aramco

F1 in Schools

SINGAPORE | 2023

WORLD FINALS

REVISION 3

# COMPETITION REGULATIONS 23

***Front Cover – Hydron, Australia, Aramco F1 in Schools 2022 World Champions***

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## SUMMARY OF CHANGES FROM 2023 REGULATIONS REVISION 2

| | |
|---|---|
| **C1.1** | World Finals Event – Revised |
| **ARTICLE C8** | VERBAL PRESENTATION JUDGING (160 points) – Total points revised. |

## SUMMARY OF CHANGES FROM 2023 REGULATIONS REVISION 1

| | |
|---|---|
| **C9.1** | Racing format revised |
| **C9.4** | Reaction race procedure revised |
| **C9.7** | knock-out competition seeding revised |
| **C9.7.2** | Knock-out competition scoring revised |
| **C9.11** | Car Deceleration Systems revised |
| **C9.11.1a** | Renumbered |
| **C9.11.1b** | New – Halo deceleration system |
| **C10.1.3** | Removed |
| **C10.1.4** | Removed |
| **C10.1.5** | Removed |
| **C10.1.6** | Removed |
| **C10.1.7** | Removed |
| **C10.2.1** | Car service schedule revised |
| **C10.2.2** | Revised |

## SUMMARY OF CHANGES FROM 2023 REGULATIONS

| | |
|---|---|
| **C2.11.2** | Portfolios - updated |
| **C2.12.1** | Team registration – updated |
| **C3.6.2** | Performance regulations list – updated |
| **C4.5** | Safe/Fit to race fix - updated |
| **C7.6.4** | Pit display set up - updated |
| **C7.6.9** | Pit display materials - updated |
| **Appendix** | Pit display build assessment scorecard – updated |
| **Appendix** | Specifications scorecard - updated. |
| **Appendix** | Pit display reference dimensions - updated |
| **Appendix** | Nose cone replacement challenge – New |

**Please note:** any amendments made prior to the event will be indicated ~~using red strikethrough text~~. New text will be indicated using blue text.

# ARTICLE C1 - DEFINITIONS

## C1.1 World Finals Event

The World Finals event is managed by F1® in Schools and is held over several days to include various programmed social and competition activities. The event aims to provide all participants with an educational and personal development 'Experience of a Lifetime'. Specifically, the competition aims to determine the World Champions of F1® in Schools according to the 2023 F1 in Schools World Finals Technical and Competition regulations.

## C1.2 F1® in Schools In-Country Co-ordinator (ICC)

Person/s and/or an organisation approved by F1 in Schools to manage and co-ordinate F1 in Schools - The Formula 1® STEM Challenge within a specified country or region of the world.

## C1.3 Parc fermé

A secure area where all submitted cars and components are held to prevent unauthorised handling, but to allow technical inspections to be conducted by the Judges. (Literal meaning in French of 'closed park').

## C1.4 Competition Programme

The competition programme will detail the schedule of judging activities for all teams.

## C1.5 World Finals terms and conditions for entry

This is a document issued by F1 in Schools which constitutes an agreement between F1 in Schools, ICC's and supervising teachers regarding participation by teams in the World Finals event.

## C1.6 Key performance indicators (KPI's)

These are portions of text that feature on the scorecards within a corresponding points range. The KPI's describe the type of evidence the Judges will be looking for in order to score the team appropriately.

## C1.7 Car race time value

A 'car race time' value is the actual time taken for a F1 in Schools car to travel the track from start to finish, measured from the instant the start box fires to when the car breaks the finish line timing beam. In the case of reaction races, the 'car race time' value is calculated as the 'total race time' value displayed on the electronic start gate minus the 'reaction time' value displayed for that race.

## C1.8 Total race time value

The 'total race time' value is displayed in the total time field on the electronic start gate at the conclusion of every race. This time is the sum of the 'car race time' value and any 'reaction time' value displayed on the electronic start gate.

## C1.9 Reaction time value

A 'reaction time' value is the time recorded from the instant the five (5) start lights extinguish to the instant the start trigger is activated by the driver. This value is displayed in the reaction time field on the electronic start gate.

## C1.10 Project elements

These are any materials and resources that the team presents as part of its entry for any judging activity.

## C1.11 Race event

The World Finals competition includes three separate race events. These are: Reaction Racing 1, Reaction Racing 2, and Knock-out Racing.

## C1.12 Engineering drawings

Engineering drawings are CAD produced drawings, which along with relevant CAM programmes, could theoretically be used to manufacture the fully assembled car by a third party. Such drawings must include all relevant dimensions, tolerances and material information. F1 in Schools engineering drawings must include detail to specifically identify and prove compliance for the virtual cargo and wing surfaces. Engineering drawings can include: orthographic projection, auxiliary projection, section views, isometric projection, oblique projection, perspective and annotated renderings.

## C1.13 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.

## C1.14 Team Digital Upload Folder

This is a team specific digital upload folder, where all digitally submitted work must be uploaded to F1 in Schools. Each team will receive a unique link to their own Team Digital Upload Folder, which will be provided by email directly to competing teams and ICC's after team registration.

## C1.15 Partnerships

A partnership can be defined as a collaborative relationship between organizations. The purpose of this relationship is to work toward shared goals through a division of labour that all parties agree on.

# ARTICLE C2 - GENERAL INFORMATION

## C2.1 Competing teams

**C2.1.1** F1 in Schools will request that each In-Country Co-ordinator (ICC) selects teams for entry to the World Finals event from their region. Once approved by F1 in Schools, these teams will then be invited to compete in the World Finals by the ICC. The invited World Finals teams will normally be the overall winner of the in-country national final, a second and third team chosen at the discretion of the ICC to suit the In-Country competition. This third team could also be an internal or international collaboration.

**C2.1.2** Each team must consist of a minimum of 3 students to a maximum of 6**.** With a maximum age of 19 years old at the first day of the World Finals event.

**C2.1.3** Only members of the official competing team (maximum 6) are permitted to wear the team's uniform

**C2.1.4** F1 in Schools will provide help to establish international collaboration teams where needed by liaising between the relevant ICC's. Teams nominated to form international collaboration teams are usually runner-up or minor placed winning teams from respective National Finals.

**C2.1.5** International collaboration teams must consist of a minimum of 4 members and up to a maximum of 6 with a minimum of 2 members from any one country (i.e. 3 countries collaborating is the maximum) and where possible be as balanced as possible in order to represent a fair split of team members between the collaboration countries.

**C2.1.6** When teams combine to form a collaboration, a maximum of six students must be nominated as the official competing team members. The remaining students may be referred to as affiliated students. Regulation C2.2.3 does not apply to International collaboration teams who have previously participated, provided the same international collaboration team is not entered. (Please note, from 2015, students who have previously attended a World Final as a collaboration team will be allowed to compete a further time at a forthcoming World Final).

**C2.1.7** During the competition, only the official core team members (maximum of 6) can represent the team at registration, Pit Display set up, Scrutineering review, Verbal Presentation, Design & Engineering judging, Project Management, Enterprise judging, Safe/Fit to race fix, racing, on-stage presentations, competition activities and any direct communication with the Chair of Judges or Event/Competition Directors.

**C2.1.8** If a collaboration team wins an award, only the official core team members may take to the stage and be involved in key photo, media and publicity sessions. Any trophies must be shared between the team following the World Finals event. Only the collaboration award will have two actual trophies associated with it. Award certificates will be duplicated for awards won by collaboration teams.

**C2.1.9** All collaboration teams must sign a memorandum of understanding (MOU) document that acknowledges the team construction, financial obligations and team member responsibilities. This document must be signed by each team member, a school official

and the ICC as witness. This document should initially be created by the ICC. Example MOU are available upon request from F1 in Schools.

**C2.1.10** Team affiliated students are welcome to attend the World Finals but must pay the participation fee to join in all official activities. They may play no part in the judging assessment process as outlined in C2.1.7. Penalty points may be applied if it is felt team affiliated students are influencing the judging process.

**C2.1.11** Team affiliated students, supervising adults / teacher must adhere to C2.1.3. If a uniform is to be worn it must be significantly different to the official core team. This is to assist the Judges in recognising the official core students.

**C2.1.12** Non collaboration teams may not have affiliated students associated with the team and any additional delegates will only be recognised as team guests**.**

## C2.2 Returning Students

**C2.2.1** A student can only participate in a maximum of 2 World Finals.

**C2.2.2** Any member of a World Finals Team (with the exception of C2.2.3), or the whole team, may return to participate in one other World Finals event, provided they have qualified to do so through their National Competition.

**C2.2.3** After the 2018 F1 in Schools World Finals, World Champions will not be able to compete in another World Finals event. They may however be invited to join the Judging panel at a future World Finals event.

## C2.3 Competition programme, team number and team name

**C2.3.1** F1 in Schools will issue the competition programme showing all scheduled judging activities, with judging times listed against team competition numbers.

**C2.3.2** F1 in Schools Ltd. will determine the team number each team will be allocated. These team numbers will correspond with those published in the competition programme.

**C2.3.3** The competition programme may be revised slightly to accommodate a team from the host country participating in the first race of the event.

**C2.3.4** No teams participating in the challenge are permitted to use any of the Formula One Word Marks (shown below) in their team name, logo, domain name, and/or any social media handle. For example, "Infinity F1" is not allowed and should be changed to something similar such as "Infinity" or "Team Infinity". No team will be permitted to use any of the prohibited word marks within their team name when participating in F1 in Schools from 2017 onwards.

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**C2.3.5** Duplicate team names will be asked to rename with the Country code after their name.

It is optional for teams to change their team logo but all judging, references and mentions will use the official corrected name.

**C2.3.6** During registration teams will be asked to define their official team's name and their "short" team's name. The official team's name will be used to identify your team by default. Please refer to C2.3.4 for guidance on creating a suitable team name. The short name is the name that will be displayed for your team where space is limited (for example, small on-screen graphics). This must be no more than 15 characters (including spaces) and be typed exactly as you want the name to appear.

**C2.3.7** Prohibited characters – Teams may be asked to alter their team and organisation names if they contain special characters outside of A-Z, a-z, 0-9 as these may cause issues with data processing. Some of the reserved characters are listed below. These may be amended at any point by F1 in Schools Ltd. Superscript or subscript characters will also be ignored.

- Team names **must not** include following reserved characters:
  - < (less than)
  - > (greater than)
  - : (colon)
  - " (double quote)
  - / (forward slash)
  - \ (backslash)
  - | (vertical bar or pipe)
  - ? (question mark)
  - * (asterisk)

## C2.4 Team responsibilities

**C2.4.1** Teams must read the World Finals Technical Regulations carefully to ensure their cars comply with those regulations.

**C2.4.2** Teams must read the World Finals Competition Regulations (this document) carefully to ensure that all project elements satisfy these regulations and that they understand the requirements and procedures for all aspects of the competition and judging.

**C2.4.3** During the competition it is the team's responsibility to ensure that team members are present at the correct time and location for all scheduled activities.

## C2.5 Role and responsibility of ICC and supervising teacher / adult.

**C2.5.1** All ICC's and supervising teachers / adults should carefully read and understand the terms and conditions for entry to the F1 in Schools World Finals event, and must have explained all relevant information within this agreement to their team/s.

**C2.5.2** It is the primary responsibility of any event accredited supervising teacher/adult and/or the ICC to ensure duty of care/well-being for all their student team members, as appropriate for their home country legislation. Any concerns arising during the event in relation to this should be brought to the attention of the F1 in Schools Event Directors immediately.

**C2.5.3** The event accredited supervising teacher/adult and/or ICC is expected to be present during any judging activity with their team, but, must not interact in any way with the

student team, Judges or judging process. Any incident considered inappropriate will be brought to the attention of the Chair of Judges and 10 penalty points may be applied to their associated team.

## C2.6 Regulations documents

**C2.6.1** F1 in Schools issues the regulations, their revisions and amendments made.

**C2.6.2** Competition Regulations – (This document). The Competition Regulations document is mainly concerned with regulations and procedures directly related to judging and the competition event. Competition Regulation articles have 'C' prefix.

**C2.6.3** Technical Regulations – A document; separate to this one which is mainly concerned with those regulations that are directly related to F1 in Schools car design and manufacture. Technical Regulation articles have a 'T' prefix.

## C2.7 Interpretation of the regulations

**C2.7.1** The final text of these regulations is in English, should any dispute arise over their interpretation, the regulation text, diagrams and any related definitions should be considered together for the purpose of interpretation.

**C2.7.2** Text clarification - Any frequently asked questions that are deemed by F1 in Schools to be related to text needing clarification will be answered. The question and the clarification will be published to all teams at the same time.

## C2.8 Supplementary competition regulations

Other documents may be issued by F1 in Schools that provide teams with further logistic and other important event information. Any supplementary regulations will be issued to all ICC's or lead teachers and team managers, where the team manager has supplied F1 in Schools with a contact email address. Copies of all supplementary regulations issued will be available online either via the website, event app or social media pages.

## C2.9 Design ideas and regulation compliance queries

Teams are not permitted to seek a ruling from F1 in Schools or any competition official or judge before the event as to whether a design idea complies with the regulations. Rulings will only be made by the Judges at the World 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, sometimes controversial ways, of creating design features by pushing the boundaries in order to get an extra competitive edge.

## C2.10 Team partnerships

**C2.10.1** F1 in Schools teams are encouraged to develop mentoring partnerships with businesses, industry, or higher education organisations throughout their project.

**C2.10.2** All teams will be required to complete a 'Team Partnerships' declaration using the template issued by F1 in Schools. A declaration is required even in the case of no partnerships to declare. This is submitted as per Article C2.13.

**C2.10.3** All design work, text and scripting for all project elements presented for assessment must be wholly undertaken and created by the team. This includes all CAD and CAM data, electronic portfolio and graphic content.

**C2.10.4** All aspects of any partnerships should also be represented in the team's portfolio. For project elements produced utilising some outside assistance, teams should be able to demonstrate to the Judges a high level of understanding of, and justification for, any of the processes used.

**C2.10.5** 'Common sense' will prevail for project elements or components that a team has purchased from a supplier. E.g. bearings, screw eye, display hardware. Teams should be able to explain and justify why a specific component was selected / purchased over other similar available components.

