

Vehicle and machinery cleandown procedures



**Queensland
Government**

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1 General information

An invasive plant is a plant species that has or is likely to have an adverse impact on a biosecurity consideration because of the introduction, spread or increase in population size of the species in an area.

Invasive plants cost Queensland more than \$600 million annually in lost production, land degradation and control costs. The spread of invasive plants threatens our agricultural industries, environment and social amenity.

Invasive plant infestations in Queensland have resulted of poor vehicle and machinery cleanliness and maintenance.

Vehicles or machinery operating or moving through weed infestations can become contaminated with invasive plant seeds or other reproductive material. These seeds or reproductive material can then travel long distances on the vehicle or machinery to new locations.

Reproductive material can include any part of a plant that is capable of growing to become a new plant (e.g. a bulb, rhizome, a stolon, a tuber, a stem, leaf cuttings or stem or root fragments).

There is a real risk that these seeds or soil and mud containing the seeds will fall from contaminated or dirty machinery or vehicles in agricultural production or environmentally sensitive locations where an invasive plant infestation may become a long-term and costly problem for the land manager to remediate.

Clean down of vehicles and machinery reduces the risk of spreading invasive plants and soil borne pests and diseases.

These clean-down procedures have been developed to allow a consistent approach across Queensland to the cleaning of vehicles and machinery. These methods will help reduce the chance of spreading invasive plant seeds or other reproductive material when moving vehicles or machinery.

This document will also help those undertaking the cleaning and inspection of vehicles and machinery to understand their role in helping drivers and operators to discharge their obligations.

1.1 General Biosecurity Obligation

Under Queensland's *Biosecurity Act 2014*, all persons have an obligation to take reasonable and practical measures to prevent or minimise the biosecurity risks associated with their activities or dealings with the carriers of invasive plants.

A carrier is anything capable of moving biosecurity matter, such as invasive plant seeds, attached to, or contained in the thing from one place to another.

All types of vehicles and machinery are capable of being carriers of invasive plants.

A person (for example, the owners or operators of vehicles and machinery) may show that they have discharged their general biosecurity obligation by following these procedures to ensure that

their vehicles and machinery are as clean as practical of the seeds or other reproductive material of invasive plants.

A person may rely on another person to take the measures on their behalf, if the measures are undertaken with due diligence.

1.2 Mineral Resources Acts - Land Access Code

Under the Land Access Code, a resource authority holder must (if asked) provide a landholder with a copy of the clean-down record. There is no set format for a clean down record. In providing that record, a person may refer to this document to describe the measures taken to perform the clean down.

1.3 Training

All people responsible for cleaning down vehicles or machinery should have previously undertaken competency-based training and received a satisfactory assessment.

Competency-based training is provided by registered training organisations (RTO) through units such as AHC BIO201A—Inspect and clean machinery of plant, animal and soil material. After completing this training, a person will be able to perform the tasks outlined in Table 1.

Table 1. Competencies required for satisfactory clean-downs

Element	Performance criteria
Check machinery and support vehicles	1.1. Machinery and equipment are checked for contamination according to written guidelines and legislative requirements. 1.2. Machinery and support vehicles are made safe for checking, supported safely, with free moving parts pinned or supported as required. 1.3. Covers and guards removed safely. 1.4. All points identified in legislation or operating procedures are identified and inspected for contamination.
Clean machinery and equipment	2.1. Machinery is made safe for cleaning, supported safely, with free moving parts pinned or supported as required. 2.2. Correct equipment for cleaning selected. 2.3. Points listed in appropriate regulations, checklists or enterprise procedures are cleaned and checked. 2.4. Guards replaced safely and checked. 2.5. Areas on other equipment likely to accumulate contaminants identified, inspected and cleaned
Complete cleaning work	3.1. Waste materials are disposed of according to enterprise operating procedures and relevant legislative requirements. 3.2. Records of cleaning are recorded on appropriate forms according to enterprise policy and procedures

1.4 Possible sources of invasive plant contamination

- Heavy machinery (e.g. dozers, excavators, graders) may contain seeds in mud on the tracks, tyres or attached implements.
- Farm vehicles that have been used in infested paddocks (e.g. tractors four-wheel drives) may be contaminated via mud on the wheels, seeds trapped in radiators or seeds in cabin floor mats.

- Farm Implements such as slashers, ploughs, mulchers and post-hole diggers may be contaminated after being used in infested paddocks.
- Harvesting machinery and headers may collect weed seeds in augers, in bins and behind guards when harvesting crops that are infested with invasive plants.
- Wheeled loaders and other mining and construction equipment may contain contaminated mud.
- Cars, trucks and four-wheel drives that have driven off-road through weed infestations may catch weed seeds in the radiator, mud guards, tyres and underbody.
- Trucks that have transported livestock from infested areas may contain viable weed seeds (e.g. prickly acacia, giant rat's-tail grass) that have fallen from or been passed through stock

1.5 High-risk areas

Vehicles and machinery driven or operated in certain areas of Queensland have a higher risk of becoming contaminated with the reproductive material of invasive plants:

- Vehicles and machinery that have been used, driven or sourced from the Central Highlands are at greater risk of being contaminated with parthenium weed seeds.
- Coastal and subcoastal areas from the New South Wales border to Rockhampton, as well as areas near Moura, Mackay, Townsville, Ingham and Mareeba, contain current infestations of exotic giant rat's-tail grass.

To view distribution maps of all Queensland's invasive plants, visit daf.qld.gov.au. However, for detailed information, you should consult those who have specific local knowledge (e.g. landholders, local and state government officers).

