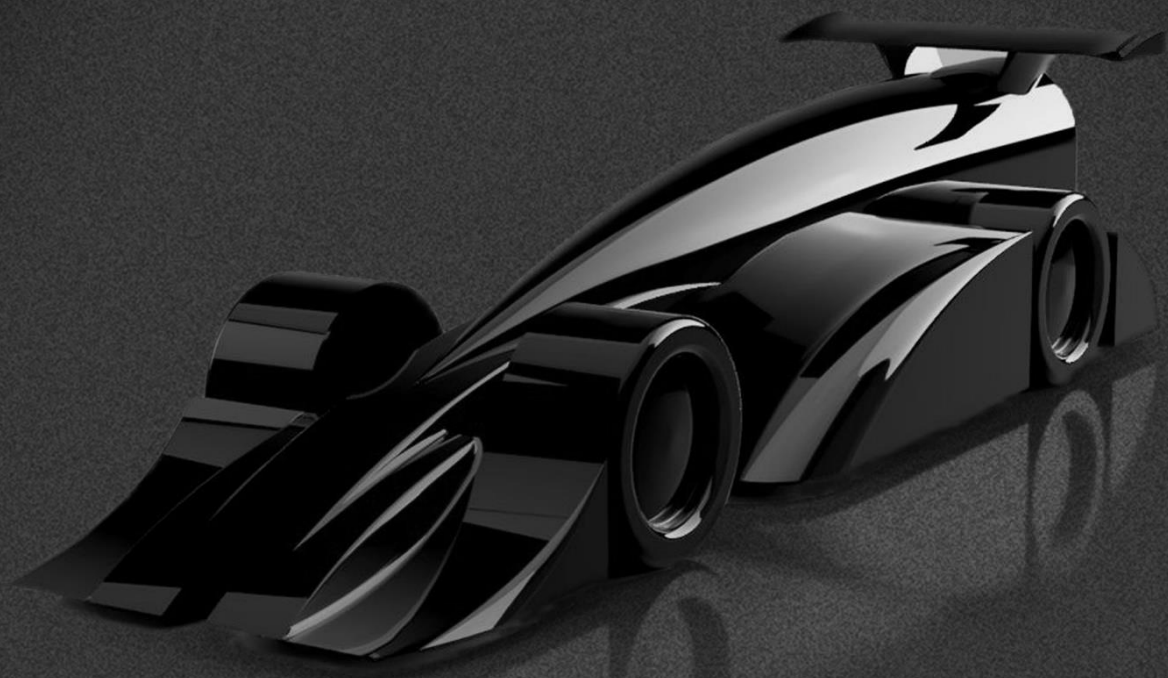


# **in Schools** INDIA



## SEASON 3

#DRIVETOFly

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**TECHNICAL REGULATIONS**  
SUB - REGIONAL FINALS 2019-20



# **F1 in schools™ India**

**Sub-Regional Technical Regulation**

**2019-20**

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**Please Note:** any amendments made prior to the event will be indicated using red underlined text.

**Amendment – Track Contact Width – Page. No. 23,24**



# 1. ARTICLE T1 – DEFINITIONS

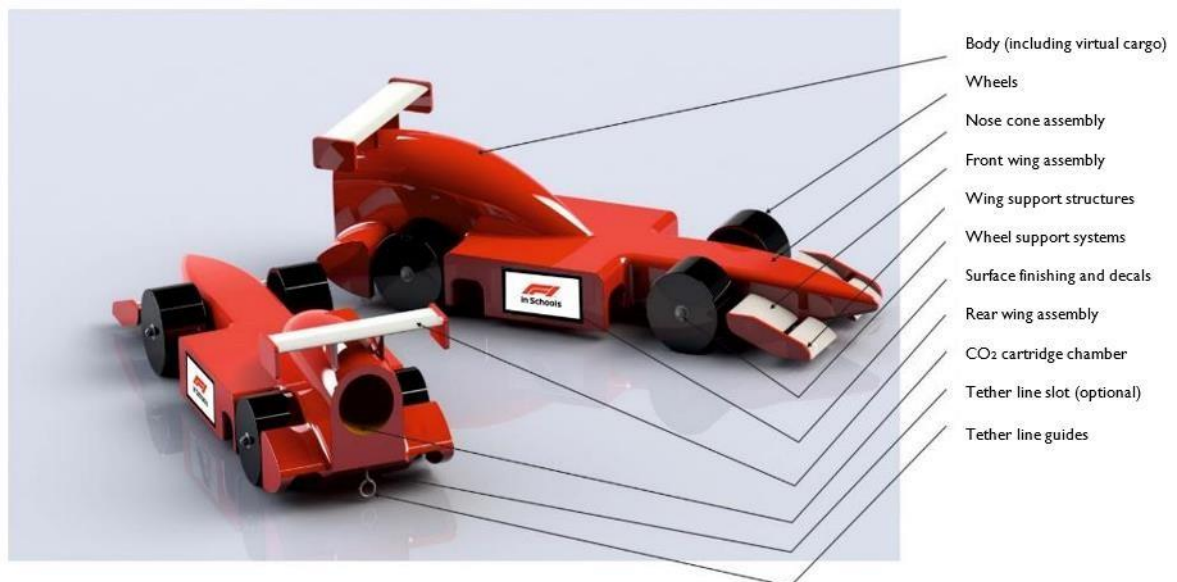
## T1.1 F1 in Schools™ car

This is also referred to as 'the car'. Designed and manufactured according to these regulations for the purpose of participating in races on the F1 in Schools track at the Regional Finals event, powered only by a single gas cartridge containing 8 grams of pressurized CO<sub>2</sub>. F1 in Schools cars are designed to travel the 20 meter race distance as quickly as possible, whilst withstanding the forces of launch acceleration, track traversing and physical deceleration after crossing the finishing line.

An F1 in Schools car assembly **can** only consist of the following components:

- A body (which includes a virtual cargo)
- A CO<sub>2</sub> cartridge chamber
- Tether line guides
- Wheels
- Wheel support systems
- Front wing assembly
- Rear wing assembly
- Wing support structures
- Nose cone assembly
- Surface finishing and decals

Adhesives with no dimensional impact are permissible for joining components.



## T1.2 Fully assembled car

An F1 in Schools car, without a CO2 cartridge inserted, presented ready for racing, resting on the track surface, free of any external force other than gravity.

## T1.3 Body

The body is a solid uninterrupted piece of F1® Model Block Material existing rear of the front axle centre line and encompassing both the virtual cargo and CO2 cartridge chamber. For dimensional purposes the body also includes any attached decals and surface finishes. Any F1® ModelBlock forward of the front axle centre line is not defined as car body.

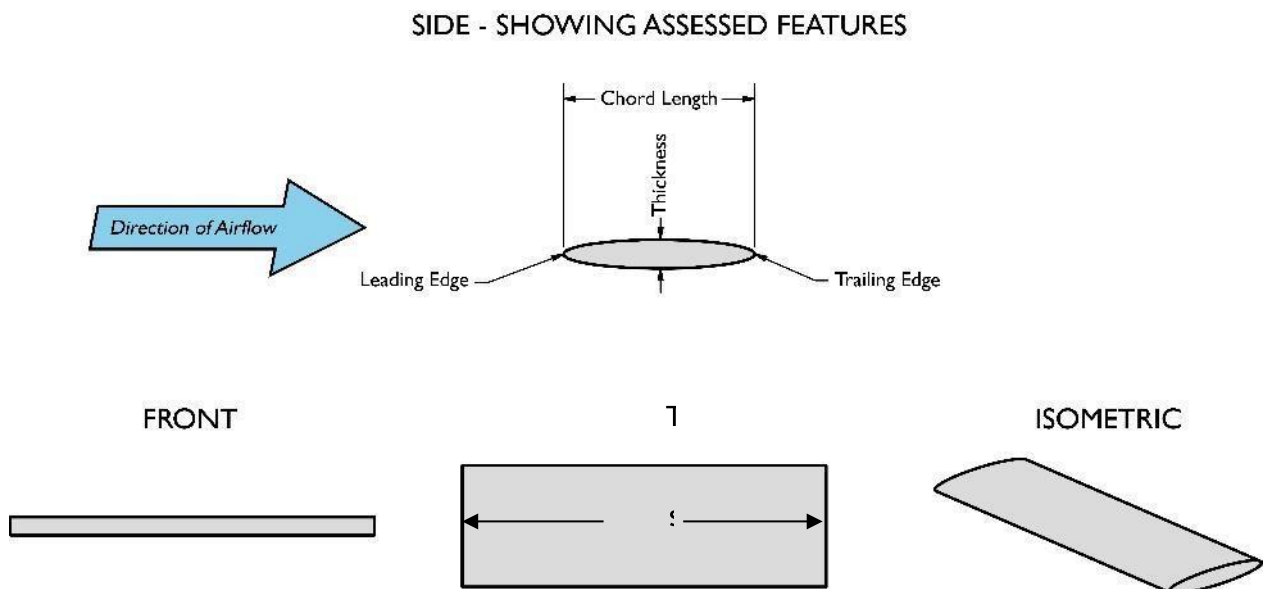
## T1.4 CO2 cartridge chamber

The CO2 cartridge chamber is a cylindrical clear space bounded around its inner circumference and one end by car body only. This is where the CO2 gas cartridge is placed for racing.