## C2.11 Mandatory project elements required for World Finals entry

Following is a summary of the mandatory elements required for judging:

- Two (2) identical F1 in Schools cars including all optional replacement components
- One (1) F1 in Schools display car for use in judging activities
- One (1) fully machined, unfinished, unassembled F1 model block car body identical to the car body used on car A & B
- One (1) digital and Two (2) physical copies of the Design & Engineering Portfolio
- One (1) digital and Two (2) physical copies of the Project Management Portfolio
- One (1) digital and Two (2) physical copies of Enterprise Portfolio
- A Pit Display
- A 10-minute Verbal Presentation
- A set of engineering drawings including orthographic and 3D renders for Scrutineering judging.
- A Digital team logo
- All relevant CAD data and access to CAD software
- 'Team Partnerships' declaration(s)
- Car Submission Checklist which must include the official F1 Model Block holographic stickers

The above list is detailed in the remainder of ARTICLE C2.

**C2.11.1** Cars - Each team must produce two (2) identical F1 in Schools race cars and one (1) display car.

**C2.11.2** Portfolios - Each team must produce:

- One (1) digital and Two (2) physical copies A3, 11-page (maximum) Design & Engineering portfolio
- One (1) digital and Two (2) physical copies A3, 12-page (maximum) Enterprise portfolio
- One (1) digital and Two (2) physical copies A3, 7-page (maximum) Project Management portfolio

Portfolios must be presented in an A3 (or equivalent) sized format. Refer to ARTICLE, C5, C6 & C7 of these regulations along with the Design & Engineering, Project Management and Enterprise judging scorecards for portfolio requirements.
Teams must submit their portfolio documents (Design & Engineering, Project Management, Enterprise) in digital format to the F1 in Schools World Finals before **Friday 1st September 2023 23:00 (GMT/UTC +00:00)**. Late submissions will incur a **20-point penalty**. Submissions must be via Team Digital Upload Folder. (Refer ARTICLE C1.14)

If you have any issues uploading your documents, you can also submit them by email to **f1inschoolshq@gmail.com.** It is recommended that when creating PDF files, teams consider embedding any unusual font types they may have used within their documents to help ensure they display correctly when opened by the Judges.

The following file conventions must be adhered to:

- Documents must be submitted in separate single Portable Document Format (PDF) files.
- PDF files must be no greater than 20Mb in size for the email option and no greater than 75MB for the F1 in Schools upload folder option.
- Text included in the PDF files must be highlightable to facilitate the similarity checking process.

The files must be named:
"**teamnumber_team_name_country_engineering.pdf**",
"**teamnumber_team_name_country_projectmanagement.pdf**"
"**teamnumber_team_name_country_enterprise.pdf**"
"**teamnumber_team_name_country_engineering_drawings_renders.pdf**"
so they can be recognised easily when submitted.
For example: "**T01_F1_in_Schools_UK_projectmanagement.pdf**".

**C2.11.3** Pit display - Each team will be provided with a dedicated exhibition style space for set-up of their pit display elements. The specific style and size of this space will be announced in supplementary event competition regulations. Refer to ARTICLE C7 for further pit display specifications and content requirements.

**C2.11.4** Verbal Presentation - Teams will be required to deliver a Verbal Presentation in relation to their project to the Judges. The presentation must not last longer than 10 minutes. If teams are unable to deliver the presentation in English, then an interpreter can be

present (teams need to bring their own translator) and a time of 20 minutes will be allocated, but the team must notify us if this is the case no later than **Monday, 31st July 2023**. Teams should bring their own laptop with any slide show or other multimedia files that need to be shown as part of their Verbal Presentation. Any team who needs a laptop for Verbal Presentation judging and is unable to bring one to the World Finals must contact F1 in Schools, (world@f1inschools.com), at least one month prior to the event. Refer to ARTICLE C7 of these regulations for details regarding presentation content and other requirements.

**C2.11.5** Electronic data - Teams must submit all additional project data as specified below: Data submitted must include:

All CAD parts and assembly files to assist the scrutineering process.
The files must be named: "**teamnumber_team_name_country_filename**", so they can be recognised easily when submitted. For example:
"**T01_F1_in_Schools_UK_full_car_assembly.stl**".

Teams must submit their files to F1 in Schools before **Friday 1st September 2023 23:00 (GMT/UTC +00:00)**. Late submissions will incur a **20-point penalty**.
Submissions must be via Team Digital Upload Folder. (Refer ARTICLE C1.14)
This data may be referred to for judging purposes and possible marketing and promotion following the event.

**C2.11.6** Engineering drawings (refer ARTICLE C1.12) and Renderings (refer ARTICLE C1.13) for specification judging - Teams must submit a digital copy and a hard copy of any engineering drawings and renderings of their car assembly and parts they wish to be referenced by the Engineering and Specification Judges.

Each team must produce:

- One (1) hard copy of A4 Engineering drawings including orthographic view
- One (1) hard copy of A4 3D car renders
- One (1) digital copy of A4 Engineering drawings including orthographic view
- One (1) digital copy of A4 3D car renders

**Mandatory table of contents for Engineering Drawings**

Teams **MUST** include the following Engineering Drawing Table of Contents

1. Orthographic drawings with detailed dimensions of fully assembled car indicating regulation compliance
2. Exploded isometric drawing with key to main components
    a. Car body
    b. Virtual cargo
    c. Chamber
    d. Tether line guides
    e. Front wheels / wheel support system
    f. Rear wheels / Wheel support system
    g. Nose cone
    h. Front wing / support structure

   i. Rear wing / support structure
3. Orthographic drawings with detailed dimensions of virtual cargo including a sectioned view.
4. Location of official F1 in Schools decals dimensioned from key structural parts (eg wheel centre).
5. Chamber details including wall thickness and depth.
6. Orthographic drawings with detailed dimensions of tether line guides.
7. Orthographic drawings of wheels with sectioned view and detailed dimensions.
8. Orthographic drawings with detailed dimensions of front wheels / wheel support system.
9. Orthographic drawings with detailed dimensions of rear wheels / wheel support system.
10. Orthographic drawings with detailed dimensions of nose cone.
11. Orthographic drawings with detailed dimensions of front wing and support structure highlighting wing surface/boundary.
12. Orthographic drawings with detailed dimensions of rear wing and support structure highlighting wing surface/boundary.

**Hard copy requirements:**

The drawing set must include an Orthographic Drawing - A 3rd angle orthographic projection, including plan, side and end elevations of the fully assembled car. 3D rendering/s of the final car design must also be included. These elements must be produced using CAD. The orthographic technical drawing should include dimensions and corresponding regulation numbers to illustrate regulation compliance. These drawings must be presented on paper only pages no larger than A4 in size. Please note, Engineering Drawings and Renderings will be stored along with your car and spare parts after Registration and Element Submission, so hard covers and / or large bindings are not advisable. Paper versions of the Engineering Drawings and Renderings are to be submitted and shipped with the team's cars (Refer ARTICLE C2.13.1).

**Digital copy requirements:**

Teams must submit their A4 Engineering Drawings and Renderings in digital format to the F1 in Schools World Finals before **Friday 1st September 2023 23:00 (GMT/UTC +00:00)**. Late submissions will incur a **20-point penalty**. Submissions must be via Team Digital Upload Folder. (Refer ARTICLE C1.14)

**C2.11.7** Computer for Design & Engineering judging - a computer with the CAD software used by the team and with all CAD parts and assembly data should be used during the Design & Engineering judging session so that the team can demonstrate their CAD work and better explain how they engineered their car design.

**C2.11.8** 'Team Partnerships' declaration – Every team must complete the declaration template online as issued by F1 in Schools. All partnerships and any outside assistance must be included. This document will be referenced by Judges so they can better understand team partnerships, ask questions, and therefore must be a full and accurate declaration. Please complete the partnership declaration here.

## C2.12 Team registration

**C2.12.1** Teams will be required to register with F1 in Schools once arriving for the event. At this registration teams will be issued with World Finals accreditation, event programmes and detailed welcome pack. The student team manager, supervising teacher and ICC for each team should attend. Each team must submit their flight details by Friday 25th August 2023. Each team will then be given a specific time and location to register prior to their arrival at the venue, this time slot must be adhered to.
Registration will close at 18:00 local time on the designated registration day.
**F1 in Schools reserves the right to impose a penalty of up to 50 points to any team arriving late at the discretion of the chair of judges.**
*F1 in Schools advises that teams plan their travel to arrive at least 3 hours before registration officially closes.*

**C2.12.2** Official F1 in Schools 30x15mm car decals will be provided for teams that have not manufactured their own. These decals must be fitted to each of the two submitted cars by the F1 in Schools team during Specification judging. You can download the decal artwork here.

## C2.13 Submission of project elements

**C2.13.1** A time and location will be published in the event programme for when each team must submit their project elements. This will occur well before judging commences. Following is a list of the elements which must be submitted by each team at this time:

- 1 x nominated Car A identified using a white or black background F1 in Schools 'Car A' logo decal
- 1 x nominated Car B identified using a white or black background F1 in Schools 'Car B' logo decal
- 1 x fully machined, unfinished, unassembled F1 model block car body identical to the car body used on car A & B
- Optional Replacement Components
  - Nose cone & front wing assembly – maximum of two (2)
  - Rear wing assembly– maximum of two (2)
  - Front wheels– maximum of four (4)
  - Front wheel support structure– maximum of two (2)
  - Rear wheels– maximum of four (4)
  - Rear wheel support structure– maximum of two (2)
- A4 Engineering drawings including orthographic view for Scrutineering judging
- A4 Car renders for Scrutineering judging
- Two (2) physical copies of the Design & Engineering Portfolio
- Two (2) physical copies of the Project Management Portfolio
- Two (2) physical copies of Enterprise Portfolio
- Project Elements Submission Checklist which must include the official F1 Model Block holographic sticker.

**DIGITAL PROJECT ELEMENTS**

- 1 x digital A3, 11-page (1-page front cover + 10 pages of content) Design & Engineering Portfolio
- 1 x digital A3, 12-page (1-page front cover + 10 pages of content + 1 page back cover) Enterprise Portfolio
- 1 x digital A3, 7-page (1-page front cover + 6 pages of content) Project Management Portfolio
- Digital A4 Engineering drawings including orthographic view for Scrutineering judging
- Digital A4 Car renders for Scrutineering judging
- Electronic copy of all additional project data
- 'Team Partnerships' declaration(s) must be completed online prior to the event.

All digital project elements must be digitally submitted before **Friday 1st September 2023 23:00 (GMT/UTC +00:00)**. Refer to ARTICLE C2.11.

**C2.13.2** During project submission, each team will be given the opportunity to check the weight of their cars on the official World Finals scales. If either car being submitted is under the minimum weight, the team will be permitted 15 minutes to fix any issue in order that both cars can be submitted at or above the minimum weight.

**C2.13.3** Small coloured 'dot' stickers (approximately 5mm in diameter) and supplied by F1 in Schools, will be adhered to the underside of each car. The stickers will feature the team's competition number.

**C2.13.4** Once cars and replacement components have been submitted, they are considered as being in parc fermé.

## C2.14 Project elements to be retained by F1 in Schools

It is a condition of World Finals entry that each team permits F1 in Schools to retain 1 x car, the three physical portfolios (Design & Engineering, Project Management, Enterprise) and the electronic copy of all specified project data submitted. Teams also permit F1 in Schools to use any of these project elements for marketing purposes and / or publication as exemplar projects for reference by others.

## C2.15 Benefit of doubt

The Chair of Judges will, where appropriate, seek to use 'benefit of doubt' when the assessment of compliance is marginal or unclear. In this situation, teams will be given the benefit of doubt rather than a firm penalty if a penalty cannot be clearly measured or identified.

## C2.16 Spirit of the competition

Teams are expected to act in the spirit of the competition, both before and during the F1 in Schools World Finals. Any team deemed by the Chair of Judges to be acting outside of the spirit of the competition, can be removed from certain or all aspects of the competition. For example, a team attempting to abuse the technical regulations to their advantage may, at the discretion of the Chair of Judges, be removed from racing and receive no points for this activity. A team deemed to be

acting in an unsportsmanlike manner towards another team or other persons may be removed from some or all judging areas.

The spirit of the competition is simple; embrace and respect the rules and regulations, do your very best to compete legally and fairly, while contributing positively to the F1 in Schools World Finals. Make friends, create positive relationships, network professionally and enjoy yourselves.

## C2.17 Plagiarism

Plagiarism within any project work submitted by teams is not permitted. All teams must complete the Originality Declaration as part of their online team registration. Where plagiarism has been detected, the Chair of Judges may choose to exclude the team from that element of the competition.

# ARTICLE C3 - COMPETITION AND JUDGING FORMAT

## C3.1 Competition programme

**C3.1.1** Each team will be judged as per the competition programme. The competition programme will be formulated by F1 in Schools to best and fairly accommodate all judging and other competition activities. Teams will rotate around judging activities as per this programme, with each rotation usually of 30 minutes in duration.

**C3.1.2** Judging Streams – The competition programme will normally be divided into three parallel judging streams (Stream A, Stream B and Stream C), to help ensure quality judging time intervals within the event time constraints. A number of strategies are implemented within the judging process, including judge briefings and judge reviews for cross-moderation to ensure there is consistency across the judging streams.

## C3.2 Judging categories

There are six (6) main judging categories, each with its own team of Judges and specified judging activities as detailed in further articles.

- Specification & Scrutineering Judging
- Design & Engineering Judging
- Project Management
- Enterprise Judging
- Verbal Presentation Judging
- Racing

## C3.3 Judging scorecards

The F1 in Schools World Finals judging scorecards provide detailed information in relation to what the Judges will be looking for. They include key performance indicators which are referred to by the Judges in awarding points during judging activities. The 2023 World Finals judging scorecards can be found in the appendix of this document.

**READING THE SCORECARDS CAREFULLY IS IMPORTANT. THEY PROVIDE CRITICAL INFORMATION FOR TEAMS AS TO WHAT NEEDS TO BE PRESENTED FOR EACH JUDGING CATEGORY.**

## C3.4 World Champions

The F1 in Schools World Champions perpetual trophy will be awarded to the team with the highest sum total from all judging categories (ARTICLE C3.5). In the case of a tied points score, the team with the highest time trial score will be determined the winner.

