for example by phone.

Training guidelines for the person in charge

Train everyone using the farm fuel storage system about:

- > how to use the fuel storage safely
- > hazards when using the fuel and how to keep safe, including protective clothing and equipment
- > what to do in an emergency (for example: fire, medical emergency, or fuel spill).

See also section 3.4 Emergency Response Plans.

If you store over 2,000 litres of petrol you must:

- > have an approved handler available, or
- > secure the petrol with a lock.

3.8 SIGNS

Warning signs are vital for the safety of workers, visitors to the farm and emergency services. You must have warning signs on your farm if you store over:

- > 250 litres of petrol
- > 1,000 litres of diesel.

Signs must be displayed at eye level in all fuel store entrances, including vehicle access points. They must be close to the fuel store but not so close that people come across the fuel before being warned.

Signs must be big enough so they can be read from 10 metres away. They must tell people, in plain English or pictograms:

- > that the storage area contains hazardous substances
- > the hazards of each product in the storage area
- > the precautions needed to manage them safely
- > what to do and who to contact in an emergency.

3.9 TANK LABELLING

You must clearly identify what each fuel tank contains and its hazards. This is essential for the safety of emergency services, workers and other people on the farm. Correct labels give useful information to the Fire Service about how to deal with a fire involving the fuel.

Labels must be at least A3 in size and positioned so they can be easily read from ground level.

Appendices B and C have examples of labels for petrol and diesel. If you store low-flashpoint diesel, replace the Hazchem code 3Z with 3YE.

3.10 LOCATION TEST CERTIFICATES

WHAT IS A LOCATION TEST CERTIFICATE?

A location test certificate shows that your petrol store is safely managed according to the HSNO rules. Location test certificates are issued by test certifiers.

LOCATION TEST CERTIFICATES FOR DIESEL ON FARMS

Diesel does not need a location test certificate, regardless of quantity.

LOCATION TEST CERTIFICATES FOR PETROL ON FARMS

If your farm is larger than 4 hectares and you store 2,000 litres or less of petrol, you won't need a location test certificate if the storage location meets the following requirements.

All above ground tanks, drums or containers where flammable substances are stored must be:

- > designed, constructed and installed according to the HSNO rules
- > in a bund or located so that spills will not flow into any water bodies or pose a risk to any buildings.

Above ground tanks must be:

- > at least 20 metres from houses or other buildings made of combustible materials
- > at least 6 metres from combustible materials such as hay barns or fuel stores.

Drums or other containers of flammable substances must be:

- > smaller than 250 litres
- > secure, so that unauthorised people can't get to the fuel
- > at least 15 metres from houses or other buildings made of combustible materials
- > built so they comply with HSNO rules
- > in a well-ventilated building or out in the open.

If your petrol store does not meet these requirements, you are likely to need a location test certificate. You should contact a test certifier to discuss what you need for your farm.

3.11 STATIONARY CONTAINER SYSTEM (TANK) TEST CERTIFICATES

WHAT IS A STATIONARY CONTAINER SYSTEM TEST CERTIFICATE (TANK TEST CERTIFICATE)?

Stationary container system test certificates confirm that a stationary container system (tank) meets the legal requirements for fuel storage. These certificates are issued by test certifiers approved to issue test certificates for stationary container systems.

STATIONARY CONTAINER SYSTEM TEST CERTIFICATES FOR DIESEL

Diesel needs a stationary container system test certificate if it is stored in:

- > a tank larger than 5,000 litres
- > tanks over 60 litres connected to a burner (including a heater or boiler)
- > tanks over 500 litres connected to a stationary engine.

STATIONARY CONTAINER SYSTEM TEST CERTIFICATES FOR PETROL

Petrol needs a stationary container system test certificate if it is stored in:

- > above ground tanks larger than 2,500 litres
- > above ground tanks larger than 50 litres and connected to a stationary engine.

04/

ABOVE GROUND FARM FUEL TANK HAZARDS

IN THIS SECTION:

- 4.1 Structural safety**
- 4.2 Tank supports**
- 4.3 Tank support foundation**
- 4.4 Ladders**
- 4.5 The fuel storage tank**
- 4.6 Fuel tank corrosion**
- 4.7 Tank ventilation**
- 4.8 Tank fill pipe**
- 4.9 Fittings, pumps and hoses**

Farm tanks mounted on stands use gravity to feed the fuel into farm machines. Tank stands create hazards like climbing the stands to fill the tanks or collapsing fuel tank stands.

