SafeWork SA

Carriage of Explosives by Road

Guide to applicants - licence to carry 3 to 1000kg of explosives.

February 2022

In South Australia, any vehicle which transports explosives by road must be issued with a licence to carry explosives (Regulation 7.03, *Explosives Regulations 2011*). Regulation 7.13 provides detailed requirements for vehicles carrying explosives in South Australia.

When a company or person applies for a licence to carry explosives, SafeWork SA needs to assess whether both the vehicle and applicant are suitable for that purpose. The purpose of this guide is to inform applicants for a new vehicle licence what information SafeWork SA requires to support the application. It does not apply to renewal of existing licences unless a substantial change is made to the vehicle's construction.

General.

Every vehicle involved in the carriage of explosives above the prescribed limit must hold an appropriate licence. No licence is required for carriage of less than 3 kg of explosives (Regulation 7.02(1)), however people carrying less than 3 kg must still comply with Part 7 of the Regulations. Also, no licence is required for carriage of any quantity of Class 1.3G, 1.4G or 1.4S explosives (Regulation 7.02(3)). Above this, licence increments specified in Regulation 7.13 are:

- 3 to 60 kg
- 60 to 265 kg, and
- 265 to 1000 kg.

For carriage above 1000 kg, please consult the SafeWork SA guidance document Carriage of Explosives by Road – Heavy Vehicles.

When calculating the number of items to be carried, only the mass of explosive material present is considered the net explosive quantity (NEQ), however explosive equivalency of detonators is determined by the masses listed in Schedule L of the Regulations (e.g. 100 No. 8 detonators is equivalent to 1.6 kg of explosives) – see Regulation 7.02(2).

Licences are generally issued to the owner of a vehicle (Regulation 7.01), however a vehicle which is hired or leased may be issued with a licence only if the application is accompanied by a copy of the hire / lease agreement acknowledging that the vehicle is to be used for carriage of explosives.

When applying for a licence, the applicant will need to state the maximum quantity of explosives to be carried, describe the type of explosives and whether mixed loads of detonators and high explosives are to be carried. Schedule L of the Regulations provides the equivalent explosive weights for detonators. Example descriptions include:

- 5000 kg packaged high explosives (HE), or
- 10000 kg packaged HE and 10000 detonators (160 kg NEQ equivalent), or
- 15000 kg bulk Class 1.5D.

A trailer can be suitable for carriage of explosives and may simplify some of the construction requirements listed below. However, the vehicle used to tow a trailer carrying explosives must also hold a licence to carry as well as the trailer. The total quantity of explosives carried across all vehicles in a combination must not exceed the maximum licenced limit of the towing vehicle.

The requirements described below apply only to packaged explosives. Explosives must never be transported loose or in unsealed packages and at all times you must ensure that the explosives are not damaged during transport. Please contact SafeWork SA for information about carriage of explosives in bulk.

Incremental requirements.

The requirements for each of the licence increments increase with the amount of explosives carried. A summary of these requirements is presented in Table 1.

Carry Boxes.

Explosives must never be carried in the cabin of a vehicle, nor be accessible from the cabin. (Regulation 7.13(3)) and must be carried in a secure receptacle that complies with Schedule U of the Regulations. Schedule U is reproduced in Appendix A of this Guide, but general features of a carry box include:

- Strongly constructed of 20mm thick tongue-and-groove timber, or 12mm thick plywood.
- Clad with metal on the exterior (either steel or aluminium)
- Fitted with one or more locks
- Marked conspicuously with the word “EXPLOSIVES” in red text on a white background.
- The interior must be free of any iron or steel.

Carry boxes must only be used for carriage of explosives – no other material is to be carried in these boxes while explosives are present, and they are to be kept clean and free of any grit or dirt. These carry boxes must be secured in or on the vehicle using sufficient means to eliminate movement under normal conditions and prevent undue movement in case of an accident. If not permanently bolted down, you should consider the National Transport Commission Load Restraint Guide for guidance on how to temporarily secure carry boxes to the vehicle.

The Australian Explosives Code.

The Australian Code for Transport of Explosives by Road and Rail, 3rd Edition (the "AEC") sets out national standards for vehicle construction, placarding, documentation and emergency procedure guides, safety equipment, safety management and security management. Whereas this code is not specifically called up by South Australian regulations, it is a requirement for vehicles travelling interstate to comply with the code.