**THE CHAIR OF JUDGE'S DECISION IS FINAL**

## C3.5 Point allocations

Points will be awarded to teams across six (6) categories with maximum possible scores as detailed in the following table:

| World Finals Judging Categories and Point Allocations | |
|---|---|
| **Specification & Scrutineering Judging** | |
| Specifications | 100 points |
| Engineering Drawings | 20 points |
| 3D Renders | 20 points |
| Quality of Finish and Assembly | 20 points |
| **Design & Engineering Judging** | |
| Design & Engineering Portfolio | 180 points |
| **Project Management Judging** | |
| Initiating | 35 points |
| Planning | 25 points |
| Executing | 20 points |
| Monitor and Controlling | 10 points |
| **Enterprise Judging** | |
| Enterprise Portfolio Only Assessment | 100 points |
| Team Identity | 20 points |
| Pit Display | 40 points |
| **Verbal Presentation Judging** | |
| Technique | 60 points |
| Composition | 40 points |
| Subject Matter | 60 points |
| **Racing** | |
| Time Trials | 105 points |
| Reaction Racing | 105 points |
| Knock-Out Racing | 30 points |
| Fastest Car Bonus | 10 points |
| **TOTAL** | 1000 points |

The international rules committee may at their discretion add point scoring judging categories into the event. This would be completed under controlled conditions during the competition.

## C3.6 Classification of technical regulations

**C3.6.1** The technical regulations are classified as either: **GENERAL**, **SAFETY**, **PERFORMANCE**.

| GENERAL | SAFETY | PERFORMANCE |
|---|---|---|
| Regulations that shape the way the car fundamentally looks and works, vital to the style of an F1 in Schools car. | Mandatory rules that govern the safe running of the car. Cars must meet these rules to be considered 'safe to race'. | Rules that have a direct impact on the performance of the vehicle, these typically carry the heaviest penalties. |

**C3.6.2** If a race car is judged as being NON-COMPLIANT with any Performance regulation they will be **INELIGIBLE** for the awards of: '**Fastest Car'** and '**Best Engineered Car'**.

If a race car is judged as being NON-COMPLIANT with any Performance regulation, racing leaderboards will show an "under investigation" symbol next to the team's race time.

For the Knock-out Competition, should there be any teams with Performance regulation failure(s) for both cars seeded in the top 24 teams then they will only be permitted to race in round one of the knock-out competition and will be automatically knocked out during round one regardless of the race result.

All Performance regulations are highlighted in yellow throughout the Technical Regulations Document:

**T3.3, T3.6, T4.2, T4.4.1, T5.6, T7.2, T7.3, T7.4, T7.5, T7.6, T7.7, T7.8, T7.9, T7.10, T7.11, T8.6.1, T8.6.2, T8.6.3, T8.7, T8.8, T9.5.1, T9.5.2, T9.5.3, T9.6, T9.7.**

For more information regarding Compliance with regulations please consult T2.4 of the Technical Regulations document.

# ARTICLE C4 - SPECIFICATION & SCRUTINEERING JUDGING (160 points)

## C4.1 What will be judged?

Specification & Scrutineering judging is a detailed inspection process where BOTH race cars plus the optional replacement components are assessed for compliance with the F1 in Schools World Finals Technical Regulations. The Engineering drawings, renderings and quality of finish & assembly will also be assessed. Refer to the scrutineering and specification judging scorecards for scoring details.

**C4.1.1** Optional replacement components must be identical to those fitted to both cars (Car A & Car B) and must be submitted with the cars. Only the following replacement components are permitted:

- Nose cone & front wing assembly – maximum of two (2)
- Rear wing assembly– maximum of two (2)
- Front wheels– maximum of four (4)
- Front wheel support structure– maximum of two (2)
- Rear wheels– maximum of four (4)
- Rear wheel support structure– maximum of two (2)

Submitted replacement components that are determined by the Judges to not be identical to that which are fitted to the car will not be allowed to be used. Submitted components will remain in parc fermé and only be handed back to the team if needed during racing and / or car servicing.

## C4.2 Team preparation

Teams must ensure that their cars (Car A & Car B) and any optional replacement components are complete and ready for specification judging and racing before they are submitted. Notice is also drawn to the performance regulations, refer ARTICLE C3.6. Teams must have also submitted an electronic copy of all specified project data such as scrutineering engineering drawings, which may all be referenced. Refer ARTICLE C2.11

## C4.3 Who needs to attend?

Specification & Scrutineering judging is a closed activity that no team member or supervising teacher may attend. There will be a specification review session scheduled that must be attended by the team manager, team design and manufacturing engineers as a minimum.

## C4.4 Judging process / procedure

Teams begin specification judging with a full allocation of 100 points. Any infringements of the Technical Regulation articles, on either car, will result in points being deducted as detailed in the Technical Regulations.

There are three (3) parts to the specification & scrutineering judging process.

A. **Specifications** – this is conducted within the confines of parc fermé, where the specification Judges will scrutineer both cars and optional replacement components for

compliance to the Technical Regulations. A series of specially manufactured gauges will be used to broadly check compliance. Accurate measuring tools, such as vernier callipers will then be used to closely inspect any dimensions found to be near to dimensional limits per the initial gauge inspection. Scrutineering commences as cars and optional replacement components are submitted. During specification judging, **T5.2, T5.4, T5.6** (please refer to the 2023 World Finals Technical regulations) will be measured with a full 8g race cartridge inserted into the cartridge chamber.

B. **Scrutineering Judging (Engineering Drawings, Rendering and Quality of Finish & Assembly)** - this is conducted within the confines of parc fermé, where the specification Judges will assess both cars and the Engineering Drawings and 3D Renders and Quality of Finish & Assembly as per the Scrutineering scorecard.

C. **Specification Review Interview** – each team will be scheduled a period of time for a review of any specification infringements ruled. The Judges will highlight to the team any regulation infringements and provide necessary explanations. The team is then given opportunity to explain to the Judges why they feel any identified infringements should be considered as permissible. Following the team's explanation, the Judges may choose to reverse their original decision or uphold it. No further discussion will then be permitted (refer C4.6). An interpreter can be present during the session (teams need to bring their own translator) but no extra time will be added.

## C4.5 Safe/Fit to race fix

Teams that have been judged during initial scrutineering to have incurred a regulation failure from the list below will be provided with a special 20-minute car service time, prior to the commencement of racing. Cars must meet these rules to be considered 'Safe/Fit to race. If during this service time the car can be modified so as to comply with the failed regulation(s), the team will then only incur HALF the point's penalty for that infringement, without being classified as having incurred a **SAFETY** infringement.

**T3.2 T4.4.4, T4.4.5, T5.1, T5.3, T5.4, T5.5, T5.6, T6.1, T6.2, T6.3 and T7.13**

## C4.6 Specification judging decision appeals

Teams may appeal the specification judge's decision if they still believe their justification for regulation compliance should be accepted. An appeal must be submitted by email to **world@f1inschools.com** within two (2) hours of the team completing their scrutineering review session. Refer ARTICLE C11. The Chair of Judges will discuss the appeal with the scrutineering Judges and may seek additional advice from F1 in Schools regulation authorities. The Chair of Judges will then communicate with the team, to discuss the appeal and explain the final decision.

# ARTICLE C5 - DESIGN & ENGINEERING JUDGING (180 points)

## C5.1 What will be judged?

The Design & Engineering Judges will examine each teams' 11-page Design & Engineering portfolio so that they can assess the team's car design and use of CAD/CAM technologies along with the quality of manufacture of both race cars submitted. The specific areas to be assessed are:

- Design & Engineering Portfolio Only Assessment
    - Design Concepts
    - CAD 3D Modelling
    - Application of Computer Aided Analysis
    - Use of CAM/CNC
    - Other Manufacturing & Assembly
    - Research & Development
    - Testing
    - Design Process Evaluation
    - Document Presentation

Refer to the Design & Engineering judging scorecard for key performance indicator information.

## C5.2 Team preparation

A laptop needs to be ready and taken to the Design & Engineering judging team along with any other items which may help the team explain any engineering or manufacturing concepts. The Design & Engineering Judges will not have access to the team pit display for judging purposes. Teams do not need to take their display (3rd) car to Design & Engineering judging. Preparation should include careful reading of the scorecard. The key performance indicators for the design process, application of CAD / CAM, analysis and associated data organisation, describe what the Judges will be looking for.

## C5.3 Who needs to attend?

This judging session must be attended by the team manager and team design and manufacturing engineers as a minimum.

## C5.4 Judging process / procedure

Teams will be awarded points as per the key performance indicators shown on the Design & Engineering scorecard. Judges will review the Design & Engineering portfolio in a 'closed to teams' session programmed before the commencement of scheduled judging sessions. The scheduled Design & Engineering judging interview session will focus on the overall engineering and design of the car. This is an informal interview where Judges will ask the team to demonstrate their CAD / CAM work and query teams on what they have done. The quality of car manufacture and car assembly will be judged during a separate 'closed to teams' session.
An interpreter can be present during the judging session (teams need to bring their own translator) but no extra time will be added.

## C5.5 Design & Engineering Portfolio requirements

The Design & Engineering portfolio must be in a digital and printed format of A3 or similar size. The portfolio is limited to 11 pages (1-page front cover + 10 pages of content). This can be a single page front cover plus 10 single sided or 5 double sided sheets. If a portfolio comprises more than 11 pages, the Judges will only review the first 11 pages for assessment purposes. There MUST be content related to the use of CAM and CNC manufacturing included in the portfolio and this will be referenced by the Engineering Judges. Content related to the car, design ideas, design development, research, testing and evaluation should be presented within the portfolio.

# ARTICLE C6 - PROJECT MANAGEMENT JUDGING (90 points)

## C6.1 What will be judged?

The Project Management judges will examine each team 7-page Project Management Portfolio so that they can assess the following specific areas.
Project Management:

- Initiating
  - Initiation Process
  - Project schedule
- Planning
  - Budget & Resource management
  - Roles and Responsibilities
- Executing
  - Team & Stakeholder Communications
  - Risk Management
- Monitor and Controlling
  - Monitoring & Controlling

Refer to the Project Management scorecard for detailed point scoring and key performance indicator information.

## C6.2 Team preparation

Each team must prepare one (1) Project Management portfolio as per ARTICLE C2.11. Most importantly, teams need to read the Project Management judging scorecard carefully to ensure that all areas to be assessed are included within the context of their Project Management portfolio.

## C6.3 Who needs to attend?

All team members must be present during the Project Management judging session.

## C6.4 Judging process / procedure

The Project Management judging will take place during dedicated judging session. Team members may be asked questions by Judges to help them find certain content and or seek further explanation. In addition to the scheduled judging session, the Judges will also be given time to conduct pre-judging and review of each team Project Management portfolio. This will be a 'closed to teams' session programmed before the commencement of scheduled judging sessions.
An interpreter can be present during the judging session (teams need to bring their own translator) but no extra time will be added.

## C6.5 Project Management Portfolio requirements

The Project Management Portfolio must be in a digital and printed format of A3 or similar size.
The **Project Management portfolio** is limited to 7 pages (1-page front cover + 6 pages of content). This can be a single page front cover plus 6 single sided or 3 double sided sheets. If the portfolio comprises more than 7 pages, the Judges will only review the first 7 pages for assessment purposes.

For Project Management teams are asked to detail their project management processes employed with the delivery of the F1 in Schools Project. The F1 in Schools Project Management Guide should be used for reference.
The number of pages allocated to each key performance indicators is at the discretion of each team.

# ARTICLE C7 - ENTERPRISE JUDGING (160 points)

## C7.1 What will be judged?

The Enterprise Judges will examine each team 12-page Enterprise Portfolio and Pit Display so that they can assess the following specific areas.

- Enterprise Portfolio only assessment:
  - Marketing
  - Sponsorship
  - Digital Media
  - Sustainability
  - Document Presentation
- Team Identity
  - Overall Team Identity
- Pit Display
  - Design Process
  - Content

The **Overall Team Identity** will be assessed based by looking at all aspects of the team's identity. This will be primarily based on the Pit display, enterprise portfolio and the interviews with the Enterprise judges. Judges may also review other documentation, such as the engineering and project management portfolios and images of the car to confirm the team's identity has been applied consistently.

The **Pit Display Criteria** (Pit Display Design Process and Pit Display Content) will primarily be based on the Pit display, Pit display designs, enterprise portfolio and the interviews with the Enterprise judges.

Refer to the Enterprise scorecard for detailed point scoring and key performance indicator information.

## C7.2 Team preparation

Each team must prepare one (1) Enterprise portfolio and Pit Display as per ARTICLE C2.11. Most importantly, teams need to read the Enterprise judging scorecard carefully to ensure that all areas to be assessed are included within the context of their Enterprise portfolio and Pit Display. It is each team's decision how and where each area is presented. Teams should be mindful of the time constraints of judging when making these decisions.

## C7.3 Who needs to attend?

All team members must be present during the portfolio and display judging session.

## C7.4 Judging process / procedure

The Enterprise judging will take place during dedicated judging session. Team members may be asked questions by Judges to help them find certain content and or seek further explanation. In addition to the scheduled judging session, the Judges will also be given time to conduct pre-judging and review of each teams Enterprise portfolio and Pit Display. This will be a 'closed to teams' session programmed before the commencement of scheduled judging sessions. An interpreter can

be present during the judging session (teams need to bring their own translator) but no extra time will be added.

## C7.5 Enterprise Portfolio requirements

The Enterprise Portfolios must be in a digital and printed format of A3 or similar size.

The **Enterprise portfolio** is limited to 12 pages (1-page front cover + 10 pages of content + 1 page back cover). This can be a single page front cover plus 10 single sided or 5 double sided sheets and a single page back cover. If the portfolio comprises more than 12 pages, the Judges will only review the first 11 pages for assessment purposes. The back cover of the portfolio should include the F1 in Schools logo, the team logo and a team photo.

- **Marketing and Sponsorship**
  For the marketing element, teams are asked to summarise their approach and reasoning to gaining awareness, engagement, sponsorship, and any other marketing activities.

- **Digital Media**
  For this element, teams are asked to outline their approach and reasoning for social media platforms, electronic mailings, website, and other online communications. The Digital Media element within the document will be assessed in conjunction with a review of the team's Digital Media campaign executed.

- **Sustainability**
  For this new assessed criterion, teams are to outline their sustainability strategy and activities which give consideration to economic, environmental, and social factors.

The number of pages allocated to each key performance indicators is at the discretion of each team.

## C7.6 Pit Display setup and parameters

**C7.6.1** The Team Pit Display is at the heart of an F1 in Schools event. It is the base of a team and says everything about a Team's identity, USP (Unique Selling Point), brand and design development journey. F1 in Schools will provide each team with a self-contained exhibition style display space including integrated lighting and 1 x power supply with pins and rating configured to the host country format. Teams need to supply any power adaptors they may require. Display spaces are normally of approximate dimensions 3m wide x 1m deep x 2.4m high. The precise space description and dimensions will be announced closer to the event

**C7.6.2** A time period will be scheduled for when all teams will set-up their pit displays. A time limit of two hours will be enforced; this will be confirmed in supplementary regulations. F1 in Schools reserves the right to apply a penalty of **up to 20 points** at the discretion of the Chair of Judges for teams that do not complete their set-up within the time limit, do not leave their stand in a safe state and clear their pit and surrounding area of all rubbish.