1.6 Tips for reducing the risk of spread

- Avoid driving off-road in areas known to contain declared plants (e.g. giant rat's-tail grass, parthenium weed) or in other areas that present a risk of vehicle or machinery contamination.
- Do not drive through infested paddocks.
- Ensure clothing and footwear is free of soil and plant material before stepping into vehicles.
- Avoid driving or working in contaminated areas in wet or dewy conditions.
- Clean vehicles and machinery suspected of carrying soil or plant material.
- Begin work in clean areas or in areas with the least amount of infestation and work towards infested or high-density areas.
- Keep roads, laneways and buffer zones free of invasive plants.
- Where possible, work infested areas separately and clean down equipment thoroughly before moving to another area.
- Avoid slashing and other work in infested areas during peak seed production times.
- Secure loads (e.g. grain, fodder) if you suspect they contain weed seeds.

2 Clean-down and maintenance sites

2.1 Choosing a mobile or field clean-down site

Cleaning vehicles and machinery before moving them to a different area helps prevent the spread of invasive plants to adjoining land, other parts of the property and along roads. However, you should choose a clean-down site that will give the best possible results and should consult the landholder about its location.

- Consider the site's run-off. Ensure the site is away from watercourses and drains—this will help prevent the spread of invasive plants and will avoid grease and detergents polluting the water.
- Choose a relatively flat site to help prevent run-off and to ensure safety. However a slight slope or the use of railway sleepers may prevent waterlogging.
- Ensure the site can be easily identified, as it will need to be monitored for outbreaks in the following seasons, and notify the landholder/trustee of the land of this location.
- A painted post, distinguishing landmark or GPS recording will help identify the site
- If possible, choose a well-grassed area to reduce mud during cleaning. Also, grass will compete with any weed seeds that later germinate, limiting the spread of the weed.
- Choose a site close to the infested area to prevent further spread.
- Do not choose a site that lies across the property boundary (unless the infestation is also located on the adjoining property at similar or higher densities).
- If possible, conduct small clean-downs at the landholder's shed facilities (with permission) before leaving the property.

2.2 Public clean-down facilities

Throughout Queensland, clean-down facilities are available for public or industry use. They are provided for cleaning vehicles and machinery to prevent spread of invasive plants and should be used whenever possible, as they are equipped with grease and silt traps for environmental protection.

Some local governments have clean-down facilities (e.g. at saleyards or council depots) and some of these may be suitable for machinery and vehicles. You may need to seek permission before using these facilities. For further information or for permission to use these facilities, contact the relevant local government.

Some facilities contain high-pressure water and air compressors.

2.3 Choosing a maintenance site

- If possible, use a hard-surfaced area such as a gravel area beside the landholder's shed. Then work can be carried out easily, parts can be removed safely and the area can be monitored.
- If the maintenance work must be done in the field/paddock, mark the area for future monitoring and record its location. Remember that during maintenance, declared

plant reproductive material may fall off the machinery when guards etc. are removed, so monitoring is essential.

3 General clean-down procedures

3.1 Safety

Ensure all safety precautions are taken. Refer to the relevant sections of the operating manual of the vehicle or machinery for specific safety instructions before cleaning.

- Place the vehicle or machinery in a safe position. It should be stable and immobile.
- Stop the engine, apply the park brake, chock the wheels and lower all implements or secure/chock them if they need to be up for cleaning (e.g. the slasher).
- Ensure the area is free of obstructions and objects that may cause injury (e.g. logs, power lines).
- Have a qualified operator present if parts of the vehicle or machinery need to be moved during cleaning.
- Move the vehicle or machinery with caution.

3.2 General clean-down guidelines

The following points are general guidelines only. Please refer to the specific procedures later in this document for different types of vehicles and machinery.

- Examine the item to determine how much mud, soil and plant material has built up.
- Identify any areas that require special attention as outlined in the specific vehicle or machinery procedures (e.g. radiators, spare tyres, behind guards and protective plates). Some of these may be difficult to locate and access. Remove the necessary guards or belly plates to access these areas for cleaning.
- Identify any areas that must be cleaned with compressed air rather than water. Clean these first.
- Where possible clean from the top down
- Clean upper body and cabin then under the guards and underneath the machinery/vehicle and then do the attachments or implements.
- Clean all toolboxes and storage compartments.
- Check that all areas have been cleaned.
- Replace the guards. (Remember that belly plates and other guards on heavy machinery may need to be replaced before moving the machinery.)
- Move the clean vehicle or machinery carefully, avoiding recontamination. If necessary, wash any remaining mud, soil or plant material from the tyres or tracks.
- Record the details of the cleaning on the appropriate forms or in the vehicle or machinery logbook.
- Present the vehicle or machinery to an inspector if required.
- Dispose of any plant material according to the relevant guidelines.

Remember that no clean-down guidelines can detail all the parts to check. This is because there are:

- numerous different models and new models
- different attachments (e.g. different types of blades on dozers)
- different modifications, either in the factory or by previous owners

- varying conditions of the machinery (e.g. rusted parts allowing entry of contaminants into sections that are usually sealed).

Examine the item you are cleaning very carefully for any areas that could be contaminated, even if these areas are not listed in the guidelines, and clean them thoroughly.

3.3 Basic cleaning for all vehicle types¹

CAUTION
DO NOT use high-pressure water jets in compartments that house electronic components.

The basic cleaning requirements for all vehicles are given in Table 2. It is best to start cleaning at the top of the vehicle and work down to the ground. Carry out the basic cleaning in conjunction with the specific requirements for the type of vehicle, ensuring that you remove all soil and plant material.

