



## Cairngorm Soapbox Extreme Cartie Specification

### Revision History

Version	Date	Notes
2.0	13 Dec 2009	Revised
2.1	27 Oct 2010	Revised
2.2	10 Nov 2011	Revised (in purple)
2.3	5 Jan 2012	Revised (in blue)

The most recent revisions are [highlighted in purple \(2.2\)](#) and [blue \(2.3\)](#).



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## 2. DISCLAIMER

No expressed or implied warranty of safety shall result from publication of or compliance with this specification.

This specification is not a guarantee against injury or death to a participant, spectator or official.

The event organisers shall be allowed to impose any further restrictions and to permit deviations from any of these specifications that in their opinion do not lower these requirements. Any deviations from this specification are left to the discretion of the event organisers. No expressed or implied warranty of safety shall result from any such deviation from this specification.

### 3. APPLICATION AND INTERPRETATION

In all matters relating to the interpretation of these rules, the decisions of scrutineers and event organisers will be final.

Competitors intending to exploit any apparent loopholes or ambiguities in this document in order to gain an unfair advantage or to avoid having to comply with its spirit or intent are strongly advised to discuss their plans with the Technical Officer well in advance of the event in order to avoid disappointment. In all matters regarding the interpretation and application of the rules detailed in this document, the organisers' decision is final.

The Technical Officer can be contacted by emailing [tech@soapboxracing.co.uk](mailto:tech@soapboxracing.co.uk).

### 4. PROPULSION

The vehicle must be powered by gravity alone. Devices which use any form of stored energy for propulsion, whether that energy be stored prior to or during the run, are not allowed.

### 5. DIMENSIONS AND WEIGHT

- Maximum overall length - 2500mm
- Maximum overall width - 1500mm
- Minimum track - 700mm
- Maximum weight of vehicle – 100Kg
- Maximum wheel diameter – 584mm
- Minimum tyre width – 44mm

The track is the measured width between centres of tyres where they contact the ground. The track may be different on front and rear axles, but both must conform to the minimum specified above.

Wheel diameter includes the fully inflated tyre. All wheel dimensions will be taken as the actual measured values. The nominal sizes marked on the tyre wall will not be used for the purpose of assessing compliance with this specification.

A tolerance of 5% shall be allowed on the measurement of the maximum weight. **Any** deviation over this margin will be classed as a failure to meet the technical requirements.

### 6. WHEELS AND TYRES

There must be four wheels located as a matching front and matching rear pair, symmetrically about the centreline of the vehicle.

All wheels must be in load bearing contact with the road during normal operation.

Wheels with plastic spokes are not allowed.

Tyres must be in good condition with no visible cracks in the sidewall or tread **and must not be inflated above or below their rated pressure range**.

Wheels and tyres must conform to the dimensions shown in rule 5.



## 7. BRAKES

The vehicle must have braking on at least 2 wheels on the same axle.

The brakes must be capable of holding the vehicle (with the driver onboard) stationary on a dry horizontal road surface against a horizontal force exerted on the front towing eye as specified in the following table;

Cartie Weight (Kg)	Brake Force (KgF)
Up to 50	52
51 – 55	54
56 – 60	56
61 – 65	58
66 – 70	60
71 – 75	62
76 – 80	64
81 – 85	66
86 – 90	68
91 – 95	70
96 – 100	72
100 – 105	74

The brakes must be designed such that failure of the brake operating on one wheel does not result in complete failure of the braking system.

The primary brakes must not act on either the tyres or on the road surface.

The primary brakes should be designed such that they can be operated effectively while keeping both hands on the steering control.

## 8. STEERING

The steering must not; be overly sensitive, have excessive free play, or any characteristic tending to promote instability.

There must a rigid mechanical linkage or gearing in the steering so that large inputs produce relatively small steering outputs. **The steering ratio<sup>1</sup> must be at least 2.0.**

For the avoidance of doubt;

- "Rope and plank" steering is not allowed.
- "Feet on the front axle" steering is not allowed.

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<sup>1</sup> Steering Ratio is the ratio between the turn of the steering wheel (in degrees) or handlebars and the turn of the wheels (in degrees). See [http://en.wikipedia.org/wiki/Steering\\_ratio](http://en.wikipedia.org/wiki/Steering_ratio) for details.