**C7.6.3** No part of the teams completed Pit Display is allowed to protrude beyond the physical dimensions of their allocated pit space. This includes anything that might protrude above

the pit space highest point e.g. flags. Teams are not permitted to remove any part of the provided exhibition booth to fit the pit display. A penalty of **up to 10 points** may be applied at the chair of judge's discretion.

**C7.6.4** **ONLY** student team members are permitted to set-up their pit displays. There must be no supervising teacher / adult or other outside assistance, unless deemed by F1 in Schools to be a health and safety issue. A penalty of up to 20 points may be applied at the chair of judge's discretion.

**C7.6.5** F1 in Schools and / or the Chair of Judges may instruct a team to take action to reduce noise or remove display inclusions deemed to be inappropriate. F1 in Schools will instruct teams to remove or alter any display inclusions considered to be a safety hazard.

**C7.6.6** Any electrical appliance connected to the power supply must be safe and compatible with the host country power rating.

**C7.6.7** The pit display should be designed in such a way as that it can be dismantled and rebuilt in a different location during or after the event. This is to allow pit displays to be rebuilt for promotional purposes in strategic locations over the Grand Prix weekend.

**C7.6.8** As part of our sustainability objectives, teams will no longer be able to send pit displays as freight to any future World Finals including the 2023 event. If your team attempts to freight anything to the venue, we will refuse delivery.

**C7.6.9** All pit display materials must be "hand carried", by the team, into the World Finals event venue. Cases with wheels to be rolled in are allowed. We recommend that the dimensions would be acceptable by an airline for checked baggage into the hold of an aircraft. All materials brought into the venue must be taken away at the end of the event. Production companies will not be allowed to assist teams on the transportation or assembly of pit displays.

*F1 in Schools recommends no item should weigh more than 30kg and total length + height + depth of any item should not exceed 240cm.*

**C7.6.10** There will be no waste (rubbish) disposal options during pit build and breakdown. Your pit display area must be left as you found it.

**IMPORTANT HEALTH & SAFETY:** Health and Safety measures must be considered when working on all aspects of your Pit Display. F1 in Schools expects teams to produce a risk assessment and method statement to ensure all team members are aware of any risks in the construction of the pit display. This is to also ensure displays are safe for other participants and visitors to the event. F1 in Schools reserves the right to apply a penalty of **up to 20 points** at the discretion of the Chair of Judges for unsafe activity

# ARTICLE C8 - VERBAL PRESENTATION JUDGING (160 points)

## C8.1 What will be judged?

The Verbal Presentation Judges will assess each teams' 10-minute Verbal Presentation across the areas of technique, composition and subject matter:

- Technique
  - Use of visual aids – effective use of multimedia and / or other 'props'
  - Team contribution – effective participation by all team members
  - Engagement – levels of enthusiasm, energy, audience interest and excitement
- Composition
  - Concepts clarification – clear and concise explanations where required
  - Use of time – how effectively was the 10 minutes used
  - Presentation structure – overview explained and connection between topics
- Subject
  - Innovation – detail key innovations related to car design, project management, marketing or any other aspect of the team's project
  - Collaboration – detail any partnerships or mentoring from outside the team and justify in terms of improving project outcomes
  - Learning experiences – explain how the F1 in Schools project has benefited team members

Refer to the Verbal Presentation judging scorecard for detailed point scoring and key performance indicator information.

## C8.2 Team preparation

Each team is required to prepare a Verbal Presentation as per the requirements at ARTICLE C2.11. Teams need to have all presentation resources tested and ready with them for Verbal Presentation judging. Most importantly, teams should read the Verbal Presentation judging scorecard carefully to ensure their Verbal Presentation features all elements and content that the Verbal Presentation Judges will be looking for.

## C8.3 Who needs to attend?

All team members must be present during the Verbal Presentation judging session.

## C8.4 Judging process / procedure

Verbal Presentation judging is scheduled for the same duration of other judging sessions, usually 30 minutes. Teams will be given an opportunity at the start of their time to set-up and test their laptop and any other presentation technologies and resources. The team will inform the Judges when they are ready to begin. The Judges start timing the 10 minute duration (20 minutes if not speaking English and using an interpreter), and will provide a discreet time warning signal when one minute of presentation time remains. The team will be asked to cease presenting when the time limit has been reached. At the conclusion of the teams' presentation time, the Judges may choose to provide some feedback and / or ask any clarifying questions they feel necessary.

## C8.5 Verbal presentation judging provisions

F1 in Schools will provide a dedicated private space, such as a small meeting room, where each team will deliver their presentation to the Judges. This space will include a data projector and screen, or LCD screen and multimedia sound system. These will be in fixed positions but usually with sufficient cable length to allow teams some freedom for choosing where they wish to locate their laptop. A single table will also be made available with its use and location in the presentation space being optional.

## C8.6 Verbal presentation video recordings

The Verbal Presentations of all teams will be used for the purpose of judging review and/or may be used for post event publicity and promotional purposes by F1 in Schools.

# ARTICLE C9 - RACING (250 points)

## C9.1 What races will be conducted?

The F1 in Schools World Finals racing points will be awarded through the staging of two types of race events:

- Reaction Racing – manual / driver launch mode, 8 races in total, 4 races in each lane
- Knock-out Competition Races – manual / driver launch mode, one race in each lane per round of competition.

Reaction racing will be split over four ~~two~~ sessions of two ~~four~~ races. **The average 'car race time' value from all reaction races will determine the Fastest Car Award (refer C9.6).** The knock-out competition is the last of the scheduled races. Refer to ARTICLE C3.5 and further information following for details on how points are calculated and awarded.

## C9.2 Team preparation

**C9.2.1** Teams should be familiar with the operation of the F1 in Schools Race System. There will normally be a section demonstration track within the venue where teams can practice race starts during free time prior to their scheduled races.

**C9.2.2** Manual / driver starts - One or more team members (driver/s) must be appointed for launching of the teams' car using the manual launch method. Each lane of the track has a dedicated starting area 1m x 1m which shall be clearly marked on the floor. The driver must only make contact with the floor within this dedicated area and must not touch or lean on the track.

**C9.2.3** Finish line management - At least one member of the team must be appointed as responsible for managing the finish line Car Deceleration System or teams own system (refer C9.11), and return of car along the track to the start.

**C9.2.4** Start line car staging – one team member may be appointed as being responsible for 'aligning' the car. This team member is only permitted to set the alignment of the car behind the start line, with respect to the start box and track under close supervision from the race track Judges. Team members are NOT permitted to interfere in any way with the Power unit cartridge or vertical alignment of the start box. This process must be completed within a time limit of 30 seconds. Appointment of this team member is optional. All four wheels must be in contact with the track surface after completion of the car staging time. The race Judges can assist or perform this task for the team.

**C9.2.5** Teams must ensure that both cars are race ready, a car service session will be provided before the next race event (refer C10.2). If a teams' car is damaged beyond achievable repair then teams will forfeit any races that the car would have been used for.

## C9.3 Who needs to attend?

All team members must be present during their scheduled racing sessions.

## C9.4 Reaction race procedure

Cars are launched in manual / driver reaction mode during four ~~two~~ racing sessions, each comprising of two ~~four (4)~~ races total per team, two (2) races in each lane. The TOTAL RACE TIME displayed and the REACTION TIME displayed for each race is recorded. The reaction races will be conducted as follows:

a) Teams race in order as shown in the competition programme. To begin racing, the lowest team number will start in lane 1. All cars will be loaded onto the track, Car A first then Car B
b) One team member to track finish for deceleration system control
c) Judge arms Start Box - SAFETY ON
d) Race 1 (Car A) - Judge sets cars on track / tether line and inserts Power unit cartridge – makes initial start box adjustments
e) A team member is then allowed 30 seconds to 'fine tune' the alignment of their car, please see C9.2.4 for more detail. The deceleration system must also be set during this time.
f) Driver and team stands trackside with corresponding lane start trigger
g) Judge checks deceleration system is ready, all team members to stand in designated safety zone as instructed by track judges, track is clear for racing, team information on race system is correct, switches Start Box - SAFETY OFF
h) Judge presses the start system reset button – cars are launched by driver pressing start trigger
i) Judge records TOTAL RACE TIME and REACTION TIME displayed on start gate
j) Team member at finish moves car into storage zone at the end of the track
k) Race 2 (Car B) conducted in same lane as above, driver can be inter-changed as nominated
l) Team member at finish control returns car and empty Power unit cartridge along track to the start with minimum handling
m) Judges remove cars from tether line and change lanes, team information on race system is correct
~~n) Race 3 (Car A) and Race 4 (Car B), driver can be inter-changed as nominated~~
o) Cars removed from track and returned to Parc Fermé

## C9.5 Reaction race scoring

All eight (8) 'total race times' recorded from the reaction races are considered. The fastest of these eight (8) times is used in the following formulae to calculate the points awarded:

- Fastest 'total race time' = 105 pts
- 2nd fastest 'total race time' = 100 pts
- 3rd fastest 'total race time' = 95 pts
- Slowest 'total race time' = 5 pts
- Base Time = 120% of 3rd fastest 'total race time'
- 4th fastest and all other teams score points using the following formula:
- Team Points = 5 + (90 / (Base Time – fastest 'total race time')) x (Base Time – teams fastest 'total race time')
- Any team with a best 'total race time' that is slower than the base time will score 5 points. To further discriminate between any teams scoring 5 points, a deduction of 1 point will be made for any did not finish (DNF) reaction race result.

## C9.6 Time trial race scoring

The eight (8) 'car race times' recorded during racing will be considered. From these eight (8) races, the team's 2nd, 3rd, 4th and 5th best **'car race times'** will be averaged. This average time is used in the following formulae to calculate the points awarded:

- Fastest average (avg.) time = 105 pts
- Second fastest avg. time = 100 pts
- Third fastest avg. time = 95 pts.
- 'Base Time' = 115% of the third fastest avg. time of all teams avg. times.
- Fourth (4th) to slowest avg. time score points using the following formula:

Team Points = 20 + (75/(Base Time – 3rd fastest avg.)) x (Base Time – teams avg.)

- Any team that has an average slower than the base time will score 20 points. To further discriminate between these teams, a deduction will be made of 2.5 points for any did not finish (DNF) time trial result.
- If after discarding a team's fastest time there remains less than 4 times from races finished, due to DNF's, the slowest time recorded is again input to the average equation until there are a total of four times to average.

**C9.6.1** Fastest Car Race Time Bonus

A 10-point bonus will be awarded to the team with the single fastest 'car race time' value from all time-trial races.

## C9.7 Knock-out Competition

Teams will take part in a knock-out (single elimination) competition. Teams will be issued the knock-out competition seeding and competition bracket prior to the race event commencing. Only the top 48 ~~24~~ teams will participate in the knock-out competition.

**C9.7.1** Seeding - The seeding order for the first knock-out round is determined through seeding all teams using the average fastest 'total race time' they achieved from the time trial racing event.

Cars judged to have performance regulation failures will have 0.5 seconds per performance regulation failure per car added on to their fastest 'total race time' for seeding purposes, see formula below:

$$\boldsymbol{Seeding\ Time} = \frac{\begin{pmatrix} \boldsymbol{Car\ A\ fastest\ 'total\ race\ time'} \\ \boldsymbol{+ (0.5 \times Car\ A\ Performance\ Regulations)} \\ \boldsymbol{+\ Car\ B\ fastest\ 'total\ race\ time'} \\ \boldsymbol{+ (0.5 \times Car\ B\ Performance\ Regulations)} \end{pmatrix}}{\boldsymbol{2}}$$

During knock-out racing teams will have 0.1 seconds per performance penalty per car added to their pre-set reaction times.

**C9.7.2** Knock-out competition procedure - During the knock-out competition BOTH race cars will be used. Cars are launched in manual / driver reaction mode, with two (2) races total, one

(1) race in each lane, for each round of the knock-out. The team with the fastest 'total race time', as displayed on the start gate, from the two races conducted, is the winner of that knock-out round. In case of a tied result, a further 'sudden death' race will be conducted, this will be a repeat of race 2. The knock-out competition will be conducted as follows:

a) Teams race in order of the competition draw. Top of draw in lane 1.
b) Prior to the cars being set on the track for each round, each team will be required to nominate which car (A or B) they will use for their first race. Each teams' other car will be used for the second race.
c) One team member to track finish for deceleration system control.
d) Judge arms start box - SAFETY ON – makes initial start box adjustments.
e) Race 1 - Judge sets all cars on track / tether line and inserts Power unit cartridge
f) A team member is then allowed 30 seconds to 'fine tune' the alignment of their car, please see C9.2.4 for more detail. The deceleration system must also be set during this time.
g) Driver stands trackside with corresponding lane start trigger.
h) Judge checks deceleration system is ready, all team members to stand in designated safety zone as instructed by track judges, team information on race system is correct, track is clear for racing, switches start box - SAFETY OFF
i) Judge presses the start system reset button – cars are launched by driver pressing start trigger.
j) Judge records TOTAL RACE TIME displayed on start gate.
k) Team member at finish moves car into storage zone at the end of the track Judges set cars for Race 2.
l) Check team information on race system is correct
m) Race 2, driver can be inter-changed.
n) Cars removed from track and returned to Parc Fermé.

**C9.7.2** Knock-out competition scoring.

Points are awarded based on the round of competition a team is eliminated as follows:

- Seeded outside top 48 = 2 pts
- Eliminated in Round 1 (33rd – 48th Seed Race off) = 4 pts
- Eliminated in Round 2 (Round of 32) = 6 pts
- Eliminated in Round 3 (Round of 16) = 8 pts
- Eliminated in Quarter Final = 15 pts
- Eliminated in Semi Final = 22 pts
- Eliminated in Final = 26 pts
- Knock-out Winner = 30 pts

## C9.8 DNF (Did not Finish) race results

Damage or part separation occurring during a race, before the car crosses the finish line, (e.g. wheel or any other part of the car separating), or a car not crossing the finish line at all, effects in a DNF race result. The Judges may refer to video evidence to verify a DNF result.

## C9.9 False Starts

**C9.9.1** A false start (jump start) occurs when the driver depresses the trigger button before the 5 start gate lights have extinguished. The screen will display a false start message.

