



Dawn

*Modbury High School, SA & Penrith Christian School, NSW
2023 F1® in Schools World Finals
- 25th Place Overall*

2024 Competition Regulations 3DP Class Version 1.0

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RE-ENGINEERING AUSTRALIA
FOUNDATION



Dawn – Modbury High School, SA & Penrith Christian School, NSW – 2023 F1 in Schools World Finals - Singapore

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ACKNOWLEDGEMENT

In preparing the F1® in Schools Australian Technical Rules, certain wording and images have been adopted from the World Final Technical Regulations.

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ALTERATIONS

Re-Engineering Australia Foundation Ltd. reserves the right to alter any specifications and documentation associated with the 'Challenge' without prior notice.

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PREFACE – SUMMARY OF MAIN REVISIONS FROM REVIEW OF 2023/2024 SEASON

This document only contains 'Competition Regulations'. A separate document encompasses the 'Technical Regulations'. This preface provides an overview of all competition related regulations that have been revised from the 2023/2024 season's regulations.

It is each team's responsibility to thoroughly read this document in order to identify wording changes and to understand any impact this **MAY** have on their project.

All changes between 2023/2024 season and V1.0 of this season are identified within the document by using red underlined text.

These regulations will be valid for all 2024 State Finals.

Please note: Due to the 3DP Class regulations being separated from other competition classes and to maintain regulation numbering consistency, some regulations will not appear as sequential. These 'missing' numbers will be present in other competition class regulations.

ARTICLE C1 - DEFINITIONS

- C1.1 Reworded to reflect 3DP Class only.
- C1.9 Updated to include the word **MAY**.
- C1.10 Updated link to REA Learning Space

ARTICLE C2 - GENERAL REGULATIONS

- C2.1 Modified to reference 3DP Class only.
- C2.3.2 Modified to reference 3DP Class only teams.
- C3.12 Modified to include progression from Regional to State final.
- C2.7.3 Modified to reference 3DP Class only project elements.
- C2.8.1.1 Modified to reference 3DP Class requirements only.
- C2.8.4 Modified to reference 3DP Class only project elements.
- C2.8.5 Reference to Trade Mark removed and **NEW** application of Registered symbol.
- C2.9.1.2 Modified to reference 3DP Class only project elements & **NEW** requirement for renders.
- C2.9.2.1 Penalty points reduced but updated for application per file and each day or part thereof.
- C2.9.5 Inclusion of footnote referencing Primary Division only and **NEW** requirement for Compliance Booklet for Junior and Senior Divisions ONLY.
- C2.10 **NEW** requirement for Compliance Booklet for Junior and Senior Divisions ONLY.
- C2.10.4 Updated regulations for ballasting of car and relevant penalties.

ARTICLE C3 - COMPETITION AND JUDGING FORMAT

- C3.7 Inclusion of email process.
- C3.7 Updated to include **NEW** CAD requirements and points allocation for 3DP Class.

ARTICLE C4 - SPECIFICATIONS JUDGING - Nil changes.

ARTICLE C5 - ENGINEERING JUDGING

- C5.1 - C5.3 Inclusion of **NEW** assessable CAD criteria .

ARTICLE C6 - POSTER JUDGING - Removed. See Article 5.

ARTICLE C7 - PORTFOLIO JUDGING - Not relevant for the 3DP Class.

ARTICLE C8 - MARKETING JUDGING - Not relevant for the 3DP Class.

ARTICLE C9 - VERBAL PRESENTATION JUDGING - Not relevant for the 3DP Class.

ARTICLE C10 - RACING - Nil changes

ARTICLE C11 - CAR REPAIR - Nil changes

ARTICLE C12 - GRIEVANCES - Nil changes

ARTICLE C13 - JUDGES - Nil changes

ARTICLE C14 - AWARDS - Nil changes

ARTICLE C15 - APPENDICES

APPENDIX 1 - Updated to in include **NEW CAD** criteria

CRITERIA 1 SCORECARD - T3.4.1 Updated and **NEW** 2pt penalty applied

CRITERIA 2 SCORECARD - **NEW** Scorecard with CAD criteria

ARTICLE C1 - DEFINITIONS

C1.1 Australian Competition Season

The standard sequence of Australian F1 in Schools **State Final** competitions for the **3DP Class** is staged around Sept/Oct/Nov **of each** year. This encompasses a complete season, for which the regulations **SHOULD** remain constant. REA Foundation Ltd reserves the right to update / revise the regulations if deemed appropriate. **There is no pathway to a National Final for 3DP Class teams.**

C1.2 Australian Competition Calendar

This is a calendar of Regional, State and National Final events which is available via the Events Calendar tab within the F1 in Schools menu on the REA Foundation Ltd. website, www.rea.org.au.

C1.3 Regional Finals

Regional Final events are generally the first level of competition for **ANY** team but usually **ONLY** take place in NSW and QLD where large numbers of teams are registered for the competition. The decision regarding the need for Regional Finals in all other states of Australia is under ongoing review and will depend on the number of Team Registrations received by the advertised deadline. REA Foundation Ltd. will inform teachers of **ANY** changes to requirements as soon as possible once final numbers are known.

Regional Finals are managed by Regional Hub Coordinators identified by REA and usually take place over 1 day.

C1.4 State Finals

State Final events managed by Re-Engineering Australia Foundation Ltd., are generally held over 2 - 3 days and **MAY** include various programmed social and competition activities. These events aim to provide all participants with an educational and personal development experience.

Rural and remote teams can choose to participate at these events virtually upon written request to REA.

C1.6 F1® in Schools National Coordinator

A person employed by Re-Engineering Australia Foundation Ltd. (REA) to manage the F1 in Schools competition in Australia on behalf of F1 in Schools Ltd. UK.

C1.7 Language Used

The language of the regulations is tiered. Those clauses expressed as "**MUST**" are mandatory and failure to comply will attract objective point and/or racing penalties and in the extreme, disqualification. Those expressed as "**SHOULD**" or "**MAY**" reflect some level of discretion and choice. Some clauses will be satisfied through team registration processes or declarations signed as complied with as part of the Challenge Terms and Conditions, whilst others will be tested through a variety of objective and subjective judging.

C1.8 Parc Fermé

A secure area where Car A is held to prevent unauthorised handling, but to allow technical inspections to be conducted by the Judges. (Literal meaning in French of 'closed park').

C1.9 REA Event App

Each team, supervising teacher and judge **MAY** be provided with access to an REA Event App that provides all event details including but not limited to, the programme, judging schedule, rooming information and maps. This app will take the place of information previously provided in hard copy.

C1.10 Terms and Conditions for Entry

There are forms prepared by Re-Engineering Australia Ltd. that teams and teachers are required to complete and submit prior to an event. These forms outline a range of Terms and Conditions that **MUST** be complied with as part of the initial registration process and participation of all teams in the competition.

Failure to submit these forms **MAY** result in teams being ineligible to compete at an REA Foundation Ltd. managed State Final. Copies of all forms can be found **within the within the REA Learning Space accessible via** the REA Foundation Ltd. website. For detailed information refer to ARTICLE C2.4.

C1.11 Regulations Documents

C1.11.1 Issuing Authority

REA Foundation Ltd. issues the regulations, their revisions and amendments.

C1.11.2 Competition Regulations

This document is mainly concerned with regulations and procedures directly related to judging and the competition event. Competition Regulation articles have a 'C' prefix. This document **SHOULD** be read in conjunction with the F1 in Schools **Australian Technical Regulations** document.

C1.11.3 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.

C1.11.4 Interpretation

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.

