

# General Plant Requirements

EPP-32-03

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SMS

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## 1 Purpose and Scope

The purpose of this document is to specify the minimum operating and safety requirements to be met for all plant used or intended for use within ARTC's operational environment. All mobile and driven plant including road rail vehicles (RRV's) shall comply with the requirements set out below.

## 2 Requirements

### 2.1 Safety Standards

All plant shall comply with the applicable requirements of the Commonwealth Work Health and Safety Acts and Regulations listed in Engineering Procedure EPP-32-02 Plant Maintenance Procedure Section 1.5 & the Australian Standards referenced in Section 1.6.

If the plant is of a type which is required to be registered or licensed, or any permit or certificate is required in relation to the operation of the plant, the supplier shall ensure that all statutory requirements are complied with. Proof that the relevant registration, license, permit or certificate is current shall be produced to the Site Supervisor on request.

The requirements in this document are in addition to the requirements for on-road registration as defined by the NSW Roads and Maritime Authority or other applicable state roads regulatory authority.

### 2.2 Design Features - General

#### Emergency Stop Devices

Emergency stops where fitted shall be prominent, clearly and durably labelled and easily accessible to the operator. Handles, bars or push buttons shall be coloured red. Emergency stops shall be positively latched when engaged and shall isolate all available energy sources immediately. The equipment shall not be capable of restarting until the emergency stop has been fully reset.

#### Work Stop Devices

Where work stop devices are installed to isolate tractive effort or other functions, these shall be clearly labelled to distinguish them from Emergency Stops.

#### Machinery Guards

All rotating, moving, hot or cold components shall be fitted with an appropriate safety guard to prevent injury to any person.

#### Fluids Under Pressure

The operator shall be effectively protected from exposure to high pressure fluids which may be present as a result of hydraulic hose (or similar) failure. The use of steel piping, guards or hose sheaths covering the hose and fittings should be used where the risk cannot be otherwise removed from operating area.

#### Hearing Protection Warnings

Any plant with a noise level above 85 dB(A), excluding alarms, shall be fitted with two 225mm hearing protection signs, one each side of the machine, and one 50mm hearing protection sign fitted in a clearly visible position within the operating compartment.

**Provision of Information**

The supplier shall ensure that relevant information on operating, maintenance and emergency features of the plant (including emergency recovery during on-rail operations) are clearly documented and provided for the use of plant operators, inspectors and other persons affected by the operation of the plant. This includes appropriate risk assessments conducted in accordance with AS4360.

**2.3 Design Features – Mobile Plant****Service Brakes (for off-track operation)**

Plant fitted with steel drums eg rollers, or a combination of steel drums/rubber tyres or tracks, while on the maximum operating gradient specified by the manufacturer, shall be capable of stopping within the distances shown in the table below or as per the relevant Australian Standard:

Plant operating mass	Stopping distance from 5 km/h
Less than 5400 kg	1.2 metres
5400 kg to 13600 kg	1.5 metres
Greater than 13600 kg	1.9 metres

Plant fitted with rubber tyres, while on the maximum operating gradient specified by the manufacturer, shall be capable of stopping within the distances shown in the table below:

Plant operating mass	Stopping distance from 30 km/h
Up to 2500 kg	9 metres
Greater than 2500 kg	14 metres

Slew brakes shall be tested to ensure they operate effectively.

**Park Brake (for off-track operation)**

On implement-type plant the park brake shall be capable of holding the plant item on an incline:

- of 15%, i.e. approximately 1 in 7, or 9 degrees for wheeled plant, or
- 25%, i.e. 1 in 4, or 14 degrees for rollers.

A “fail safe” braking system will receive a higher evaluation rating than similar plant without this system.

For truck-mounted plant the emergency brake shall meet the following minimum braking standard:

Plant operating mass	Stopping distance from 30 km/h
Up to 2500 kg	22 metres
Greater than 2500 kg	34 metres

### **Plant Used Under Overhead Wiring**

Plant to be used under Overhead Wiring shall be designed so as not to require persons to climb onto the top of the plant in the course of normal operation, routine servicing, or fault rectification. Where necessary the plant shall be moved to a safe location to enable access to the top of the plant. Where plant is to be used under live overhead wiring, warning signs indicating the possible presence of live overhead wiring shall be prominently displayed at all relevant access and operational control points. Note this includes boom lifts, scissor lifts, mobile cranes and vehicle loading cranes.