## T1.5 Wing

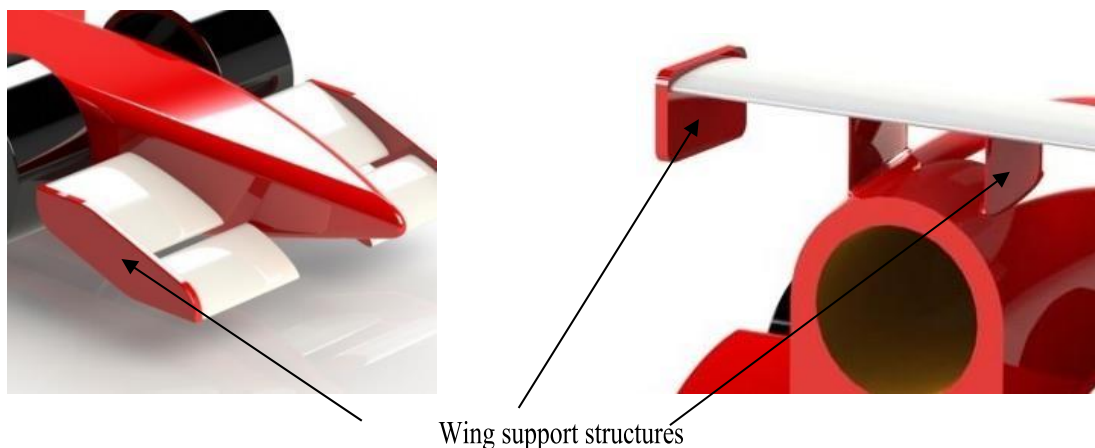
A wing on an F1 in Schools car is an aerodynamic feature that permits airflow around its chord surface including its features of a leading and trailing edge across its required span width. A wing is dimensionally defined by the span, chord and thickness. The vertical cross-sectional shape of the wing, parallel to the direction of car travel, is referred to as an aero foil.

Wing cross-section / aero foil nomenclature:



## T1.6 Wing support structure

A wing support structure is a feature, other than a wing, car body or nose cone that joins a wing surface to another component of the car assembly.



### **T1.7 Nose cone**

The nose cone is a component of the car, which may be used as a wing support structure, that only exists forward of the front axle centre line, when the car is in racing trim. This includes any F1® Model Block Material or any other materials that continue forward of the front axle centre line.

### **T1.8 Wheel**

A wheel is a single part or assembly of components, cylindrical in form, with its maximum circumference contacting the track surface, enabling forward motion of the car through rotation. All material existing within the volume of the extreme diameter and width is considered to be part of the wheel.

### **T1.9 Wheel support system**

Wheel support systems are single parts or an assembly of components that connect a wheel to any other part of the car, they **MUST** be contained within a theoretical cylindrical extrusion defined by the diameter of the relative wheels across each axle. These may consist of a combination of manufactured or commercial parts, i.e. bearings, bushes and axles could be used.

### **T1.10 Tether line guide**

A tether line guide is a key safety component which completely surrounds the track tether line so as to safely connect the car to the tether line during races. A tether line guide can be a component sourced from a supplier or manufactured wholly or in part by the team.

### **T1.11 Surface finish and decals**

A surface finish on an F1 in Schools car is considered to be any applied visible surface covering, of uniform thickness over the profile of a car component. A decal is material adhered to a component or surface finish. To be defined as a decal, 100% of the area of the adhering side must be attached to a surface. Surface finishes and decals are included when measuring the dimensions of any components they feature on.

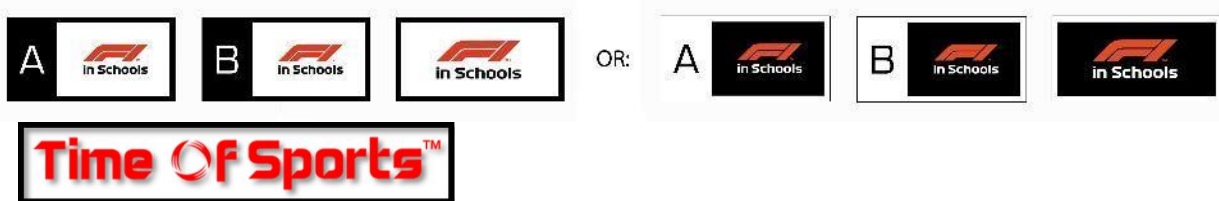
## T1.12 F1 in Schools™ logo decal

Teams must use a labelled decal to identify Car A and Car B and a blank decal to identify display car(s). The official decals are supplied by F1 in Schools India at event registration.

This consists of the F1 in Schools logo graphic printed on a black or a white adhesive vinyl with a 1 mm contrast Keyline border, with a horizontal dimension of 30mm and vertical dimension of 15mm. Teams choose to use either the black or white outlined decal so as to provide maximum contrast to the surface colour the decal is being adhered to. In addition it is mandatory for all teams to put up a Time of Sports Decal, with a horizontal dimension of 58mm and vertical dimension of 9mm, on the cars they will be using for racing

A team can manufacture and fit their own decals, provided they use the official F1 in Schools logo decal artwork which can be downloaded from the F1 in Schools website: <http://www.f1inschools.com/downloads-and-resources/>

### Decal designs:



## T1.13 Hand finishing

Hand finishing is defined as use of a hand powered device (e.g. abrasive paper) for removing only the irregularities that may remain on a CNC machined surface of the car body. These irregularities are often referred to as 'scalloping marks'.

## T1.14 Official F1® Model Block

The official F1® Model Block Material is a rigid, closed cell foam block processed to the dimensional features as shown by diagrams in the appendix of this document.

**IMPORTANT:** all cars entered into the 2018 Regional Finals must be manufactured from F1® Model Blocks. The official F1® Model Blocks can be sourced directly from Denford Limited or an official Denford Limited distributor.

## T1.15 Engineering Drawings

Engineering drawings are CAD produced drawings which should be such that, along with relevant CAM programs, could theoretically be used to manufacture the fully assembled car by a third party. Such drawings MUST include all relevant dimensions and material information.

Where stated, F1 in Schools engineering drawings of a readable scale MUST be clearly dimensioned and identified by hatching, shading or block colour within the engineering drawings to specifically identify and prove compliance for the virtual cargo, wheel support structures, nose, wing support structures and wing surfaces, imaginary lines will not be acceptable.

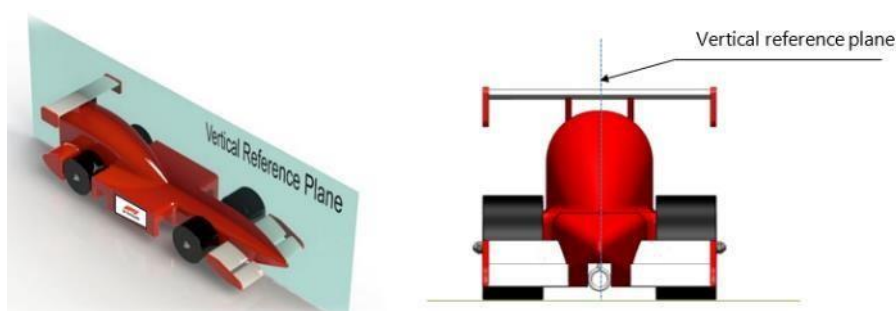
Engineering drawings can include: orthographic projection, auxiliary projection, section views, isometric projection, oblique projection, perspective and annotated renderings.

### **T1.16 Renderings**

Renderings are images intended to illustrate the three dimensional form of an object. These can be generated in isometric projection, oblique projection or perspective.

### **T1.17 Vertical reference plane**

To assist with describing dimensions, it is assumed that a two dimensional invisible plane exists along the length of the CO2 cartridge chamber centre axis and normal to the track surface. This is known as the vertical reference plane.



### **T1.18 Additional Components**

Any component other than those listed in T1.1 will be considered an additional component. Please refer to T11 and also the Regional Finals Competition Regulations.

### **T1.19 Normal**

The term 'normal' can be used in geometry to describe a line or object that is perpendicular or at 90 degrees to another given object. When referring to the term normal in these regulations it is considered to mean:

Being at right angles; perpendicular.

Perpendicular to the direction of a tangent line of a curve or a tangent plane to a surface.

### **T1.20 Full 8 gram CO2 cartridge**

A metallic cartridge which contains a compressed 8 gram charge of CO2. For weights and dimensions refer to appendix IV. Official CO2 cartridge dimensions.



## 2. ARTICLE T2 – GENERAL PRINCIPLES

### T2.1 Regulations documents

**T2.1.1** F1 in Schools India issues the regulations, their revisions and amendments made. **T2.1.2** Technical Regulations - this document. The Technical Regulations document is mainly concerned with those regulations that are directly related to F1 in Schools car design and manufacture. Technical regulation article numbers have a 'T' prefix.

**T2.1.3** Competition Regulations – a document separate to this one which is mainly concerned with regulations and procedures directly related to judging and the competition event.

Competition Regulation article numbers have a 'C' prefix.

### T2.2 Interpretation of the regulations

**T2.2.1** The final text of these regulations is in English should any dispute arise over their interpretation. The text of a regulation, diagrams and any related definitions should be considered together for the purpose of interpretation.

**IMPORTANT:** diagrams are for illustration purposes only and do not represent all permutations of any particular regulation.

**T2.2.2** Text clarification - any questions received that are deemed by F1 in Schools India, to be related to regulation text needing clarification will be answered by F1 in Schools India.

### T2.3 Amendments to the regulations

Any amendments will be announced and released by F1 in Schools India, by email notification to all Teams as well as being posted on the website [www.timeofsports.com/f1inschoolsindia](http://www.timeofsports.com/f1inschoolsindia).

Any amended text will be indicated **thus** (using red underlined text).

### T2.4 Compliance with regulations

Points are deducted for non-compliance with the technical regulations as per the specification judging score card. Both the race cars are scrutineered and points will be deducted for any infringements on either car. These penalties are only imposed once, per infringement, per car. Several regulations have been identified as 'critical regulations'.