- “Lean” steering (e.g. skateboard) is not allowed.
- Differential braking or “skid” steering is not allowed.

## 9. DRIVING POSITION

The driver will ride alone, feet first.

Only seated, reclined or supine<sup>2</sup> driving positions are allowed.

Prone<sup>3</sup> or head first driving positions are not allowed.

## 10. BODYWORK AND SAFETY FEATURES

### 1. General

There must be no sharp edges or protrusions either inside or outside the vehicle.

No glass, Perspex or other materials that would shatter or cause injuries to drivers or spectators in the event of a crash can be used in the construction of the vehicle.

Any steering column, brake lever or other protrusion must be designed and fitted such that puncture injuries cannot happen.

### 2. Access

Bodywork and controls must not impede the driver in exiting the vehicle unaided. *Access for first aid teams in the event of an accident must be considered, and vehicles which are difficult to exit are strongly discouraged.*

Any doors or hatches required for driver access must be readily operated from both inside and outside the vehicle without the use of tools. *Handles, latches, etc. for access points must be clearly marked.*

*Bodywork must not prevent scrutineers being able to check the integrity of roll bars, steering linkages, tyres, wheel bearings and wheel security. Vehicles must be presented at scrutineering with these items exposed.*

### 3. Driver Protection

The following must be fitted:

- A substantial roll-over bar above or to the rear of the driver’s head. It shall be in a suitable position to protect the head, neck and spine of the driver should the vehicle become inverted or topple on to its side. **It shall be braced fore or aft (or both) for support.**
- A substantial roll-over bar above or forward of the driver’s hands.
- An impact resistant structure at least 150mm forward of the driver’s feet which is sufficient to offer protection to the driver in the event of a head-on collision. The forward roll bar can, if suitably positioned, fulfil this requirement as well.

The top most points of the two roll-over bars shall describe a line which is at least;

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<sup>2</sup> Supine means lying on the back with the face up. See [http://en.wikipedia.org/wiki/Supine\\_position](http://en.wikipedia.org/wiki/Supine_position).

<sup>3</sup> Prone means lying on the front with the face down. See [http://en.wikipedia.org/wiki/Prone\\_position](http://en.wikipedia.org/wiki/Prone_position).

1. 50mm above the helmet of the tallest driver in the team when he/she is seated normally in the vehicle.
2. 25mm above the driver's hands when they are at the highest point on the steering controls.

#### 4. Visibility and Warning

The driver must have good all round vision, including to both sides and the rear. If necessary, mirrors should be fitted in order to achieve this.

The vehicle must have a clearly audible warning device. It must be possible to operate this device while keeping both hands on the steering control.

The bodywork and helmet must not unduly affect the driver's hearing or vision.

#### 5. Batteries

If batteries are used to power the horn or any other electrical equipment, they shall be securely fitted.

The following battery types are not permitted;

- Lithium Ion and Lithium Polymer batteries (this does not apply to small devices with internal batteries rated 6.0 Watt Hours or less)
- Wet lead/acid batteries

Gel filled sealed lead acid batteries are allowed.

#### 6. Drag Plates

The vehicle shall have drag plates fitted. These shall be one of;

1. A single plate of at least 285mm x 203mm (i.e. a standard UK "square" rear number plate)  
- or -
2. Two plates each of at least 285mm x 101.5mm

Drag plates may be mounted horizontally or vertically and must be no more than 10mm thick. If not using a commercially made 285x203mm number plate, the corners must be rounded to a diameter of 24.5mm (the diameter of a 10 pence coin).

The drag plates shall be made of a suitable material that will not deform significantly when the vehicle is in motion.

The drag plates shall be placed perpendicular to the direction of travel, in clean undisturbed airflow. All parts of the plates shall be clearly visible from the front. There shall be a space behind both plates at least 100mm deep which is open to airflow and contains no significant bodywork. No baffles, fins or similar may be used to attempt to deflect airflow away from the front of the plates or to significantly interrupt the flow of air for at least 100mm behind the plates.

Drag plates do not need to be fitted to the front of the vehicle. Other suitable mounting points include (but are not limited to); on the front axle beams or wishbones, on an exposed roll bar, on a spoiler or wing, etc. Where a drag plate extends out the front of the vehicle, it will not be included in the measurement of the overall length of the vehicle.