**C9.9.2** All reaction false starts will incur a 2.5 point penalty and by default forfeit that race. This penalty does not apply to knock-out racing.

**C9.9.3** During knock-out racing – If one team false starts (jump starts), the other team should continue to race as normal. The team who false started forfeits that race, scoring a DNF, and the other team's time is recorded. If both teams false start, the race counts as one of the two (2) runs.

**C9.9.4** During any manual / driver starts, if a driver false starts and distracts the other driver the race will be re-run and the driver who caused the distraction will forfeit their race.

**C9.9.5** Distractions outside of the race start area will be assessed by the lead track judge and track officials to determine if the race should be re-run. All competitors must, and other spectators will be instructed to, keep noise down to a minimum and to not use flash photography.

**C9.9.6** If a false start occurs on race 1 or 3 of a racing session or the first race of a knock-out then the car(s) shall be walked to the end of the track and placed in the storage zone (refer C9.11.4).

## C9.10 Track, tether line and timing system information

**C9.10.1** The F1 in Schools Elevated Race Track, supplied by Denford Ltd will be used. The official length of the track, from start line to finish is 20 metres. A monofilament tether line of diameter 0.6mm, fixed at the finish end, passes down the centre of each lane. At the start end the line passes through 90 degrees over a single pulley then attached to a 1.0kg mass suspended above the floor.

**IMPORTANT: Teams are not permitted to add anything to the race track until 250mm after the finish line/gate.**

**C9.10.2** Launch/Timing - The F1 in Schools Launch/Timing System will be used for launching cars and timing races and driver reaction times to 1/1000th of a second.

## C9.11 Car Deceleration Systems

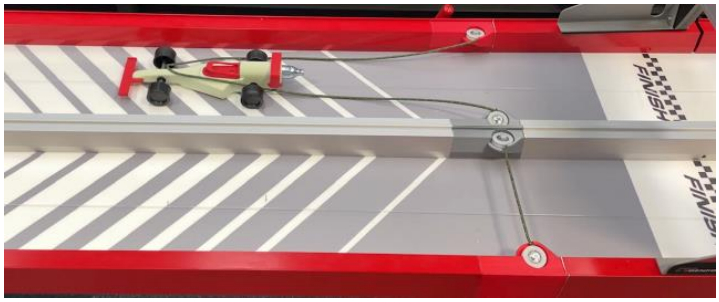
Teams shall have 3 options for car deceleration systems. Teams may choose any system and changing systems between races is permitted.

a) Car Deceleration System (Brushes)
b) Halo Deceleration System
c) Teams' own deceleration system

**C9.11.1a** The Car Deceleration System acts to bring cars to rest once crossing the finish line. F1 in Schools will provide a standard Car Deceleration System, consisting of tapered brushes positioned behind the finish line of each lane. Please see Appendix V of the 2023 World Finals Technical Regulations for dimensions of the F1 in Schools Car Deceleration System.

*Car Deceleration System*

**C9.11.1b** The Halo Deceleration System acts to bring cars to rest once crossing the finish line. F1 in Schools will provide a Halo Deceleration System which is integrated into the final track section after the finish line. This consists of an arresting cable which is aligned with the circular notch of the Halo. Only cars that comply with the Halo regulations T4.4 of the Technical Regulations shall be allowed to use the Halo Deceleration System. If a team are not using the Halo Deceleration System, then the arresting cable shall be raised to not interfere with the chosen system.




*Halo Deceleration System*

**C9.11.2** Teams may supply their own deceleration system and the team will be responsible for its management. The Car Deceleration System maximum length is 1500mm. The Car Deceleration System cannot have any electronic components. Any system supplied by a team must be simple to setup within 1 minute and must not impede the opposing track lane, race car or the race schedule in any way. Teams must be able to safely reset their deceleration system by the time the start line car staging time is complete. The Judges, at their discretion, can rule any system supplied by a team to be inappropriate and revert to use of the standard deceleration system.

**C9.11.3** Deceleration systems must be located a minimum of 250mm after the finish line.

**C9.11.4** The final 350mm of the track after deceleration systems is reserved for a storage zone to store raced cars before they are returned to the track start.

## C9.12 Race Power Packs

Compressed gas cartridges to be used for all World Finals competition races will be supplied by F1 in Schools. Each race cartridge will be separately weighed before competition to ensure that all race cartridges used for races are within a weight range of 0.5 grams. All race cartridges will be kept in a temperature-controlled environment of 21 degrees Celsius.

## C9.13 Car weight checks

Cars will have their weight checked at the race track prior to commencing a race event. This is done to ensure each car remains at a legal weight during all races. If a car is judged to have gone under weight whilst stored in parc fermé, the Judges will add ballast to return the car weight to what it was when first submitted to parc fermé, without penalty.

## C9.14 Judges handling cars

The race Judges will not be required to comply with any special car handling requests made of them by teams. This includes use of any special gloves or tools.

# ARTICLE C10 - CAR REPAIRS AND CAR SERVICING

## C10.1 Car repairs

**C10.1.1** All damage issues and related repair work during racing is at the Judge's discretion and may be referred to the scrutineering Judges and/or Chair of Judges for a final decision.

**C10.1.2** No items can be removed or added to a car during racing, other than Power unit cartridges, except in the case of a repair.

~~**C10.1.3** If a race car sustains damage during racing and this damage is ruled to be related to engineering deficiencies and a repair is achievable then a repair will be allowed. If this repair can be undertaken using any of the defined replacement components (including those already part of the car assembly, refer T3.10) in under 60 seconds and be race ready, then no penalty will be applied. A timer will start when the race official places the damaged car on the official repair table. If the repair takes longer than 60 seconds, doesn't use the defined replacement components or the car is not race ready, then a 5-point penalty will be applied. A repair time limit of 120 seconds (2 minutes) will be applied, if the car is not race ready at the end of this time then any further repairs must take place in the next service session (refer C10.2).~~
~~Please note, the Best Engineered Car award is calculated using a number of scores from the competition, including penalty points incurred through damage during racing. Please see the Awards Matrix in the appendix of this document for more information.~~

~~**C10.1.4** Engineering deficiencies may include but not limited to damage to car body, wings & wheels as part of racing including damage occurring within the deceleration area.~~

~~**C10.1.5** Curing time for adhesives must be included in 60 second repairs.~~

~~**C10.1.6** Tool kits are allowed to be taken racing. Teams must supply all of their own tools and other necessary resources. Judges will not be able to assist teams with any additional resource requirements~~

~~**C10.1.7** If the Judges rule that damaged sustained was not due to engineering deficiencies, immediate repairs will be permitted without penalty.~~

**C10.1.8** No penalty is applied for damage incurred during knock-out racing or a car's final race of any race event.

## C10.2 Car servicing

**C10.2.1** Teams will be scheduled time to carry out penalty free maintenance and repairs on their race cars in the designated car service area. ~~The car service session shall last 25 minutes. The service session will occur between the team's reaction racing 1 and reaction racing 2 as per the competition programme.~~ There shall be 4 car service sessions as detailed in the table below. No other car service time will be permitted.

| Session | Duration |
|---|---|
| Car Service 1 (after racing session 1) | 10 minutes |
| Car Service 2 (after racing session 2) | 25 minutes |
| Car Service 3 (after racing session 3) | 10 minutes |
| Car Service 4 (after racing session 4) | 15 minutes |

**C10.2.2** ~~Teams will also be provided with a 15 minute car service interval prior to the commencement of the first round of knock-out racing round.~~ A shorter car service session will be allowed between further rounds.

**C10.2.3** Only team members and Judges are allowed to enter the car service area.

**C10.2.4** Tool kits are allowed to be taken into car service. Teams must supply all of their own tools and other necessary resources. Judges will not be able to assist teams with any additional resource requirements.

**C10.2.5** Maintenance and alterations can only be made to the front and rear wings, nose cone, tether line guides, wheels and wheel support systems. The car body MUST NOT be modified or substituted.

**C10.2.6** Each team will be required to complete a car service log form, declaring any maintenance or repair work completed. This will be validated by the Judges.

**C10.2.7** Teams must hand their race cars and completed car service log to the service area Judges BEFORE the conclusion of their scheduled service interval. A penalty will apply for exceeding the scheduled service time limit of 5 points for every minute late.

# ARTICLE C11 - PROTESTS

## C11.1 Scrutineering decision appeals

These must be submitted within two hours of the team completing their specification review judging. Other rules for submitting these will be the same as for protests.

## C11.2 Submitting a protest

Any protest issues must be submitted by the team manager by email to an Event Director, who will register this and immediately submit it to the Chair of Judges. This must occur by the date and time stated in the event supplementary regulations. Any protest or appeals submitted after this time may be disregarded. All protests must be lodged in writing via the official protest form available from the Event Directors. The Chair of Judges decision related to any protest is final.

## C11.3 Unsuccessful protests

Teams should carefully consider their grounds for submitting a protest or appeal. Any protest or appeal that is unsuccessful, with the Judges initial decision remaining unchanged, will result in the team having a **15-point penalty** applied against their total score.

**THE CHAIR OF JUDGE'S DECISION IS FINAL**

# ARTICLE C12 - JUDGES

## C12.1 Overview

There will be six (6) teams of Judges plus officials that form the entire judging panel. Each judging team will have one Judge appointed as the Lead Judge. Judges are nominees from ICC's and other education and industry experts invited by F1 in Schools. All Judges sign a 'declaration' and code of conduct to ensure there are no conflicts of interest with respect to Judges and the teams they are judging.

## C12.2 Chair of Judges

An independent authority appointed by F1 in Schools to oversees all judging procedures. The Chair of Judges will determine the final judging decision where a protest has been submitted or other judging issue needs resolution. The Chair of Judges will also preside over a meeting of all Lead Judges to ratify the final results along with nominations and winners for relevant awards.

## C12.3 The Judging teams

**C12.3.1** Specification & Scrutineering Judges - will assess both race cars plus the rendered images and engineering drawings as per the Specification & Scrutineering scorecards.

**C12.3.2** Design & Engineering Judges - will assess each team as per the Design & Engineering scorecard.

**C12.3.3** Verbal Presentation Judges – will assess each team as per the Verbal Presentation scorecard.

**C12.3.4** Project Management– will assess each team as per the Project Management scorecard.

**C12.3.5** Enterprise Judges – will assess each team as per the Enterprise scorecard.

**C12.3.6** Race Judges – will oversee and rule on all race events and any incidents.

**C12.3.7** Car servicing officials – will oversee all car service activities and rule on any infringements that may occur.

## C12.4 Judging Decisions

**THE DECISION OF THE JUDGES AND OFFICIALS IS FINAL.**

# ARTICLE C13 - AWARDS

## C13.1 Awards Celebration

The World Finals awards will be presented at the Awards Celebration Gala Dinner. Details of this event will be released closer to the event.

## C13.2 Participation Recognition

All students will receive an official participation certificate.

## C13.3 Prizes and Trophies

**C13.3.1** Formula 1® Team Trophies – In past years F1 in Schools has been extremely fortunate to have all F1 teams generously supply purpose built 'one off' trophies for various awards. These trophies are unique and some are constructed from F1 car components.

**C13.3.2** Awards – Teams that win an award will be presented with a **SINGLE main trophy** or similar memento and the team members and / or supervising teacher will need to decide how this memento is to be shared and displayed amongst the team stakeholders.

**C13.3.3** Student mementos – students winning an award may be presented with their own individual medallion or certificate.

**C13.3.4** F1 in Schools World Champions Trophy – This is a perpetual trophy presented to the World Champions, and as such, must be returned to F1 in Schools before the following years World Finals event. Our Title partner, Aramco will also be providing a World Champions trophy for the winner to keep forever.

## C13.4 List of awards to be presented

All awards below will be presented to the team that achieves the highest score in each category taken from the scorecards unless otherwise indicated (*) below (This list may be amended at the discretion of F1 in Schools).

1. World Champions – F1 in Schools World Champions Trophy
2. 2nd Place
3. 3rd Place
4. Best International Collaboration Team Award
5. Best Newcomer Award
6. Best Engineered Car Award
7. FIA Scrutineering Award
8. Sponsorship & Marketing Award*
9. Innovative Thinking Award*
10. Chair of Judges Recognition of Achievement Award*
11. Research and Development Award*
12. Fastest Car Award
13. Identity Award*

14. Pit Display Award*
15. Verbal Presentation Award*
16. Project Management Award*
17. Digital Media Award*
18. Knockout Competition Winners
19. FIA Women in Motorsport Award*
20. Sustainability Award*
21. Fastest Nose Change Award

# APPENDIX...

1. Awards Matrix
2. 2023 World Finals Scorecards
3. Race Procedure & Troubleshooting Flowchart
4. Pit Display Reference Dimensions
5. Project Submission Checklist
6. Suggested table of contents for engineering drawings