It is a condition of any vehicle licence for carriage of over 265 kg of explosives that the AEC will be complied with.

Freight containers.

Freight containers may be used as demountable carry boxes if constructed in accordance with Clause 6.3 of the ("the AEC"), but the container itself does not need a licence. SafeWork SA links freight containers to vehicles by listing the container on the conditions of the vehicle's licence – a vehicle may have more than one freight container listed on its conditions, and one container may be linked to several vehicles. The container will be identified by SafeWork SA using its 10-digit unique identifier (e.g. ABCU 001234), and only those containers listed on the conditions of licence may be used on that vehicle.

Containers must use a twist lock mechanism to secure the container to the vehicle, complying with AS 3711.1:2015. Other mechanisms or methods proposed to be used to secure the container may require an engineer's report to certify their suitability.

Vehicle construction and other requirements

Vehicles carrying more than 265 kilograms must also have a metal fire screen fitted to the tray or compartment (Regulation 7.13(5)). This fire screen must extend horizontally underneath the entire length and width of the tray of the vehicle, vertically in front of the carry box the full width and height of the cabin and must be separated from the cabin by an air gap of at least 75mm.

Additionally, vehicles carrying more than 265 kg must have the exhaust system discharge from the side of the vehicle in front of the vertical fire screen and below the horizontal fire screen. Fuel tanks may be located underneath the fire screen, but in all cases the vehicle

must be fitted with an emergency fuel cut-off switch in a readily accessible position. Many applicants will install this next to an electrical isolator and some will have an all-systems isolator that cuts both fuel and power to the vehicle.

All vehicles carrying explosives must carry a fire extinguisher capable of dealing with a fire that breaks out (Regulation 7.13(12)) and that extinguisher must be carried in a readily accessible position. It is recommended that the minimum rating for a fire extinguisher is 30B (see the Australian Explosives Code, Section 8.3.9(1)).

A trailer can be used to carry explosives; however both the towing vehicle and the trailer must hold an appropriate licence to carry explosives. All requirements for a regular vehicle also apply to a trailer.

Figure 1: EXPLOSIVES sign and Class 1 dangerous goods placard.

Safety plans.

Any licence for carriage of more than 265 kg of explosives will be subject to a condition that the licensee is required to comply with all relevant aspects of the AEC. One part of this is a requirement to prepare documented plans which detail how explosives will be managed during transport. These include:

- explosives handling, loading & management plans,
- explosives emergency and security plans,
- driver training and accreditation plans.

Such plans are not required for carriage of less than 265 kg, however SafeWork SA strongly recommends that applicants consider developing such plans to foresee and reduce some of the risks associated with carriage of explosives.

Table 1: Summary of requirements for explosive carriage quantity increments

	Under 3 kg	3-60 kg	60-265 kg	265-1000 kg
Is a licence required?	No	Yes		
Is a fire extinguisher required? (see Note 1)	Yes (30B recommended)	Yes (30B minimum)		Yes (10B minimum in cabin, and 2x40B or 1x80B external)
Where do “EXPLOSIVES” signs need to be displayed? (Figure 1)	Front & rear only		All four sides	
Are Class 1 dangerous goods placards (Figure 1) required?	No	Recommended – front and rear		
Is a Schedule U carry box required?	No, but must be in the original packaging and protected from damage during transit	Yes		
Are two exterior rear mirrors mandatory?	No (normal road vehicle requirements apply)			Yes
Can other items of merchandise be carried?	Yes			No
Are any vehicle modifications required?	No			Yes – see Note 2
Is an assistant or second person travelling as a passenger required?	No	Yes – or an appropriate communication system with full coverage for use in an emergency		

Note 1: Fire extinguishers – dry chemical fire extinguishers are recommended for carriage of explosives. The rating of the fire extinguisher for B-class fires is normally expressed in the format “2A:30B: E”, as defined by Australian Standard AS1850. Fire extinguishers must be readily accessible in an emergency.