These hazards fall into the following categories:

- > the tank's supports
- > the foundations for the tank's support
- > the ladder
- > the hose and fittings
- > tank access
- > tank location.

4.1 STRUCTURAL SAFETY

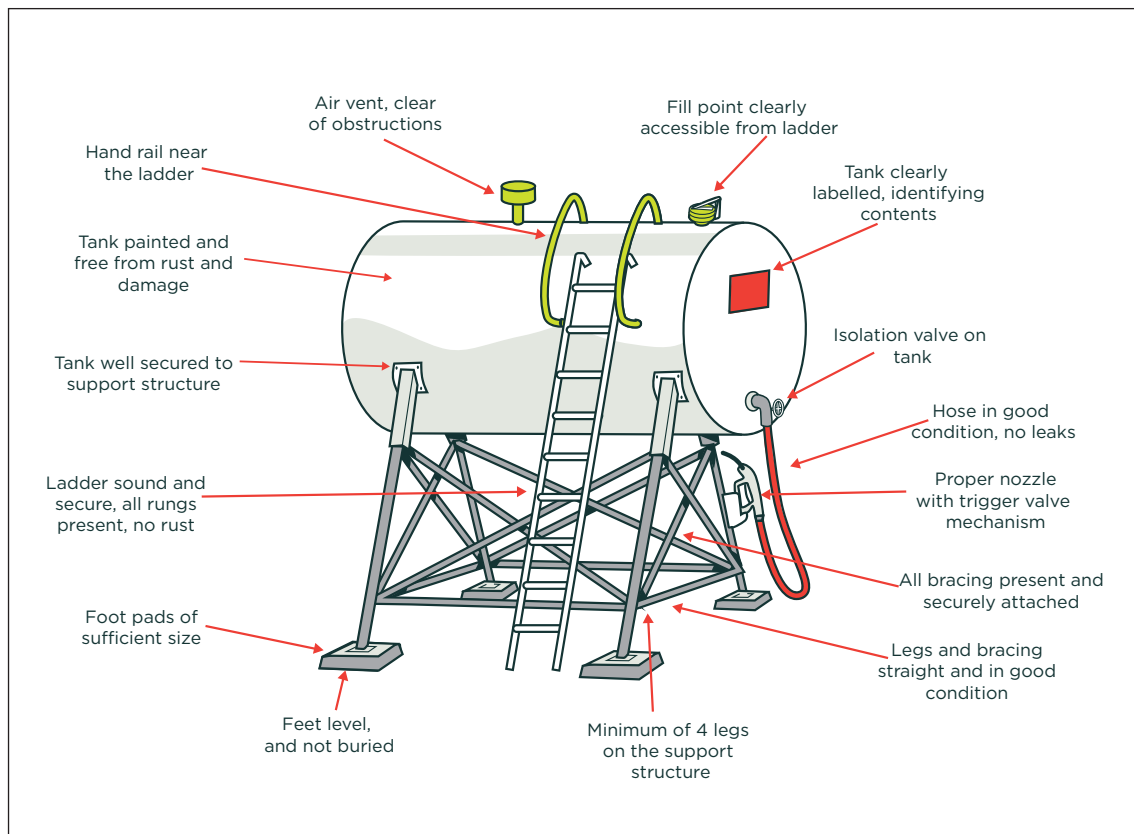


Figure 2: A safe above ground farm fuel tank (note: secondary containment is not shown)

4.2 TANK SUPPORTS

Why tanks and supports can be unstable:

- > basic design problems
- > missing support parts (for example, no spreaders)
- > poor attachments between the tank and legs, sometimes because of breaking joints
- > lack of maintenance, often associated with serious rusting
- > legs not secured to the ground.

EFFECT OF RUST ON TANK SUPPORTS

Rust has a major effect on the support stand's strength.

The key to preventing rust damage is good maintenance. Remove rust as soon as it appears with a wire brush, and repaint with a rust-inhibiting undercoat and topcoat.

Major areas of concern for rust are:

- > at the connections, bolts, welded points and main contact support to the tank
- > at all welded joints, especially between the ladder rungs and the legs
- > on welded sleeves used on some models to fit legs or spreaders
- > the joints between the feet and legs, especially if the feet are buried.