### T2.5 Critical regulations

**T2.5.1** If a race car is judged as being NON-COMPLIANT with any critical regulation they will be INELIGIBLE for the awards of: World Champions, Fastest Car & Best Engineered Car. All Critical regulations are highlighted in yellow throughout this document.

**T2.5.2** The critical regulations are articles:

T3.1.1/T3.1.2/T3.1.3/T3.2.1/T3.3/T3.4/T3.5/T3.6/T3.7/T4.1.1/T4.2/T4.4/T5.2/

T5.3/T5.4/T5.6/T7.1/T7.4/T8.1/T8.2/T8.3/T8.4/T8.5.1/T8.5.2/T8.10/T10.1/T10.3/

## T10.5 / T10.6

**T2.6 Design ideas and regulation compliance questions**

Teams are not permitted to seek a ruling from F1 in Schools India or any competition officials or judges before the event as to whether a design idea complies with these regulations. Rulings will only be made by the judges at the Regional Finals event. Design compliance to the regulations forms part of the competition. As in Formula 1® innovation is encouraged and F1 in Schools teams may also find ways of creating design features that push the boundaries of the regulations in order to get an extra competitive edge.

**T2.7 Measurements**

**T2.7.1** All dimensions and weights are presented as absolute minimum or maximum, unless stated otherwise.

**T2.7.2** Dimensional measures - all car component dimensions are inclusive of any applied paint finish or decal. A series of specially manufactured gauges will be used to broadly verify dimensional compliance. Accurate measuring tools, such as Vernier calipers, will then be used to closely inspect any dimensions found to be close to the dimensional limits per the initial gauge inspection.

**IMPORTANT:** Some regulations are assessed with a full 8g race cartridge fully inserted into the cartridge chamber. This is stated in the individual regulations so please read each section carefully. **T2.7.3** Weight measures—all weight measurements will be made using the F1 in Schools calibrated electronic competition scales.

**SAMPLE OF COMPLIANCE OF ABSOLUTE DIMENSIONS AND WEIGHTS.**

**Weight;** (minimum 50g)

**50.0g; (pass)**

**49.9g; (fail)**

**Dimension;** (minimum 26.0mm)

**26.0mm; (pass)**

**25.9mm; (fail)**



**CARDESIGN:**

## **COMPLIANCEANDPENALTIES**

<b>Article 3:</b>	<b>Fully assembled car</b>	<b>14</b>
<b>Article 4:</b>	<b>Car body</b>	<b>16</b>
<b>Article 5:</b>	<b>CO2 cartridge chamber</b>	<b>18</b>
<b>Article 6:</b>	<b>Tether line slot</b>	<b>19</b>
<b>Article 7:</b>	<b>Tether line guides</b>	<b>19</b>
<b>Article 8:</b>	<b>Wheels</b>	<b>21</b>
<b>Article 9:</b>	<b>Nose cone</b>	<b>24</b>
<b>Article10:</b>	<b>Wings/support structure</b>	<b>24</b>
<b>Article11:</b>	<b>Additional Components</b>	<b>27</b>

### 3. ARTICLE T3 – FULLY ASSEMBLED CAR



#### T3.1 Design and manufacture – [Critical regulations]

**T3.1.1** All F1 in Schools cars must be designed and engineered using CAD (Computer Aided Design) and CAM (Computer Aided Manufacture) technology. CAD software used should provide for 3D part modelling, assembly and 3D realistic rendering. The CAM package should allow students to simulate CNC machining processes so they can show evidence of these in their portfolio. We recommend the use of Denford QuickCAM PRO software.

**T3.1.2** The body of all F1 in Schools cars must be manufactured via material removal using a CNC router/milling machine. We recommend all teams use a Denford CNC router. This manufacturing process should occur at your school/college or at a designated manufacturing centre/partner site. **T3.1.3** The individual components of both race cars must be designed with identical geometry.



#### T3.2 Safe Construction [Critical regulation | Penalty – 5pts]

**T3.2.1** Specification judging - all submitted cars will be inspected closely to ensure that they are engineered and constructed safely for the purpose of racing. If the judges rule an aspect of either race car to be unsafe for racing, the team will be required to carry out repairs / modifications to the car(s). Any such repair work will result in a penalty of 5 points per unsafe car.

**T3.2.2 [NON-critical regulation]** during racing – the race officials will routinely inspect cars for safety during scheduled races. If the officials rule a car to be unsafe, a penalty of 5 points will be imposed at the discretion of the Chair of Judges. The team may repair the car as per the Competition Regulations – C10 Car Repairs and Servicing.



#### T3.3 Undefined features – [Critical regulation | Penalty – 6pts]

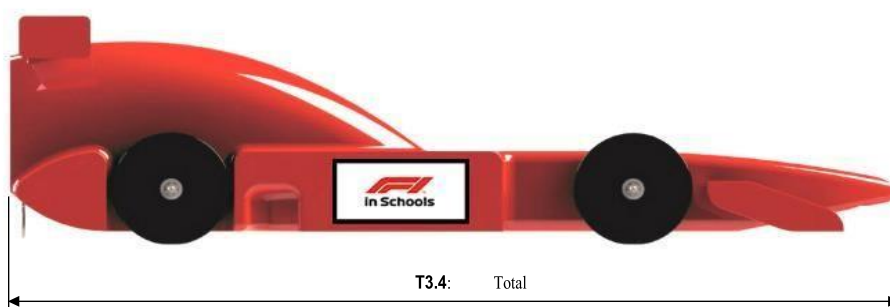
The car assembly must only consist of components listed in ARTICLE T1.1.



#### T3.4 Total length – [Critical regulation | Penalty – 6pts]

Overall length is measured parallel to the track surface and vertical reference plane, between the front and rear extremities of the assembled car.

**Absolute Min: 170.0mm / Absolute Max: 210.0mm**





### T3.5 Total width – [Critical regulation | Penalty – 6pts]

Width is the maximum assembled car width, measured normal to the vertical reference plane, between the outer edges of the widest feature of the car assembly.

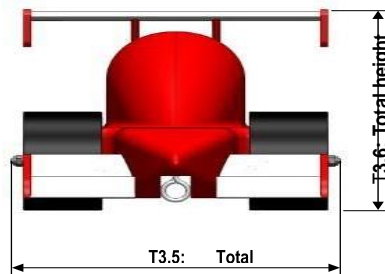
**Absolute Max: 85.0mm**



### T3.6 Total height – [Critical regulation | Penalty – 6pts]

Height is the maximum assembled car height, normal to the vertical reference plane, between the track surface and the highest feature of the car assembly. This is measured with a full 8g CO<sub>2</sub> cartridge inserted into the cartridge chamber.

**Absolute Max. 65.0mm**



### T3.7 Total weight – [Critical regulation | Penalty – 6pts]

Total weight is the weight of the car excluding a CO<sub>2</sub> gas cartridge. If ruled underweight, ballast will be added before racing, at 0.2g for every 0.1g underweight.

**Absolute Min: 50.0g**

### T3.8 Track clearance – [Penalty – 6pts]

Track clearance is the distance between track surface and any car component, except wheels. Measured normal to the track surface. This is measured with a full 8g CO<sub>2</sub> cartridge inserted into the cartridge chamber.

**Absolute Min: 1.5mm**





**T3.9 Status during racing - [Penalty – 6pts]**

The car assembly must be designed so that no items other than those listed in T3.10, or CO2 cartridges are removed, replaced or added to the assembly during scheduled race events.

**T3.10 Replacement Components – [Penalty – 6pts]**

Any spare / replacement components must be identical to those fitted to the car and must be submitted with the cars. Only the following spare / replacement components are permitted:

Rear wing / support structure – maximum of three (3)

Front wing / support structure and / or nose cone – maximum of three (3)

Wheel / wheel support system – maximum of three (3) car sets

Submitted replacement components that are determined by the judges to not be identical to those fitted to the cars will not be allowed to be used.

## 4. ARTICLE T4 – BODY

### T4.1 Body construction – [Critical regulation | Penalty – 6pts]

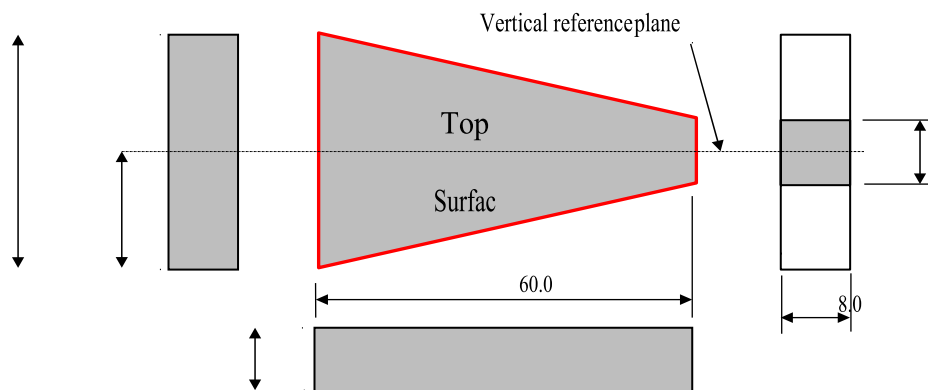


**T4.1.1** A single continuous piece of CNC manufactured F1® Model Block Material must exist rear of the front axle centre line, encompassing both the virtual cargo and CO2 cartridge chamber.