Table 2. Basic cleaning requirements for vehicles

Area	Actions
Air tanks	Clean these as for fuel tanks.
Air vents	Unscrew the air vents and blow them with compressed air. If filters are fitted, remove and clean them.
Battery	Remove the battery and clean underneath it.
Battery box	Clean the battery box.
Bodywork	Check all damaged bodywork. Remove any floor or body strips or moldings that form lips where soil or plant material may become trapped, particularly on vehicle floor compartments.
Bumper and brush guard	Clean all hollow sections and attachment points.
Canopy	Remove the canopy and brush it, then clean it with compressed air or high-pressure water.
Canopy bows	Disassemble the canopy bows, then wipe or scrub them with brushes and water. Pay particular attention to locking catches, joints and hollow cross members.
Chassis	Clean the chassis with high-pressure water using equipment with a flexible nozzle. Pay particular attention to small apertures, which may act as reservoirs for soil and plant material.
Dashboard	Use compressed air and dry paintbrushes to clean the dashboard.
Dual wheels	Take extra care cleaning vehicles fitted with dual bogie wheels. If contamination is detected, an inspector may ask for the outer wheel to be removed, cleaned and re-inspected.
Fender wells	Clean the access areas for tail-light wiring and other fender apertures that may collect soil and plant material.
Floor drain plugs	Remove all floor drain plugs to facilitate cleaning. Clean all drain plugs and apertures, paying particular attention to threaded areas.
Floor mats	Remove all floor mats or carpets and clean them.
Fuel tanks	If fuel tanks are strapped to the vehicle, clean them to remove contamination between the tank and the vehicle.

¹ Adapted from *Australian Defence Force military equipment & personnel: guidelines for offshore inspection*—see More Information, page 30.

Area	Actions
Insulation tape	Check all taped areas for contamination and replace the tape with new where necessary.
Interior	Remove all contamination with vacuum or compressed air equipment.
Internal panels, access panels	Where possible, remove all internal panels to allow cleaning of inner compartments.
Lights and reflectors	Remove all damaged lights (internal and external) and any lights where seals have not maintained their integrity, so that you can clean the light fittings.
Metal racks	Clean all box and tubular steel racks (which have openings) with high-pressure water.
Mirrors	Clean all mirror holders.
Radiator (all types)	Clean the radiator with compressed air and follow this with a low-pressure high-volume water wash. You may need to use brushes or to pick seed material from between the veins on the radiator.
Ropes, straps and Velcro	Check and clean all ropes and straps and items containing Velcro. Extend ropes and straps to their full length when cleaning and check all attachment points, fixtures and tension devices
Rubber seals	windcreens, doors, tailgates and other areas and clean or replace them as necessary.
Seatbelts	Clean and check all seatbelts, especially the catches where the seatbelts fasten. You may need to remove any sheaths or covers to adequately clean seatbelts.
Seat cushions	Clean the cushion covers.
Storage and tool compartments	Empty and clean all storage and tool compartments.
Support and cross members	Check and clean the transmission support members and other cross members.
Tools and equipment	Remove all items for cleaning. This may include jacks, wheel braces etc. Wipe tools clean
Toolboxes	Empty and clean all toolboxes. If they are bolted to the floor tray, unfasten and remove them to check there is no debris trapped between the floor and the toolboxes.
Tyres	Clean the tyres, paying particular attention to the tread and any cuts or gashes.
Winch cable drum	Unwind the winch cable and clean the drum, cable and any attachments of any soil and plant material that is embedded in the components or grease.

Remember: The key to successful cleaning is more than just ticking off a checklist
You should be thorough, systematic and consistent.

CHECK, CLEAN, RECHECK

3.4 Suggested equipment

- A mobile water tanker or spray unit (ideally) or water pumped from a dam or cattle trough or tank.
- A high-pressure water cleaner or pump.
- A garden hose (for small clean-downs).
- An air compressor (for removing dry material, e.g. from radiators and grain headers).
- Brooms, brushes and a dustpan (for cleaning cabins).
- A vacuum cleaner.

4 Specific cleaning checklists²

4.1 Cars, trucks and four-wheel drives

CAUTION

DO NOT use high-pressure water jets in compartments that house electronic components.

Complete the basic cleaning outlined in Table 2 and also check the following areas, cleaning as necessary.

Interior

- Check and clean the foot wells.
- Check the carpets and mats.
- Check and clean the seatbelts.

Boot

- Check and clean the carpet (checking for deposits of hay, weed seeds, burrs and/or soil).
- Check and clean the spare tyre area.
- Check and clean other recesses in the boot or rear of the vehicle.

Engine bay

- Check and clean the radiator.
- Check and clean the grill.
- Check and clean the top of the transmission gearbox.
- Check and clean the recess under the windscreen wipers.
- Check and clean the air filters.

Underside

- Check and clean the wheel arches, wheel trims, flares, step treads and bumpers.
- Check and clean the mudflaps.
- Check and clean the tyre rims (particularly the near side).
- Check and clean the axles and differentials.
- Check and clean the spare tyres on four-wheel drives and station wagons. These are often suspended underneath.

Note: These are high-risk areas, as contaminants collect inside the horizontally positioned rim.

Other areas

- Check and clean all toolboxes, ladders and storage compartments.
- Check and clean the back or tray of trucks and four-wheel drives.

Remember: The key to successful cleaning is more than just ticking off a checklist
You should be thorough, systematic and consistent.

CHECK, CLEAN, RECHECK

² Adapted from the Australian Department of Agriculture's machinery cleaning guides and checklists—see More information, page 30

4.2 Compactors³

CAUTION

DO NOT use high-pressure water jets in compartments that house electronic components.

Complete the basic cleaning outlined in Table 2 and also check the following areas, cleaning as necessary.