ATTACHING THE FUEL TANK TO THE SUPPORT

Securely attach the tank to the support stand so there is no danger of the tank falling off. If the support stand's legs slot into a sleeve on the tank, pin or bolt the legs into the sleeve so they won't pull out of the stand support.

TRIPOD SUPPORTS

The former Department of Labour (now WorkSafe) cancelled approval for manufacturing tripod (three-legged) stands for fuel tanks in 1996. At the time, farmers could use existing tripod stand tanks until they reached the end of their working life.

Today, WorkSafe expects that most, if not all, tripod tanks are no longer in use.

Farmers must make sure their tank's design and construction complies with HSNO design standards. No tripod-supported tanks comply with HSNO design standards.

THE SUPPORTS' BRACING

Bracing helps the supports' structural integrity. Examples of bracing are:

- > diagonal leg bracing to prevent racking or twisting
- > horizontal leg bracing to prevent the legs spreading (called spreaders) that usually work under tension
- > support bracing between the tank and the supports.

It is important to brace all legs properly to prevent the support stand distorting or collapsing.

SUPPORT STRAIGHTNESS

Farm fuel tank stand legs often bend, especially if hit by machinery. Any bending of the support legs decreases its strength and ability to support the tank, especially when the tank is full.

Distorted support legs are a special hazard during refilling, because of the different stresses exerted on the stand. Bends in legs or bracing suggest unequal loading on the legs.

Guidelines for straight supports

The support stand legs should be straight – no bending or buckling. Repair or replace damaged legs.

Replace excessively bent bracing.

The tank should not sway when a person applies a moderate force to one leg of the support stands at shoulder height.

If the tank moves slightly (50-100 mm) the tank could be unstable or not adequately braced.

CHANGES TO FUEL TANK SUPPORTS

Changes to the tank support, like mounting the legs on blocks, or putting tanks on platforms to raise the tank, can reduce stability and increase the risk of the tank tipping over.

Guidelines for changes to fuel tank supports

Any change to the fuel tank support should not decrease the fuel tank's stability.

Modified tank supports must meet all attachment and structural requirements set out in this good practice guide.

Changes to the tank's height must comply with regulation 21 of the *Health and Safety in Employment Regulations 1995* for work above three metres. This means that people working above three metres must have something in place to prevent them from falling.

4.3 TANK SUPPORT FOUNDATION

Mount the tank legs on a concrete pad, or on concrete footings. The recommended minimum size for footings is 600 mm x 600 mm x 300 mm. Alternatively, erect the tank stand on a solid, well-drained foundation, like compacted ground that will not become boggy when wet.

The legs should have big enough pads (or feet) to distribute a full tank of fuel's weight without causing ground settlement.

It is important to attach the support's feet to the foundation or ground so the fuel stand and tank will not tip over when someone climbs it. Use anchor bolts on concrete footings. If you are not using concrete footings, pin the feet to the ground, or tie them to a post or Warratah stake.

The leg feet should be level, and on top of the ground or concrete. Do not bury or let the feet get buried – this leads to rapid corrosion. You also cannot check their condition.

Tanks must also be able to withstand forces from earthquakes.

4.4 LADDERS

People usually use a ladder to access overhead tanks. This could be a fixed ladder that is attached to the tank support stand, or a free-standing (portable) ladder.

However, several accidents occurred where fuel drivers fell from free-standing ladders when filling tanks. Because of this, WorkSafe prefers fixed ladders on farm fuel tanks.

FIXED LADDERS

Fixed ladders should be safe, robust and secure. Check all ladder rungs are present, and damage- or corrosion-free. It is important to remove rust on welded joints between the ladder rungs and supports. If the ladder is attached to a support stand leg, position the ladder directly below the tank's handholds.

Fixed ladders attached to tank supports should have hand rails (see the diagram at section 4.1).

FREESTANDING (PORTABLE) LADDERS

If it is not practicable to have a fixed ladder, position freestanding ladders on a stable footing away from obstacles. Do not sit the ladder's footing on loose wooden chocks – they can easily slip and make the ladder fall.

If using a freestanding ladder against an existing three-legged tank, position it so it is directly opposite a supporting leg. Make sure the ladder will not tip the tank over.

