



# High Power Rocketry Certification

[www.rocketry.org.au](http://www.rocketry.org.au)

## Introduction

AMRS have adopted a three level system for high power rocketry to facilitate a structured progression. Level 1 is the basic level with level 3 the highest. This system is recognised internationally. At each stage, the rocketeer must undertake evaluations and pass an assessment process.

AMRS certifying members, **Certification Officers (CO)**, **Advanced Certification Officers (ACO)** will witness flights and administer evaluations as required.

## Application

For each level attempted, the AMRS members must complete the AMRS HPR Certification Application Form and submit to the AMRS before evaluation can commence. The forms are available from the AMRS web site [www.rocketry.org.au](http://www.rocketry.org.au). AMRS members should speak with their local clubs certification assessor to express their interest in certifying. Where applicable, AMRS will appoint a certification assessor and inform the applicant.

Rocketeers must have current membership with an AMRS member organisation to be eligible to apply for certification.

Rocketeers must be 18 years old or have a parent/guardian to represent them in the process.

Those who are successful with the assessment will be notified by AMRS. They will receive a certificate and have the option to purchase certification merchandise.

## Recognition of Other Organisations

AMRS have a reciprocal arrangement with the National Association of Rocketry (NAR) for HPR Certifications. AMRS recognises HPR certifications from the Canadian Association of Rocketry (CAR), NAR, Tripoli Rocketry Association (TRA) and the United Kingdom Rocketry Association (UKRA).

People who already hold a current HPR certification with a recognised organisation, will automatically have that level recognised by the AMRS.

## Other Information

Rocketeers can determine the timing with which they wish to progress through the levels. This will be determined by the rocketeer based on their level of knowledge, understanding and experience to advance.

Rocketeers cannot attempt a higher level of certification unless all of the lower level certifications have been achieved. However, it is possible for a rocketeer to attempt the levels 1 and 2 certification on the same day as long as all of the prerequisites have been successfully completed.

There will be conditions on the use of motors for certification attempts as per the Safety Codes and local statutory requirements.

If the rocketeer's AMRS membership is allowed to expire, certification will be reset to Level 0 two years after the expiry date. If rocketeers subsequently wish to regain certification, they will need to complete the full assessment process as if they were seeking it for the first time.

Certified rocketeers are encouraged to complete the Launch Control Officer/Range Safety Officer course within 12 months of successful Level 1 accreditation.

In some states, there may be additional statutory requirements to be considered when obtaining certification e.g. may require to obtain an explosives licence.



# Level 1

Level 1 Certification allows rocketeers to fly High Power Rockets with a total installed impulse up to 640N.s. The certification will be administered by a **CO** or **ACO**.

**Airframe** – The rocket must be built by the rocketeer. The rocket shall have a display on the exterior identifying the calculated centre of pressure. The rocket must be of conventional rocket design. Odd rockets, including flying pyramids, saucers and flying spools will not be allowed for any certification flight. The rocket may be either a kit or scratch built. Scratch built rockets may contain commercially built components.

**Recovery** - Standard parachute recovery is required. Non-parachute recovery methods e.g. tumble, helicopter, gliding are not permitted for certification flights. If the rocket is using dual deployment, the first event recovery may be via drogue-less or streamer as long as the main or second event uses a standard parachute.

**Motor** – The certification flight must be with a single certified H or I motor (tested total impulse between 160.01 and 640.00N.s). Staged and/or clustered rockets may not be used for certification flights. The rocketeer shall be observed by the certifying member or their designated representative during the assembly (if a reload or hybrid) and preparation of the motor.

**Electronics** – Electronics are not required for level 1 certification flights.

**Certification Flight** – Level 1 Certification flight may take place at any insured launch. The certifying member i.e. CO or ACO must be present and witness the certification flight. The certifying member must witness the rocket ascend in a stable manner and descend in stabilized manner controlled by the recovery system.

**Post-Flight Inspection** – The rocket must be presented to the certifying member for inspection. If the rocket cannot be readily recovered e.g. power lines, tree, but can be inspected in place, this is acceptable. The certifying member shall inspect the rocket for excessive damage i.e. damage to the point that if the rocketeer were handed another motor, the rocket could not be put on the pad and flown again safely. Damage caused by wind dragging will not cause a disqualification.

**Non-certification** – Any of the following will result in non-certification for a certification flight:

- Motor Cato
- Excessive Damage
- No recovery system deployment or tangled recovery system deployment
- Rocket drifting outside the specified launch range
- Components coming down not attached to the recovery system.
- Any other violation of AMRS safety code associated with this particular flight.
- Any other legitimate reason the certifying member deems merits non-certification.

## Level 2

Level 2 Certification allows rocketeers to fly High Power Rockets with a total installed impulse between 640.01 and 5120.00N.s. The certification will be administered by a **CO** or **ACO**.

**Written Test** – The written examination for level 2 shall be passed prior to a level 2 certification flight. The examination paper incorporates questions relating to technical and safety aspects of rocketry.

**Airframe** – The rocket must be built by the rocketeer. The rocket shall have a display on the exterior identifying the calculated centre of pressure. The rocket must be of conventional rocket design. Odd rockets including flying pyramids, saucers and flying spools will not be allowed for any certification flight. The rocket may be either a kit or scratch built. Scratch built rockets may contain commercially built components.