Where plant is routinely used under live overhead wiring eg in Metropolitan areas, they shall be fitted with height limiting devices to prevent approach to the live overhead in accordance with the requirement defined by the track authority responsible for the electrified network.

## **2.4 Design Features – Driven Plant**

### **ROPS / FOPS**

All earth moving machinery shall be fitted with a certified roll-over protective structure (ROPS) and a falling-object protective structure (FOPS) where applicable, complying with ISO3471, ISO12117.1, AS2294 (AS1636 for tractors) or equivalent (includes plant manufactured prior to 1/7/89). A suitably designed roll-cage or protective structure is highly recommended for other items of plant where potential for rollover exists or has been identified through a hazard analysis process.

The ROPS /FOPS structure fitted to RRV's should be capable of supporting the full operating weight of the machine including the installed rail guidance equipment. This will become a mandatory requirement on 1<sup>st</sup> January 2017.

### **Seats**

All driven plant shall be fitted with ergonomically designed seating relevant to the task being undertaken. Seats shall be permanently mounted within the confines of the cabin and be suitably located to provide the operator with ready access to all required operational controls. The preferred orientation is for forward facing seating in the direction of travel. Side seating installations should be avoided. All fitted seats shall be free from tears and without protruding springs or padding.

Provisions may be made for passenger seating where space permits. A permanent sign indicating the maximum number of persons allowed to travel within in the machine cabin should be installed in a clearly visible location.

All persons travelling within the machine cabin must remain seated in the seats provided.

### **Seat Belts**

All driven plant and vehicles shall be fitted with seat belts for each seating position conforming to one of the following Standards:

- Australian Standard AS 2664 - 1983
- International Standard ISO 6683
- Society of Automotive Engineers SAE J386.

Each seat belt assembly or part assembly should be permanently and legibly marked with the following:

- The manufacturer's name and trademark
- Date of manufacture by month and year
- Manufacturer's identification code (relevant standard).

Seat belts shall be worn at all times during the operation of plant and vehicles (including road rail vehicles) unless the operator is required to stand to perform operating functions.

#### **Reverse or Travel Alarm**

All plant and RRV's shall be fitted with a reversing alarm which is automatically activated when the reverse direction is selected. The alarm shall be mounted with unobstructed 'vision' to the rear of the plant to ensure adequate sound dispersion.

Excavators and other plant with restricted operator vision in both forward and reverse directions shall be fitted with a travel alarm which operates in both directions. Alternatively, two alarms may be fitted.

The preferred alarm shall vary its output in response to changes in the surrounding noise level, e.g. "Smart Alarm", and be clearly audible above the noise level of the plant. The alarm's base sound pressure shall be greater than 87 dB(A) measured at a distance of 1 metre from the source. Broadband / white noise / quacker style alarms are also preferred to minimise environmental impacts.

#### **Neutral Start**

Neutral start switches shall operate on all transmissions other than manual gearboxes fitted with a mechanical type clutch. Excavators and skid steer loader travel levers shall self-centre to the neutral position.

#### **Amber Beacon**

Plant and RRV's shall have as a minimum one amber beacon which is wired through the ignition switch and is active whenever the plant is travelling on track or operating on the job site. The beacon shall be mounted as near as possible to the top of the plant, and be clearly visible in normal daylight at a distance of 200 metres in all directions. The preferred beacon shall be a rotating type (minimum 55 watt or LED equivalent), flashing xenon (strobe) types are also acceptable.

#### **Air Conditioner**

Fully enclosed cabins that have no opening windows shall have an operational air conditioner fitted.

#### **Windows**

The windscreen and all other windows shall be made of an approved safety type of glass which complies to the relevant Australian Standard. The relevant standard or manufacturer's code referring to this shall be permanently marked on the glass.

#### **Signs, Notices and Markings**

In addition to the minimum compulsory sign requirements are summarised in Table 2, all driven items of plant shall be fitted with an instruction label advising the operator that "Mobile phones must not be used whilst operating machine"

**S.W.L. and Cranes**

Safe working loads and Manufacturers Load Chart shall be distinctively labelled on all mechanical lifting equipment including backhoes, excavators and loaders that are used for lifting loads. Additional load charts may be placed in the operator's compartment for reference.

Specific on-rail load lifting charts should also be installed where equipment capable of lifting or lift and carry operations are used on rail.

Operating cranes including vehicle loading cranes must be appropriately maintained according to Australian Standards AS1418.

**Articulation Joint Crush Zone**

All articulated plant shall have suitable pictograms displayed where crush hazards exist. Additional crush zones / pinch points shall also be clearly marked.