4.5 THE FUEL STORAGE TANK

Tanks must be designed, built and installed in line with the specifications listed in HSNO.

Tanks must be kept in good condition.

Rust must not be so bad that it could affect the tank's integrity.

There must be no major shape deformities to the tank, like dents or cracks. These move the tank's centre of gravity and impose stress points where corrosion occurs more quickly, or stress the supporting framework.

The attachment between the legs and the tank should be solid, not corroded.

4.6 FUEL TANK CORROSION

Rust has a major impact on a fuel tank's soundness. How much damage rust causes depends on the thickness of the steel used to build the tank, and how far the rust has penetrated.

Areas at particular risk of rust damage are:

- > on the top of tanks, especially if they are cylindrical tanks mounted on end
- > on the underside
- > around the fill point and drain plug
- > on the welded seams
- > the joints between the tank and supports.

RUST AND FUEL QUALITY

Rust in tanks can cause corrosion debris in the fuel. This reduces fuel lubrication and can cause fungi and bacteria that feed on the fuel and clog filters. Rust particles themselves can also clog diesel filters. Micron-sized and smaller rust particles may pass through fuel filters to reach injectors, scoring surfaces and ruining fuel injection spray patterns.

It is important to minimise rust in fuel by keeping the storage tank in good condition.

Guidelines for rust on tanks

Rust on the tank should only be dry surface rust that won't affect the tank's structural integrity.

Only surface corrosion or shallow pitting is acceptable. Find out the rust depth by carefully prodding the empty tank with a screwdriver. Pitting should be no more than one-third of the wall thickness.

If you find evidence of deeper tank pitting, have the tank inspected by a person qualified for this work.

Wet rust (where the fuel is leaking through the rusted area) is unacceptable.

4.7 TANK VENTILATION

Tanks must be ventilated. Ventilation prevents splash back during filling and unsafe pressure or vacuums developing in the tank. The air vent should be separate from the filling point unless the filling point is a suitable size for safe air displacement during refilling. If the tank needs a ventilation pipe, it should be at least half the size of the filling pipe, and have a minimum size of 25 mm diameter. Keep the ventilation pipe obstruction-free.

Air vents on tanks must have suitably-sized gauze for the fuel in the tank. For petrol tanks, use 500 microns gauge brass mesh for the gauze. The gauze helps as a flame arrestor if vapours flash back to the tank. For diesel tanks, the gauze can be coarser as the main purpose is to prevent material going into the vent.

4.8 TANK FILL PIPE

Tanks used for storing petrol must have a fill pipe extending from the fill point to at least 25 mm below the lowest level of liquid in the tank. If a fill pipe isn't fitted, static electricity can build up while the tank is filled, creating a significant fire and explosion risk.

4.9 **FITTINGS, PUMPS AND HOSES**

Use fittings, pumps and hoses carefully and keep them in good condition. This will help prevent spills or leaks.

Guidelines for hoses, pumps and fittings on fuel tanks

Make sure the hose is made of material suitable for the fuel, and replace the hose if it shows signs of deterioration.

Have an isolation valve on the tank outlet before the hose so you can isolate the tank contents if the hose or nozzle leaks. The isolation valve should be a fire-safe valve and suitable for the purpose.

Fit the hose with a proper fitting nozzle with a trigger valve.

Fittings, pumps, valves and hoses should not leak. If they do, repair or replace them.

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ACCESS TO THE FUEL STORAGE

IN THIS SECTION:

- 5.1 Access to the farm from a public road**
- 5.2 Access to the fuel tank site using the farm road**
- 5.3 Access between the delivery tanker and the fuel tank**
- 5.4 Access to the fuel tank fill point**

This section gives advice for safe fuel truck access to farms and fuel sites.

5.1 ACCESS TO THE FARM FROM A PUBLIC ROAD

The delivery tanker should be able to enter the farm safely from a public road.

5.2 ACCESS TO THE FUEL TANK SITE USING THE FARM ROAD

The access should be safe for the vehicles that your fuel supplier uses. The access track should be accessible in all weathers. It should also be in good repair.

Trim overhanging trees to avoid damaging the delivery tanker. Take care with any overhead power lines when trimming trees⁸.