**Recovery** - Standard parachute recovery is required. Non-parachute recovery methods e.g. tumble, helicopter, gliding are not permitted for certification flights. If the rocket is using dual deployment, the first event recovery may be via drogue-less or streamer as long as the main or second event uses a standard parachute.

**Motor** – The certification flight must be with a single certified J, K, or L motor (tested total impulse between 640.01 and 5120.00N.s). Staged and/or clustered rockets may not be used for certification flights. The rocketeer shall be observed by the certifying member or their designated representative during the assembly (if a reload or hybrid) and preparation of the motor.

**Electronics** – Electronics are not required for level 2 certification flights. However, prior to attempting level 3 certification, the rocketeer shall successfully fly at least one rocket in the Level 2 impulse range using an electronic device as the primary means of recovery system deployment. This may be their level 2 certification flight or any subsequent flight.

**Certification Flight** – Level 2 Certification flight may take place at any insured launch. The certifying member must be present to witness the certification flight i.e. must witness the rocket ascend in a stable manner and descend in stabilized manner controlled by the recovery system.

**Post-Flight Inspection** – The rocket must be presented to the certifying member for inspection. If the rocket cannot be readily recovered e.g. power lines, tree, but can be inspected in place, this is acceptable. The certifying member shall inspect the rocket for excessive damage i.e. damage to the point that if the rocketeer were handed another motor, the rocket could not be put on the pad and flown again safely.

Damage caused by wind dragging will not cause a disqualification.

**Non-certification** – Any of the following will result in non-certification for a certification flight:

- Motor Cato
- Excessive Damage
- No recovery system deployment or tangled recovery system deployment
- Rocket drifting outside the specified launch range
- Components coming down not attached to the recovery system.
- Any other violation of AMRS safety code associated with this particular flight.
- Any other legitimate reason the certifying member deems merits non-certification.

## Level 3

Level 3 Certification allows rocketeers to fly High Power Rockets with a total installed impulse greater than 5120N.s. The certification will be administered by two **ACOs**.

**Airframe** – The rocket must be built by the rocketeer. The rocket shall have a display on the exterior identifying the calculated centre of pressure. The rocket must be of conventional rocket design. Odd rockets, including flying pyramids, saucers and flying spools will not be allowed for any certification flight. The rocket may be either a kit or scratch built. Scratch built rockets may contain commercially built components. Commercially available prefabricated fin cans, either as part of a kit or obtained separately, may not be used for level 3 certification flights.

**Design and Construction Report** - AMRS members designing or preparing to fly a level 3 project must present details of their design and construction process to two ACOs of their choice in the form of a Design and Construction Report. It should contain the following data:

- A completely filled out Pre-Flight Data Capture form
- Drawings of the rocket showing airframe components, fins, bulkheads, recovery system components, payloads, etc.
- A parts-listing that includes material descriptions, adhesive types, screw sizes, gauges, thicknesses, etc.
- A simplified wiring diagram of the electronic recovery system that shows the major components
- Pre-flight checklist describing field assembly of the rocket, motor installation, recovery system preparation, launcher installation, system arming, etc.

These items should be neatly drawn, and, if possible, lists typed. The primary preparation criteria is that those drawings and lists are neat and legible. All items will be returned to the submitter if desired. A self-addressed envelope or supply postage funds to assist the ACO with returns would be required.

ACOs should be kept informed of any changes during construction. It is best if the ACOs review the report a number of times before the day of the launch. This will allow adjustments to the rocket design if deemed necessary by either of the two ACOs

**Recovery** - Standard parachute recovery is required. Non-parachute recovery methods e.g. tumble, helicopter, gliding are not permitted for certification flights. If the rocket is using dual deployment, the first event recovery may be via drogue-less or streamer as long as the main or second event uses a standard parachute.

**Motor** – The certification flight must be with a single certified M or larger motor (tested total impulse greater than 5120.01 N.s). Staged and/or Clustered rockets may not be used for certification flights. The rocketeer shall be observed by the ACO or their designated representative during the assembly (if a reload or hybrid) and preparation of the motor.

**Electronics** – Prior to a level 3 certification flight, the rocketeer shall successfully fly at least one rocket in the level 2 range using an electronic device as the primary means of recovery system deployment. Level 3 certification flights shall include at least two completely separate electronic devices, with independent power sources, wire harnesses, and ignition devices for the primary and back-up means of recovery system deployment.

**Certification Flight** – Before attempting a level 3 flight, the two ACOs must have signed off on the member's certification form. Level 3 Certification flight may take place at any insured launch. The ACO must be present and witness the certification flight. The ACO must witness the rocket ascend in a stable manner and descend in stabilized manner controlled by the recovery system.

**Post-Flight Inspection** – The rocket must be presented to the certifying member for inspection. If the rocket cannot be readily recovered e.g. power lines, tree, but can be inspected in place, this is acceptable. The certifying member shall inspect the rocket for excessive damage e.g. damage to the point that if the rocketeer were handed another motor, the rocket could not be put on the pad and flown again safely.



Damage caused by wind dragging will not cause a disqualification.

**Non-certification** – Any of the following will result in non-certification for a certification flight:

- Motor Cato
- Excessive Damage
- No recovery system deployment or tangled recovery system deployment
- Rocket drifting outside the specified launch range
- Components coming down not attached to the recovery system.
- Any other violation of AMRS safety code associated with this particular flight.
- Any other legitimate reason the ACO deems merits non-certification.