C1.11.5 Text Clarification

ANY questions relating to clarification of regulations should be forwarded to contact@rea.org.au.

C1.11.6 Supplementary Competition Regulations

Other documents **MAY** be issued by REA Foundation Ltd. that provide teams with further logistic and other important event information. **ANY** supplementary regulations will be issued to all teachers and team managers of registered teams, where a valid contact email address has been supplied to REA Foundation Ltd and published on the REA Foundation Ltd. website.

C1.12 Key Performance Indicators (KPI's)

These are portions of text that feature on the score cards 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.

C1.13 Net Race Time Value

A 'net race time' value when racing in Automatic Launch (Time Trial) Racing, is the actual time taken for a F1 in Schools car to travel the track from start to finish, measured from the instant the launch pod fires to when the car breaks the finish line timing beam. In the case of Manual Launch (Reaction) Racing, the 'net 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.

C1.14 Gross Race Time Value

The 'gross 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 'net race time' value and **ANY** 'reaction time' value displayed on the electronic start gate. During time trial races where the automatic launch mode is used there is a zero reaction time value.

C1.15 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 depressed by the driver. This value is displayed in the reaction time field on the electronic start gate.

C1.18 Project Elements

These are **ANY** materials and resources (electronic or physical) that the team presents as part of its entry for **ANY** judging activity and which are submitted leading up to and/or at event check-in, as advised.

C1.19 Racing Modes

There are two 'modes' of racing used at Australian State Final competitions which are used to determine results for the Grand Prix Race. These are Automatic Launch (Time Trial) Racing and Manual Launch (Reaction) Racing. For more information, refer to ARTICLES C10.2 & C10.3.

C1.20 Launch Energy Recovery System (LERS)

Commencing from the 2017/2018 Season, it will **NOT** be permitted to attach **ANY** device, including a LERS device, to the track or starting mechanism or car, or modify the track or starting mechanism in **ANY** way for **ANY** race event within the Australian F1 in Schools competition including Regional Finals. Car alignment devices are permitted provided they are removed from the track and starting mechanism prior to a run.

C1.21 Engineering Drawings

CAD produced drawings which **SHOULD** be such that, along with relevant CAM programs, could theoretically be used to manufacture the fully assembled car by a third party. Such drawings **SHOULD** include all relevant dimensions, tolerances and material information. F1 in Schools engineering drawings **MUST** include detail to specifically identify compliance intent for the virtual cargo and wing surfaces.

C1.22 Penalties

A range of penalties will be applied for non-compliance with identified competition regulations including:

C1.22.1 Point Penalty

Invoked from non-compliance with competition regulations governing Project Element Submission. These are identified as **[Point Penalty]**.

C1.22.2 Eligibility

Teams need to meet certain eligibility criteria to compete at a State Final. Failure to comply with certain eligibility criteria **MAY** lead to disqualification from the competition or a class of competition. These are identified as **[Eligibility]**.

C1.23 Competition Classes

There are two Cadet classes in the Australian F1 in Schools competition with some having Junior and Senior categories defined by school year levels:

C1.23.1 3DP Classes (1 – 3 team members)

An entry class of competition. Students **MAY** participate multiple times. This is a simplified project with a pathway to state level competitions **ONLY** and no pathway to the National or World Final.

C1.23.1.1 Primary: Years 5 - 6

C1.23.1.2 Junior: Years 7 – 9

C1.23.1.3 Senior: Years 10 – 12

C1.24 Virtual Events

SHOULD the need arise to run virtual or hybrid State Finals, these regulations still apply. However, separate Supplementary Regulations **WILL** be released that will override the equivalent regulations within this document.

ARTICLE C2 - GENERAL REGULATIONS

C2.1 Representative Team Selection

C2.1.1 State Finals

[Eligibility]

In all states other than NSW & Queensland, the first level of competition for teams is usually a State Final. However, REA Foundation Ltd. reserves the right to request Regional Finals in **ANY** state **IF** registrations received by the advertised deadline exceed the maximum 24 teams allowable (excluding 3DP Class teams) at a State Final.

Schools are required to select their best 2 – 3 teams maximum for participation at a State Final where no Regional Final is in place. The participation of additional teams **MUST** be negotiated directly with REA Foundation Ltd.

In NSW and Queensland, all teams **MUST** participate in a **Regional Final** as their first level of competition. The location and timing of these can be found within the 'Events Calendar' tab of the F1 in Schools menu on the REA Foundation Ltd. website.

The best 3DP Class teams from a Regional Final will be eligible to move forward to the State Final so long as they achieve the minimum 60% requirement as per ARTICLE C14.4 (1). Additional teams will be considered on a case by case basis on request to REA Foundation Ltd. by the Regional Hub Manager. **ALL** Regional Final results **MUST** be forwarded to REA Foundation Ltd. within 7 days of the completion of the competition event.

Teams will **NOT** be permitted to move forward to a State Final if they are **NOT** registered **prior** to a Regional Final. This is **NOT** negotiable and Regional Final Coordinators are responsible to ensure **ALL** teams are registered.

At State Finals, the Chair of Judges **MAY** combine the 3DP Junior and 3DP Senior Class teams into one overall 3DP Class if representative numbers in these classes are five or less.

C2.2 Cost of Participation

C2.2.1 State Finals

[Advice]

In addition to ARTICLE C2.3.10 and the Team Registration fees outlined on the REA Foundation Ltd. website, teams and teachers are responsible for all costs associated with participating in the competition. This includes but is **NOT** limited to project costs, travel and accommodation and meals.

C2.3 Team & Project Entry Conditions

C2.3.1 Varying the Conditions

[Advice]

REA Foundation Ltd. reserves the right to vary the Team & Project Entry Conditions where special circumstances exist.

C2.3.2 Team Membership

[Eligibility]

Each **3DP Class** team registered in the Australian competition **MUST** consist of a minimum of 1 student and maximum of 3 students. Mixed gender teams are encouraged.

C2.3.4 Supporting or Affiliate Team Members

[Eligibility]

Supporting or affiliate team members are **NOT** permitted for **ANY** class or level of the Australian competition.

C2.3.8 Multiple Class Entry Restrictions

[Eligibility]

Individual students can **ONLY** compete in one competition class per event.

C2.3.9 Enrolled Full-time Students

[Eligibility]

All team members **MUST** be enrolled as full-time primary/secondary students studying at school or TAFE or home schooled (at the time of the event) to be eligible to participate in State Final competitions.

C2.3.10 Team Registration Conditions

[Eligibility]

Each student team **MUST** be registered by their teacher for their first competition event by the prescribed date advertised on the REA Foundation web site. The REA Foundation Ltd. registration process **MUST** be followed and the entry fee received by REA Foundation Ltd before the competition date. Entry fees are non-refundable once processed. Fees **ONLY** apply to State Finals.

C2.3.11 Team Membership Changes

[Eligibility]

Each team **MAY ONLY** make one change (i.e. add, subtract or substitute) to its membership when progressing to the next level of competition.

C2.3.12 Changes to Team Classification

[Eligibility]

When progressing from **Regional** to **State** Finals, teams **MUST** remain in the class in which they qualified. This includes the effects of changes to team membership. Teams **MAY** present a compelling case in writing to REA Foundation Ltd. for transfer to another class which will be considered and adjudicated on by the Rules Committee. Age eligibility criteria applies.

C2.3.13 Entered Cars

[Eligibility]

Entered cars **MUST** be designed and produced during the current Challenge Season and the same car design **MUST NOT** be entered in more than one Challenge Season.