### T4.2 Virtual cargo – [Critical regulation | Penalty – 6pts]

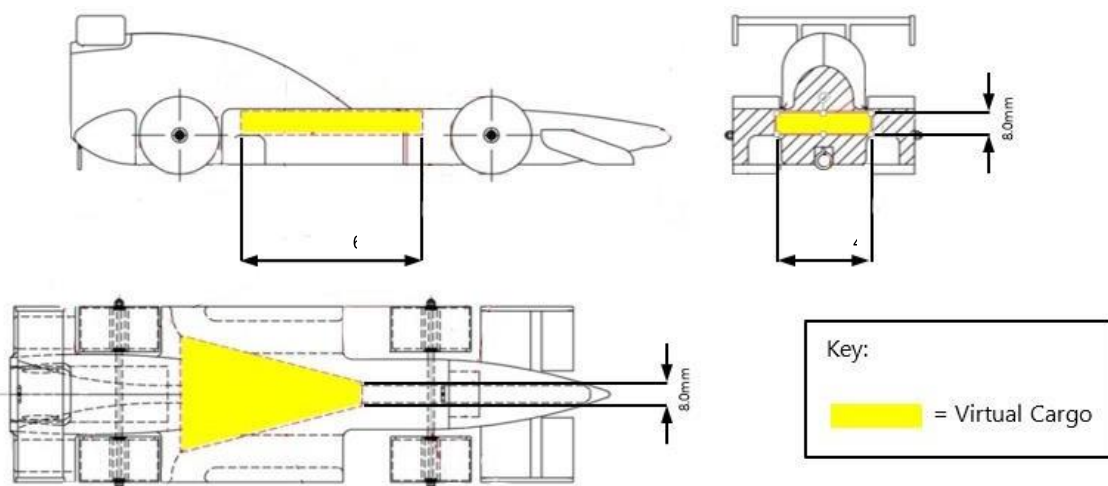


A virtual cargo must be completely encompassed by the body and be wholly positioned between the front and rear wheel centre lines. The virtual cargo must have minimum dimensions as shown below, with its top surface located symmetrical about and positioned normal (90 degrees) to the vertical reference plane. The virtual cargo may be intersected by the FRONT wheel support system and may also share common faces with the car body. All dimensions shown are absolute minimum.



### T4.3 Virtual cargo identification – [Penalty – 3pts]

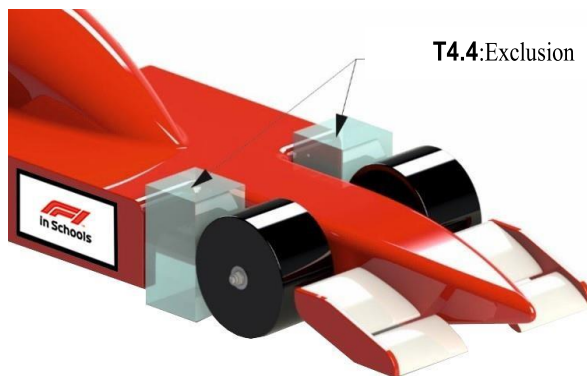
The virtual cargo location and compliance **MUST** be clearly dimensioned and identified by hatching, shading or block colour within the engineering drawings submitted for scrutineering. Please refer to the example diagram below, showing the virtual cargo clearly highlighted yellow:



#### T4.4 Exclusion Zones – [Critical regulation | Penalty – 6pts]

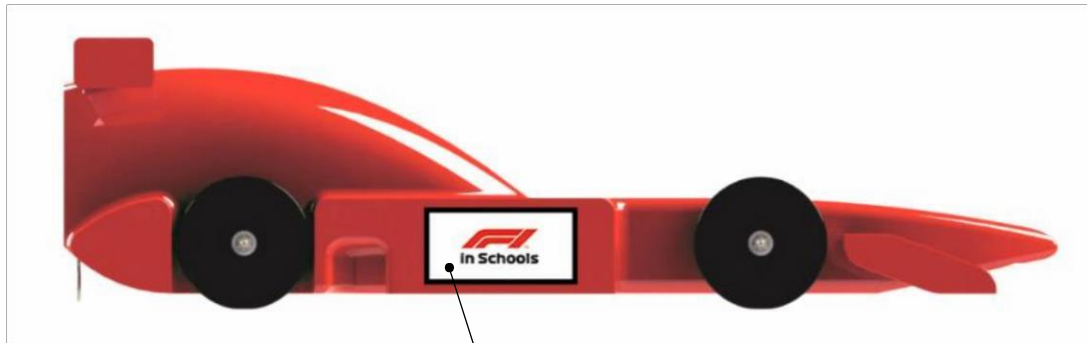
When viewed from the top and side, the car body must not exist within a dimension of 15.0mm immediately rear of either front wheel (measured horizontally at wheel centre line). The volume of this exclusion zone must exist from the inside rear edge of each wheel track contact width to the extreme width of the car assembly and a height from track surface of 65.0mm. This is measured, parallel to the vertical reference plane and track surface.

**Absolute Min: 15.0mm behind front wheel**



#### T4.5 F1 in Schools™ logo decal location – [Penalty – 6pts]

An F1 in Schools logo decal (refer ARTICLE T1.12) must be wholly adhered to each **side** of the car, positioned between the front and rear wheels and being 100% visible in the respective side view. Teams may manufacture their own decals but must use the artwork supplied by F1 in Schools India.



**T4.5:** F1 in Schools™ logo decal location

## 5.ARTICLE 5 - CO2 CARTRIDGE CHAMBER

### T5.1 Diameter – [Penalty – 3pts]

This is the diameter of the CO2 cartridge chamber, measured at any point through its depth.

**Absolute Min: 17.8mm / Absolute Max: 19.5mm**



### T5.2 Distance from track surface – [Critical regulation | Penalty – 6pts]

This is measured with a full 8g CO2 cartridge inserted into the cartridge chamber. This is measured from the centre of the CO2 cartridge to the track surface, measured normal to the track surface.

**Absolute Min: 30.0mm / Absolute Max: 40.0mm**



### T5.3 Depth – [Critical regulation | Penalty – 6pts]

The depth of the chamber is measured parallel to the vertical reference plane anywhere around the chamber circumference from the opening to the chamber end.

**Absolute Min: 45.0mm / Absolute Max: 58.0mm**



### T5.4 Max angle of chamber – [Critical regulation | Penalty – 6pts]

The absolute maximum angle of the chamber, parallel to the track surface. This is measured with a full 8g CO2 cartridge inserted into the cartridge chamber.

**Absolute Min: -3° Absolute Max: 3°**

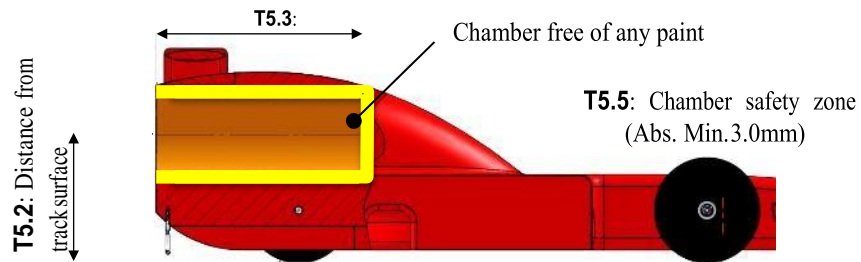
### T5.5 Chamber safety zone – [Penalty – 3pts]

A safety zone of F1 Model Block Material with a minimum thickness of 3.0mm must be maintained around the minimum chamber volume. The chamber safety zone and connection to the car body will be assessed and if determined below the minimum thickness, may be considered a safety issue at the judges discretion, see ARTICLE T3.2.

**IMPORTANT:** the entire circumference and length of the CO2 cartridge chamber must not be intersected by any object.

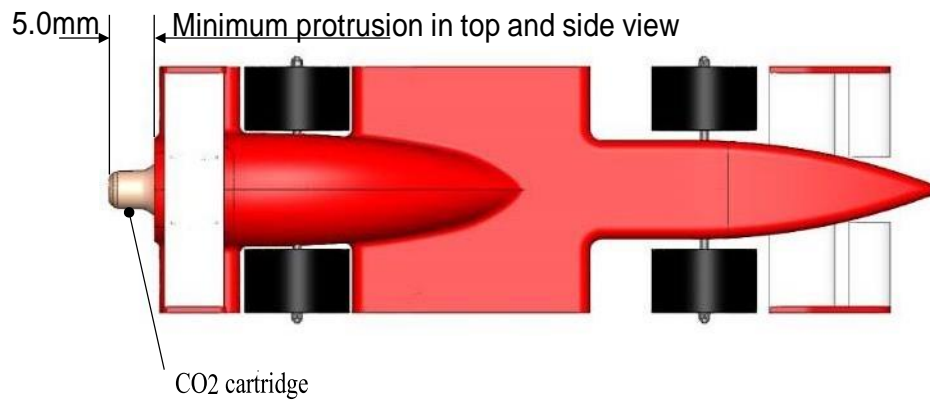
**Absolute Min: 3.0mm**





## T5.6 CO2 cartridge visibility – [Critical regulation | Penalty – 6pts]

When fully inserted, the CO2 cartridge must protrude a minimum of 5.0mm from the rear of the car and be visible in its entirety, in the top, bottom and side views.



## 6. ARTICLE T6 – TETHER LINE SLOT

### T6.1 Location

A tether line slot is an optional feature, free in length and location. The official F1® Model Block features a standard slot machined along the centre of its underside as shown by diagrams in the appendix of this document.