Cabin

- Remove any rubber floor mats and clean the floor surface.
- Remove and clean all door rubbers and internal door paneling.
- Clean all windowsills.
- Remove and clean under the seat, including the rubber seat shroud.
- Remove any non-affixed floor panels and clean underneath them.
- Remove the rubber pedal covers and clean them.
- Remove the cabin wall lining and clean behind it.
- Clean all air-conditioning vents, including the air-conditioning filter. You may have to remove paneling to do this.
- Remove the joystick control housing and clean inside it.
- Check the cabin roof, both inside and out.
- Remove any false floor under the cabin for cleaning.
- Clean the ladder to the cabin (which may have a hollow frame) and clean under each footstep.
- Remove all light covers and check the cavities behind them.
- If the cabin housing can be flushed via drainage holes, do so.

Engine bay

- Check all surfaces of the engine block, including between tappet covers.
- Remove and clean the air-filter pre-cleaner.
- Remove and clean the air-filter with compressed air.
- Clean inside the fan belt flywheels (harmonic balancer).
- Remove and clean any belly plates.
- Remove all non-affixed engine covers to allow access and clean all surfaces.
- Check the engine covers for any hollow support frameworks and flush these to ensure that they are clean.
- Remove all engine cover rubbers and clean them.
- Flush the hollow chassis rails either side of engine via drainage holes on the underside of the rails. You may need to remove the belly plate bolts to do this.
- Check the battery boxes either side of engine. Loosen the batteries and clean under them.
- Flush the radiator and oil cooler from both sides to ensure that the fin and core are clean.
- Loosen the radiator shroud to let loose debris fall through.
- Check either side of the radiator for vertical hollow support structures and flush them.
- Check inside all wiring harnesses.
- Check under all hydraulic looming.
- Remove zip-ties and electrical tape that hold hydraulic hoses together—this will facilitate cleaning.

³ Adapted from the Australian Department of Agriculture's cleaning guide and checklist for compactors—see More information, page 30.

- Check all surfaces of the fuel cell (which generally sits below the radiator and the engine).

Wheel drums, boots and rims

- Check inside each cleat/boot on each wheel drum—generally these are only spot-welded or are hollow with access points.
- You may need to remove plates inside the wheel rims to access the brake drums. If so, remove them and clean them thoroughly.

Tyres

- Check each tyre for cracks or splits that can harbour seeds, soil or any other risk material.

Front end and bucket/blade

- Remove the front housing cover plate to allow better access to the hydraulics.
- Remove the cutting teeth from the bucket.
- Remove all non-affixed wear plates from the bucket.
- Check the front and back of the bucket for any cracks, splits or evidence of repair. If any are detected, the inside will need to be verified clean.
- Check any light mounts on the front wheel arches—these are generally hollow and require cleaning.
- Bucket push arms are generally sealed units, and check for hollow areas and drainage points.

Other areas

- Check all wheel arches for hollow support frameworks. You may have to loosen these from the chassis to clean where they join the arches.
- Clean all surfaces of the oil tank (which is generally near the ladder to the cabin).
- Clean and flush under all non-slip checker-plate surfaces.
- If the rear drawbar is hollow, remove the towing pin and flush the drawbar.
- Remove all contaminated grease on the machine, including around pivot points.

Remember: The key to successful cleaning is more than just ticking off a checklist
You should be thorough, systematic and consistent.

CHECK, CLEAN, RECHECK

4.3 Cotton pickers

CAUTION

DO NOT use high-pressure water jets in compartments that house electronic components.

Complete the basic cleaning outlined in Table 2 and also the following checks, cleaning as necessary.

Row units

- Examine the picking heads externally for cotton trash or soil and plant material.
- Open all picking head inspection doors to expose the moisture racks, doffers, spindle bars and rotor assemblies. Manually rotate and check and clean the rotor assemblies.
- Open the rear inspection doors on the air ducts (located at the rear of the picking heads). Raise the picking heads to check and clean their underside.

Note: The picking heads are held up by hydraulics—DO NOT climb underneath them unless the heads are safely secured in the raised position.

Cabin

- Check externally under and around the cabin. Check under the mats in the cabin. Check the air-conditioning system (where fitted), including ducts and filters.

Air ducts

- Remove/open all cover/inspection panels. (These horizontal ducts convey cotton from the front picking section to the basket.)
- Check and clean all air ducts from the top.

Basket

- Check and clean the basket roof.
- Access the internal parts of the basket through the hinged door on the roof. (You will need a ladder to climb into the basket.)
- Tip or elevate the basket (depending on the model) to check and clean the underside, drive shaft assemblies, blower fan and hollow basket support frames (located on the left-hand side of some models).

Note: The meshed surface area of the basket will NOT support a person's weight—walk only on the perforated metal walkways that run from the back to the front of the machine. The basket is lifted by hydraulics—DO NOT climb under the basket unless it is properly and safely secured in its raised position.

Undercarriage/chassis

- Check all undersides of the machine, chassis rails and telescopic rear axle if fitted.

Engine

- Remove the cover panel to expose the top of the radiator. (This can be done when the basket is in the raised position.)
- Remove or open all screens on the engine, radiator and fuel bays.

Tyres

- Check for soil or any other contaminants.

Remember: The key to successful cleaning is more than just ticking off a checklist
You should be thorough, systematic and consistent.

CHECK, CLEAN, RECHECK

4.4 Dump trucks⁴

CAUTION

DO NOT use high-pressure water jets in compartments that house electronic components.

Complete the basic cleaning outlined in Table 2 and also check the following areas, cleaning as necessary.

Cabin

- Remove any rubber floor mats and clean the floor surface.
- Remove and clean all door rubbers and internal door paneling.
- Clean all windowsills.
- Remove and clean under the seat, including the rubber seat shroud.
- Remove any non-affixed floor panels and clean underneath them.
- Remove and clean the rubber pedal covers.
- Clean inside all air-conditioning vents and ensure there is access for inspection.
- Clean inside all joystick controls and ensure there is access for inspection.
- Check the cabin roof and walls, both inside and out.
- Clean the ladder (which may have a hollow frame) and clean under each footstep.
- Clean inside all light covers and ensure there is access for inspection.
- Check for a false floor under the cabin and if it is present, remove it for cleaning.
- If the vertical cabin housing can be flushed via drainage holes, do this.