For the avoidance of doubt; the explicit purpose of the drag plates is to induce aerodynamic drag. Any attempt to compromise this will not be acceptable.

## 11. HARNESS

A four point or harness shall be correctly fitted and worn by the driver at all times when the vehicle is in motion, including when being towed. The harness shall be fitted so that the minimum roll-over clearances detailed in rule 10.3 are maintained if the vehicle is inverted.

If the driving position is seated and predominantly upright or slightly reclined, then a four point harness or better must be worn. Drivers in low reclined seating positions will be required to wear five point safety harness or better.

Shoulder strap anchor points should be placed in accordance with the harness manufacturer's instructions. In the absence of these instructions, the anchor points should be neck width apart and no more the 200mm below shoulder height.

## 12. BALLAST

Removable ballast is not permitted. The driver may not carry any ballast on their person.

## 13. TOWING

### 1. Tow Points

**Vehicles must be fitted a permanent towing eye at the front and a tow rope guide at the rear.**

#### Front Towing Eye

The front towing eye must be;

- clearly visible and easily accessible
- made of steel bar of at least 10mm diameter
- of size and location such that a M10 clip hook can be easily attached to it
- permanently attached during the course of the event

#### Rear Tow Rope Guide

Vehicles must have a tow rope guide at the rear through which the tow rope can be passed to stop it from fouling on the wheels of the cartie. This does not need to be load bearing and will not be used as a tow point. It is to stop the tow rope from moving from side to side during towing.

The rope guide must be;

- clearly visible and easily accessible
- directly in line with the front towing eye

It should be possible to quickly and easily pass the tow rope through it (e.g. a snap hook or similar).

The towing eye and tow rope guide must be positioned to allow the tow rope to pass freely to the rear of the vehicle without fouling the wheels, the steering or the brakes, and should allow sufficient clearance that the rope is not damaged by the road surface.

## 2. Tow Rope

Each team shall provide at least one tow rope sufficient to allow between 2.5m and 3.0m separation between the rear of their vehicle and the tow point of the following vehicle. This tow rope shall be either;

1. A 14mm polypropylene rope eye spliced at both ends  
or
2. A BSEN1492 compliant duplex lifting sling rated to at least 1 ton

In addition, each team shall provide;

- At least one 1 ton rated D or bow shackle
- At least one M10 clip hook

Teams may also provide bungee “shock absorbers”.

There may be a limited stock of towing equipment available for purchase at the event, but it is strongly recommended that teams bring their own spares.

The rope, shackle, clip hook and bungees must be securely stowed in the vehicle when not in use and easily accessible to the event crew when needed for towing. Towing equipment must be stowed in such a way that it cannot interfere with the normal operation of the vehicle.

## 3. Attachment Procedure

When attaching your vehicle on to be towed;

1. Use your M10 clip hook to attach your vehicle’s front towing eye to the rear loop of the tow rope in front of you. You may use bungee straps between the rope loop and your clip hook to absorb snatch if you wish.

When attaching another vehicle behind your own;

1. Use your 1 ton shackle to attach your tow rope to the rear loop of the tow rope in front of you. Do **not** attach it to your bungees, clip hook or your front tow point.
2. Pass your rope to the rear of your vehicle and through your rear tow rope guide. Make sure that it does not foul the wheels, the steering or the brakes.
3. Extend your rope behind your vehicle ready for the following vehicle to be attached to it.

## 14. CLOTHING

The driver’s body and limbs must be fully covered by suitable abrasion resistant clothing such as; heavy duty overalls, a karting suit, motorcycle leathers or similar. Sturdy footwear and abrasion resistant gloves must be worn.

A properly fitted neck support is strongly advised at all times when competing or when being towed.

The driver must wear a helmet at all times when competing or when being towed. The helmet must at least comply with, and carry the appropriate markings for, any one of;

- BSI 6658-85
- BSI 2495-77



- EN 22.05
- DOT FMVSS 218
- SNELL M2005, M2010, SA/K2005 or K-98
- ACU Approved

The helmet may be “open-face” or “full- face”.

The helmet must be in good condition and worn to the manufacturers recommendations.

For the avoidance of doubt, skateboard helmets, mountain bike helmets, cycle helmets, riding hats, etc are not acceptable. Only proper motorsport/motorcycle helmets are allowed.