# Awards Matrix

Please find below a matrix that shows which judging categories contribute towards each award:

| Judges | Heading | Sub Heading | World Champions | 2nd Place | 3rd Place | Best International Collaboration | Best Newcomer | Best Engineered Car | FIA Scrutineering Award | Sponsorship & Marketing Award | Innovative Thinking Award | Team Identity Award | Pit Display Award | Verbal Presentation Award | Sustainability Award | Research & Development Award | Digital Media Award | Project Management Award | Fastest Car Award |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Scrutineering | Scrutineering | Specifications | • | • | • | • | • | • | • | | | | | | | | | | |
| | | Engineering Drawings | • | • | • | • | • | • | | | | | | | | | | | |
| | | Rendering | • | • | • | • | • | • | | | | | | | | | | | |
| | | Quality of Finish and Assembly | • | • | • | • | • | • | | | | | | | | | | | |
| Design & Engineering | Design & Engineering Portfolio | Design Concepts | • | • | • | • | • | • | | | | | | | | | | | |
| | | 3D Modelling | • | • | • | • | • | • | | | | | | | | | | | |
| | | Application of CAA | • | • | • | • | • | • | | | | | | | | • | | | |
| | | Use of CAM/CNC | • | • | • | • | • | • | | | | | | | | | | | |
| | | Other Manufacturing & Assembly | • | • | • | • | • | • | | | | | | | | | | | |
| | | Research & Development | • | • | • | • | • | • | | | | | | | | • | | | |
| | | Testing | • | • | • | • | • | • | | | | | | | | • | | | |
| | | Design Process Evaluation | • | • | • | • | • | • | | | | | | | | | | | |
| | | Document Presentation | • | • | • | • | • | | | | | | | | | | | | |
| Project Management | Initiating | Initiation Process | • | • | • | • | • | | | | | | | | | | | • | |
| | | Project Schedule | • | • | • | • | • | | | | | | | | | | | • | |
| | Planning | Budget and Resource Management | • | • | • | • | • | | | | | | | | | | | • | |
| | | Roles and Responsibilities | • | • | • | • | • | | | | | | | | | | | • | |
| | Executing | Team & Stakeholder Comm. | • | • | • | • | • | | | | | | | | | | | • | |
| | | Risk Management | • | • | • | • | • | | | | | | | | | | | • | |
| | Mon. and Cont. | Monitoring & Controlling | • | • | • | • | • | | | | | | | | | | | • | |
| Enterprise | Enterprise | Marketing | • | • | • | • | • | | | | | | | | | | | • | |
| | | Sponsorship | • | • | • | • | • | | | • | | | | | | | | • | |
| | | Digital Media | • | • | • | • | • | | | • | | | | | | | • | | |
| | | Sustainability | • | • | • | • | • | | | | | | | | • | | | | |
| | | Document Presentation | • | • | • | • | • | | | | | | | | | | | | |
| | Team Identity | Overall Team Identity | • | • | • | • | • | | | • | | • | | | | | | • | |
| | Pit Display | Pit Display Design Process | • | • | • | • | • | | | | | | • | | | | | | |
| | | Pit Display Content | • | • | • | • | • | | | | | | • | | | | | | |
| Verbal Presentation | Technique | Visuals | • | • | • | • | • | | | | | | | • | | | | | |
| | | Team Contribution | • | • | • | • | • | | | | | | | • | | | | | |
| | | Engagement | • | • | • | • | • | | | | | | | • | | | | | |
| | Composition | Concept Clarification | • | • | • | • | • | | | | | | | • | | | | | |
| | | Time / Presentation | • | • | • | • | • | | | | | | | • | | | | | |
| | Subject | Innovation | • | • | • | • | • | | | | • | | | • | | | | | |
| | | Collaboration | • | • | • | • | • | | | | | | | • | | | | | |
| | | F1 in Schools Learning Experiences | • | • | • | • | • | | | | | | | • | | | | | |
| Racing | Racing | Time Trials | • | • | • | • | • | | | | | | | | | | | | • |
| | | Damage During Racing | • | • | • | • | • | • | | | | | | | | | | | |

| **Scrutineering Judging Scorecard** | Team Number:<br>Team Name:<br>Country: |
|---|---|

| **Scrutineering** | | | | |
|---|---|---|---|---|
| Engineering Drawings | Little or no detail, Little or no annotation. | Third angle orthographic projection. Excessive or insufficient detail. | Third angle orthographic projection and unrendered isometric view or similar. Parts list / bill of materials. Additional views to show sufficient detail. Regulation compliance shown. | |
| | 1 2 3 4 | 5 6 7 8 9 10 11 | 12 13 14 15 16 17 18 19 20 | |
| Rendering | Poor quality. | Different views, some inconsistencies with final car. | Different Views. Perfect match to final car including branding. Environment and lighting High end render technique. | |
| | 1 2 3 4 | 5 6 7 8 9 10 11 | 12 13 14 15 16 17 18 19 20 | |
| Quality of Finish and Assembly | Reasonable finish with some inconsistencies. | Good overall finish quality and assembly with attention to details. | 'Showcase' finish quality on all components. Exceptional attention to detail across all assembly and finishing. Two cars are identical. | |
| | 1 2 3 4 | 5 6 7 8 9 10 11 | 12 13 14 15 16 17 18 19 20 | |
| | | | **Scrutineering Total =** | /60 |

**Notes:**

| **Design & Engineering Scorecard** | Team Number:<br>Team Name:<br>Country: |
|---|---|

| **Design & Engineering Portfolio Only Assessment** | | | | |
|---|---|---|---|---|
| Design Concepts | Single or basic concepts.<br>1 2 3 4 | Multiple concepts with links to research.<br>5 6 7 8 9 10 11 | Several technically inspired ideas for different car components.<br>12 13 14 15 16 17 18 19 20 | |
| 3D Modelling | Basic application. Only final design 3D modelled.<br>1 2 3 4 | Appropriate 3D modelling in development stages. Dimensional constraints of F1 model block considered.<br>5 6 7 8 9 10 11 | Advanced use of 3D modelling techniques through. Highly detailed modelling. Designed for manufacture considerations (ie fillets).<br>12 13 14 15 16 17 18 19 20 | |
| Application of Computer Aided Analysis | No or minimal CFD/FEA analysis shown.<br>1 2 3 4 | Appropriate analysis shown. Results applied to development.<br>5 6 7 8 9 10 11 | Advanced and relevant. Virtual analysis integrated throughout design development.<br>12 13 14 15 16 17 18 19 20 | |
| Use of CAM/CNC | No or minimal evidence of CAM/CNC understanding.<br>1 2 3 4 | Effective use and understanding of CAM/CNC processes used.<br>5 6 7 8 9 10 11 | Evidence of excellent understanding of CAM/CNC technologies. Appropriate techniques and processes used to achieve manufacturing goals.<br>12 13 14 15 16 17 18 19 20 | |
| Other Manufacturing & Assembly | No or minimal manufacturing presented. Outsourcing with minimal understanding or justification.<br>1 2 3 4 | Manufacturing process and stages described. Appropriate use of manufacturing resources documented (i.e. tools, finishes, jigs, fixtures).<br>5 6 7 8 9 10 11 | Details all manufacturing stages and processes. Quality assurance and workplace safety considerations evident. Appropriate outsourcing justified.<br>12 13 14 15 16 17 18 19 20 | |
| Research & Development | No or limited evidence of R&D.<br>1 2 3 4 | Some scientific & mathematical theories and principles considered. Logical research based design developments explained.<br>5 6 7 8 9 10 11 | Relevant R&D throughout the entire product design & development cycle. Design concept developments justified from research & test findings.<br>12 13 14 15 16 17 18 19 20 | |
| Testing | No or little evidence of testing.<br>1 2 3 4 | Limited testing. Some evidence of method and outcomes.<br>5 6 7 8 9 10 11 | Purposeful testing with method and outcomes documented. Evidence of virtual and physical testing on the fully assembled car and individual components.<br>12 13 14 15 16 17 18 19 20 | |
| Design Process Evaluation | No or limited design process evaluation.<br>1 2 3 4 | Ideas or process evaluations at different stages.<br>5 6 7 8 9 10 11 | Excellent ongoing idea evaluations linked to improvement actions.<br>12 13 14 15 16 17 18 19 20 | |
| Document Presentation | Difficult to follow with basic presentation standard.<br>1 2 3 4 | Clear structure, well organised.<br>5 6 7 8 9 10 11 | High impact and professional throughout. Consistent and clear organisation.<br>12 13 14 15 16 17 18 19 20 | |
| | | | **Design & Engineering Portfolio Only Assessment Total =** | /180 |

**Notes:**

| **Project Management Scorecard** | Team Number:<br>Team Name:<br>Country: |
|---|---|

| **Project Management Assessment** | | | | |
|---|---|---|---|---|
| **Initiating** | | | | |
| Initiation Process | Limited evidence of an Initiation process | Evidence of an Initiation process with goals and deliverables identified, leading to a basic scope statement | Kick-off meeting evidenced. Detailed Project Charter created, clearly defining all deliverables and Stakeholders. Scope statement developed, identifying acceptance criteria for each deliverable | |
| | 1 2 3 4 | 5 6 7 8 9 10 11 | 12 13 14 15 16 17 18 19 20 | |
| Project Schedule | Limited evidence of tasks to be completed | Evidence of a project schedule, showing a breakdown of time required to complete essential tasks | Clear evidence of a project schedule and Work Breakdown Structure. Detailed Gantt chart created to identify all tasks, dependencies and time estimations | |
| | 1 2 3 | 4 5 6 7 8 9 | 10 11 12 13 14 15 | |
| | | | **Initiating Total** | /35 |
| **Planning** | | | | |
| Budget and Resource Management | Limited evidence of strategies to manage budget and/or resources | Some evidence of resources required and how they are to be acquired and managed. Some evidence of budgeting | Clear evidence of budgeting and use of accounting methods to track expenditure. Clear identification of where, when and how resources are to be acquired and used | |
| | 1 2 3 | 4 5 6 7 8 9 | 10 11 12 13 14 15 | |
| Roles and Responsibilities | Limited evidence of clear roles and responsibilities within team | Team roles and responsibilities identified, with some evidence of task and/or activity breakdown | Team members identified and a highly structured team created with clearly defined job functions and appropriate responsibilities. Evidence of a Responsibility Assignment ('RACI') Matrix | |
| | 1 2 | 3 4 5 6 | 7 8 9 10 | |
| | | | **Planning Total** | /25 |
| **Executing** | | | | |
| Team & Stakeholder Communications | Limited evidence of engagement between team members and stakeholders | Evidence of a communication plan and engagements between team members and with stakeholders | Clear communication plan implemented between team members and stakeholders. Key stakeholders registered and reported to regularly. Multiple communication tools used | |
| | 1 2 | 3 4 5 6 | 7 8 9 10 | |
| Risk Management | Limited evidence of risk identification and management | Evidence of risk identification and response management plans in place | Clear evidence identifying all relevant risks, area(s) of impact and response planning. Assessment of impact on resources, timing, scope and quality | |
| | 1 2 | 3 4 5 6 | 7 8 9 10 | |
| | | | **Executing Total** | /20 |
| **Monitoring and Controlling** | | | | |
| Monitoring & Controlling | Limited or isolated project evaluation | Ongoing evaluation of most areas. Documented evidence of problems identified and suggested solutions | Excellent ongoing 'Status Reports', documenting tasks signed off and highlighting areas of concern. Scope creep identified with a clear action plan for tasks that overrun. | |
| | 1 2 | 3 4 5 6 | 7 8 9 10 | |
| | | | **Monitoring and Controlling Total** | /10 |
| | | | **Initiating + Planning + Executing + Monitoring and Controlling = Project Management Total =** | /90 |

**Notes:**

| **Enterprise Scorecard** | Team Number:<br>Team Name:<br>Country: |
|---|---|

| **Enterprise Portfolio Only Assessment** | | | | |
|---|---|---|---|---|
| Marketing | Limited evidence. | Some evidence of marketing strategy, delivery and marketing materials. | Clear, well thought through documentation of planning and delivery of an effective marketing strategy, including development of suitable marketing materials. | |
| | 1 2 3 4 | 5 6 7 8 9 10 11 | 12 13 14 15 16 17 18 19 20 | |
| Sponsorship | Limited evidence. | Sponsor/partner hierarchy and benefits identified. Some evidence of return of investment (ROI) to relevant sponsors. | Sponsor/partner hierarchy and benefits detailed and justified. Range of relevant sponsors/partners showing mutually beneficial relationships. Creative activities linked to return of investment (ROI). | |
| | 1 2 3 4 | 5 6 7 8 9 10 11 | 12 13 14 15 16 17 18 19 20 | |
| Digital Media | Limited or low level of documented planning, understanding and execution. | Some evidence of strategic planning and execution in line with documented strategy, consideration for audience and platforms. | Clear, structured and well-communicated digital strategy with execution in line with documented plans, proactive use of platforms, creativity and audience engagement. | |
| | 1 2 3 4 | 5 6 7 8 9 10 11 | 12 13 14 15 16 17 18 19 20 | |
| Sustainability | No or limited sustainability considered. | Sustainability strategy identified with some evidence of implementation. | Sustainability strategy and activities evidenced considering economic, environmental, and social factors. | |
| | 1 2 3 4 | 5 6 7 8 9 10 11 | 12 13 14 15 16 17 18 19 20 | |
| Document Presentation | Difficult to follow with basic presentation standard. | Clear structure, well organised. | High impact and professional throughout. Consistent and clear organisation. | |
| | 1 2 3 4 | 5 6 7 8 9 10 11 | 12 13 14 15 16 17 18 19 20 | |
| | | | **Enterprise Portfolio Only Assessment Total** | /100 |
| **Team Identity** | | | | |
| Overall Team Identity | Inconsistent, limited or obscure identity. | Effective team identity consistent through various project components e.g. car matches team uniform. | Excellent and highly effective team identity. Team 'brand' consistently applied through all project elements. | |
| | 1 2 3 4 | 5 6 7 8 9 10 11 | 12 13 14 15 16 17 18 19 20 | |
| | | | **Team Identity Total** | /20 |
| **Pit Display** | | | | |
| Pit Display Design Process | Limited evidence of design process. | Some ideas & justification of design. Some consideration of constraints e.g. freight packing. | A range of ideas, clearly justified creative final design. Evidence of development considering factors including team identity, budget, sustainability and time constraints. | |
| | 1 2 3 4 | 5 6 7 8 9 10 11 | 12 13 14 15 16 17 18 19 20 | |
| Pit Display Content | Repetition of Portfolio contents. Disorganised layout. Little or no evidence of marketing materials. | Clear and effective presentation and messaging. Multimedia used to enhance display, some marketing material on display. | Clean, well-organised with high impact. Highly professional with attention to detail. Excellent integration of technology, multimedia and marketing materials. | |
| | 1 2 3 4 | 5 6 7 8 9 10 11 | 12 13 14 15 16 17 18 19 20 | |
| | | | **Pit Display Total** | /40 |
| | | | **Enterprise Portfolio Only Assessment + Team Identity Total + Pit Display Total = Enterprise Total =** | /160 |