C2.4 Competition Procedural Regulations

C2.4.1 Submitting Documentation

[Eligibility]

Each team **MUST** complete and submit ALL the relevant competition documentation as required by REA Foundation Ltd. within the stated timeframes. Some forms are signed electronically when teachers register teams. Others **MUST** be signed and uploaded to an REA provided Google Drive link prior to the event. All forms are downloadable from **REA's Learning Space** via <https://rea.org.au/>. The following documents apply:

C2.4.1.1 Terms and Conditions Form

[Eligibility]

This form constitutes an agreement between REA Foundation Ltd. and supervising teachers regarding participation by teams in State and National finals. The form is **electronically signed** by teachers when registering their teams on-line via the REA Foundation Ltd website. It is very important that teachers read this form before registering their teams. Valid for the entire Australian Competition Season.

C2.4.1.2 Media Consent Form**[Eligibility]**

- One per student.
- Valid for the entire Australian Competition Season.
- Parent/Guardian signature required if student under 18 years.
- **MUST** be signed and submitted as per ARTICLES C2.9.5. Students failing to submit a signed Media Consent form by the published deadline will **NOT** be permitted to attend or participate at an REA managed final.

C2.4.1.5 Grievance Form (all classes)**[Advice]**

- Submission is via an on-line form, a link to which will be provided on request.
- Completed **ONLY** if teams have a judging grievance.
- **MUST** be submitted by the published deadline.
- **MUST** be completed by the Team Manager **ONLY**.
- The Chair of Judges decision is **FINAL**.

C2.4.1.6 Student Code of Conduct Form (all classes)**[Eligibility]**

- One per team.
- Valid for the entire Australian competition season.
- ALL student and teacher signatures required.
- Must be read by **ALL** team members at the point of team formation (including any subsequent membership changes) then signed and submitted as per ARTICLE C2.9.5.

C2.4.1.7 Student and Teacher Survey

- Submission is via an on-line form, a link to which will be provided 2 weeks prior to a State Final.
- One submission per student and one submission per supervising teacher.
- **MUST** be submitted within 7 days of the event.
- Individual team reports will not be provided until all surveys are submitted.

C2.4.2 Event Check-in**C2.4.2.1 Team Attendance****[Eligibility]**

3DP Class teams or their teacher **MUST** attend a team Event Check-in process, the timing of which will be published by REA Foundation Ltd. no less than one month prior to the State Final. At this check-in, teams will be issued with State Final accreditation.

C2.4.2.2 Submitting Project Elements**[Eligibility]**

When checking in at State Finals, each team **MUST** provide REA Foundation Ltd with minimum mandatory project elements as outlined in ARTICLE C2.10 Failure to provide the listed items **MAY** impact on a team's eligibility to compete and judging outcomes. Some project elements will require pre event electronic uploading on-line to an REA managed google drive by the published deadline as per ARTICLE C2.9, the link for which will be provided by event organisers. Teams **WILL** be required to have a Google account for this purpose.

C2.4.3 Team Uniforms**[Eligibility]**

3DP Class teams are only permitted to wear a school uniform at State Finals.

C2.5 Team responsibilities**C2.5.1 Australian Technical Regulations****[Advice]**

Teams **MUST** read the Australian Technical Regulations carefully to ensure their cars comply with those regulations.

C2.5.2 Australian Competition Regulations**[Advice]**

Teams **MUST** read the Australian 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.

C2.5.3 Attendance at Scheduled Activities

C2.5.3.1 Team Representation Only

[Eligibility]

During the competition, **ONLY** the official team members can represent the team at specifications compliance feedback, critical rule rectification, racing and **ANY** direct communication with the Chair of Judges or Event/Competition Director concerning judging matters.

C2.5.4 All Team Members Required

[Eligibility]

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

C2.6 Role and Responsibility of Supervising Teacher.

C2.6.1 Terms and Conditions Form

[Advice]

All supervising teachers **MUST** carefully read and understand the terms and conditions for entry to the F1 in Schools State Final events, and must have explained all relevant information within this agreement to their team/s.

C2.6.2 Other Documentation

[Advice]

All supervising teachers **MUST** ensure ALL forms at ARTICLE C2.4.1, are completed and submitted to REA Foundation Ltd. by the stated deadline otherwise teams **MAY** be ineligible to participate.

C2.6.3 Duty of Care by Schools & Teachers

[Advice]

It is the primary responsibility of **ANY** event accredited supervising teacher to administer their school's duty of care / well-being, relevant to their education system's guidelines, for all their student team members, throughout the entirety of REA Foundation Ltd. managed events. **ANY** concerns arising during the event in relation to this **SHOULD** be brought to the attention of the F1 in Schools Event Director immediately. A school's Duty of Care cannot be transferred to a 3rd party such as REA Foundation Ltd.

C2.6.4 Standard of Care by REA

[Advice]

REA Foundation Ltd. will do its utmost to administer a high 'Standard of Care' for teachers, students and members of the public through adherence with requirements of Workplace Health & Safety, Risk Management and Child Protection procedures. It will always strive to ensure the judging process is applied fairly and equally to each and every team attending our managed events.

C2.6.5 Attending Judging Sessions

[Advice]

Where space permits and at the discretion of the Chair of Judges, **ONE** approved supervising teacher **MAY** be permitted to observe (in the background) **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. Teachers are to ensure **ALL** team members attend every judging session scheduled for their team.

C2.7 Team Collaborations with External Partners

C2.7.1 Mentoring Collaborations

[Advice]

Teams are encouraged to develop mentoring collaborations with individuals from external businesses, industry or higher education organisations throughout their project.

C2.7.2 Sponsorship Collaborations

Teams are encouraged to develop sponsorship (cash or in-kind) collaborations with businesses, industry or higher education organisations to help fund their project.

C2.7.3 Student Work Only

[Advice]

ALL design work, text and scripting for **ALL** project elements presented for assessment **MUST** be wholly undertaken and created by the team members and be their own original work. This includes **ALL** CAD and CAM data, Poster and graphical content.

The process of assembling the cars from manufactured components, purchased components and purchased sub-assemblies **MUST** be wholly undertaken by the team. The process of 'finishing' the cars **MUST** be wholly undertaken by the team.

C2.8 REA Corporate Partner Logos, Word Marks & National Support

C2.8.1 REA Corporate Partner Logos

[Advice]

Teams **MUST** include the REA Foundation Ltd. Corporate Partner logos in their project and failure to use some or all of the logos as required will be reflected in a team's marks in the relevant judging criteria. The logos and branding guidelines (where they exist) are available to download from the REA Learning Space via the REA Foundation Ltd website and teams **MUST** be fully aware of the conditions outlined in these documents. The Corporate Partners are clearly identified within the downloadable file.

C2.8.1.1 Corporate Partner Logos

[Advice]

These **MUST** be applied to a team's car and poster. Car decals for REA Corporate Partners are supplied to a team at the event check-in process and **MUST** be applied to Car A. Teams are **NOT** permitted to produce their own corporate partner decals. Refer to the Technical Regulations.

C2.8.2 F1® in Schools In Country Logo

[Eligibility]

Teams **MUST** use the F1 in Schools Logo with the IN-COUNTRY indicator. No other version of the logo is permitted.



C2.8.3 Formula One® Word Mark Restrictions

[Eligibility]

No teams participating in the challenge are permitted to use **Formula One Word Marks** in their team name, logo, email address, domain name, and/or ANY social media handle. These Word Marks include: F1®, Formula One, Formula 1, Grand Prix and F1® in Schools. Registered team names including **ANY** of these marks will be rejected.

