

NEW SOUTH WALES ROCKETRY ASSOCIATION INC. (NSWRA)



PROTOCOLS FOR THE USE OF “SPARKY” MOTORS

INTRODUCTION

“Sparky” motors contain particles of titanium (sometimes referred to as ‘titanium sponge’) in the propellant grains, resulting in a shower of sparks being emitted from the motor when the rocket is launched. This increases the risk of fires at the launch site. These types of motors have several descriptive names, including “Skidmark”, “Spitfire”, “Black Lightning”, “Metalstorm” and “Dark Matter”.

NOTIFICATION OF INTENDED USE

The member must notify the committee in advance of his/her intention to use a sparky motor at an upcoming launch. This allows time for a review of the conditions and proper site preparation. It is essential that fire-fighting equipment is present when these motors are used and appropriate personnel are present during the launch.

If advance notice is not given, or the area required is large, further site preparation may need to be conducted by the member, under the supervision of the RSO. Members should not expect the range officers to forgo their other duties to conduct last-minute clearing of an area or other site preparation requirements. If the site cannot be made ready with suitable firefighting equipment and cleared areas, the launch must not take place.

PERSONNEL REQUIRED

The following personnel must be present for a sparky motor launch:

- Range Safety Officer (RSO)
- Launch Control Officer (LCO)
- Fire Marshal

CLEARED AREA REQUIRED

The minimum clear distance for sparky motors is 1.5 times that for non-sparky motors. Refer to the table below.

For sparky motors, **all** combustible material must be removed.

Installed Total Impulse (Newton-seconds)	Equivalent Motor Type	Minimum Clear Distance (metres)	
		Non-sparky	Sparky
0.01 - 160.0	< H	As required	23
160.01 - 320.00	H	15	23
320.01 - 640.00	I	15	23
640.01 - 1,280.00	J	15	23
1,280.01 - 2,560.00	K	23	36
2,560.01 - 5,120.00	L	30	45
5,120.01 - 10,240.00	M	38	61
10,240.01 - 20,480.00	N	38	61
20,480.01 - 40,960.00	O	38	61

FIRE EXTINGUISHER LOCATION

At least one fire extinguisher shall be located in clear view, near the edge of the cleared area. It should be positioned upwind of the launch pad, and away from any cables to avoid trip hazards.

LAUNCH SEQUENCING

A rocket using a sparky motor should be the only rocket to be launched in a session, or at least be the last rocket launched in a session. This means that the range is inherently "safe" once the rocket has been successfully launched, and any issues can be immediately dealt with.

DUTIES OF PERSONNEL

Range Safety Officer

- Ensure conditions are safe for launching.
- Confirm that the area around the pad has been cleared of all combustible material. Refer to the table for the size of the area required.
- Check that fire extinguisher(s) are in the correct location(s)
- Be aware of changes in wind direction.
- Confirm readiness of the Fire Marshal.
- Assist the Fire Marshall as required.
- Confirm with the Fire Marshal that there are no fires after the rocket has been launched.

Launch Control Officer

- Aim to plan activities so that the rocket with the sparky motor is the only rocket to be launched in that session.
- If other rockets are on the pads, all these should be launched before launching the rocket with the sparky motor.
- Confirm approval to launch with the RSO and Fire Marshal.
- Once the rocket has been successfully launched (adequate altitude, stable ascent), announce for the Fire Marshal to check the area near the launch pads for any spot fires.
- Continue to observe the flight of the rocket to ensure the safety of the Fire Marshal.

Fire Marshal

- The focus of the Fire Marshal is solely on the launch pad area and surrounds. He/she is not to be distracted by the flight of the rocket (unless there is a risk due to an unsatisfactory flight or recovery)
- He/she must be competent in the use of the fire extinguisher.
- Once advised by the LCO that it is safe to do so, immediately proceed briskly to the launch pad area to check for any spot fires. Examine the entire area thoroughly.
- Do not put himself/herself in danger. Stamp out any spot fires if safe to do so. Use the fire extinguisher if required.
- Call to the RSO and LCO for assistance if required.
- Wait in the area for the RSO to confirm that there are no issues.

Members

- Contribute to fire-fighting activities if required. Do not put yourself in danger.