Front end and radiator

- Remove the radiator grill (both outside and inside). Access will be required for inspection.
- Loosen the radiator shroud to let loose debris fall through.
- Check either side of radiator for vertical hollow support structures. If they are present, flush them.
- Clean inside all light covers. Access will be required for inspection.
- If the front drawbar has drainage holes, flush them.
- If the vertical channels either side of the radiator have drainage holes, flush them.
- Check the air filter (using compressed air if necessary).
- Remove any non-affixed panels from the front of the cabin to access the air-conditioner.

Engine bay

- Remove the air-filter pre-cleaner cover and clean it.
- Remove the air-filter and clean it with air.
- Clean inside the fan belt flywheels (harmonic balancer).
- Check all surfaces of the engine block, including between tappet covers.
- Remove any belly plates and clean them.
- Remove all non-affixed engine covers for cleaning and inspection.
- Remove all engine cover rubbers for cleaning and inspection.
- Check the engine housing for any open-ended or spot-welded hollow support framework and flush it clean.
- Flush the radiator and oil cooler from both sides to ensure that the fin/core is clean.
- Check the battery boxes. Loosen the batteries and clean under them.
- Check all wiring harnesses.

⁴ Adapted from the Australian Department of Agriculture's cleaning guide and checklist for dump trucks—see More information, page 30.

- Check under all hydraulic looming.
- Ensure that all engine mounts are clean.
- Ensure that all surfaces of the sump and the engine block are clean.
- Remove all contaminated grease from the universal joints.
- Clean inside all light covers. They will need to be accessed for inspection.
- Remove zip-ties and electrical tape that hold electric and hydraulic hoses together—this will facilitate cleaning and inspection.
- Flush under all non-slip checker-plate footings.
- If the wishbone between the front wheels is hollow, flush it via the openings inside the struts.

Rear chassis

- Clean all surfaces of the oil and fuel tanks.
- Check all wiring harnesses.
- Check under all hydraulic looming.
- Clean all universal joints to ensure they are free of contaminated grease.
- Clean all surfaces of the chassis rails.
- Clean all internal ledges and hollow cavities inside the track frames.
- If the carrier rollers above the tracks have a hollow vertical support structure, clean it.

Tyres and rims

- Ensure that all cracks and splits in tyres are free of contamination.
- When checking inside wheel rims, you may need to remove non-affixed plates to access the brake drums and inner rim.
- Remove dual tyres for checking.

Dump tray

- Check all surfaces of the tray for cracks, splits or evidence of repair. If any are detected, they will need to be investigated for internal contamination (if double skinned).
- Check all rubber mounts on the underside of the tray.

Remember: The key to successful cleaning is more than just ticking off a checklist
You should be thorough, systematic and consistent.
CHECK, CLEAN, RECHECK

4.5 Excavators

CAUTION

DO NOT use high-pressure water jets in compartments that house electronic components.

Complete the basic cleaning outlined in Table 2 and also check the following areas, cleaning as necessary.

Cabin

- Remove any rubber floor mats and clean the floor surface.
- Remove and clean all door rubbers and internal door paneling. Clean all windowsills.
- Remove the cabin wall lining and clean behind it.
- Remove and clean under the seat, including the rubber seat shroud.
- Remove any non-affixed floor panels and clean underneath them.
- Remove and clean the rubber pedal covers.
- Remove and clean inside the joystick control housing.
- Check all air-conditioning vents, including the air-conditioning filter. You may have to remove some paneling for cleaning.
- Check the cleanliness of the cabin roof, both inside and out.
- Clean the ladder to the cabin (if applicable). It may have a hollow frame, so check for possible entry points. Clean under each footstep.
- Remove all light covers and check the cavities behind them.
- If the cabin housing can be flushed via drainage holes, flush it with water.

Body and engine bay

- Remove and clean the air-filter pre-cleaner.
- Remove the air-filter and clean it with compressed air.
- Check all surfaces of the engine block, including between tappet covers.
- Clean inside the fan belt flywheels (harmonic balancer).
- Remove all non-affixed engine covers and clean all surfaces.
- Check the engine covers for hollow support frameworks and flush them to ensure that they are clean.
- Remove and clean the engine cover rubbers.
- Check either side of the radiator for vertical hollow support structures and, if they are present, flush them to ensure that they are clean.
- Loosen the radiator shroud to let loose debris fall through.
- Check inside all wiring harnesses.
- If necessary, remove the counterweights to allow cleaning and inspection.
- Remove and check the engine cover rubbers.
- Remove zip-ties and electrical tape that hold hydraulic hoses together—this will facilitate cleaning.
- Loosen the batteries and clean under them.
- Flush the radiator and oil cooler from both sides to ensure that the fin/core is clean.
- If the bottom rails along the sides are open ended, flush them with water.
- Check the sump and engine block.
- Remove all contaminated grease from the hydraulic rams.
- Check all lights and cavities behind them.
- Check all rubber engine mounts.
- Flush under all non-slip checker-plate footings to ensure they are clean.