C2.8.4 F1® in Schools & Department of Defence Logo Permitted Use

[Eligibility]

Use of the F1 in Schools and Department of Defence logos outside of the STEM Challenge is **NOT** permitted and use of these logos within the 'Challenge' is **NOT** permitted on **ANY social media pages**. Use is restricted to project elements such as the car or poster.

C2.8.5 F1® in Schools Word Mark Permitted Use

[Advice]

ANY team using the F1 in Schools Word Mark anywhere within their project **MUST** include the Registered symbol in superscript form if using as a heading or sub-heading. This symbol is **NOT** required if used as body text.

C2.8.6 F1® Word Mark Permitted Use

[Advice]

When using the Word Marks F1®, Formula 1® and Formula One® they **MUST** be accompanied by the Registered symbol in superscript form as indicated if using as a heading or sub-heading. This symbol is **NOT** required if used as body text.

C2.8.7 Department of Defence National Support

[Advice]

The Australian Government's Department of Defence has provided REA with financial support for F1 in Schools since 2008. As the largest financial supporter of REA activities, the Department of Defence is already a supporter of your team, so please **DO NOT** approach them for **ANY** further financial support.

C2.9 Mandatory Project Elements Submission: Prior to Event

C2.9.1 Digital Upload via REA Google Drive

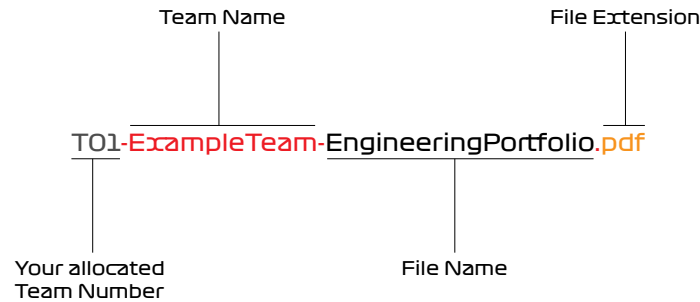
[Eligibility]

Around two weeks prior to an event, teams will be emailed a unique link to a google drive folder that they will be required to upload their electronic data to. A deadline will be imposed around one week out from the event. Teams will require a google account for uploading of electronic project elements. Refer to C.2.9.5 for a checklist of required elements.

C2.9.1.1 General Requirements

[Eligibility]

- Uploaded files **MUST** be a team's final versions they are submitting for judging.
- **ALL** files **MUST** be clearly labelled in accordance with the specified naming convention as depicted below. **Penalties apply.**



C2.9.1.2 File Formats & Size

[Eligibility]

- Posters **MUST** be submitted as separate **PDF** files no larger than 100mb. **Penalties apply.**
- CAD files **MUST** be submitted as **STEP, STP or other universal** file formats, **NOT** the native format. For example Fusion 360 native format is .f3d.
- Car renders **MUST** be submitted as **high quality PNG** files.

C2.9.2 Penalties

C2.9.2.1 Late Submission

[10 Points per day]

If Project Elements are not submitted to the REA Google Drive by the required deadline, the following arrangements will be in place:

- Project elements submitted after the deadline will still be assessed if readable.
- A penalty of **10** points per day will be applied for each file, per day or part thereof, until ALL project elements are received.

C2.9.2.2 File Size & Document Formats

[10 Points]

A single penalty of **10** points will be applied for **ANY** submitted file satisfying the following conditions:

- Exceeds the maximum files size as per APPENDIX 1.
- Are **NOT** submitted in the correct file format.
- Does **NOT** comply with the required file naming convention

C2.9.5 Project Elements for Digital Submission

ENGINEERING			
	Project Element	Submission Details	Judging Criteria
<input type="checkbox"/>	1 x A2 Poster or 2 x A3 Posters	Electronic: PDF format Maximum 100mb file size Submitted to REA G-Drive	• Engineering Design Process
<input type="checkbox"/>	<u>1 x Engineering Compliance Booklet</u>	Electronic: PDF format Maximum 100mb file size Submitted to REA G-Drive	• <u>Engineering CAD</u>
FORMS			
<input type="checkbox"/>	Media Consent Form (for each team member)	Electronic: PDF format Submitted to REA G-Drive	• Eligibility
<input type="checkbox"/>	Student Code of Conduct	Electronic: PDF format Submitted to REA G-Drive	• Eligibility

C2.10 Mandatory Project Elements Required at Event Check-in

ENGINEERING			
	Project Element	Submission Details	Judging Criteria
<input type="checkbox"/>	Poster(s)	1 x A2 Poster or 2 x A3 printed	<ul style="list-style-type: none"> Engineering Design Process
<input type="checkbox"/>	Engineering Compliance Booklet	1 x A3 printed and bound	<ul style="list-style-type: none"> Engineering: CAD Engineering: Specifications
CARS			
	Project Element	Submission Details	Judging Criteria
<input type="checkbox"/>	Car	1 x Car A complete with decals	<ul style="list-style-type: none"> Engineering: Specifications Racing

C2.10.3 Car Submission Procedure

- Decals are provided at check-in and teams are responsible for their application to the cars.
- Cars **MUST** have a surface finish which is dry to touch.
- A Car with a mass that is below the minimum legal mass **WILL NOT** be accepted at submission. Prior to submission, each team will be given the opportunity to check the mass of their cars on the official State Final REA scales. Teams will be required to increase the mass of the car/s to at least the minimum legal mass by using **ONLY** the legal ballasting procedure.
- Car A once submitted will be placed into Parc Ferme and **NOT** released for **ANY** other judging.

C2.10.4 Legal Ballasting of Race Cars

[Penalty – 1pt per Screw]

Teams **MAY** increase the mass of a car (ballasting) using **ONLY** the methods prescribed.

Teams **MUST** consider carefully the method by which the mass of a car is increased, as a car **MUST** comply with the Technical Regulations after its mass is increased. When adding mass, teams are advised to pay particular attention to issues such as effect on ground clearance.

C2.10.4.1 Methods of increasing mass that **MAY NOT** infringe Technical Regulations

- Addition of [a single](#) screw and such that:
 - Screws **MUST** be screwed in fully up to the screw head.
 - Screws **MUST NOT** be screwed into that part of the Body that surrounds the canister.
 - Screws **MUST NOT** obstruct the tether line.
 - [Screws **MUST NOT** be screwed into the virtual cargo.](#)

C2.10.4.2 Methods of increasing mass that **WILL** infringe Technical Regulations

- [Addition of more than one screw will result in a 1 point penalty per additional screw.](#)
- Addition of BluTack, putty or other pressure-sensitive adhesive material to the Body.
- Attaching pieces of solid material to the Body other than screws.

C2.11 Use of Project Elements by REA Foundation Ltd.

[Eligibility]

It is a condition of entry to Australian State and National Finals that each team permits REA Foundation Ltd. to use their [Poster](#) for marketing purposes and / or publication as exemplar projects for reference by others.

ARTICLE C3 - COMPETITION AND JUDGING FORMAT

C3.1 Event Information

[Advice]

All event information including the timing and venue for all judging and competition activities will be provided via the REA Event App [or via email](#) with details emailed to teams and teachers in the lead up to the event.

C3.2 Judging Schedule

Each team will be assessed as per the Judging Schedule. The Judging Schedule will be formulated by REA Foundation Ltd. to best and fairly accommodate all judging and other competition activities.

C3.3 Judging Panels

[Advice]

REA Foundation Ltd. always makes every effort to select judges from industry or education institutions who have knowledge and experience relevant to the panel they will be judging on. All judging panels are fully briefed by the Event Director and/or the Chair of Judges prior to the start of the competition.