Culverts or farm bridges should take the weight of a fully-laden fuel delivery tanker. Farmers have a duty to provide safe access to their workplaces. This includes making sure bridges and culverts are safe for tankers. If there is doubt, the farmer should supply evidence that bridges and culverts can hold the necessary traffic.

Plan for turnarounds, so the delivery tanker does not have to reverse to the fuel site. This minimises difficult reversing and manoeuvring.

5.3 ACCESS BETWEEN THE DELIVERY TANKER AND THE FUEL TANK

The area between the delivery tanker and the fuel tank's filling point should have a good clearway. Obstacles like rubbish, machinery and junk should not be within three metres of the tank legs. This means the driver can safely move between the truck and the tank ladder.

5.4 ACCESS TO THE FUEL TANK FILL POINT

The tank delivery fill point should be clear of anything that could prevent the delivery hose nozzle from inserting completely into the tank.

Make sure the driver can open and access the dip and fill points from the ladder without stretching to reach. They should not have to climb off the ladder, or on to the tank, unless a suitable access platform is available. The driver should be able to see into the fill point clearly from the ladder while refuelling the tank.

⁸ Refer to the *New Zealand Electrical Code of Practice for Electrical Safe Distances* (NZECP 34) for the minimum safe approach distances for power lines.

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FARM FUEL STORAGE IN DRUMS (LESS THAN 250 LITRES IN SIZE)

IN THIS SECTION:

- 6.1** What are the specific requirements for petrol storage in drums?
- 6.2** Other rules for storing petrol or diesel in drums
- 6.3** Filling fuel storage drums safely

HSNO regulations allow for fuel storage in drums (such as 44 gallon or 209 litre drums). Some of the rules for drums are similar to fuel storage in tanks.

6.1 WHAT ARE THE SPECIFIC REQUIREMENTS FOR PETROL STORAGE IN DRUMS?

Up to 2,000 litres of petrol can be stored above ground in drums without a location test certificate if:

- > it is stored in one or more secure drums that holds 250 litres or less
- > the containers comply with HSNO tests⁹
- > it is stored at least 15 metres from any area of high intensity land use, or area of regular habitation
- > it is stored in the open, or in a well-ventilated building
- > it is stored in a bund or a place where spills will not endanger buildings or water bodies, like streams or lakes.

If you cannot meet all of these requirements, you need a location test certificate to store over 50 litres of petrol.

6.2 OTHER RULES FOR STORING PETROL OR DIESEL IN DRUMS

The rules for emergency response plans, signs, fire extinguishers, training, approved handlers and documentation also apply to fuel storage in drums.

You must bund the drum storage if you store:

- > over 2,000 litres of fuel, or
- > over 1,000 litres of fuel in a place where a spill could endanger buildings or water bodies.

6.3 FILLING FUEL STORAGE DRUMS SAFELY

If you fill drums incorrectly, you could breathe in dangerous vapours, or create enough static electricity to cause a fire or explosion.

Do not fill drums *inside* buildings, unless there is enough ventilation.

Some fuel delivery companies may not have the equipment to fill drums safely and may refuse to do so.

Other fuel providers may have extra conditions for filling fuel drums.

AVOIDING STATIC ELECTRICITY

A build-up of static electricity will release a spark. If this happens in areas with flammable vapours it could cause a fire or explosion.

You can avoid static electricity when filling drums of petrol by:

- > never using equipment made from plastic or synthetics
- > earthing all plant, equipment and people and making sure the drums are electrically continuous by attaching earth clamps to the drums before starting filling.

Remember:

- Paint is an insulator, so bonding clips must bite through the drum's paint.
- Earth clamps must have at least one bare metal handle (to earth the person filling the drums).
- Make sure you use a filling probe that extends to 25 mm from the bottom of the drum. If you do not have a filling probe, make sure the fuel runs down the inside of the drum.

⁹ Drums that meet the requirements for class 3.1B (petrol) should meet these requirements. Check with your manufacturer or supplier before buying drums.

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APPENDICES

IN THIS SECTION:

- 7.1 Glossary
- 7.2 Example tank label for diesel (not applicable for low flashpoint diesel)
- 7.3 Example tank label for petrol
- 7.4 Checklist for safe farm fuel storage

7.1 GLOSSARY

Please note: some terms are based on the *Health and Safety in Employment Act 1992*, the *Hazardous Substances and New Organisms Act 1996* and their regulations, but do not replace legal advice.