## 7. ARTICLE T7 – TETHER LINE GUIDES



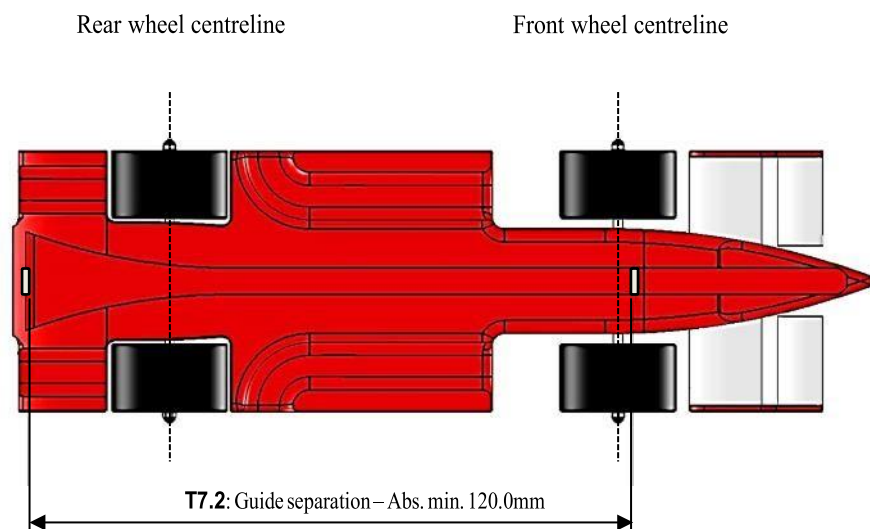
### T7.1 Location – [Critical regulation | Penalty – 6pts]

Each car must have two (2) firmly secured tether line guides, one on or in front of the front axle centreline and one on or behind the rear axle centreline of the car. The track tether line must pass through both tether line guides during racing.

### T7.2 Guide separation – [Penalty – 2pts]

The guide separation is the shortest distance between the inside edges of the guides, measured parallel to the track surface and vertical reference plane.

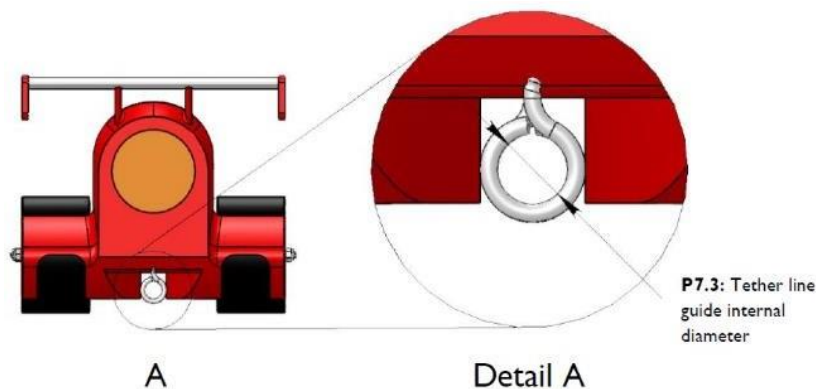
**Absolute Min: 120.0mm**



### T7.3 Internal diameter – [Penalty – 2pts]

The internal measurement of the opening within the guide which the tether line passes through.

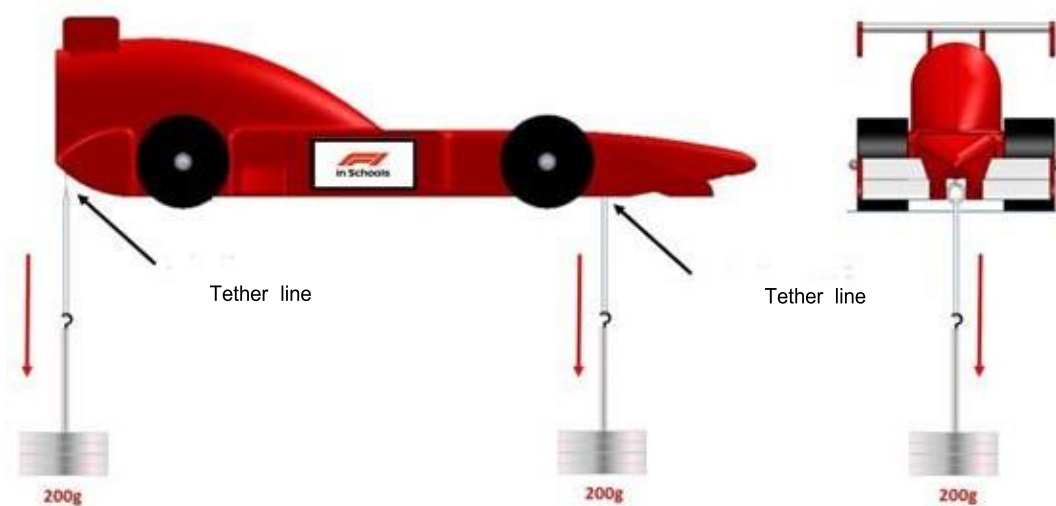
**Absolute Min: 3.5mm / Absolute Max: 6.0mm**





## T7.4 Tether line guide safety – [Critical regulation | Penalty – 3pts]

The guide holes must be completely closed to prevent the tether line from slipping out during racing. The construction of the tether line guides will be closely examined in relation to safety, refer to ARTICLE T3.2. The guides must be robust so as to prevent the diameter or shape changing during racing. The below tether line guide test will be conducted during scrutineering. A 200g weight will be suspended from each tether line guide to check the guides are securely fitted to the car and safe to race.

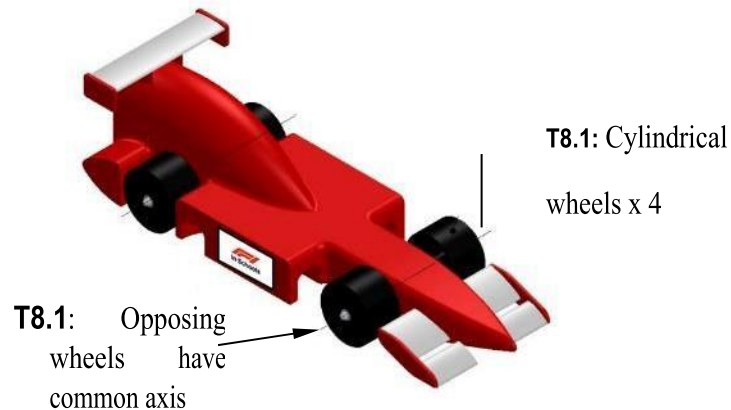


## 8. ARTICLE T8 – WHEELS



### T8.1 Number and location – [Critical regulation | Penalty – 6pts]

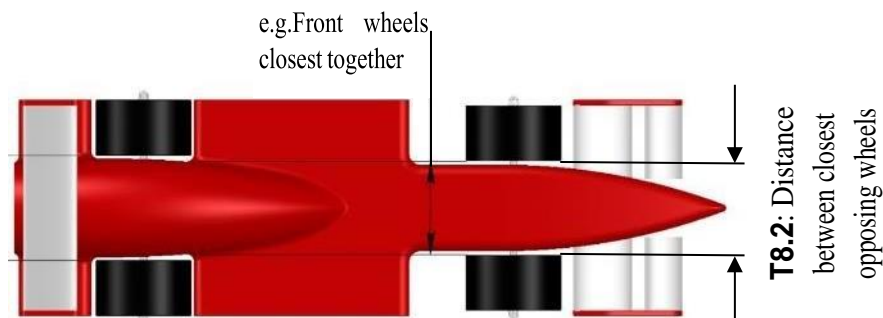
The car assembly must include four (4) cylindrical wheels, maximum of two (2) at the front and a maximum of two (2) at the rear. Opposing wheels must share a common centreline/axis.



### T8.2 Distance between opposing wheels – [Critical regulation | Penalty – 6pts]

This is measured as the innermost distance of the rotating wheel components (other than a rotating axle) between the two (2) opposing wheels which are the closest together, measured parallel to the track surface.

**Absolute Min: 30.0 mm**



### T8.3 Diameter – [Critical regulation | Penalty – 6pts]

This is the wheel diameter measured across the track contact width rolling surface.

**Absolute Min: 26.0mm / Absolute Max: 34.0mm**

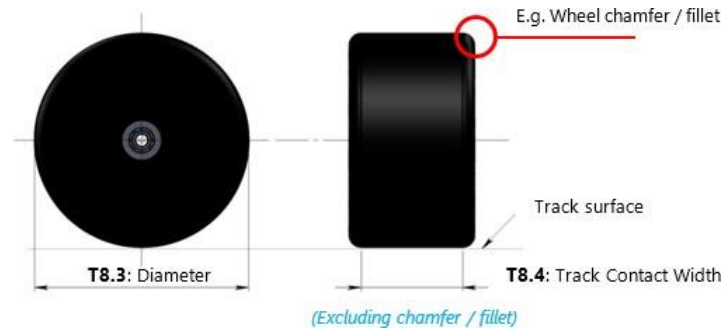


### T8.4 Track contact Width – [Critical regulation | Penalty – 6pts]

This is measured along the surface of the wheel that makes constant contact with the track surface, excluding any chamfers or fillets.