C3.5 Students with Special Needs

[Eligibility]

In circumstances where a student has special needs and upon written application to REA Foundation Ltd. by the supervising teacher at least one month prior to a State Final, every effort will be made to accommodate the needs of the student.

C3.6 Judging Categories

[Advice]

There are three (3) judging categories, each with its own team of judges – where possible - and specified judging activities as detailed in further articles.

- Specifications
- Engineering - Design Process
- Racing

C3.7 Point Allocations

[Advice]

At State Finals, points will be awarded to teams across six (6) categories with maximum possible scores as detailed in the following table.

Points Allocation Table		
Judging Criteria	Primary Division	Junior & Senior Division
Specification	80 points	80 points
<u>CAD</u>	<u>20 points</u>	<u>10 points</u>
Manufacturing	20 points	20 points
Design Process <u>Poster</u>	40 points	40 points
Grand Prix	60 points	60 points
Total	220 points	210 points

C3.8 Judging Score Cards

[Advice]

The REA Foundation Ltd State and National Finals judging score cards 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. These can be found in the Appendices at the end of this document.

Reading the score cards carefully is important as they provide critical information for teams as to what needs to be presented for each judging category.

C3.9 Critical Regulations Non Compliance

[Advice]

Technical Regulations attracting time penalties have been identified as being **critical regulations**. If a team's Car A is judged as being **NON-COMPLIANT** with **ANY** critical technical regulation, they will be **INELIGIBLE** for the following awards:

- Best Engineered

ARTICLE C4 - SPECIFICATIONS JUDGING (80 points)

C4.1 General Information

C4.1.1 Competition Class Provisions

Specifications judging is conducted for **ALL** competition classes.

C4.1.2 What will be Assessed?

Specification judging is a detailed inspection process where Car A will be assessed for compliance with the F1 in Schools Australian Technical Regulations. Refer to the specification judging score card for scoring details.

C4.1.3 Team Preparation

Teams **MUST** ensure that their Car A is complete and ready for specification judging before they are submitted. Notice is also drawn to the critical technical regulations, refer ARTICLE C3.10. Teams **MUST** have also submitted a hard copy of their Engineering Drawing. Refer ARTICLES C2.9. and C2.10.

C4.1.4 Judging Process / Procedure

Teams begin specifications judging with a full allocation of 80 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 two parts to the specification judging process.

C4.1.4.1 Specifications Compliance Judging

This is conducted within the confines of parc fermé, where the Scrutineers will check both cars 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. Specifications compliance checking **MAY** commence as cars are submitted at event check-in.

C4.1.4.2 Rectifying Critical Regulation Failure

Teams that have been judged during initial specifications compliance to have incurred a critical regulation failure through non-compliance with a Technical Rule attracting a Time Penalty, **WILL** be provided with a special 20-minute car service time, prior to the commencement of racing. If during this service time the car can be modified so as to comply with the failed regulation/s, the Time Penalty/ies **WILL** be removed without being classified as having incurred a critical regulation infringement. However, the points' penalty **WILL** still apply.

Teams are advised to bring their own tools and measuring devices for rectification. REA will **NOT** provide these items.

C4.1.4.3 Specifications Compliance Feedback

Where time permits, each team **WILL** be scheduled a period of time for a review of **ANY** specification infringements ruled. This will generally be conducted at a team's Trade Display or in the case of 3DP Class teams, other area identified in pre-competition event documentation. The Lead Scrutineer will highlight to the team **ANY** technical regulation infringements and provide necessary explanations.

The team is then given an opportunity to explain to the Judges why they feel **ANY** identified infringements **SHOULD** be considered as permissible.

Following the team's explanation, the Lead Scrutineer **MAY** choose to reverse the original decision or uphold it. No further discussion will then be permitted at that point. Teams **MAY** lodge a Grievance as per ARTICLE C2.4.1.5.

C4.2 Specification Judging Decision Appeals

Teams **MAY ONLY** appeal the specification judges' decision if they believe their justification for regulation compliance **SHOULD** be accepted. The procedure for submitting technical regulation infringements is outlined in ARTICLE C12.

ARTICLE C5 - ENGINEERING JUDGING (80 points)

C5.1 General Information

C5.1.1 Competition Class Provisions

- Orthographic and Rendering are the ONLY elements of Engineering CAD judging conducted for the 3DP Class.
- **Quality of Finished Product** are the **ONLY** elements of **Manufacturing** judging conducted for the 3DP Class.

C5.1.2 Team Preparation

C5.1.2.1 CAD & Manufacturing Judging

- 3D Photorealistic Render/s: A hard copy of the 3D photorealistic render/s of the final car design **MUST** be submitted at event check-in. This is to be included in the bound Engineering Compliance Booklet of engineering drawings and clearly identified with the team name. Refer ARTICLE C2.10.
- **Orthographic Drawing/s:** As a minimum, a 3rd angle orthographic projection drawing, including plan, side and end elevations of the fully assembled car **MUST** be included within an Engineering Compliance Booklet. These elements **MUST** be produced using CAD. The orthographic technical drawing **SHOULD** include dimensions and corresponding regulation numbers in order to illustrate regulation compliance. The team name and author **MUST** also be included in a title block.

C5.1.2.2 Engineering Design Process Judging

- Teams **SHOULD succinctly** document their Engineering Car Design Process on one (1) A2 poster or two (2) A3 posters. Preparation **SHOULD** include careful reading of the score card. The key performance indicators describe what the judges will be looking for. Lamination of posters is recommended.

C5.2 Judging Process / Procedure

C5.2.2 CAD

The **CAD** orthographic and rendering will be assessed from a team's electronic Compliance Booklet leading up to an event! Teams are not required as part of this judging process.

C5.2.3 Manufacturing

Manufacturing will be assessed using a team's car behind closed doors and teams are not required as part of this judging process

C5.2.4 Engineering Design Process

Engineering Design Process will be judged from the information documented in the 3DP Class **Poster**. Teams are not required as part of this judging process.

C5.3 Key Criteria

C5.3.1 CAD (20 points)

Refer to the Engineering CAD judging score card for key performance indicator information.

C5.3.1.1 What will be assessed?

- Orthographic (A3 bound Engineering Compliance Booklet).
- Rendering (A3 bound Engineering Compliance Booklet).

C5.3.3 Manufacturing (20 points)

Refer to the Engineering Manufacturing judging score card/s for key performance indicator information.

C5.3.3.1 What will be assessed?

The engineering judges will assess a team's:

- Quality of Finished Product - Geometry/Form.
- Quality of Finished Product - Surface finish.

C5.3.4 Engineering Car Design Process (40 points)

Refer to the Engineering Car Design Process judging score card for key performance indicator information.

C5.3.4.1 What will be assessed?

The engineering judges will assess the team's Car Design Process which includes all stages from identifying the requirements of the brief through to the final design. Specific areas to be assessed are:

- Ideas
- Analysis
- Evaluation
- Overall Design Technical Merit

ARTICLE C10 - RACING (60 points)

C10.1 General Information

C10.1.1 Competition Class Provisions

Racing applies to ALL competition classes.

C10.1.2 Launch / Timing System

At State Finals, the official Denford or Pitsco F1 in Schools Race System (whichever is available), will be used for launching cars, timing races and driver reaction times to 1/1000th of a second. Where possible, teams **SHOULD** be familiar with the operation of these Race Systems.