**Tail Swing**

All slewing plant shall have suitable pictograms displayed where tail swing hazards exist.

**Hydraulic Steering**

Plant with hydraulic steering shall have appropriate means for inspecting & maintaining hydraulic fluid level on a daily basis.

**Confined Space**

Plant with a confined space, e.g. water tankers, shall have an appropriate sign fitted near the entry point to the confined space.

**Dual Control**

Dual control mobile plant to be driven on public roads shall have the words "Dual Control" displayed on the rear of the unit in accordance with the local regulatory authority requirements.

**Left Hand Drive**

Left hand drive mobile plant to be driven on public roads shall have the words "Left Hand Drive" displayed on the rear of the unit in accordance with the local regulatory authority requirements.

**Water-filled Tyres**

Plant fitted with water-filled tyres shall have a warning sign adjacent to each tyre notifying this hazard and shall be serviced by competent people.

**Emergency Lowering (EPV)**

Emergency Lowering valves on Elevating Platform Vehicles (EPV) shall be clearly marked to indicate their purpose and the method of operation. An approved fall arrest harness with shoulder straps shall be worn whilst working at height within an EPV.

**Hitches**

All hydraulic quick hitches shall be fitted with an approved mechanical lock pin or alternatively be fully automatic.

Automatic quick hitches should have two mechanisms to engage the attachment; a primary retaining system and a backup safety system. In the event the primary retaining system fails, working forces should not act on any component of the hitch in a direction that could cause the safety device to disengage. Where a hitch can be engaged from the driver's cabin, it should be possible to verify correct engagement of the retaining system and the safety device from this position.

Hitches shall be identified with:

- a unique identification mark
- manufacturer's name and model
- maximum rated attachment capacity
- mass of the hitch
- lift point capacity (kg)

Lifting hitches, chains and other lifting devices shall operate correctly and shall not be worn so as to render them unsafe.

### **Lifting Devices**

Plant that may be used as cranes, e.g. backhoes, loaders and excavators, having components used for lifting, e.g. hooks and lugs shall have a manufacturer's ID and SWL or Structural Engineer's Certificate approving these components.

### **Safety Equipment for Travel Towers**

Travel towers for electrical work shall be provided with:

- Suitable harnesses for operators
- Controlled Descent Devices (CDD) or Emergency Descent Devices (EDD) in the basket for each person the Elevated Work Platform (EWP) is capable of holding
- Basket rescue kit e.g. if the basket does not tilt or have an escape hatch.

### **Windscreen Wipers**

Plant having a windscreen shall have an operative windscreen wiper(s) which effectively clears the screen directly in front of the operator and gives an adequate view in front of the plant. Wipers fitted to other windows shall also operate effectively. Where fitted, windscreen washers shall operate effectively.

### **Lights and Reflectors**

The requirements for lights and reflectors are shown in Table 1 at the end of this specification. Reflectors shall be in accordance with ADR 47/00 Class 1a / 1b.

Plant required to work at night work shall have suitable and efficient lights, including headlights and worklights.

### **Reflective Tape**

Plant items which do not have rear reflectors shall be fitted with side and rear reflective tape having a zebra stripe pattern. Requirements for the installation of reflective tape on various plant types are shown in Table 1.

- **Material**

The reflective tape shall be in accordance with AS 1318 – SAA Industrial Safety Colour Code with a retro-reflective surface having photometric performance and durability complying with AS 1906 Class 2 or above. Acceptable colour combinations include yellow & black, red & white, red & yellow. Green and white or blue and white tape shall not be used, AS 1906.

- **Size**

The total surface area of reflective tape shall be at least 0.32 square metres, e.g. 150mm by 2100mm.



- **Installation**

The tape shall be evenly applied to the rear and sides of the plant. Tape shall not be applied to the front of plant. Where practical, the lower edge of the tape shall be between 400mm and 1500mm from the ground, with the outermost edge less than 150mm from the corners of the plant.

**Horn**

All driven plant shall be equipped with a clearly audible horn. Exhaust whistles, compression whistles, sirens or alternating tone horns are not acceptable.

Separate horn activation buttons should also be fitted at external locations on the equipment where personnel are required to work within close proximity of the operating plant.

**Rear Vision Mirrors**

All driven plant items shall be fitted with rear vision mirrors (at least 2) that provide adequate rear vision on both sides of the plant.