Absolute Min: 15.0mm/Absolute Max: 19

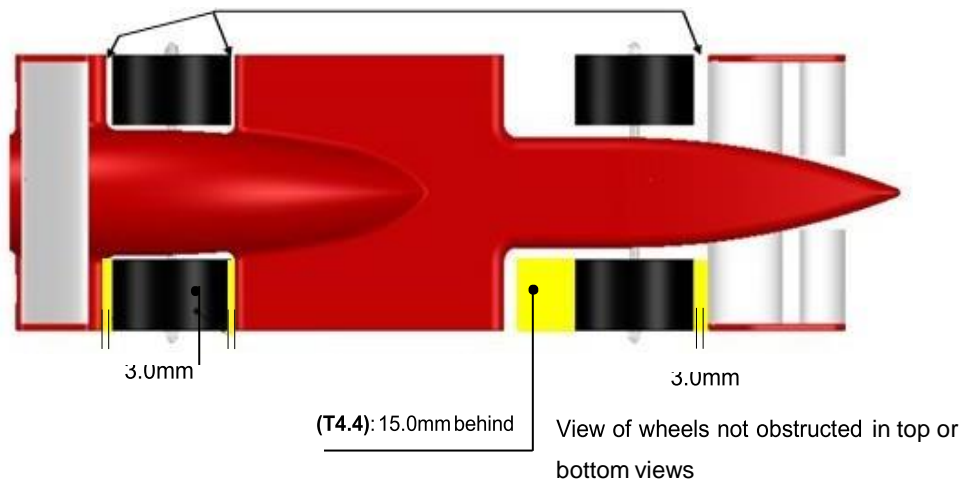


## T8.5 Visibility – [Critical regulation | Penalty – 6pts]

**T8.5.1 Top and bottom views** – View of all wheels must not be obscured by any component of the car in the car's top and bottom elevation views. Car body or any other components must not exist within a dimension of 3.0mm immediately front and rear of either rear wheel or front only of either front wheel (measured horizontally at wheel centre line). This dimension must exist from the inside edges of each wheel's track contact width to the extreme width of the car assembly and a height from track surface of 65.0mm. This is measured, parallel to the vertical reference plane and track surface. Please also refer to T10.10 – Clear Airflow.

**Absolute Min: 3.0mm**

**T8.5.1:** Track visible in top view 3.0mm minimum



**T8.5.2 Side views** – View of all wheels must not be obscured by any component of the car with the exception of any wheel support systems, in the car's side elevation views.

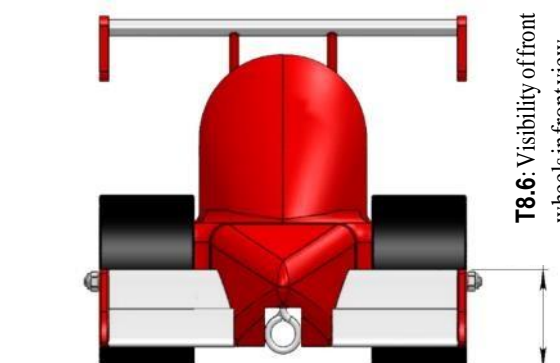


View of wheels only obstructed by wheel support system (circled in yellow)

### T8.6 Visibility in front view – [Penalty – 6pts]

The visibility of the front wheels in the car's front view may only be obstructed to a height of 15.0mm from the track surface. This is measured with a full 8g CO<sub>2</sub> cartridge inserted into the cartridge chamber.

**Absolute Max: 15.0mm**



### T8.7 Race track contact – [Penalty – 2pts]

All four (4) wheels must touch the racing surface at the same time across the full track contact width, measured with a full CO<sub>2</sub> cartridge inserted. Race track contact must be maintained prior to car launch and during racing.

## T8.8 Rolling surface – [Penalty – 3pts]

The wheel diameter must be consistent across the track contact width. *(i.e. no tread like features are permitted)*

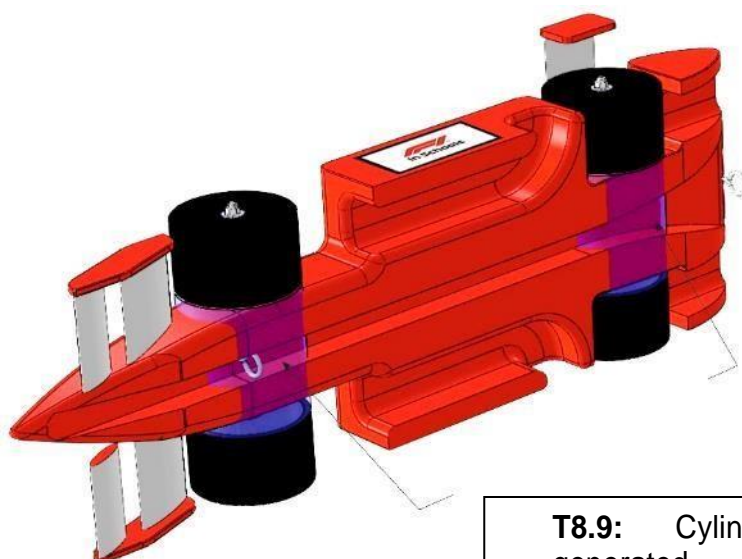
## T8.9 Wheel support

### T8.9.1 Wheel support systems – [Penalty – 6pts]

Wheel support systems may only exist within the cylindrical volume generated through the diameter of the two (2) opposing wheels. Refer to ARTICLE T3.8 Track clearance.

### T8.9.2 Wheel support systems identification – [Penalty – 6pts]

The surfaces defining the wheel support structures MUST be dimensioned and identified clearly by hatching, shading or block colour within the engineering drawings submitted for scrutineering, imaginary lines will not be acceptable.



**T8.9:** Cylindrical volume generated through the maximum diameter of two opposing wheels



## T8.10 Rotation – [Critical regulation | Penalty - 6pts]

All four (4) wheels must rotate freely about their own centre axis to facilitate forward motion of the car during racing. The scrutineering judge must be able to validate this with reasonably minimal effort, using a 2° incline test during scrutineering.

**Absolute Min rolling incline: 2°**

## 9. ARTICLE T9 – NOSE CONE

### **T9.1 Construction**

The nose cone can be manufactured from any material.

### **T9.2 Nose cone identification – [Penalty – 6pts]**

The surfaces defining the nose cone structure **MUST** be dimensioned and identified clearly by hatching, shading or block colour within the engineering drawings submitted for scrutineering, imaginary lines will not be acceptable.

## 10. ARTICLE T10 – WING AND WING SUPPORT STRUCTURE



### T10.1 Description and placement – [Critical regulation | Penalty – 6pts]

The design of the car should resemble an actual F1 car through the inclusion of a wing(s) on the nose of the car and a wing(s) at the rear of the car. Each wing section must have a leading edge and a trailing edge across their full span. Refer to the definition in ARTICLE T1.5.

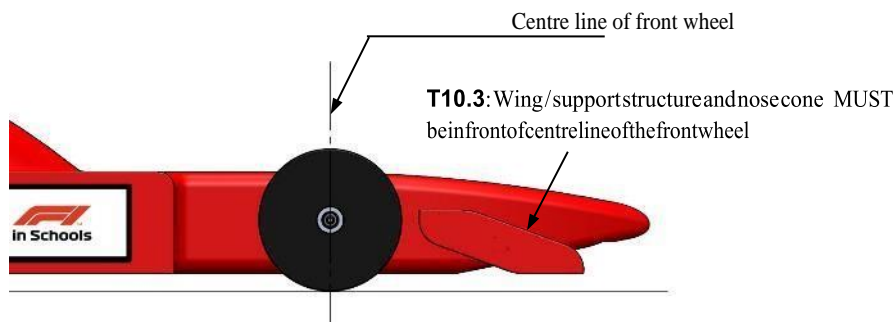
### T10.2 Wing support structure and Wing identification – [Penalty – 6pts]

The surfaces defining the wing support structures and front and rear wings MUST be dimensioned and identified clearly by hatching, shading or block colour within the engineering drawings submitted for scrutineering, imaginary lines will not be acceptable.



### T10.3 Front wing location – [Critical regulation | Penalty – 6pts]

The whole of the front wing and any support structure and nose cone MUST be in front of the centre line of the front wheel when viewed in the side elevation.



### T10.4 Visibility of front wing – [Penalty – 3pts]

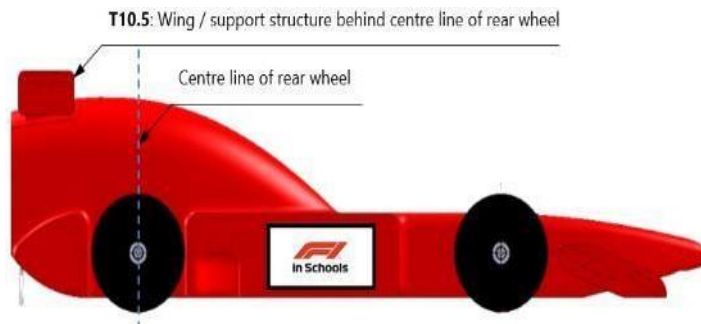
Visibility of the front wing must not be obstructed by any other component when viewed in the front view.





## T10.5 Rear wing location – [Critical regulation | Penalty – 6pts]

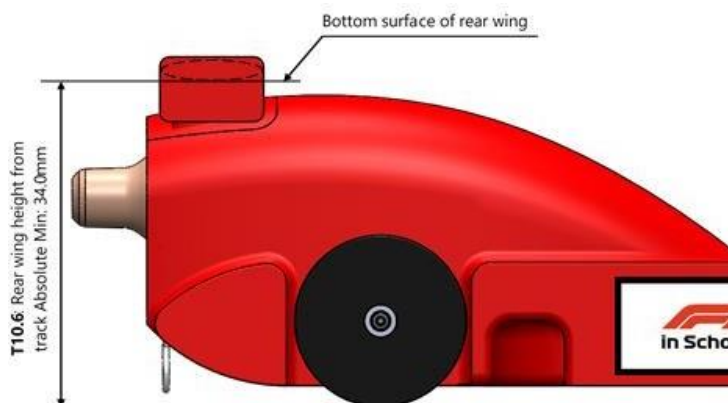
The whole of the rear wing and any support structure must be behind the centre line of the rear wheel when viewed in the side elevation.