Note 2: Vehicle modifications that are required for carriage of more than 265 kg are:

- Installation of horizontal and vertical steel fire screens
- Exhaust system discharges below & in front of the vertical fire screen, or a minimum gap of 50 mm between the exhaust system & the horizontal fire screen
- Batteries and fuel tanks must be located in front of the fire screen
- Wiring underneath the horizontal fire screen must be protected in conduit complying with Australian Standard AS2053.
- An emergency stop is fitted to the vehicle to isolate the electrical and fuel systems.

Carrying detonators and high explosives together.

Regulation 7.10 requires that explosives of different compatibility groups must not be carried together unless they are segregated by sufficient means to prevent the explosive effects of one product affecting the other in an accident.

When carrying both detonators and high explosives, the equivalent mass of detonators must be included as part of the total NEQ carried by the vehicle. For example:

A vehicle is licenced to carry 60 kg of explosives. The owner plans to carry two bags of ANFO blasting explosives (Division 1.1D, 25 kg each), two rolls of detonating cord (Division 1.1D, 3 kg each), and 500 No.8 plain detonators (Division 1.1B).
From Schedule L, the detonators have an equivalent explosive mass of 8 kg.
The explosive load is 50 kg ANFO, 6 kg detonating cord, and 8 kg detonators, equalling a total of 64 kg. This exceeds the licenced limit for the vehicle, and the owner must reduce one of the products to be carried.

There are several options for configuring your vehicle to be able to carry mixed loads of high explosives and detonators. There are:

- Separating the carry boxes by a 2m air gap
- Constructing a laminated blast barrier between the carry boxes
- Constructing a laminated barrier and separating the carry boxes by a 400 mm air gap
- Constructing a barrier conforming to the Code of Practice – Segregation Barriers for Transporting Mixed Loads of Detonators and High Explosives (Edition 3) published by the Australian Explosives Industry Safety Group Inc (AEISG).

Detonators of Class 1.4B or 1.4S may be transported on the same vehicle as other explosives without a segregation barrier or air gap, however they must be in separate compartments from other explosives. It is important to remember that this only applies to products in their original packaging – as soon as the package is opened the detonators revert back to Class 1.1B and all of the above segregation requirements apply.

Each of these segregation options affect the quantity of detonators and high explosives that may be carried together. Table 2 summarises the maximum combinations that SafeWork SA will approve for carriage of mixed loads.

Table 2: Mass limits for mixed loads at regulatory licence increments

Licence category	Segregation type	Maximum NEQ	
		Detonators[a]	High explosives
< 3 kg[b]	Separated as far as possible	1.6 kg (100 No. 8)	1.4 kg
3-60 kg	2m air gap[c]	8 kg (500 No. 8)	52 kg
	Laminated barrier[d]	3.2 kg (200 No. 8)	56 kg
	Laminated barrier + 400mm air gap	8 kg (500 No. 8)	52 kg
60-265 kg	2m air gap	8 kg (500 No. 8)	257 kg
	Laminated barrier	3.2 kg (200 No. 8)	261 kg
	Laminated barrier + 400mm air gap	8 kg (500 No. 8)	257 kg
265-1000 kg	Laminated barrier	3.2 kg (200 No. 8)	996 kg
	Laminated barrier + 400mm air gap	8 kg (500 No. 8)	992 kg
	AEISG barrier[e] + 500mm air gap	160 kg (10000 No. 8)	840 kg

Notes:

a) Maximum NEQ's for the detonators are listed, with example quantities of Number 8 detonators listed as examples. Consult Schedule L of the Regulations for guidance on other detonator strengths.
b) Carriage of 3 kg or less of explosives does not require a licence, however the carrier is still required to comply with Part 7 of the Regulations.
c) An air gap must not be used for storage of other items.
d) The laminated barrier must comply with Figure 2.
e) The AEISG barrier must comply with the AEISG Code of Practice.

Laminated barriers must comply with the following minimum requirements (see Figure 2):

- A laminated barrier will have the following layers, constructed from inside to outside:
  - A layer of 6mm plywood on the interior face of the carry box,
  - A layer of 25mm hardwood,
  - A layer of 12 mm thick plywood,
  - A layer of 12mm thick fibre cement sheet, and
  - A layer of 3mm metal (steel or aluminium) on the exterior face of the carry box. This layer must be joined to the other exterior faces of the carry box by either:
    - A seamless bent joint, or
    - A continuous fillet weld along the entire length of the joint.
- The laminated barrier must be constructed on the side of the carry box facing the high explosives carry box.
- The carry box constructed with the laminated barrier must be marked as “LAMINATED BARRIER FITTED” or “DETONATORS ONLY” or words to that effect, to ensure that high explosives are not carried in that carry box.
- Where an air gap is used as part of the segregation, the gap is to be measured from the exterior face of the detonator carry box to the exterior face of the high explosives carry box.
- No item may be stored within the air gap. A sheet metal shroud which envelops this air gap (and which prevents this space from being used as storage) is permitted. If fitted, this may be fitted with screws, rivets, or similar fastenings.