**Notes:**

| **Pit Display Build Assessment Scorecard** | Team Number:<br>Team Name:<br>Country: |
|---|---|

| **Pit Display Build Assessment<br>Points may be deducted as per the criteria below** | | | | |
|---|---|---|---|---|
| Heading | Penalty | Assessment Details | Notes | Points |
| Pit Display Items<br>C7.6.8<br>C7.6.9 | -20 | All pit display materials must be "hand carried", by the team, into the World Finals event venue. Freights are not allowed. A penalty of up to 20 points may be applied at the chair of judge's discretion. | | |
| Set-up Time<br>C 7.6.2 | -5 points per 5 minutes over time rounded up to the nearest 5 minutes* | A time period will be scheduled for when all teams will set-up their pit displays. A time limit of two hours will be enforced; this will be confirmed in supplementary regulations. F1 in Schools reserves the right to apply a penalty of up to 20 points at the discretion of the Chair of Judges for teams that do not complete their set-up within the time limit, do not leave their stand in a safe state and clear their pit and surrounding area of all rubbish. | | |
| Pit Display Size<br>C7.6.3 | -10 | No part of the teams completed Pit Display is allowed to protrude beyond the physical dimensions of their allocated pit space. This includes anything that might protrude above the pit space highest point e.g. flags. Teams may be instructed by the Chair of Judges to rectify and infringements. Time taken to rectify outside of the outside of the set-up time limit will incur penalty points as per C 6.6.3. Teams are not permitted to remove any part of the provided exhibition booth to fit the pit display. A penalty of up to 10 points may be applied at the chair of judge's discretion. | | |
| Only student team members<br>C7.6.4 | -5 | **ONLY** student team members are permitted to set-up their pit displays. There must be no supervising teacher / adult or other outside assistance, unless deemed by F1 in Schools to be a health and safety issue. A penalty of up to 20 points may be applied at the chair of judge's discretion. | | |
| Health & Safety | Up to -20 | Health & Safety measures must be considered when working on all aspects of your Pit Display. A penalty of up to 20 points may be applied at the discretion of the Chair of Judges | | |
| | | | **Pit Display Build Assessment =** | |
| | | | **Completed by (initials):** | |
| | | | **Checked by (initials):** | |

**Notes:**
*A team that runs over by 30 seconds would be rounded up to 5 minutes and therefore will incur a 5pt penalty.

**Please note:** These points are deducted from your Pit Display Total score.

| **Verbal Presentation Scorecard** | Team Number:<br>Team Name:<br>Country: |
|---|---|

| | | | | |
|---|---|---|---|---|
| **Technique** | | | | |
| Visuals | Little use of aids.<br>1 2 3 4 | Some aids used effectively.<br>5 6 7 8 9 10 11 | Highly professional aids effectively improve communication.<br>12 13 14 15 16 17 18 19 20 | |
| Team Contribution | Minimal team participation.<br>1 2 3 4 | Good contributions from most team members.<br>5 6 7 8 9 10 11 | Excellent team work with all members participating effectively.<br>12 13 14 15 16 17 18 19 20 | |
| Engagement | Artificial and/or low energy. Minimal engagement.<br>1 2 3 4 | Speakers generally enthusiastic with lively delivery. Some audience connection at times.<br>5 6 7 8 9 10 11 | Passionate with effective and appropriate levels of liveliness. Audience fully engaged and excited throughout presentation.<br>12 13 14 15 16 17 18 19 20 | |
| | | | **Technique Total** | /60 |
| **Composition** | | | | |
| Concept Clarification | Several concepts lacked clarification.<br>1 2 3 4 | Clear and appropriate concept explanations.<br>5 6 7 8 9 10 11 | Everything presented was understood through excellent explanations.<br>12 13 14 15 16 17 18 19 20 | |
| Time / Presentation | Too fast or ran out of time. No structure presented.<br>1 2 3 4 | Good timing. Balanced topic depth and pace. A basic structure / outline provided and could be followed by audience.<br>5 6 7 8 9 10 11 | Ran on time or under. Excellent balance of depth for each topic. Clear presentation outline / overview. Excellent connections between topics and easy for audience to follow.<br>12 13 14 15 16 17 18 19 20 | |
| | | | **Composition Total** | /40 |
| **Subject** | | | | |
| Innovation | Little project innovation presented.<br>1 2 3 4 | Project innovations described and justified.<br>5 6 7 8 9 10 11 | Originality. Clever innovations related to car design, project management, marketing or other aspect with high positive project impact.<br>12 13 14 15 16 17 18 19 20 | |
| Collaboration | Little collaboration discussed.<br>1 2 3 4 | Links with industry or higher education described.<br>5 6 7 8 9 10 11 | Collaborations justified with links to learning and project outcomes.<br>12 13 14 15 16 17 18 19 20 | |
| F1 in Schools Learning Experiences | No real reflections discussed.<br>1 2 3 4 | Good explanation of some learning outcomes.<br>5 6 7 8 9 10 11 | A range of personal, life-long learning and career skills acquired and identified as project outcomes for a range of team members.<br>12 13 14 15 16 17 18 19 20 | |
| | | | **Subject Total** | /60 |
| | | | **Technique Total + Composition Total + Subject Total = Verbal Presentation Total =** | /160 |

**Notes:**

# Specifications Scorecard

Team Number:
Team Name:
Country:

For clarification on individual regulations, refer to the World Finals Technical Regulations.

Please enter ✓ for a pass and **F** for a fail

**(8g Pack) – measured with full 8g race power pack cartridges**

| Reg | Regulation Overview | Min/Max Quick Guide | Penalty per Car | Initial Scrutineering | | | Post Safety Fix | | | Post Review Interview | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Car A | Car B | CoJ CS | Car A | Car B | CoJ CS | Car A | Car B | CoJ CS | |
| **ARTICLE T3 – FULLY ASSEMBLED CAR** | | | | | | | | | | | | | |
| T3.1.1 | Designed and engineered using CAD / CAM | | -5 | | | | | | | | | | |
| T3.1.2 | Body manufactured using CNC only | Check unfinished body | -5 | | | | | | | | | | |
| T3.1.3 | F1 in Schools holographic sticker | Must be supplied | -5 | | | | | | | | | | |
| T3.1.4 | Race cars identical geometry | Visual check | -5 | | | | | | | | | | |
| T3.2.1 | Safe Construction – Specification judging | Check T3.2.1 | -10 | | | | | | | | | | |
| T3.3 | Undefined features | Check T1.1 | -20 | | | | | | | | | | |
| T3.4 | Total width PP+ | Min: 65 Max: 85 | -5 | mm | mm | | | | | | | | |
| T3.5 | Total height (8g Pack) PP+ | Max: 65 | -5 | mm | mm | | | | | | | | |
| T3.6 | Total weight PP+ | Min: 50.0g | -10 | g | g | | | | | | | | |
| T3.7 | Track clearance (8g Pack) PP+ | Min: 1.5 | -10 | mm | mm | | | | | | | | |
| T3.8 | Status during racing | Nothing removed | -5 | | | | | | | | | | |
| T3.9 | Replacement Components | Identical to fitted | | | | | | | | | | | |
| | Nose Cone & Front Wing Assembly | Max: 2 | -5 | | | | | | | | | | Supplied: |
| | Rear Wing Assembly | Max: 2 | -5 | | | | | | | | | | Supplied: |
| | Front Wheels | Max: 4 | -5 | | | | | | | | | | Supplied: |
| | Front Wheel Support Structure | Max: 2 | -5 | | | | | | | | | | Supplied: |
| | Rear Wheels | Max: 4 | -5 | | | | | | | | | | Supplied: |
| | Rear Wheel Support Structure | Max: 2 | -5 | | | | | | | | | | Supplied: |
| | | | **Assessed by: (Initials)** | | | | | | | | | | |
| | | | **Checked by: (Initials)** | | | | | | | | | | |

Page 1 Notes:

# Specifications Scorecard

Team Number:
Team Name:
Country:

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Please enter ✓ for a pass and **F** for a fail

**(8g Pack) – measured with full 8g race power pack cartridges**

| Reg | Regulation Overview | Min/Max Quick Guide | Penalty per Car | Initial Scrutineering | | | Post Safety Fix | | | Post Review Interview | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Car A | Car B | CoJ CS | Car A | Car B | CoJ CS | Car A | Car B | CoJ CS | |
| **ARTICLE T4 – BODY** | | | | | | | | | | | | | |
| T4.1 | Body construction | F1 Model Block only | -20 | | | | | | | | | | |
| T4.2 | Virtual cargo – See T4.2 for dims | Between axles | -25 | | | | | | | | | | |
| T4.3 | Virtual cargo identification | Check Eng. drawing | -5 | | | | | | | | | | |
| T4.4.1 | Halo visibility | Refer to Article T1.21 | -10 | | | | | | | | | | |
| T4.4.2 | Halo circular notch height | 34.0 (±1.0) | -5 | mm | mm | | | | | | | | |
| T4.4.3 | Halo safety test | 1kg test, safe to race | -5 | | | | | | | | | | |
| T4.5 | Helmet | Included | -5 | | | | | | | | | | |
| T4.6 | F1 in Schools logo decal location | Between Front & Rear wheels 100% Visible | -5 | | | | | | | | | | |
| T4.7 | Team Number | Min: 4.0 | -2 | mm | mm | | | | | | | | |
| T4.8 | Decal Thickness | Max: 0.5 | -5 | | | | | | | | | | |
| **ARTICLE T5 – RACE POWER PACK CARTRIDGE CHAMBER** | | | | | | | | | | | | | |
| T5.1 | Diameter | Min: 18 Max: 18.5 | -5 | mm | mm | | | | | | | | |
| T5.2 | Distance from track surface (8g Pack) PP+ | Min: 30 Max: 40 | -5 | mm | mm | | | | | | | | |
| T5.3 | Depth | Min: 45 Max: 58 | -5 | mm | mm | | | | | | | | |
| T5.4 | Max angle of chamber (8g Pack) | Min: -3° Max: 3° | -5 | ° | ° | | | | | | | | |
| T5.5 | Chamber safety zone (8g Pack) | Min: 3 | -10 | | | | | | | | | | |
| T5.6 | Power unit cartridge visibility (8g Pack) PP+ | Min: 5mm top view | -10 | mm | mm | | | | | | | | |
| **ARTICLE T6 – TETHER LINE GUIDES** | | | | | | | | | | | | | |
| T6.1 | Location | 10mm in front / front axle 10mm behind / rear axle | -10 | | | | | | | | | | |
| T6.2 | Internal diameter | Min: 3.5 Max: 6 | -5 | | | | | | | | | | |
| T6.3 | Tether line guide safety | 200g test, safe to race | -10 | | | | | | | | | | |
| | | | **Assessed by: (Initials)** | | | | | | | | | | |
| | | | **Checked by: (Initials)** | | | | | | | | | | |

Page 2 Notes:

# Specifications Scorecard

Team Number:
Team Name:
Country:

For clarification on individual regulations, refer to the World Finals Technical Regulations.

Please enter ✓ for a pass and **F** for a fail

**(8g Pack) – measured with full 8g race power pack cartridges**

| Reg | Regulation Overview | Min/Max Quick Guide | Penalty per Car | Initial Scrutineering Car A | Initial Scrutineering Car B | Initial Scrutineering CoJ CS | Post Safety Fix Car A | Post Safety Fix Car B | Post Safety Fix CoJ CS | Post Review Interview Car A | Post Review Interview Car B | Post Review Interview CoJ CS | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ARTICLE T7 – WHEELS AND WHEEL SUPPORT STRUCTURES** | | | | | | | | | | | | | |
| T7.1 | Number and location | 4, 2 x 2 | -25 | | | | | | | | | | |
| T7.2 | Distance between opposing wheels PP+ | Front Min: 38<br>Rear Min: 30 | -2.5 | F: mm<br>R: mm | F: mm<br>R: mm | | | | | | | | |
| T7.3 | Wheelbase PP+ | Min: 120<br>Max: 140 | -5 | mm | mm | | | | | | | | |
| T7.4 | Track contact width PP+ | Front Min: 13<br>Rear Min: 17<br>exc. chamfer/fillet | -2.5 per wheel | FL: mm<br>FR: mm<br>RL: mm<br>RR: mm | FL: mm<br>FR: mm<br>RL: mm<br>RR: mm | | | | | | | | |
| T7.5 | Diameter PP+ | Min: 28<br>Max: 32 | -2.5 per wheel | FL: mm<br>FR: mm<br>RL: mm<br>RR: mm | FL: mm<br>FR: mm<br>RL: mm<br>RR: mm | | | | | | | | |
| T7.6 | Racetrack contact (8g Pack) | All 4 in contact | -2.5 per wheel | FL:<br>FR:<br>RL:<br>RR: | FL:<br>FR:<br>RL:<br>RR: | | | | | | | | |
| T7.7 | Rolling surface | Consistent, no tread | -2.5 per wheel | FL:<br>FR:<br>RL:<br>RR: | FL:<br>FR:<br>RL:<br>RR: | | | | | | | | |
| T7.8 | Rotation | Abs. Min rolling incline: 2° | -5 per wheel | FL:<br>FR:<br>RL:<br>RR: | FL:<br>FR:<br>RL:<br>RR: | | | | | | | | |
| T7.9 | Visibility in top and bottom views | In front of front wheels Min: 5mm | -2.5 | mm | mm | | | | | | | | |
| | | Behind front wheels Min: 15mm | -5 | mm | mm | | | | | | | | |
| | | In front of rear wheels Min: 5mm | -5 | mm | mm | | | | | | | | |
| | | Behind rear wheels Min: 5mm | -2.5 | mm | mm | | | | | | | | |
| T7.10 | Visibility in side views | Side views | -10 | | | | | | | | | | |
| T7.11 | Visibility in front view (8g Pack) PP+ | Max obscured 20mm | -10 | mm | mm | | | | | | | | |
| T7.12.1 | Wheel support systems | Cylindrical volume | -5 | | | | | | | | | | |
| T7.12.2 | Wheel support systems identification | Check Eng. drawing | -5 | | | | | | | | | | |
| T7.13 | Wheel Safety Test | 100g test per wheel | -2.5 | | | | | | | | | | |
| | | | **Assessed by: (Initials)** | | | | | | | | | | |
| | | | **Checked by: (Initials)** | | | | | | | | | | |

Page 3 Notes:

# Specifications Scorecard

Team Number:
Team Name:
Country:

For clarification on individual regulations, refer to the World Finals Technical Regulations.