## T10.6 Rear wing height – [Critical regulation | Penalty – 6pts]

The bottom surface of the rear wing must be higher than 34mm when measured from and normal to the track surface. This is measured with a full 8g CO<sub>2</sub> cartridge inserted into the cartridge chamber.

**Absolute Min: 34.0mm**



## T10.7 Front and rear wing span – [Penalty – 3pts]

The wing span is measured along the leading and trailing edge of the wing, parallel to the track surface and normal to the vertical reference plane. The wing span is defined by whichever is shortest.

Where the wing span is intersected by another part of the car, the total span is the sum of two (2) of the wing segments, which must be no less than 15.0mm each.

**T10.7.1 Front wing span: Absolute Min: 30.0mm**

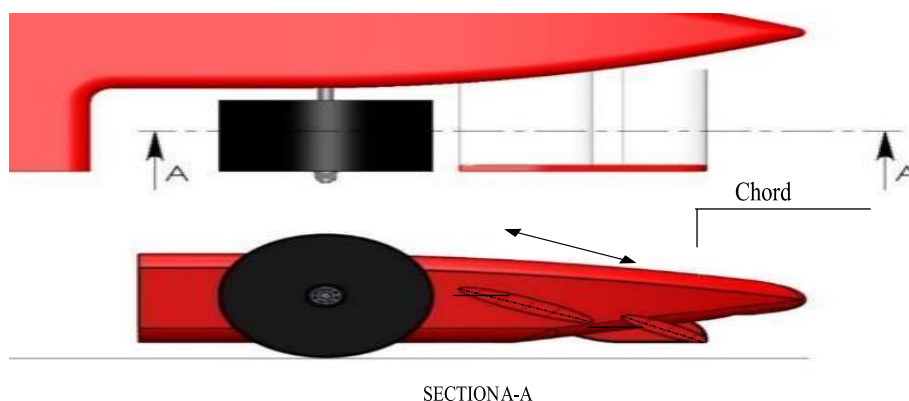
**T10.7.2** Rear wing span: **Absolute Min: 40.0mm**

## **T10.8 Front and rear wing chord – [Penalty – 2pts]**

The wing chord minimum to maximum dimensions must exist throughout the minimum wing span. The chord is the distance between the leading edge and trailing edge (chord line) measured parallel to the vertical reference plane.

**T10.8.1** Front wing chord: **Absolute Min: 15.0mm / Absolute Max: 25.0mm**

**T10.8.2** Rear wing chord: **Absolute Min: 15.0mm / Absolute Max: 25.0mm**

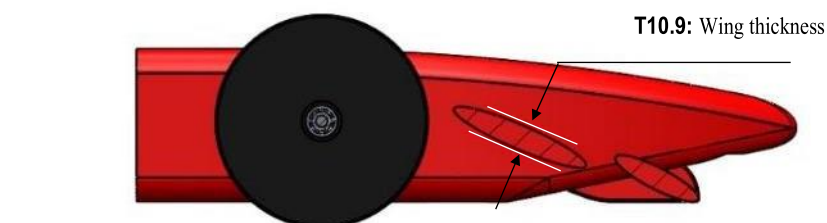


## **T10.9 Front and rear wing thickness – [Penalty – 1pt each]**

The wing thickness minimum to maximum dimensions must exist throughout the wing's minimum span and at a point along the minimum chord, measured perpendicular to the chord line.

**T10.9.1** Front wing thickness: **Absolute Min: 1.5mm / Absolute Max: 6.0mm**

**T10.9.2** Rear wing thickness: **Absolute Min: 1.5mm / Absolute Max: 6.0mm**

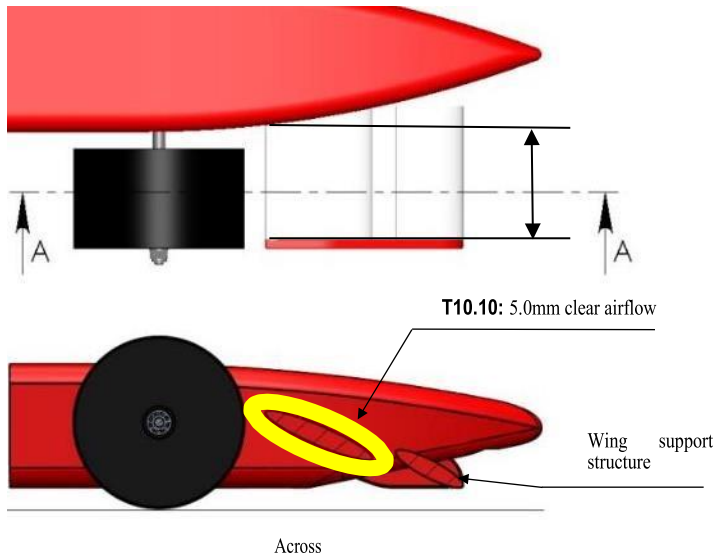


## **T10.10 Clear airflow – [Penalty – 6pts]**

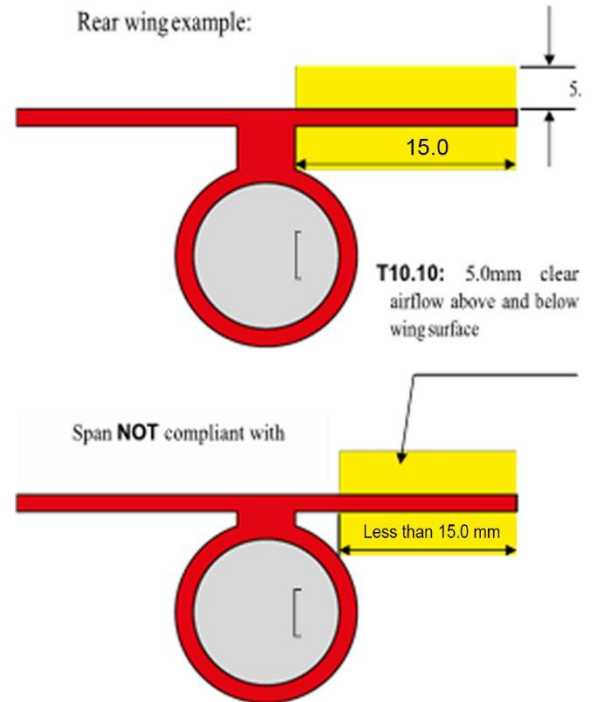
A wing, measured across its minimum span, must have a minimum of 5.0mm of clear 'air' space to any other part of the car or track surface, measured normal from any part of the wings surface.

**Absolute Min: 5.0mm**

Front wing example:



Rear wing example:



## T10.11 Construction and rigidity – [Penalty – 6pts]

The front wing, rear wing and any support structures may be manufactured from any separate materials. The wing span dimension must remain unchanged during races. (*i.e. wings must be rigid, ruled at the judge's discretion*)

## 11. ARTICLE T11 – Additional Components

### **T11.1 Description and placement**

Only the CO2 cartridge, as positioned by race officials, is permitted to make contact with the launch pods and/or cars prior to and/or during racing. Any car alignment tools must be approved by race officials prior to use. Please refer also to the Regional Finals Competition Regulations.



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### APPENDIX

### OTHER INFORMATION & ILLUSTRATIONS

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Appendix iii:	Wing Scrutineering Examples	30
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## 12. APPENDIX – OTHER INFORMATION / ILLUSTRATIONS

### i. Launch Pod and Finish Gate

The launch pods are designed to sit centrally within each lane of the track

The distance from the emitter centre line to the race track surface on both lanes is ~7mm

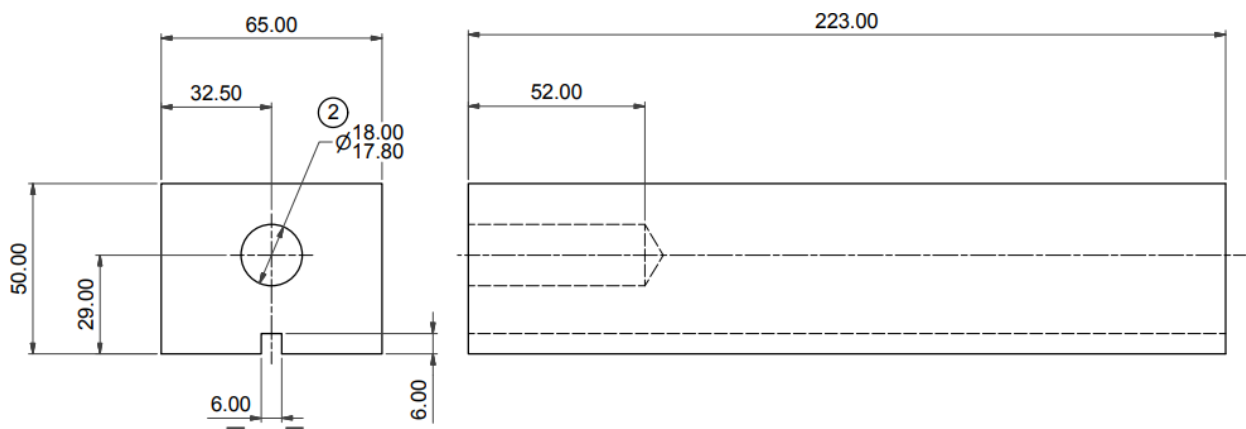
### ii. Official F1® Model Block Dimensions

Below: orthographic projection of F1® Model Block. All dimensions shown in millimetres



