

NEW SOUTH WALES ROCKETRY ASSOCIATION INC. (NSWRA)



Medium and High Power Rocketry Certification Guidelines

Rocketry certifications should be a fun, exciting and safe journey, where members gain skills, experience and knowledge as they steadily work their way through the certification levels.

Members should consider the guidance below when planning certification flights.

1. NSW Rocketry Association implements 5 certification levels:
 - a) Mandatory LPR flights (NSWRA)
 - b) MPR Assessment (NSWRA)
 - c) HPR Level 1 Certification (TRA)
 - d) HPR Level 2 Certification (TRA)
 - e) HPR Level 3 Certification (TRA)
2. Before considering a Medium Power assessment attempt members should carefully read and understand the requirements outlined on the NSWRA website:
<http://nswrocketry.org.au/membership/certifications/>
3. Before considering a High Power certification attempt members should carefully read and understand the certification requirements outlined on the Tripoli website:
<http://www.tripoli.org/Certification>
4. Certifications should not be a box ticking exercise. Members are expected to gain a broad understanding of rocketry at each level by completing multiple successful flights before moving up to the next level. At least 2 successful flights are required at each level.
5. Members should not rush through their certifications. Rushing through certifications increases risk and reduces the opportunity for gaining knowledge and experience.
6. Members should not expect to complete more than one certification level in a single launch day or weekend. This includes moving from mandatory LPR flights to MPR and from MPR through the 3 HPR levels.
7. Tripoli Level 3 certification rules state that “The candidate must have successfully completed their Level 2 certification BEFORE they can commence their Level 3 certification process.”
8. It is strongly recommended that a new rocket be built for each certification level. The build requirements for the different certification levels can be different. As an example, building a L2 rocket may not meet the requirements for a L3 rocket. As you progress through the certification levels, the build techniques and materials used in the construction may change and this needs careful consideration.

9. Rockets for certification attempts must be built by the member wishing to certify. Members must be able to answer detailed questions about the design and construction of their rocket to demonstrate that they built it.
10. To reduce risk and to reduce the stress on the rocket, when safe to do so, members should:
 - a) Select a motor towards the lower end of the certification impulse range for their certification flight.
 - b) Avoid using very high thrust motors that induce high acceleration loads for their certification flight. This adds significant risk to the flight if the rocket is not appropriately designed for the loads.
11. Members must be confident that their parachute(s) will deploy successfully. There are a number of factors that must be considered including:
 - a) Size of the deployment charge. While deployment charge calculators are useful they are just a guide, so whenever possible members should ground test their deployment before their certification flight (and whenever shear pins are used).
 - b) Nose cone or coupler fit.
 - c) Rocket length, diameter and volume.
 - d) Whether shear pins are required (ground testing is essential whenever shear pins are used).
 - e) Delay time. Note that most high power motors have an adjustable delay, so members must complete a simulation to establish the appropriate delay. OpenRocket is free and typically works well. <https://openrocket.info/>. Alternatively, gain experience with electronic deployment where the flight computer automatically detects apogee to release the recovery system at the most appropriate time.
 - f) Back up charges and back up electronics.
12. Rails and rail buttons are recommended for all HPR flights. Rails are stiffer than rods, providing a more reliable initial rocket trajectory. Rail buttons can be attached more securely and are the leading choice for heavier rockets. Launch rails are typically longer than launch rods and therefore allow the rocket more time/distance to establish stable flight.
13. It is Club Policy that those attempting L2 or L3 certification have a NSW Safework Pyrotechnic Licence. It is recommended that L1 flyers have a licence. The licence application process can take several months and this should be factored into your timetable. Most other clubs require a pyro license for all HPR flights, so keep this in mind if you plan to fly HPR with another club.
14. When considering a certification attempt members should contact the NSWRA President and Tripoli Prefect in advance to request guidance and approval. Keep in mind that the NSWRA President and Tripoli Prefect are volunteers, so respect their time by adhering to the notice periods and information requirements detailed below:

Certification Level	Minimum Notice Period	Information to be provided
MPR assessment	1 hour before launch.	Simulation report for scratch built or modified rockets.
HPR – Level 1	1 month before launch.	Simulation report and details of rocket construction.
HPR – Level 2	2 months before launch. Arrangements should also be made to complete the Level 2 exam at least 2 weeks prior to the launch date. The exam must be administered by either the Tripoli Prefect or a TAP member, and they will be very busy in the weeks prior to a launch. If a member fails both exam A and exam B they must wait 7 days before attempting a retake, so factor this in to your planning.	Simulation report and details of rocket construction (including photographs).
HPR – Level 3	A detailed plan of design and construction (including timeframes) must be approved by to 2 members of the Tripoli Technical Advisory Panel (TAP) BEFORE commencing construction. 2 TAP members must have signed off on the member's certification form. TAP members should be kept informed of any changes during construction. There are only a small number of TAP members so we recommend providing as much notice as possible.	Simulation report and details of rocket construction including: <ul style="list-style-type: none"> • Pre-Flight Data Capture form. • Detailed drawings of the rocket. • A parts listing that includes material descriptions/dimensions, adhesive types etc. • Simplified wiring diagram of the electronic recovery system. • Material strength test reports, where available. • Checklist describing: field assembly/preparation of the rocket, motor installation, recovery system preparation, launcher installation, system arming and disarming, etc. • Construction photographs.

Note that these guidelines have been designed to help members through their certification journey and to help members demonstrate to the certifying officer that their rocket has been built with safety and reliability in mind from lift-off, through the flight and to successful recovery.

We hope you enjoy the certification journey in a safe way and enjoy taking time to gain the knowledge and experience required to become a high power rocketeer.

If you have any questions please don't hesitate to contact the club President or Tripoli Prefect. We are here to help.

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