Approved handler means a person qualified to handle very hazardous substances. Approved handlers can also provide guidance and assistance to other people handling the substances.

Area of high intensity land use includes areas of regular habitation. It also includes:

- > buildings made of (or containing) flammable materials that would fuel a significant fire
- > high-density traffic routes.

Area of regular habitation means:

- > buildings used for accommodation (including cooking, sleeping and ablution areas)
- > any part of a building used for sleeping with other buildings used for cooking and ablution
- > areas where people regularly meet.

Examples include homes, staff accommodation, childcare areas, smoko rooms and sleep outs.

Compound or bund means a hollow pit or structure designed to contain fuel spilt from the tank.

Double skin tank means a fuel storage tank with secondary containment built in.

Farm In this guideline, means an area of land at least four hectares in size, but does not include golf courses or parks. The land's main purpose must be agricultural.

Fuel In this guide, fuel includes petrol, aviation gasoline, racing gasoline, kerosene and diesel fuel.

HSNO is short for the Hazardous Substances and New Organisms Act 1996.

HSE Act is short for the Health and Safety in Employment Act 1992.

Location test certificate means an annual certificate that confirms a work site has the appropriate controls in place to store and use explosive, flammable or oxidising substances safely.

Oxidisers are hazardous substances that increase the burning of fuels (combustibles and flammables) by increasing the oxygen levels available to the fuels.

RMA is short for the Resource Management Act 1991.

Safety data sheets (SDSs) are documents designed to protect the health and safety of people in the workplace. They provide information about the hazards of substances, and how they should be safely used, stored, transported and disposed of. They also describe emergency procedures, such as what to do in the event of a spill or fire.

Secondary containment means a system that prevents leaks from the fuel storage area to spread. This could mean placing a compound or bund underneath the tank.

Shall and **must** are used in this good practice guide where there is a legal requirement to achieve the desired result.

Should is used in this good practice guide to suggest a preference. It does not indicate a compulsory requirement because other alternatives may also be suitable.

Spill kit means a kit that contains materials for cleaning hazardous substance spills.

A **stationary container system test certificate** is required for tanks or process containers and associated working equipment that store flammable or oxidising substances. The test certificate confirms the substance is stored safely and won't leak or cause a fire.



A **test certifier** is a person approved by WorkSafe to issue test certificates, including certificates for approved handlers, locations and stationary containers.

Test certificates confirm that people, sites or containers are compliant with the HSNO Act and regulations.



Toxic means poisonous to humans.

WorkSafe means WorkSafe New Zealand, the agency responsible for promoting and enforcing workplace health and safety.

7.2 **EXAMPLE TANK LABEL FOR DIESEL**
(NOT APPLICABLE FOR LOW FLASHPOINT DIESEL¹⁰)

HAZCHEM 3Z	
	<p>COMBUSTIBLE LIQUID</p> <p>KEEP AWAY FROM IGNITION SOURCES</p> <p>NO OPEN FLAME - NO SMOKING</p> <p>IN THE CASE OF FIRE CALL 111</p>
	<p>EXCOTOXIC TO AQUATIC LIFE - CONTAIN SPILLS, PROTECT WATERWAYS</p> <p>IN CASE OF SPILL CALL REGIONAL COUNCIL POLLUTION HOTLINE</p> <p>[0800]</p>

7.3 **EXAMPLE TANK LABEL FOR PETROL**

HAZCHEM 3YE	
	<p>EXTREMELY FLAMMABLE LIQUID AND VAPOUR</p> <p>KEEP AWAY FROM IGNITION SOURCES</p> <p>NO OPEN FLAME - NO SMOKING</p> <p>IN THE CASE OF FIRE CALL 111</p>
	<p>EXCOTOXIC TO AQUATIC LIFE - CONTAIN SPILLS, PROTECT WATERWAYS</p> <p>IN CASE OF SPILL CALL REGIONAL COUNCIL POLLUTION HOTLINE</p> <p>[0800]</p>

¹⁰ For low-flashpoint diesel, replace the Hazchem code 3Z with 3YE.