Tracks, rollers and frame

- Remove the track rock guards to allow access to inside the track frames.
- Once the rock guards have been removed, check where the bolts attach to the frame. If this is hollow, flush it.
- Remove any individual rubber track pads (usually on small excavators).
- Remove the motor cover plates and clean inside the drive motor.
- Individually clean each countersunk bolt hole on the rollers.
- Flush the hollow track frame ends to remove all contamination.
- Remove all non-affixed covers and plates.
- Turn the roll tracks one revolution to check each track pad and the countersunk bolts on the rollers and idler wheels.
- Clean behind the sprockets.
- Thoroughly clean the spring adjuster inside the track frame.
- If the carrier roller above the tracks has a hollow support structure, check it.
- If the excavator has telescopic tracks (generally only small excavators), extend them and clean inside them.
- Clean all internal ledges and hollow sections inside the track frames, as these can harbour contamination.

Boom stick and bucket

- Check the front and back of the bucket for any cracks, splits or evidence of repair. If any are detected, the inside will need to be verified as clean.
- Remove all non-affixed wear plates.
- Flush spot-welded wear plates on the back of the bucket.
- Remove all cutting teeth (boots) from the bucket.
- If the boom arm is hollow, remove all external non-affixed plates.
- Clean all knuckles, removing all contaminated grease.
- Remove the cutting teeth from the blade.

Remember: The key to successful cleaning is more than just ticking off a checklist
You should be thorough, systematic and consistent.

CHECK, CLEAN, RECHECK

4.6 Headers and harvesters

CAUTION

DO NOT use high-pressure water jets in compartments that house electronic components.

Complete the basic cleaning outlined in Table 2 and also do the following checks, cleaning as necessary.

All harvesters

Check and clean:

- the area under the skid plate.
- each header knife and finger.
- the auger located horizontally across the header.
- the area behind any cover on the header.
- the area within any belts on any draper front (if fitted).
- the feeder house.
- the cabin floor area.
- the cleaning fan and the area between the bottom of the fan housing and any shield under the fan housing.
- the chassis, including inside any rail ledges, the back axle-beam and the undercarriage.
- any tailing auger.
- any sieve area, including the full length and width of the grain pan.
- any grain bin area, including any auger.
- the engine compartment, including the radiator core.
- any grain or repeat elevator, including any cups and rubber flights.
- any straw spreader or chopper.
- the tyres and rims.

Conventional harvesters

Check and clean:

- the threshing or separating area, including the drum and concaves behind the rasp bars and lead-in plates and around the concave wires.
- the beater drum, including the area between the drum and walkers.
- the straw walkers, including the beater and the chaff pan, underneath the straw walker and any concealed areas under rubber air flaps.

Rotary harvesters

Check and clean:

- the external top and sides of the conical section of the rotor cage.
- the areas inside the top of the conical section.
- the threshing or separating area, including along the rotor cage.

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You should be thorough, systematic and consistent.

CHECK, CLEAN, RECHECK

4.7 Mini tractors

CAUTION

DO NOT use high-pressure water jets in compartments that house electronic components.

Complete the basic cleaning outlined in Table 2 and also check the following areas, cleaning as necessary.

Tyres and rims

- Check all parts of the tyres and rims, including the inner sides of the rims.
- Check for gaps in split-type rims.
- Check for any cuts and gashes in the tyres.
- Check any wheel-mounted counterweights.

Chassis

- Check the inside of the chassis rail ledges.
- Carefully check for hollow areas and cover plates that may conceal voids.
- Check voids in the area between the gearbox and the engine. (Several models have a large void that is accessible from underneath)
- Check voids in the counterweights. You may need to remove multiple counterweights for cleaning.
- Check any hollow sections in the sub-frame under the motor that links the chassis rails.

Engine

- Remove the grill (usually by unscrewing two wing nuts) and clean it.
- Remove the wire mesh screen from the front of the radiator and clean it.
- Check and clean the fan shroud at the rear of the radiator.
- Remove and clean the air filter cover, remove the dust dish from the air filter cover, and remove and check the air filter/cleaner. (If you cannot clean these satisfactorily, you may need to destroy them and install new ones.)
- Check around the fuel tank and brackets for build-up of soil and plant material.
- Check all areas in the bonnet and in the engine bay for hollows and clean them.

Other

- Check the external rear brake assemblies and the common shaft for the brake and clutch pedals.
- Check the foot plates and mounting brackets.
- Check the hollow sections in the mudguards, the joints between the mudflaps and the mudguards and the wiring looms under the mudguards.
- Check and clean the toolbox under the seat or the fuel tank. Empty it before cleaning.
- Check and clean any torn seats and exposed foam at the rear of the seat. (Soil and plant material can become lodged in the cushioning.)
- Check and clean the rear axles, in particular the track-width adjustment pinholes.
- Check and clean the drawbar and mounting.
- Check and clean the three-point linkages and operating levers.

Remember: The key to successful cleaning is more than just ticking off a checklist
You should be thorough, systematic and consistent.

CHECK, CLEAN, RECHECK

4.8 Power Take Off (PTO) rotary hoes

CAUTION

DO NOT use high-pressure water jets in compartments that house electronic components.

Complete the basic cleaning outlined in Table 2 and also do the following checks, cleaning as necessary.

- Check and clean the tyres and mounting bolts for soil. You may need to remove the tyres or loosen them from their adaptors on the horizontal shaft so that you can remove soil from the void.
- Remove or loosen the skid/wear plate from the vertical gear casing. (This casing is filled with oil, so make sure you remove or loosen only those bolts securing the plate.)
- Check the body of the hoe for double skins or voids that could contain soil due to inadequate or incomplete weld joints.
- Check and clean all areas where mudflaps are attached or plates overlap.
- Check for hollow sections in reinforcing ribs.
- Check and clean the three-point linkage attachment points, the PTO knuckles and tube, the universal joints and the shafts.
- Check and clean all ground-engaging areas for signs of wear that could allow the ingress of soil or plant material.
- Rotate the rotary shaft and probe for plant material that may be caught in the bearing housing at the ends (or middle if twin shafted).
- Check and clean the frame, supports and mounts for the trailing wheels. These are often hollow sections.
- Check and clean the trailing wheels. These are usually hollow and are made from two pieces of metal welded together. With wear, the metal and welds crack and the wheels fill with soil.