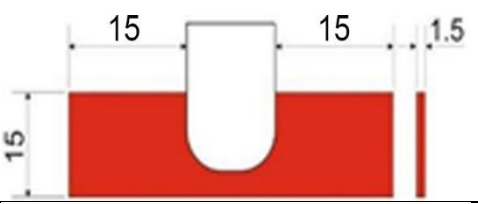
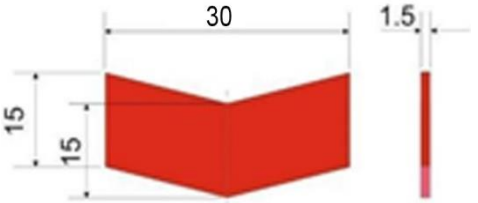
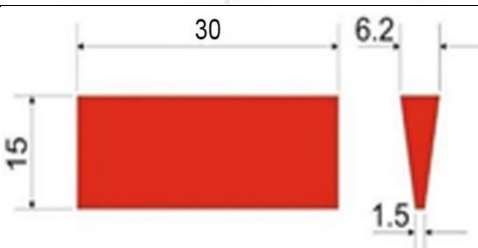
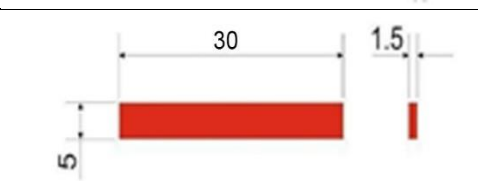
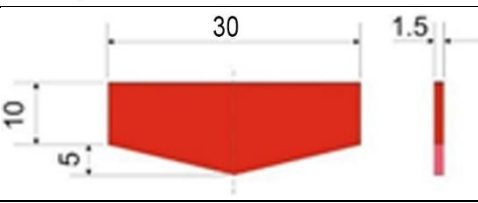
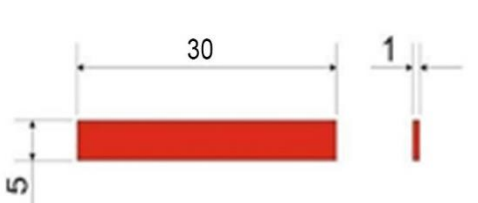
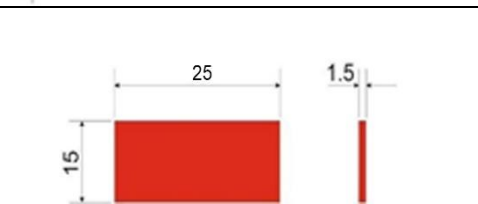
This component is available to download as a .ipt 3D part from the F1 in Schools website. For this part and more free downloads, please visit

<http://www.f1inschools.com/downloads-and-resources/>



## i. Front and Rear Wing Scrutineering Examples

The following table shows how penalty points are awarded for front and/or rear wingspan, chord or thickness dimensions that do not meet the specifications set out in **T10.7**, **T10.8** and **T10.9**:

Wing Example	T10.7 Span -3pts	T10.8 Chord -2pts	T10.9 Thickness -1pts	Remarks
	Pass	Pass	Pass	All conform to rules
	Pass	Pass	Pass	All conform to rules
	Pass	Pass	Fail	Span is ok, chord is ok, but maximum thickness is too thick. Therefore, thickness does not comply with the rules
	Pass	Fail	Pass	Span is ok, thickness is ok but chord is too short. Therefore chord does not comply with the rules.
	Pass	Fail	Pass	Span is ok, thickness is ok, but chord is too narrow at ends. Therefore chord does not comply with the rules.
	Pass	Fail	Fail	Span is ok, chord is too narrow and thickness is too thin. Therefore chord and thickness do not comply with the rules.
	Fail	Fail	Fail	Span is too short therefore chord and thickness do not comply with the rules as they cannot exist across the full minimum wing length of 40mm

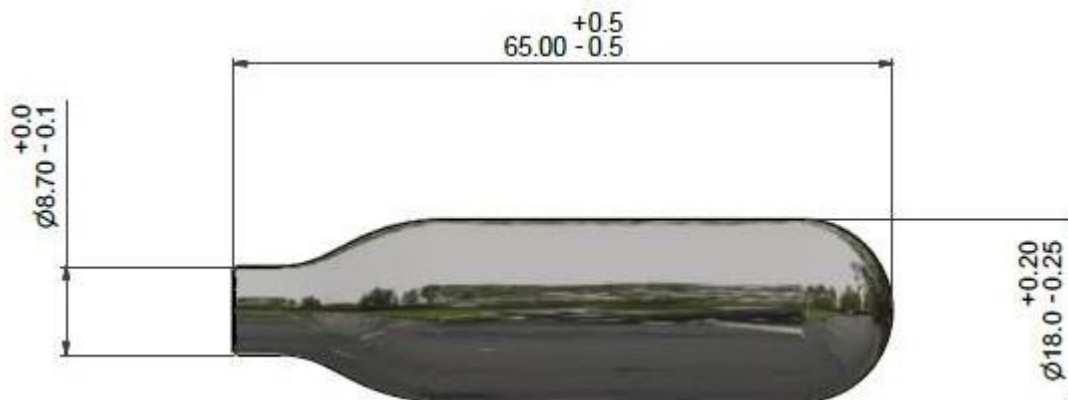


## ii. Official Denford Race CO2 Power Pack dimensions



This component is available to download as a .ipt 3D part from the F1 in Schools website. For this part and more free downloads, please visit

<http://www.f1inschools.com/downloads-and-resources/>

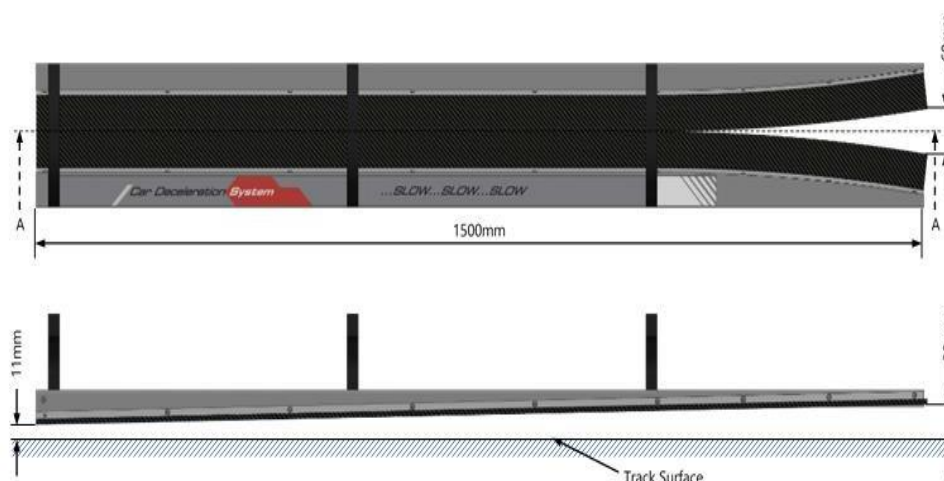


**Full weight of RACE CO2 Power Pack - between: 28.9g and 29.4g**

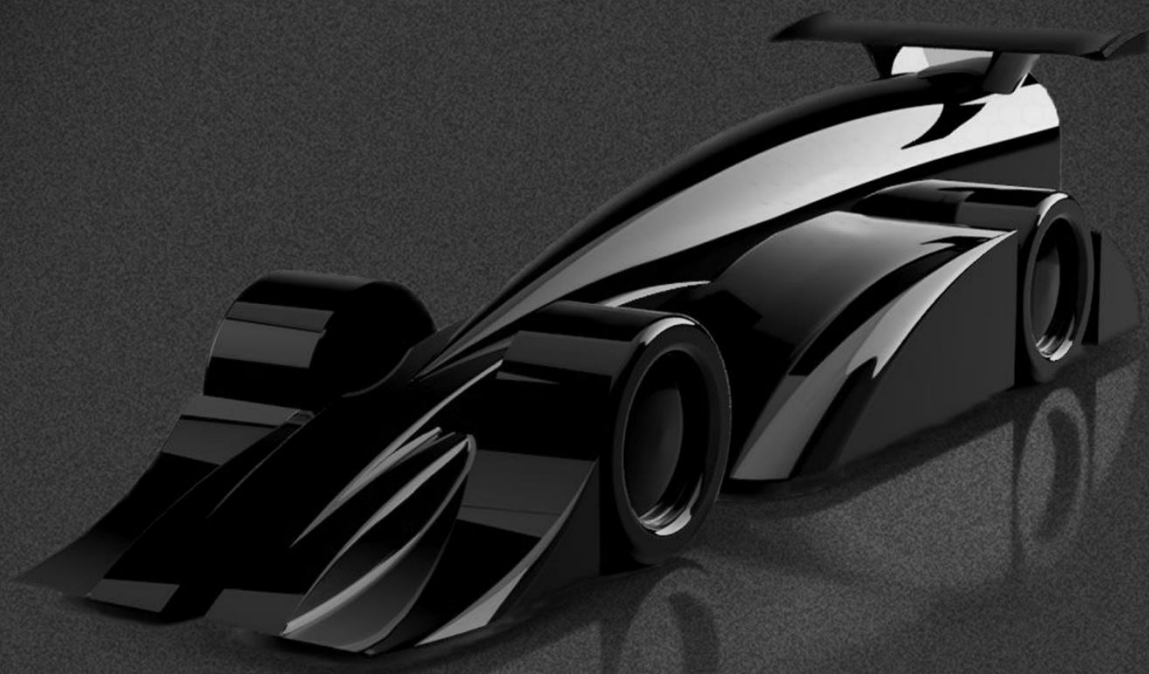
## iii. Car Deceleration System dimensions

The following diagram shows the important dimensions of the Official F1 in Schools Car Deceleration System, which will be used at the F1 in Schools Regional Finals. The dimensions shown indicate the relative spacing between the integrated brushes and the track surface.

Please note: teams have the option to use their own car deceleration systems.



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