## 2.5 Mobile Plant for use on Public Roads

**Registration / Unregistered Vehicle Permit**

When plant operation is expected to occur on public roads, plant shall be fully registered, conditionally registered or covered by an unregistered vehicle permit for the duration of the operational period. The appropriate registration label shall be affixed in a secure, visible location. All old labels shall be removed.

**Features Required**

The minimum features required for mobile plant for use on public roads as shown in these requirements are in accordance with those in the RMS publication "Plant Vehicles - Registration Options". Traffic cones / triangles shall be provided in case of breakdown.

## 2.6 Mobile Plant for use on Rail (Fitted with Flanged Wheels)

Plant items fitted with flanged rail wheels shall comply with the relevant provisions of ARTC WOS Rolling Stock Standards. This includes plant capable of both on and off rail operation e.g. excavators, hi-rail Pettibone etc.

## 2.7 Maintenance of Plant

All ARTC owned plant is to be inspected, maintained and serviced in accordance with EPP-32-02 Plant Maintenance Procedures.

Plant in use by contractors or supplied to ARTC for hire shall have an appropriate preventative maintenance program in place which may be audited by ARTC.

## 2.8 Condition and Serviceability Requirements

**Defects**

Defective plant shall have an out of service tag attached at the start switch or battery isolator and shall be made inoperable. Any damage or defects identified are to be repaired by a competent person.

**Major Defects**

Plant with any of the following defects at the time of inspection shall not be used until the defect is rectified:

- Defective neutral start switch.
- Defective service, park or emergency brakes.
- Defective seat belt or absence of a seat belt.
- Inoperative or inaudible reverse/travel alarm.
- Mechanical lock pin not available or not fitted to a manual quick hitch when a bucket or attachment is attached.
- Machinery guards not fitted.
- No manual transmission lock (applies to rollers).
- Faulty suspension, steering or tyres.
- Any other condition which could impair the safe operation of the plant.

**2.9 Mechanical****Brakes**

Brake components shall be free from oil/air leaks or defects and be securely mounted. Brake controls shall be fully operational and free from any defects. Air tanks shall be free from excessive contamination and drained on a daily basis. Brake reservoir levels shall be within the range recommended by the manufacturer.

**Leaks**

For road registered plant, the engine, transmission, drive-line, wheel hubs, hydraulics and fuel lines shall not have any leaks which allow oil or fuel to drip on the road surface, or on exhaust system or on brake components. Steering and brake systems shall be free from leaks, including air leaks. Catch trays or tanks to contain leaks are unacceptable.

**Fluid levels**

All fluid levels shall be within the range recommended by the manufacturer.

**Engine**

The engine shall start readily and provide sufficient power for the desired operation. Frequent jump starting is dangerous and unacceptable. Engine mountings shall be adequately designed and in a satisfactory condition. Air Cleaner indicator level, hoses and clamps shall be satisfactory.

**Cooling System**

The cooling system shall provide efficient cooling for all climatic conditions. The radiator core and all drive belts and hoses shall be free from deterioration and/or leaks. Fan hub bearings shall be free from excessive play or noise.

**Exhaust System**

The exhaust system shall be free from leaks and be securely mounted.

**Exhaust Smoke**

Plant shall not emit visible smoke for continuous periods of more than ten (10) seconds – Protection of the Environment Operations (Clean Air) Regulations 2010.

### **Transmission and Final Drive**

General condition of transmission, front and rear drive lines including axle pivots shall be in satisfactory condition, shall operate to the manufacturer's specifications and be free of leaks. Manual gearboxes coupled to hydrostatic drives shall be locked in gear to prevent accidental gear selection.

### **Hydraulics**

All hydraulic functions shall respond quickly and smoothly, and be free from leaks. Time for the hydraulics to 'warm up' shall be within manufacturer's specifications. Plant used as a crane or to suspend loads above ground level shall be fitted with suitable load holding valves.

## **2.10 Chassis**

### **Chassis / Frame**

The chassis shall be free from cracks, advanced rust, missing or loose bolts, sharp edges or protrusions that could cause personal injury. This includes booms, jibs, loader frames & arms.

### **Body / Cabin / Steps and Handrails**

The body and cabin shall be free from cracks, advanced rust, missing or loose bolts, sharp edges or protrusions that could cause personal injury. All doors, door locks and latches shall be secure and functional.

Steps and handrails shall be as originally manufactured or with approved variations. Painting white to provide good visibility at night is preferred. Steps edges should contrast for visibility. Steps should have a non-slip treatment. This must be in serviceable condition.

All warning or indicator lights, alarms and gauges shall operate properly. Air Conditioner, where fitted, shall operate properly in both hot and cold cycles. Cabin should be clean and tidy at all times.