Remember: The key to successful cleaning is more than just ticking off a checklist
You should be thorough, systematic and consistent.

CHECK, CLEAN, RECHECK

4.9 Track-type dozers

CAUTION

DO NOT use high-pressure water jets in compartments that house electronic components.

Complete the basic cleaning outlined in Table 2 and also check the following areas, cleaning as necessary.

Cabin

- Check externally under and around the cabin.
- Check under the mats in the cabin.
- Remove or lift the seat, then remove or lift any floor panels and check the top of the transmission.
- Check that the air-conditioner filter (if fitted) is clean by shaking or tapping it.

Tracks and track frame

- Examine the tracks carefully.
- Remove the inspection/cover plates and check inside the track area.
- Check the idler wheels. (These support the tracks.)

Belly plates

- Remove and check behind these plates.

Rear plates

- Remove and check behind these plates.

Hydraulic cover plates

- Remove and check behind these plates.

Engine

- Check the radiator core and engine area.
- Remove and check the air filter/cleaner. Replace it if it is clogged with contaminants.
- Check carefully the void between the oil and radiator cores.

Battery box

- Lift or remove the battery and check under it for contamination. (The battery box may be at the side or at the rear or under the seat.)

Fuel cells

- Remove these and check for any soil and plant material packed between the tank and the frame.

Blades

- Ensure that the edges of the blades (top/bottom) are not split, as this allows soil to pack very tightly in the hollows.
- Check the truncation arms.
- Check carefully the pivot points and adaptors at the rear of the front blade—these allow the blade to change height and angle. Sometimes soil will be compacted and difficult to dislodge.
- Check all hollow sections.

Ripper support frame

- Check carefully to see if any contaminants have entered this hollow section. You may need to remove the tines.

Tines

- Check these carefully. You may be able to remove contamination by water blasting, however you may need to remove the tines for cleaning in some cases.

Ripper points

- A pin holds the ripper points in place. Check for any soil and plant material compacted under the ripper points.

All areas

- Check for any hollow sections or channels and determine whether there is a possible entry point for contamination. Check whether the plates are covering compartments or spaces that may have collected soil or plant material.

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You should be thorough, systematic and consistent.
CHECK, CLEAN, RECHECK

4.10 Wheeled loaders⁵

CAUTION

DO NOT use high-pressure water jets in compartments that house electronic components.

Complete the basic cleaning outlined in Table 2 and also check the following areas, cleaning as necessary.

Cabin

- Remove any rubber floor mats and clean the floor surface.
- Remove and clean all door rubbers and internal door paneling. Clean all windowsills.
- Remove and clean under the seat, including the rubber seat shroud.
- Remove any non-affixed floor panels and clean underneath them.
- Remove and clean the rubber pedal covers.
- Remove the wall lining and clean behind it.
- Clean all air-conditioning vents, including the air-conditioning filter. You may have to remove paneling to do this.
- Remove the joystick control housing and clean inside it.
- Check the cabin roof, both inside and out.
- If there is a false floor under the cabin, remove it for cleaning.
- Clean the ladder to the cabin (which may have hollow frame) and clean under each footstep.
- Remove all light covers and check the cavities behind them.
- If the cabin housing can be flushed via drainage holes, do this.

Engine bay

- Check all surfaces of the engine block, including between tappet covers.
- Remove the air-filter pre-cleaner and clean it.
- Remove the air-filter and clean it with compressed air.
- Clean inside the fan belt flywheels (harmonic balancer).
- Remove any belly plates and clean them.
- Remove all non-affixed engine covers to allow access and clean all surfaces.
- Check the engine covers for hollow support framework and flush it to ensure that it is clean.
- Remove all engine cover rubbers and clean them.
- Flush the hollow chassis rails either side of the engine via drainage holes on the underside of the rails. Remove the belly plate bolts for access if necessary.
- Check the battery boxes on either side of the engine. Loosen the batteries and clean under them.
- Flush the radiator and oil cooler from both sides to ensure that the fin/core is clean.
- Loosen the radiator shroud to let loose debris fall through.
- Check either side of the radiator for vertical hollow support structures and flush these to ensure that they are clean.
- Check inside all wiring harnesses.
- Check under all hydraulic looming.
- Remove zip-ties and electrical tape that hold hydraulic hoses together—this will facilitate cleaning.
- Check all surfaces of the fuel cell (which generally sits below the radiator and engine).
- Check the support arm behind the differential, as this can be hollow and harbour contamination.

⁵ Adapted from the Australian Department of Agriculture's cleaning guide and checklist for wheel loaders—see More information, page 27

- Check all rubber engine mounts.
- Clean all surfaces of the axles and differential.
- Check the sump and engine block.
- Check all lights and the cavities behind them.
- Remove all contaminated grease from universal joints.

Front end and bucket

- Remove the front housing cover plate to allow better access to hydraulics.
- Remove all cutting teeth (boots) from the bucket.
- Remove all non-affixed wear plates from the bucket.
- Check the front and back of the bucket for any cracks, splits or evidence of repair. If any are detected, the inside will need to be verified clean.
- Check any light mounts on the front wheel arches, as these areas are generally hollow and require cleaning.
- Remove all contaminated grease from all pivot points.
- Bucket push arms are generally sealed units, however check for hollow areas and drainage points.
- Flush spot-welded wear plates on the back of the bucket.

Tyres and rims

- Check each tyre for cracks or splits that contain seeds, soil or any other risk material.
- You may need to remove the plates on the inside wheel rims to access the brake drums, then remove these and clean them thoroughly.