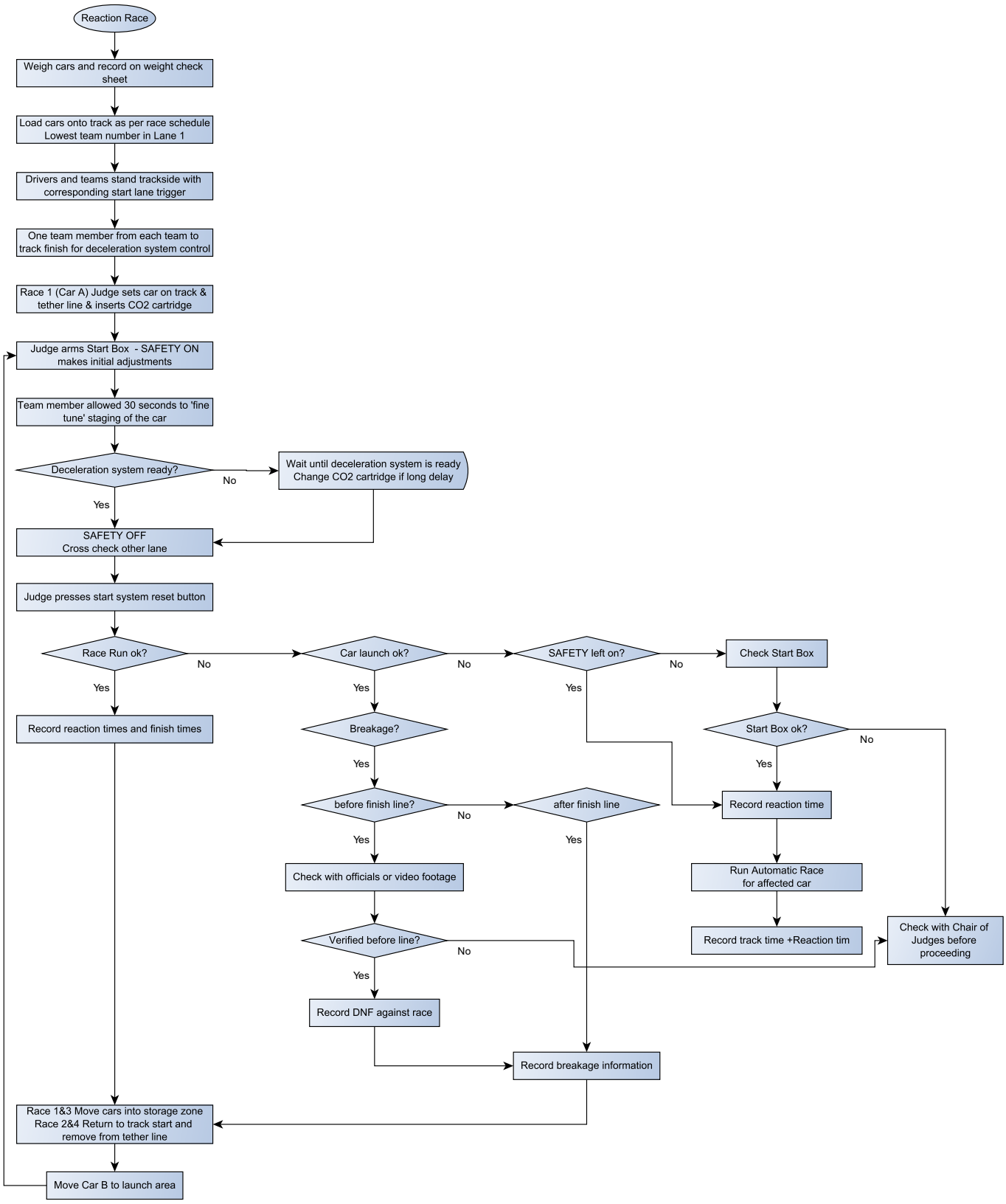
Please enter ✓ for a pass and **F** for a fail

**(8g Pack) – measured with full 8g race power pack cartridges**

| Reg | Regulation Overview | Min/Max Quick Guide | Penalty per Car | Initial Scrutineering | | | Post Safety Fix | | | Post Review Interview | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Car A | Car B | CoJ CS | Car A | Car B | CoJ CS | Car A | Car B | CoJ CS | |
| **ARTICLE T8 – NOSE, FRONT WING AND WING SUPPORT STRUCTURES** | | | | | | | | | | | | | |
| T8.1 | Nose, front wing & wing support structure identification | Check Eng. drawing | -5 | | | | | | | | | | |
| T8.2 | Nose cone assembly dimension | Min: 30 Max: 40 | -5 | mm | mm | | | | | | | | |
| T8.3 | Front wing(s) description and placement | F & R & height | -5 | | | | | | | | | | |
| T8.4 | Front wing(s) construction and rigidity | Span constant during racing + rigid | -5 | | | | | | | | | | |
| T8.5 | Front wing and wing support structure location | In front of Reference Plane A & below 25mm | -10 | | | | | | | | | | |
| T8.6.1 | Front wing span PP + | Min: 50 | -2 | mm | mm | | | | | | | | |
| T8.6.2 | Front wing chord PP + | Min: 15 Max: 25 | -1 | mm | mm | | | | | | | | |
| T8.6.3 | Front wing thickness PP + | Min: 2 Max: 6 | -1 | mm | mm | | | | | | | | |
| T8.7 | Front wing clear airflow | 5mm clear 'air' space | -5 | mm | mm | | | | | | | | |
| T8.8 | Front wing visibility | Visible and not obstructed in front view | -10 | | | | | | | | | | |
| **ARTICLE T9 – REAR WING AND WING SUPPORT STRUCTURES** | | | | | | | | | | | | | |
| T9.1 | Rear wing and wing support structure identification | Check Eng drawing | -5 | | | | | | | | | | |
| T9.2 | Rear wing(s) description and placement | F & R & height | -5 | | | | | | | | | | |
| T9.3 | Rear wing(s) construction and rigidity | Span constant during racing + rigid | -5 | | | | | | | | | | |
| T9.4 | Rear wing and wing support structure location | Rear overhang length Min: 30 Max: 40<br>Rear overhang height Max: 65 | -10 | | | | | | | | | | |
| T9.5.1 | Rear wing span PP + | Min: 50 | -2 | mm | mm | | | | | | | | |
| T9.5.2 | Rear wing chord PP + | Min: 15 Max: 25 | -1 | mm | mm | | | | | | | | |
| T9.5.3 | Rear wing thickness PP + | Min: 2 Max: 6 | -1 | mm | mm | | | | | | | | |
| T9.5.4 | Rear wing height deviation PP + | Max: 15 | -1 | mm | mm | | | | | | | | |
| T9.6 | Rear wing clear airflow | Min: 5 | -5 | mm | mm | | | | | | | | |
| T9.7 | Rear wing visibility | Visible and not obstructed in front view | -10 | | | | | | | | | | |
| | | | **Assessed by: (Initials)** | | | | | | | | | | |
| | | | **Checked by: (Initials)** | | | | | | | | | | |

Page 4 Notes

# Race Procedure & Troubleshooting Flowchart

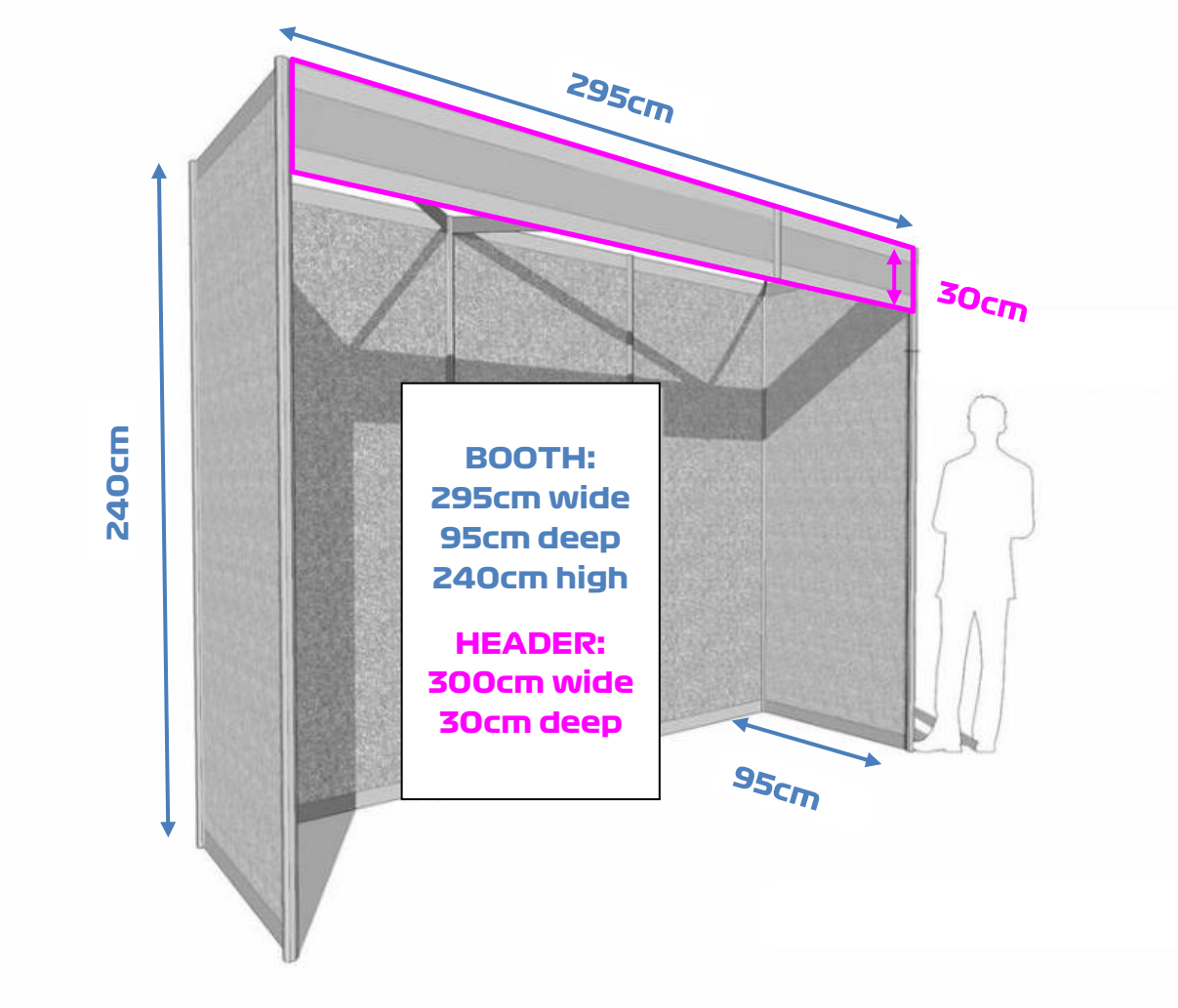


## Pit Display Reference Dimensions

Teams must design their pit displays using the **estimated** dimensions stated below. Detailed dimensions will be confirmed closer to event. At the discretion of the Chair of Judges, a penalty of up to 20 points may be applied for teams working outside these dimensions.

**Pit Header Board Graphic (area highlighted pink):** as stated, pit booths will be fitted with an event branded header board by F1 in Schools. Light(s) shall be provided behind the header board as part of the standard build. The pit display must designed in such a way that it fits without removal of the header board or lights.

Please check the dimensions below to ensure your pit header graphic fits perfectly on your Pit Display design:



## Nose Cone replacement Challenge

The replaceable nose cone assembly challenge is an optional challenge and consists of a team being able to completely remove and replace the car's nose cone assembly in under 60 seconds. This will need to be demonstrated on one of the two cars and recorded by F1 in Schools during car submission. The fastest nose changes will be nominated for the Fastest Nose Change Award.

**Instructions and procedures to participate:**

1. **WHEN** - This optional challenge will be available during your registration slot on the 8th of September before element submission.
2. **WHO** – Team needs to select one team member to perform the challenge.
3. **CHALLENGE PREPARATION** – Preparation and participation will not exceed 10 minutes.
4. **CHALLENGE DURATION** - You will have a maximum time of 60 seconds from start to finish to change the nose cone.
5. **MATERIALS** - You will need to select one of your two competition cars to perform the challenge. You will also require a spare nose cone assembly. Please refer to T3.9.1 of our technical regulations.
6. **WORKSPACE** – A special table will be prepared with designated areas to place your car and components.
7. **RECORDING & TIMING** – The challenge will be recorded and timed from start to finish.
8. **INSTRUCTIONS**:
    a. Selected team member places chosen car and spare component in designated space.
    b. F1 in schools Staff gives instructions on how to start and finish the challenge.
    c. Challenge starts:
        i. Selected team member presses start button.
        ii. Team member removes the car nose cone assembly and places the part in the allocated area.
        iii. Team member collects spare part from allocated area.
        iv. Team member inserts spare nose cone assembly back into car.
        v. Team member presses finish button.
    d. When challenge is finished, cars and components are returned to the team to finalise submission process to specification judging.
9. **EVALUATION** – The winner will be selected from the fastest recorded assembly that followed the instructions provided.
10. **IMPORTANT** – Teams need to be careful participating in the challenge avoiding any breakages to their components as no repair time is available before car submission.

## Physical Project Element Submission Checklist

| | | | |
|---|---|---|---|
| **Team Number:** | | | |
| **Team Name:** | | | |
| **Country:** | | | |
| **Project Element** | **Checked by Team** | **Received by F1 in Schools** | **Comments: (Completed by F1 in Schools Officials only)** |
| **A4 Engineering drawings** | TEAM TICK | F1S TICK | |
| **A4 Car renders** | TEAM TICK | F1S TICK | |
| **Design & Engineering Portfolios (2)** | TEAM TICK | F1S TICK | |
| **Enterprise Portfolios (2)** | TEAM TICK | F1S TICK | |
| **Project Management Portfolios (2)** | TEAM TICK | F1S TICK | |
| **Team Partnerships declaration** | | | Must be submitted digitally |
| **Electronic copy of all data** | | | Must be submitted digitally |
| **RACE CARS:** | | | |
| **1 x Car A** (Ready-to-Race) | TEAM TICK | F1S TICK | Weight: g |
| **1 x Car B** (Ready-to-Race) | TEAM TICK | F1S TICK | Weight: g |
| **1 x Fully machined, unfinished, unassembled F1 model block car body** | TEAM TICK | F1S TICK | |
| **OPTIONAL COMPONENTS: (Maximum of three car sets per item)** | | | |
| **Nose cone & front wing assembly** | TEAM TICK | F1S TICK | Maximum of two (2) - Sets Submitted: |
| **Rear wing assembly** | TEAM TICK | F1S TICK | Maximum of two (2) - Sets Submitted: |
| **Front wheels** | TEAM TICK | F1S TICK | Maximum of four (4) - Sets Submitted: |
| **Front wheel support structure** | TEAM TICK | F1S TICK | Maximum of two (2) - Sets Submitted: |
| **Rear wheels** | TEAM TICK | F1S TICK | Maximum of four (4) - Sets Submitted: |
| **Rear wheel support structure** | TEAM TICK | F1S TICK | Maximum of two (2) - Sets Submitted: |
| **3 x Official F1 Model Block Holographic Stickers** | Car A sticker here | Car B sticker here | Car Body sticker here |

| **SIGN-OFF BY** | **TEAM MEMBER:** | **F1 IN SCHOOLS OFFICIAL:** |
|---|---|---|
| **Name** | | |
| **Signature** | | |