### **Windows**

The windscreen and all other windows shall be free from defects that impair visibility.

### **Suspension**

Suspension components shall not be broken, loose, cracked, cut, missing or modified. All nuts, bolts and locking devices shall be in place and secure. The maximum allowable free play in any suspension component shall be within manufacturer's safe operating limits.

### **Steering**

Steering components shall not be broken, loose, cracked, cut, missing or modified. All nuts, bolts and locking devices shall be in place and secure. The maximum allowable free play in any steering joint is 3mm. Rotational free play at the steering wheel shall not exceed 100 mm or the manufacturer's limit if less than this.

The steering shall operate smoothly in both directions. The operation of the steering, from lock to lock, on plant with full hydraulic steering is to be checked at approximately half maximum engine speed.

### **Tyres and Wheels**

Pneumatic tyres shall be free from deep cuts, bulges, exposed cords or other signs of carcass failure. Traction tyres shall provide adequate grip. Tyres shall be the correct type, load rating and size to suit the wheel rims. Wheel nuts shall be correctly torqued. Wheel rims shall be free from cracks and advanced corrosion.

Split rims or multi piece bolted rims used on earthmoving and load-shifting equipment must be adequately maintained and removed or repaired by competent persons.

**Tracks**

Tracks shall be in good condition and within manufacturer's operating limits. Rubber track pads (where fitted) shall be adequately secured and in good condition when used on rail.

**2.11 Miscellaneous****Controls**

All controls shall be secure, function correctly, be free of excessive wear, perform as designed, and be permanently and clearly labelled to indicate the direction of the movement.

**Work Attachments / Tools**

All attachments shall be securely mounted, free from cracks, leaks or any defects and be in good working order. Attachments used with quick hitch devices must have pin diameters and centres matched to the gripping capabilities of the hitch being used.

**Articulation Joints and Control Linkages**

Clearance in the articulation joint shall be within the manufacturer's specifications. There shall also be a means of locking the articulation joint. Bearings and retainers shall not be worn excessively.

**Electrical System**

All electrical equipment shall operate as intended by the manufacturer. Electrical wiring and connections, both inside and outside the plant, shall be secure and free from any damage or corrosion. Insulation shall not be damaged or exposed to heat or sharp edges. The battery shall be securely mounted and free from any cracks or leaks. Terminals should be tight and free from excessive corrosion.

**Plant Security/Safety**

Parts of the plant which are critical to its operation and which are subject to vandalism shall be adequately protected, e.g. engine covers, console covers and appropriate locking devices.

**Lifting Equipment Log Books**

All plant fitted with designated lifting equipment including cranes, jibs, hi-rail etc shall carry an appropriately formatted log book to record pre-use inspections of such equipment. The operator of the equipment shall record all necessary details from the pre-start inspection in the log book.

All lifting equipment shall operate safely within its current certified capacity. 10 year and subsequent inspections must be up to date and evidenced on site when requested.

**Environmental**

Spill containment kits may be kept on plant items where suitable storage facilities are available and / or where the risk of environmental contamination is deemed unacceptable e.g. wetlands or other environmentally sensitive areas.

**Noise**

Noise emissions shall be as per manufacturers standards and shall comply with the relevant state Noise Control Act and regulations.