If you want to use a segregation method other than those detailed in this Guide, you will need to supply evidence that your method is able to safely prevent the effects of fire or explosion in the detonator carry box from affecting the contents of the high explosives carry box. Such evidence may include computer modelling or experimental testing - please contact SafeWork SA to discuss your requirements in this case.

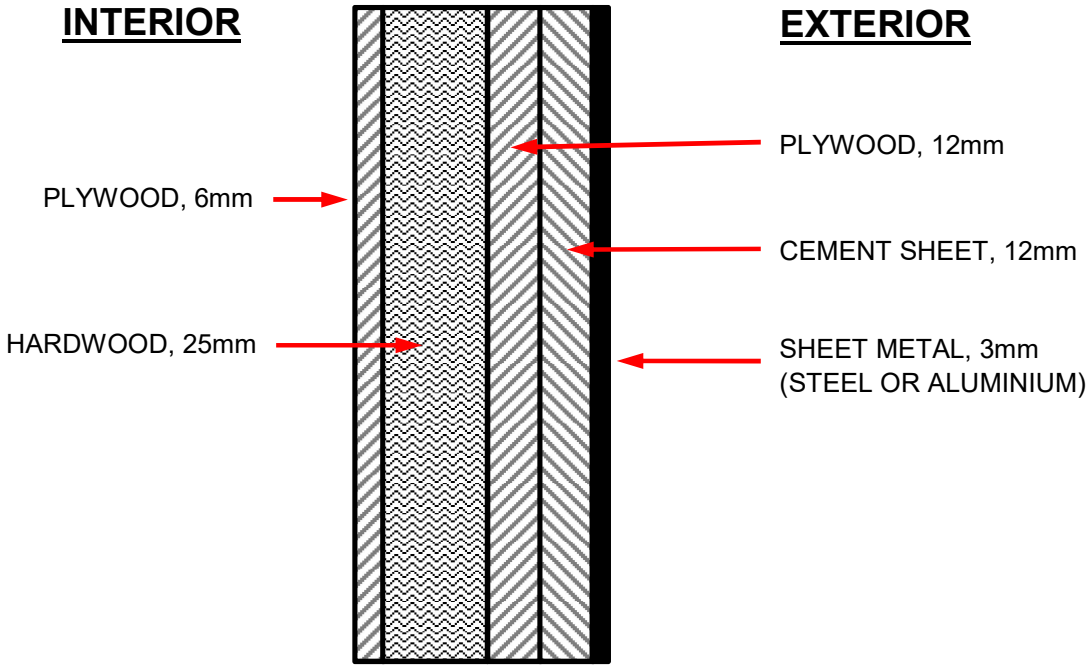


Figure 2: Construction of a laminated segregation barrier (adapted from BATF Ruling 77-24).

Evidence required for licence applications.

In order to ensure smooth processing of your application, you will need to provide sufficient evidence that the vehicle is constructed and managed to be able to safely carry explosives in South Australia.

The attached checklist (Appendix B) provides the minimum information that SafeWork SA will rely on to assess your application. The more information that is supplied at the time of your application will reduce the need for our inspectors to contact you for further details.

Once you submit your application it will be allocated to an inspector for assessment. One part of that assessment may be to arrange an inspection of the vehicle with you at a suitable time or location.

For more information, please contact SafeWork SA by telephone 1300 365 255, via email (help.safework@sa.gov.au), or via our website www.safework.sa.gov.au.

Related documents

- Explosives Act, 1936
- Explosives Regulations 2011
- AEISG Code of Practice Segregation Barriers for Transporting Mixed Loads of Detonators and High Explosives, 3rd Edition
- Australian Code for the Transport of Explosives by Road and Rail, 3rd Edition
- National Transport Commission Load Restraint Guide

Appendix A – Carry boxes for explosives, Explosives Regulations 2011.