C10.1.3 Official REA Foundation Ltd Race Track

At State Finals, REA Foundation Ltd. Will use the official REA Foundation Ltd or Denford Elevated Race Track (whichever is available), the length of which is approximately 24 -25 metres. A 'thermally fused braid' tether line of diameter 0.2 mm and fixed at the track end, passes down the centre of each lane. At the start of the track, the line passes through 90 degrees over a single pulley and is then attached to a 2.0kg mass suspended above the floor.

The official **distance** that cars are raced from start to finish is 20 metres.

C10.1.4 Car Design Considerations

The design of the car **SHOULD** be undertaken with an understanding of the car's journey on the track. The most damaging loads are imparted to the car during the retardation phase after the car crosses the finish line. Cars are typically retarded by running into a buffer comprised of towels. This can be as much as a -20g collision. To avoid engineering deficiency penalties, cars are to be robust enough to withstand this loading as part of the defined use and operational cycle.

C10.1.5 Retardation Devices

Standard track environments provide a buffer of towels positioned behind the finish line or the Denford Deceleration System consisting of tapered brushes which gradually slow cars down after they have crossed the finishing line. However teams are permitted to provide their own retardation environment and the team will be responsible for its management. Such an environment **MUST** be approved by a Race Marshall. It shall **NOT** be attached to the track and it shall be restricted to be fully within their lane. Retardation systems **MUST** be located a minimum of 100mm after the finish line and be in place when the track marshall is ready to launch the cars. No further time delays will be allowed.

C10.1.6 Who needs to attend?

3DPI Class team members **SHOULD** be present during their scheduled racing sessions and **SHOULD** assemble at the track start for briefing by the race track judges 5 minutes prior to their scheduled time. 3DP Class teams who cannot attend State Finals will have their car raced in Automatic Launch mode by the track marshalls and the results recorded.

C10.1.7 Time Penalties

If a team's Car A is judged as being NON-COMPLIANT with **ANY** critical technical regulation, the Time Penalty will be applied to every run/lap for ALL forms of racing.

C10.1.8 DNS Penalties

If a car incurs a breakage during racing and is unable to be repaired during a 10 minute Car Repair session immediately following a team's scheduled racing, it will DNS **ANY** following races until it can be repaired in a subsequent Car Repair session.

C10.1.9 Safety Checks

Race Officials will routinely inspect cars for safety during scheduled races - in particular, to ensure that the tether line guides are secure. If the Officials rule a car to be unsafe, **ANY** remaining races leading up to a Car Repair session **WILL** be deemed DNS. Unresolved safety concerns **WILL** prohibit cars from racing on the track and **WILL** result in zero points being awarded for racing.

C10.1.10 Did Not Start (DNS)

Cars deemed unsafe or ineligible to race by Scrutineers **WILL** be classified as Did Not Start (DNS) in racing events.

C10.1.11 Did Not Finish (DNF)

Damage incurred during a run, before the car crosses the finish line, (e.g. wheel, wing, tether line guide or **ANY** other part of the car product separating) **WILL** result in a Did Not Finish (DNF) race result. The Judges **MAY** refer to video evidence where available to verify a DNF result.

C10.1.12 False Start (FS)

A false start (jump start) occurs during Manual Launch (Reaction) Racing when the driver depresses the trigger button before the 5 start gate lights have extinguished. This will be signalled with the outer red light above a lane illuminating.

In the event of a reaction False Start (FS) in Manual Launch (Reaction) Racing, the car will subsequently be run using automatic launch mode to record a net "lap time" but a reaction FS will also be recorded.

Teams **NOT** recording a Reaction run time (i.e. four False Starts) will be excluded from Knock-out Racing as well as the marks associated with this and Fastest Reaction Time.

C10.1.13 CO2 Cylinders

CO2 cylinders **MUST** be inserted so that they are situated firmly against the base of the cartridge chamber.

All cylinders for State Finals contain 8 grams of CO2. They are provided by REA Foundation Ltd. and are weighed as follows:

- State Finals: Within 0.50 grams, with random allocation

C10.1.14 Car Mass Checks

Cars will have their mass checked at the race track prior to commencing each race event. This is done to ensure each car remains at or above the legal minimum mass. If the mass of a car is judged to have gone below the legal minimum mass whilst stored in parc fermé, then the judges in consultation with the team will add ballast in the form of one or more REA supplied screws until the mass of the car is at least the required minimum mass.

C10.1.15 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.

C10.2 Types of Racing

The F1 in Schools State Final racing points will be awarded through the staging of two types of racing modes.

C10.2.1 Automatic Launch (Time Trial) Racing

Automatic launch mode, consisting of two races in each lane will **only** be conducted **if team members are not present to conduct Reaction Racing**.

C10.2.2 Manual Launch (Reaction) Racing

Manual / driver launch mode, commonly referred to as 'reaction racing' consisting of two races in each lane as per the judging schedule. These **four** races **determine** the overall Grand Prix Race event results. 'Drivers' will **NOT** be permitted to practise during the official race time.

C10.3 Racing Procedures

C10.3.1 Manual / Driver Launch

A maximum of two (2) team members (driver/s) can be appointed for launching the team's car using the manual launch method. **ONLY** one driver per scheduled session of Reaction Racing is permitted. **ONLY** the driver can stand within the dedicated starting area.

C10.3.2 Start Line Car Adjustments

A Race Marshall **WILL** initially stage the car on the track but teams are permitted to make **ANY** adjustments approved by the Race Marshall after the car has been staged so long as this does **NOT** take more than 30 seconds. The use of 'positioning blocks' to align the car in the centre of the lane is permitted however these **MUST** be removed prior to launch. Teams **MUST NOT** use devices which interface with the starting mechanism and teams are **NOT** permitted to attach signage or other materials to the track or timing system.

C10.3.3 Finish Line Management

At least one member of the team **MUST** be appointed as responsible for managing the finish line retardation device, e.g. Denford Deceleration System or teams' own system (refer ARTICLE C10.1.5). Once the race session is complete, a race marshall shall remove and inspect each car before it is returned to Parc Ferme or released to the team member for Car Repairs.

C10.3.4 Automatic Launch Race Procedure

Car is only launched in automatic mode for teams who do not have members present. Four (4) races in total will be conducted per team, two (2) races in each lane. These races **MAY** be run over two separate sessions. Teams are advised to check the Judging Schedule. The total time displayed on the start gate for each race is recorded for scoring purposes. The automatic launch race events will be conducted using the following procedure:

- i Teams race in order as shown in the competition program.
- ii All cars are weighed and ballast applied.
- iii One team member to track finish for deceleration system control – maximum of 30 seconds.
- iv Race 1 – Race Marshall will load Car A onto the track along with a competitor's car in the opposite lane.
- v Race Marshall sets car at track start line, inserts CO2 cylinder and engages car with launch pod.
- vi A team member is then allowed 30 seconds to 'fine tune' the staging of their first car.
- vii Race Marshall presses the start system reset button – car is launched.
- viii Judge records TOTAL RACE TIME displayed on start gate.
- ix Team member at finish line lifts the retardation device and rolls car to the track start keeping the CO2 cylinder inserted in the car chamber.
- x Race Marshall removes the spent CO2 cylinder and Race 2 conducted in same lane using same process as per v - x.
- xi Race Marshall at start line removes car from tether line and returns it to Parc Ferme, or places it at the designated Car Repair location if damage has occurred. At the conclusion of Car Repair, car is returned to Parc Ferme.
- xii This process is repeated for Race 3 and Race 4 at the next race session as per the Judging Schedule with cars placed in lanes opposite to the configuration used in Races 1 and 2.