7.4 CHECKLIST FOR SAFE FARM FUEL STORAGE

Site:

Date:

ISSUE	YES	NO	N/A	ACTIONS
LOCATION OF FLAMMABLE LIQUIDS				
Are ignition sources a safe distance from fuel storage areas?				
Over 15 m for petrol				
Over 6 m for diesel				
Is the petrol tank at least 20 m from areas of high intensity land use or areas of regular habitation?				
Is the diesel tank:				
> at least 20 m away from areas of regular habitation or high intensity land				
> 6 m from farm sheds?				
EMERGENCY RESPONSE PLANS				
If storing over 2,000 L ¹¹ of fuel, is an emergency response plan available?				
Have you tested the emergency response plan in the last 12 months?				
SAFETY DATA SHEETS (SDSS)				
Do you have a SDS for the fuel you store?				
(SDSs must be available within 10 minutes of the fuel's storage area)				
Do all workers who handle fuel know where the SDSs are and understand them?				
FIRE EXTINGUISHERS				
Do you have fire extinguishers for:				
Petrol:				
Less than 50 L = no extinguisher needed				
Between 50 L and less than 200 L = at least one extinguisher				
Over 200 L = two extinguishers				
Diesel:				
Less than 50 L = no extinguisher				
Over 500 L = two extinguishers				

¹¹ Or over 1,000 litres of petrol if stored where a spill would endanger buildings or water bodies.

ISSUE	YES	NO	N/A	ACTIONS
Are fire extinguishers less than 30 m from fuel stores?				
SECONDARY CONTAINMENT				
Is the fuel in an area where spills will not endanger buildings, or flow into water bodies?				
If you store over 2,000 L of petrol or diesel, is the storage area bunded to contain spills?				
Does the bund include a method for draining water?				
Do you regularly clear the bund of leaves and other debris?				
TRAINING AND APPROVED HANDLERS				
Are workers who handle and store fuels trained in safe fuel handling? (Training should include fuel hazards, safe use and handling, and emergency procedures)				
If you store over 100 L of petrol, is an approved handler available?				
SIGNS AND LABELLING				
If you store over 250 L of petrol or over 1,000 L of diesel, do you have warning signs?				
Are your fuel tanks labelled clearly with their contents?				
LOCATION TEST CERTIFICATE				
If you store over 2,000 L of petrol in an above ground tank, do you have a current location test certificate? (Location test certificates last one year)				
STATIONARY CONTAINER SYSTEM (TANK) TEST CERTIFICATE				
If the petrol tank is larger than 2,500 L, do you have a stationary container system test certificate?				
If the diesel tank is larger than 5,000 L, do you have a stationary container system test certificate?				

ISSUE	YES	NO	N/A	ACTIONS
TANK VENTILATION				
Is the vent pipe at least half the size of the filling pipe (and no smaller than 25 mm diameter)?				
Is gauze of a suitable size fitted over the vent for petrol tanks?				
TANK FILL PIPE				
Does the petrol storage tank fill pipe extend from the fill point to at least 25 mm below the lowest level of liquid in the tank?				
TANK STRUCTURAL SAFETY				
Are the tank supports sound and stable? (Look for corrosion, buckling or bent legs and bracing. Do not use tripod stands).				
Is the tank support on a solid, level foundation? (Consider stability when using a ladder to access the fuel tank).				
Are ladders in sound condition and secure? (Look for corroded, bent or damaged rungs).				
Is the storage tank of sound construction? (Look for corrosion, leaks and seals).				
Are fittings, pumps and hoses leak-free and undamaged?				
ACCESS TO FUEL STORAGE FOR DRIVERS				
Can the delivery tanker safely access the property off a public road?				
Can the delivery tanker securely access the fuel site from a farm road?				
Is the fuel site clear of obstacles, allowing the driver unimpeded access to the tank and access ladder?				
Is the tank fill point clear of debris or obstacles?				

ISSUE	YES	NO	N/A	ACTIONS
FARM FUEL STORAGE (UP TO 2,000 L) IN DRUMS LESS THAN 250 L IN SIZE				
Is the fuel in drums smaller than 250 L?				
Is the fuel at least: > 15 m from areas of high intensity land use or areas of regular habitation > 6 m from the farm shed for diesel drums?				
Is the fuel stored in the open, or in a well-ventilated building?				
Is the fuel stored in a bund preventing spills from endangering buildings or waterways?				
Do you refill drums outside buildings?				
Is static electricity avoided when refilling drums? (Do not use plastic or synthetic equipment; earth the drums).				

Date actions completed

Signature

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