Schedule U—Box for carriage of explosives

(Regulations 7.13(3), 7.13(4)(b), 7.13(5), 7.13(6)(b))

A box for the carriage of explosives in a vehicle or a boat shall be—

1 Strongly constructed of tongue and groove timber at least 20 mm thick or of wooden sheets at least 12 mm thick (see sketches below);

2 Sheathed outside with flat galvanised iron;

3 Fitted with one or more locks;

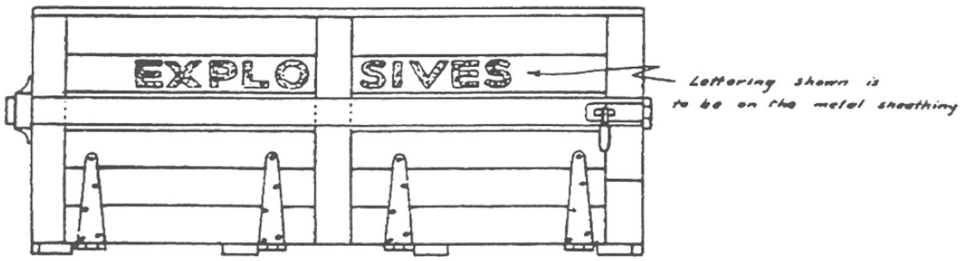
4 Marked with the word "EXPLOSIVES" painted conspicuously in red on a white background;

5 Secured firmly in the vehicle when being used for the carriage of explosives;

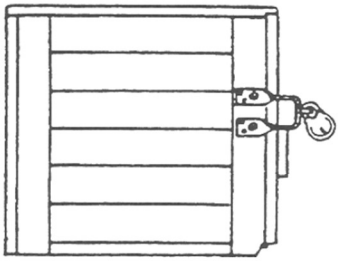
6 Fitted with lugs or rings if ropes are to be used to secure it in the vehicle;

7 Used only for the carriage of explosives.

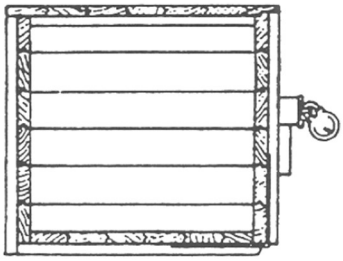
CONSTRUCTIONAL DETAILS
[EXTERNAL SHEATHING NOT SHOWN]