C10.3.5 Manual Launch Race Procedure

Car is launched in manual / driver reaction mode with four (4) races total per team, two (2) races in each lane. These races **MAY** be run over two separate sessions. Teams are advised to check the Judging Schedule. The TOTAL RACE TIME displayed and the REACTION TIME displayed for each race is recorded. The manual launch reaction races will be conducted as follows:

- i Teams race in order as shown in the competition program.
- ii One team member to track finish for deceleration system control – maximum of 30 seconds.
- iii Race 1 – Race Marshalls will load Car A onto the track along with a competitor's car in the opposite lane.
- iv Race Marshall sets car at track start line, inserts CO2 cylinder and engages car with launch pod.
- v A team member is then allowed 30 seconds to 'fine tune' the staging of their first car.
- vi Driver stands trackside with corresponding lane start trigger. Remaining team members stand behind driver.

- vii Race Marshall presses the start system reset button – lights come on
- viii When lights extinguish, driver presses trigger and car is launched.
- ix Judge records TOTAL RACE TIME and REACTION TIME displayed on start gate.
- x Team member at finish line lifts the retardation device and rolls car to the track start keeping the CO2 cylinder inserted in the car chamber.
- xi Race Marshall removes the spent CO2 cylinder and Race 2 conducted in same lane using same process as per v - x.
- xii Race Marshall at start line removes car from tether line and returns it to Parc Ferme, or places it at the designated Car Repair location if damage has occurred. At the conclusion of Car Repair, car is returned to Parc Ferme.
- xiii This process is repeated for Race 3 and Race 4 at the next race session as per the Judging Schedule with cars placed in lanes opposite to the configuration used in Races 1 and 2.

C10.4 Race Scoring for Awards

C10.4.1 Grand Prix Race

Due to variability in track conditions, the 'Grand Prix Race' award marks will be awarded based on multiple runs, similar to a multiple lap race. The 'Race Time' will be the sum of the recorded net lap times from Automatic (Time Trial) Racing and Manual Launch (Reaction) Racing where the single fastest and slowest laps recorded are excluded. One lap DNF can be considered the "slowest lap" and excluded. A second lap DNF will lead to the car being deemed as failing to complete the race. Teams will be awarded points that match the performance of their car when compared to the fastest car in the competition. The scaling system uses the following formula to calculate points:

C10.4.1.2 3DP Class (60 points)

- **Regional Final Race Points** = $20 + (40 / (\text{Fastest Car Race Time} \times 0.30)) \times (\text{Fastest Car Race Time} \times 1.30 - \text{Team's Race Time})$
- **State Final Race Points** = $20 + (40 / (\text{Fastest Car Race Time} \times 0.20)) \times (\text{Fastest Car Race Time} \times 1.20 - \text{Team's Race Time})$

The **minimum score** awarded for a team completing the race is 20 marks and requires **3 legal runs**.

The **minimum score** awarded for a team starting but failing to complete the race is 10 marks plus 2 marks for each lap completed up to a maximum of 2 laps.

Teams **NOT** starting the race (**DNS**) will receive 0 points.

ARTICLE C11 - CAR REPAIRS

C11.1 Car Servicing

- There will be **NO** car 'servicing' sessions.
- Once a car is submitted at event check in, **NO** servicing including lubrication of **ANY** component **SHALL** be permitted at **ANY** time including car repair sessions.

C11.2 Car Repairs

- At State Final events, teams will be allocated **10 minutes** to perform penalty free repairs on cars in the dedicated Car Repair area if the team can satisfy a Track Marshall or Race Director that the car has suffered damage during racing or handling.
- The allocated 10 minutes for car repairs commences as soon as the Track Marshall places the damaged car within the Car Repair area. Timing will **NOT** be stopped for **ANY** reason, including the retrieval of tools to effect repairs.
- Evidence of damage **MUST** be either a cracked component, a component separated from the car, or some other change of condition of the car so as to be considered a safety issue by a Track Marshall.
- The repair **MAY ONLY** return the car to its state prior to receiving the damage for which it is being repaired.
- Design or assembly issues such as wheels **NOT** rotating satisfactorily **SHALL NOT** be accepted as damage.
- Repair **SHALL NOT** be permitted for the purpose of improving the performance of the car.
- All damage issues and related repair work during racing is at the Judge's discretion and **MAY** be referred to the Lead Scrutineer and/or Chair of Judges for a final decision.
- Should repairs undertaken by teams result in a violation of any technical regulations, a penalty **MAY** be imposed by the Lead Scrutineer and/or Chair of Judges.
- All repairs **WILL** be managed and monitored by a designated Track Marshall.

C11.3 Car Repair Penalties

- A car **NOT** returned within the 10 minutes **SHALL** be deemed DNS for the following races until it can be repaired in subsequent Car Repair sessions.
- A repaired car **WILL** be weighed and **MUST** meet the minimum mass, otherwise, ballast in the form of screws will be applied by Track Marshalls where required.
- **ANY** repaired car deemed unsafe to race by the Lead Track Judge, will result in a DNS for the following scheduled race/s until it can be repaired in a subsequent Car Repair session.

C11.4 Dedicated Area

Car Repair **MUST ONLY** take place at the dedicated Car Repair area. A maximum of two (2) team members and Judges are allowed to enter the car repair area. Repairs will be managed and monitored by a designated Track Marshall. Teams **MUST** keep the area clean of glue and rubbish.

C11.5 Team Tool Kits

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.

ARTICLE C12 - GRIEVANCES

C12.1 Procedure

C12.1.1 Specifications Compliance Related

- If a team is dissatisfied with the decision of the Lead Scrutineer, following critical regulation rectification, an appeal **MAY** be submitted in writing by the advertised deadline using the official on-line Grievance Form.
- The Chair of Judges **WILL** discuss the appeal with the scrutineers. The Chair of Judges **WILL** then meet with the team, to discuss the appeal and explain the final decision.

C12.1.2 Non Specifications Related

Grievances need to be submitted by the advertised deadline using the official on-line Grievance Form.

C12.2 Judge's Decision

The Chair of Judges decision related to **ANY** grievance is final and no further discussion will be entered into.

ARTICLE C13 - JUDGES

C13.1 Overview

There will be several teams of judges that form the entire judging panel.

Judges are generally higher education and industry experts invited by REA Foundation Ltd. They are selected and appointed to teams based on their qualifications and experience.

All judges undertake a comprehensive briefing prior to the competition and are required to declare **ANY** conflicts of interest with respect to the teams they are judging. Where a conflict of interest **MAY** occur, the judge is required to step back from judging the relevant team/s.

Some judges **MAY** perform a dual role. For example, undertake the specifications compliance of cars and Poster judging.

C13.2 Chair of Judges

An independent authority appointed by REA Foundation Ltd. to oversee all judging procedures. The Chair of Judges will determine the final judging decision where a grievance has been submitted or other judging issue needs resolution. The Chair of Judges will ratify the final results and work with the Competition Director to ensure all scores are entered correctly into a spread sheet to identify awards winners.

C13.3 The Judging Teams

C13.3.1 Specifications Judges

Will scrutinise each Car A with respect to the Australian Technical Regulations.

C13.3.3 Poster Judges

Poster Judges will assess each team's Engineering Design Process as per the Criteria 4 score card.

C13.3.6 Race Judges

Will oversee and rule on all race events and **ANY** incidents.

C13.3.7 Car Repair Judges

Car Repair Judges will oversee all car service activities and rule on **ANY** infringements that **MAY** occur.

C13.4 Judging Decisions

THE DECISION OF THE JUDGES IS FINAL.

ARTICLE C14 - AWARDS

C14.1 Awards Celebration

At each State Final, an Awards Presentation is conducted, the timing of which is included in the Event Programme which is released closer to the event.