Other areas

- Check all wheel arches for hollow support frameworks. You may also have to loosen these from the chassis to clean where the arches join the frame.
- Clean all surfaces of the oil tank (which is generally near the ladder to the cabin).
- Clean under all non-slip checker-plate surfaces.
- If the rear drawbar is hollow, remove the towing pin and flush the drawbar.
- Remove all contaminated grease, including around pivot points.

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 You should be thorough, systematic and consistent.
CHECK, CLEAN, RECHECK

4.11 Wheeled tractors

CAUTION

DO NOT use high-pressure water jets in compartments that house electronic components.

Complete the basic cleaning outlined in Table 2 and also do the following checks, cleaning as necessary.

Tyres and rims

- Check and clean all parts of the tyres and rims, including the inner sides of the rims.
- Check between dual wheels (if fitted).
- Check any wheel-mounted counterweights.
- Check for any gashes or cuts in the tyres.

Engine

- Check the radiator core and grill for residues.
- Check the void between the oil cooler and radiator. (The oil cooler may be hinged or on a slide.)
- Remove and check all air filters/cleaners, pre-cleaners and cyclone-style dust separators. If you cannot clean them satisfactorily, you may need to destroy them and install new ones.
- Check and clean sound-deadening foams and heat shields. (Foams can become impregnated with dust.)

Cabin

- Check externally under and around the cabin.
- Check under the mats in the cabin and in any void or on any skirt under suspended seats.
- Check air-conditioner filters (if fitted). Most large tractors will have a false cabin roof housing the air-conditioning unit, so remove or open the false roof for access.
- Check the integrity of rubber door and window seals. If they are torn, soil and plant material will be sucked into them and trapped.
- Check the void behind consoles and the dashboard.

Chassis and vehicle body

- Check the inside of the chassis rail ledges and the back axle-beam and the undercarriage of this area.
- Check any hollow sections in the front axle tubes.
- Check and clean all toolboxes and battery boxes. These are often under the cabin steps or in the engine bay.
- Check any voids in the rear brake assemblies.
- Check any hollow sections in the drawbars and in the retractable/extendable three-point linkages.
- Check and clean single counterweights. You may need to remove multiple counterweights to clean the voids.
- Check and clean mudguards and wheel flares, and look for hollows and crevices.
- Check and clean roll cages and roll bars. Look for holes and gaps where these are attached to the vehicle.
- For four-wheel drives, check the torque tube (front drive shaft guard) for holes or poor attachment.
- Check and clean the power take-off (PTO) area, PTO shaft, universal joints and shaft covers/PTO tubes.

- Check and clean the wiring looms in split protective conduit.

Note: Some agricultural tractors will have a rear carryall mounted on the three-point linkages or a forward-mounted forklift or bucket/scoop attachment—check these carefully.

Buckets, blades and scoops

- Check and clean all areas of the blade. Look for holes or double skins.
- Remove, check and clean the cutting teeth, adaptors and wear plates on the blades.
- Check and clean the hydraulic arms and supports. Look for hollows that may contain soil and plant material.

All areas

- Check for any hollow sections or channels and determine if there is a possible entry point for contamination. Check whether any plates are covering a compartment or space that may have collected soil and plant material.

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CHECK, CLEAN, RECHECK

5 More Information

5.1 Invasive plants

To see a current list of Queensland's invasive plants, visit daf.qld.gov.au.

5.2 AgGuide—Machinery hygiene

A hard-copy handbook that includes information about machinery inspection and cleaning to prevent the spread of invasive plants, pests and diseases and is available from the New South Wales Department of Primary Industries Tocal College. Visit www.dpi.nsw.gov.au for details.

<https://www.tocal.nsw.edu.au/publications/list/farm-management/agguide-machinery-hygiene>

5.3 Australian Defence Force military equipment guidelines for offshore inspection

These guidelines are used by Australian Defence Forces. They are available at

5.4 DAWR machinery cleaning guides and checklists

These guides and checklists have been developed to help importers and offshore cleaners meet Australia's import permit conditions (free of biosecurity risk material) as found in BICON, the Biosecurity Import Conditions system.

These conditions are more onerous than those required by Queensland legislation. The department has provided a generic checklist as well as cleaning guides and checklists for:

- articulated dump trucks
- caterpillar dozers
- compactors
- dump trucks
- excavators
- forklifts
- Hitachi DX40 dozers
- Komatsu dozer
- M motor grader
- medium-sized dozers
- mini excavators
- mini tractors
- motor graders
- scrapers
- skid steer loaders
- wheel loaders.

The guides and checklists illustrate and describe the many areas in machinery that commonly harbour risk (soil and plant) material. Visit <http://www.agriculture.gov.au> for more information.

<http://www.agriculture.gov.au/import/goods/vehicles-machinery/regulations/guides-checklists> (accessed 1/03/2019)

5.5 USA Armed Forces Pest Management Board Technical Guide No.31

This technical guide (published in 2017) provides information on cleaning techniques and inspection procedures currently used by the United States Department of Defense for washing and reviewing equipment, supplies and vehicles. Visit www.dodinvases.org for more information. <https://www.acq.osd.mil/eie/afpmb/docs/techguides/tg31.pdf> (accessed 1/03/2019)

5.6 Tasmanian wash-down guidelines for weed and disease control

These guidelines establish the standard for washing down machinery, vehicles and other equipment to minimise the risk of spreading weed seeds, some insects and plant pathogens in Tasmania. Visit www.dpiw.tas.gov.au to view the guidelines. <https://dpiwwe.tas.gov.au/Documents/Washdown-Guidelines-Edition-1.pdf> (accessed 1/03/2019).