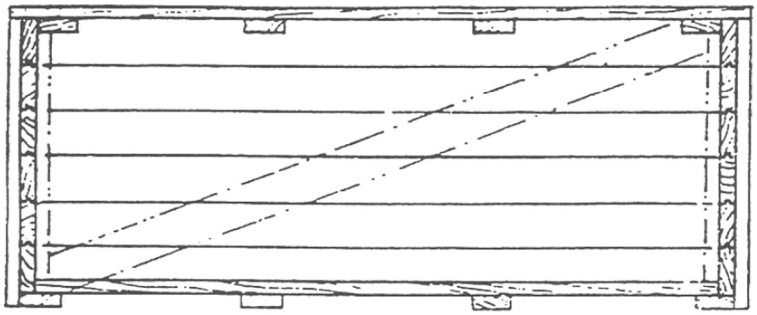
FRONT VIEW



END VIEW



SECTION B-B



SECTION A-A

Appendix B - Evidence required to accompany a licence application

	3-60 kg	60-265 kg	265 – 1000 kg
General.			
Registration certificate	X[Note 1]	X[Note 1]	X[Note 1]
Photographs of all four sides of the exterior of the vehicle.	X	X	X
Vehicle construction / fixtures			
Specify the fuel used for the vehicle. *AEC 6.4.2(j)*	X	X	X
Photographs of the location and labelling of the automatically or manually operated fuel cut-off valve. *Regulation 7.13(5)(e)*	N/A	N/A	X
Photographs of the location of the battery and battery isolation switch. *Regulation 7.13(5)(d) and AEC 6.4.2(2)(d-h)*	N/A	N/A	X[Note 2]
Provide details of the fuse or circuit breaker system protecting the electrical systems of the vehicle. *AEC 6.4.2(2)(f)*	N/A	N/A	X[Note 2]
Provide details that wiring outside, to the rear of the vertical firescreen and under the load area is be enclosed in conduit to AS2053 or ASD26 (flared fittings), so that there are no exposed wires or connections. *AEC 6.4.2(2)(e)*	N/A	N/A	X[Note 2]
Provide details of the location of the exhaust pipe. *AEC 6.4.2(2)(c)*	N/A	N/A	X
Explosives carry boxes.			
Photographs of the location & type of all placarding and “EXPLOSIVES” signs fitted to the vehicle. *Regulation 7.13(1) & AEC 3.4.1(1)(a to c)*	X	X	X
Provide photographs of the exterior of each carry box	X	X	X
Provide photographs of the interior of each carry box	X	X	X
Provide details of the exterior materials of construction of the carry box. *AEC 6.2.(2)(c)*	X[Note 2]	X[Note 2]	X[Note 2]
Provide details of the interior materials of construction of the carry box. *AEC 6.2.(2)(b, e-h)*	X[Note 2]	X[Note 2]	X[Note 2]
Provide details of all carry box locking mechanisms *AEC 6.2.(2)(d)*	X[Note 2]	X[Note 2]	X[Note 2]
Provide details of the horizontal firescreen fitted to the vehicle *Regulation 7.13(5)(b) and AEC 6.4.2(2)(a)*	N/A	N/A	X[Note 2]
Provide details of the vertical firescreen fitted to the vehicle *Regulation 7.13(5)(b) and AEC 6.4.2(2)(b)*	N/A	N/A	X[Note 2]
If the vehicle is carrying mixed loads of detonators and high explosives, provide details of the segregation between the carry boxes.	X	X	X
Where a laminated barrier is fitted to provide segregation, provide details of the construction of the barrier (e.g. design drawings or a report by an independent competent person).	X	X	N/A

	3-60 kg	60-265 kg	265 – 1000 kg
Where an AEISG barrier is fitted to provide segregation, provide an engineer's report certifying compliance with the AEISG Code of Practice	N/A	N/A	X
Specify how the carry box is secured to the vehicle (not applicable for enclosed vehicle bodies). *AEC 6.2(2) and 6.4.1(2)(e)*	X Note 2	X Note 2	X Note 2
Safety equipment and management.			
Specify the location, type and capacity of fire extinguishers or fire suppression system fitted to the vehicle. *AEC 8.3.9 (1) & (2)*	X	X	X
Provide a copy of the emergency management plan for this vehicle. *AEC 8.3.14 and 8.4.6*	N/A	Recommended	X Note 3
Provide a copy of the vehicle management plan applicable to routine operation of this vehicle. *AEC 8.3.6, 8.3.10 to 8.3.13, 8.3.15 and 8.4.5.*	N/A	Recommended	X Note 3
Photographs of the location of the emergency procedure guide. *AEC 8.3.8 (1) (a-b)*	X	X	X
Provide details of the safety equipment carried on the vehicle. *AEC 8.3.9 (3) and (4)*	X	X	X
Provide details of what security equipment is fitted to the vehicle (e.g. tamper alarms, GPS trackers, communication radios, satellite phone) *AEC 8.2.18 and 8.8.4*	X	X	X
Provide a copy of the training and certification plan for drivers of this vehicle. *AEC 8.3.13 and 8.4.3*	N/A	Recommended	X Note 3
Provide evidence that insurance covers the vehicle for explosives transport insured. *AEC 8.3.5*	X	X	X

Note 1: An application for a hired or leased vehicle must supply a copy of the hire agreement and acknowledgement by the owner of the vehicle that it will be used for carriage of explosives.

Note 2: In the alternative to photographs, a report from an independent engineer (or independent competent person) can be supplied detailing compliance with the specified requirement.

Note 3: The vehicle management, emergency management, security management and training plans may be covered by individual plans, or by one single plan as appropriate for the applicant. If this has already been provided in an application for a different vehicle (and the management plans are still current), please provide details of that vehicle to SafeWork SA so the documents can be retrieved and cross-referenced.

Note 4: Where more than one freight container is nominated as a carry box, the information must be supplied separately for each container.

One piece of evidence may satisfy more than one criteria (e.g. photographs of all four sides of the vehicle may also be used to show the location of placarding).