### 3 Appendix 1: Table 1 – Required Safety Features for Mobile Plant

Plant item	Amber rotating beacon	Brake lights & turn signals	Headlights, tail lights & clearance lights	Rear reflectors	Rear & side reflective tape	Rear vision mirror(s)	Horn	Reverse or travel alarm	Neutral Start
Backhoe loader	Yes	Yes	Yes <sup>1</sup>	Yes	Yes <sup>2</sup>	Yes	Yes	Yes	Yes
Crane, Mobile (all types)	Yes	Yes	Yes <sup>1</sup>	Yes	Yes <sup>3</sup>	Yes	Yes	Yes	Yes
Dozer	Yes	No	Yes <sup>1</sup>	Yes	Yes <sup>2</sup>	Yes	Yes	Yes	Yes
Dump Truck (all types)	Yes	Yes	Yes <sup>1</sup>	Yes	Yes <sup>2</sup>	Yes	Yes	Yes	Yes
Excavator/Trencher	Yes	No	Yes <sup>1</sup>	No	Yes	Yes	Yes	Yes	Yes <sup>4</sup>
Forklift / Telescopic Handler	Yes	Yes	Yes <sup>1</sup>	Yes	Yes <sup>2</sup>	Yes	Yes	Yes	Yes
Grader	Yes	Yes	Yes <sup>1</sup>	Yes	Yes <sup>2</sup>	Yes	Yes	Yes	Yes <sup>4</sup>
Loader, Skid Steer	Yes	Yes	Yes <sup>1</sup>	Yes	Yes <sup>2</sup>	Yes	Yes	Yes	Yes <sup>4</sup>
Loader, Wheel	Yes	Yes	Yes <sup>1</sup>	Yes	Yes <sup>2</sup>	Yes	Yes	Yes	Yes
Roller, Compaction (all types)	Yes	Yes	Yes <sup>1</sup>	No	Yes	Yes	Yes	Yes	Yes
Tractor	Yes	Yes	Yes <sup>1</sup>	Yes	Yes <sup>2</sup>	Yes	Yes	Yes	Yes
Travel Tower / Boom lift	Yes	Yes	Yes <sup>1</sup>	Yes	Yes <sup>3</sup>	Yes	Yes	Yes	Yes <sup>4</sup>
Water Tanker	Yes	Yes	Yes <sup>1</sup>	Yes	Yes <sup>2</sup>	Yes	Yes	Yes	Yes <sup>4</sup>

Notes applying to table:

<sup>1</sup> Only required if plant item is required to work at night or is road registered.

<sup>2</sup> If no rear reflectors.

<sup>3</sup> Including outriggers.

<sup>4</sup> Refer to Section 2.4 for further details on neutral start requirements.

Road registered vehicles must comply with the regulatory requirements for the state of registration.

For rail bound plant and equipment, refer to ARTC's Minimum Operating Standards for Rolling Stock – WOS 01

## 4 Appendix 2: Table 2 – Safety Signage Required

Plant item	Hearing Protection	SWL	Electrical Hazard Plate	Roll-over Hazard. Wear Seat Belt	Articulation Joint / Crush Zone	Hydraulic Steering Warning	Confined Spaces	Dual Control	Left Hand Drive
Backhoe loader	Yes <sup>3</sup>	Yes <sup>1</sup>	Yes	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes	No	No	No
Crane, Mobile (all types)	Yes <sup>3</sup>	Yes <sup>1</sup>	Yes	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	No	Yes <sup>1</sup>	Yes <sup>1</sup>
Dozer	Yes <sup>3</sup>	No	No	Yes <sup>1</sup>	No	Yes	No	No	No
Dump Truck (all types)	Yes <sup>3</sup>	No	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	No	No	Yes <sup>1</sup>
Excavator / Trencher	Yes <sup>3</sup>	Yes <sup>1</sup>	Yes	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	No	No	Yes <sup>1</sup>
Forklift / Telescopic Handler	Yes <sup>3</sup>	Yes	Yes	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	No	No	No
Grader	Yes <sup>3</sup>	No	No	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes	No	No	No
Loader, Skid steer	Yes <sup>3</sup>	Yes <sup>1</sup>	No	Yes <sup>1</sup>	Yes <sup>1</sup>	No	No	No	No
Loader, Wheel	Yes <sup>3</sup>	Yes <sup>1</sup>	Yes	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes	No	No	No
Roller Compaction (all types)	Yes <sup>3</sup>	No	No	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes	Yes <sup>1</sup>	Yes <sup>1</sup>	No
Tractor	Yes <sup>3</sup>	Yes <sup>1</sup>	Yes	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes	No	No	No
Travel Tower / Boom lift	Yes <sup>3</sup>	Yes <sup>1</sup>	Yes	Yes <sup>1</sup>	Yes <sup>1</sup>	No	No	Yes <sup>1</sup>	No
Water Tanker	Yes <sup>3</sup>	No	No	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	No	No

Notes applying to table:

<sup>1</sup> Denotes that these warning signs shall be fitted where applicable.

<sup>2</sup> Recommended that these signs be fitted near the boom and/or articulation area.

<sup>3</sup> Hearing protection signs shall be fitted when noise levels exceed 85dB(A).

All signage to be in accordance with AS 1319.

All plant with water-filled tyres shall have a warning sign on the machine frame indicating this adjacent to each tyre.

All emergency stop devices shall be clearly labelled.

All horn activation buttons shall be clearly labelled.

For vehicles with flanged rail wheels, refer to ARTC's Minimum Operating Standards for Rolling Stock – WOS 01.

All plant is to be fitted with safety signage in the operating compartments advising the operator

“Mobile phones must not be used whilst operating machine”