C14.2 Participation Recognition

At State Finals, all students and judges will receive official participation/recognition certificates. These will be provided in the team and judge information packs.

C14.3 Prizes and Trophies

C14.3.1 State Finals

At State Finals, teams winning an award will be presented with a certificate.

C14.4 List of Awards to be Presented

Notes:

1. Eligibility for winning awards, requires teams to achieve at least 60% of the overall mark used to calculate overall 1st, 2nd and 3rd placings and Category Awards.
2. Teams incurring Time Penalties will **NOT** be eligible to win Engineering related awards.
3. In situations where there are five or less teams representing a competition class, overall 2nd and 3rd place, along with some category awards **MAY NOT** be presented. This will be at the discretion of the Chair of Judges.

C14.4.2 3DP Class Teams

FASTEST LAP AWARD

The team with fastest individual net run time from:

Criteria 11.1: Racing/Grand Prix Racing.

BEST TEAM POSTER AWARD

Team with highest score for Poster Criteria

Criteria 4: Engineering/Design Process

BEST ENGINEERED CAR AWARD

Team with highest score for:

Criteria 1: Engineering/Specifications

Criteria 2.6 & 2.7: Engineering/CAD

Criteria 3.6 & 3.7: Engineering/Manufacturing

CHAMPIONS

Team with the highest scoring sum of all marking criteria.

Note: For 3DP Class teams there is no pathway to the National Final

1. AWARDS MATRIX

Judging Category	Judging Sub Category	Criteria	3DP Class Awards					
			Champions	2nd Place	3rd Place	Best Engineered Car	Best Team Poster	Fastest Lap
Engineering	Specifications	1 Specifications						
Engineering	CAD	2.6 Orthographic						
		2.7 Rendering						
Engineering	Manufacturing	3.6 Quality of Finished Product - Geometry/Form						
		3.7 Quality of Finished Product - Surface Finish						
Engineering	Design Process	4.2 Ideas						
		4.4 Analysis						
		4.6 Evaluation						
		4.7 Overall Design Technical Merit						
Racing	Racing	11.1 Automatic Launch						
		11.2 Manual Launch						

2. SUGGESTED RECTIFICATION TOOL KIT CHECKLIST

	Item / Element	Details
<input type="checkbox"/>	Technical Regulations	Current Edition - either electronic copy on tablet or printed copy
<input type="checkbox"/>	Digital Calliper	To re-measure dimensions before and after removing material
<input type="checkbox"/>	Steel Rule	Useful for measuring, straight edge for cutting guide and for wrapping sand paper around to give flat sanding surface
<input type="checkbox"/>	Sand Paper	Including coarse grades to remove material quickly: 80, 120, 180, 400
<input type="checkbox"/>	Dremel Tool	For removing material quickly and accurately
<input type="checkbox"/>	Safety Box Cutter Knife	For slicing through bulky material quickly and easily
<input type="checkbox"/>	Hobby Razor Saw	For sawing plastic and balsa quickly and straight
<input type="checkbox"/>	Files	Thin Flats: Coarse, fine; Rounds: <3mm diameter; Square
<input type="checkbox"/>	Drill Bits	1mm, 2mm and 2x 3mm diameter. Useful for checking clearances, and aligning front wings if need to be reglued
<input type="checkbox"/>	Super Glue	
<input type="checkbox"/>	MDF Board	About 200x100x5. Useful as cutting board, and as flat surface for measuring ground clearance, wing tip heights, etc.
<input type="checkbox"/>	Scissors	
<input type="checkbox"/>	Masking Tape	Useful to hold pieces while glue is setting
<input type="checkbox"/>	Pliers	Pointy nose and flat nose
<input type="checkbox"/>	Side Cutters	
<input type="checkbox"/>	Spare Parts	To provide spare pieces, eg. extra wing pieces, wheels, etc.
<input type="checkbox"/>	Marker Pens	Black and matching body colours to mark where to cut, and to touch up body colour after mods
<input type="checkbox"/>	Tissues / Cloth Rags	To wipe off excess glue, and clean up spills and shavings

CRITERIA 1 - SPECIFICATION SCORE CARD (1 OF 3)For clarification on individual regulations, refer to the **2024 Australian Technical Regulations**.

Regulation	Regulation Overview	Quick Guide	Penalty	Car A	Judge 1	Judge 2	Deduction	Remarks	Rectification
ARTICLE T2 – GENERAL PRINCIPLES									
T2.4	Safe Construction	Visual Check	-10						Pass/Fail
ARTICLE T3 – GENERAL CAR REGULATIONS									
T3.1.1	Designed and engineered using CAD / CAM	Check Portfolio	-10						Pass/Fail
T3.1.2	Body manufactured using CNC only.	Check Portfolio	-10						
T3.1.7	No separately formed plastic parts	Check Drawing	-10						
T3.2.1	Leading Features Min Width – Forward most Extremity (FME)	3mm or R1.5mm	-10						
T3.2.2	Leading Features Min Width – 6mm back from FME	6mm	-10						
T3.3.3	Hand Finishing permitted. Max variation to CAD Model.	3mm	-10						
T3.3.4	Hand Created Features – not permitted	Visual Check	-10						
T3.4.1	Team Number Decal	Visual Check	-2						
T3.4.2	REA Corporate Partner (REA, F1IS, DoD) & State Sponsor Logo Decals	Visual Check	-2 ea						
T3.4.3.1	REA Corporate Partner Logo Decals Minimum Dimensions	30mm x 15mm	-2 ea						
T3.4.3.2	Positioning of F1IS A & B Decals on Side Pods	Visual Check	-2 ea						
T3.4.3.3	Positioning of other Corp Partner. Decals visible in top or side view	Visual Check	-2 ea						
T3.5	Undefined features	Check T1.6	-4						
T3.6	Overall length	Min:170mm Max:210mm	-4						
T3.9.1	3D printed plastic default material for all non-rotating components	Visual & Drawing Check	-4						
T3.9.2	Thickness	Min 3mm	-1						
ARTICLE T5 – BODY & SIDEPOD REGULATIONS									
T5.1	Body construction – single continuous 3D printed plastic between axles	Visual & Drawing Check	-4						Pass/Fail
T5.2	Implants, foreign objects & voids not permitted	Visual & Drawing Check	-4						
T5.3	Width of Sidepod	Min 40mm	-2						
T5.4	Side pod projected surface	Min 30mm x 15mm	-1						
T5.5	Virtual cargo – between centre line of front & rear axles	T4.5	-4						

LEGEND ■ Eligibility Regulations/Possible Disqualification ■ Critical Regulations - 0.02/0.05 Time Penalty ■ Critical Regulations - 0.05 Time Penalty

CRITERIA 1 - SPECIFICATION SCORE CARD (2 OF 3)For clarification on individual regulations, refer to the **2024** Australian Technical Regulations.

Regulation	Regulation Overview	Min/Max Quick Guide	Penalty	Car A	Judge 1	Judge 2	Deduction	Remarks	Rectification
ARTICLE T7 – WING REGULATIONS									
T7.1.1	Car MUST have a front wing	Visual & Drawing Check	-20						Pass/Fail
T7.1.2	Car MUST have a rear wing	Visual & Drawing Check	-20						Pass/Fail
T7.4	Front wing/support structure in front of centre line of axle	Visual Check	-1						Pass/Fail
T7.6	Front wing construction material - 3D printed plastic only	Visual & Drawing Check	-4						Pass/Fail
T7.8.1	Front wing span	Min 34mm	-4						Pass/Fail
T7.8.2	Rear wing span	Min 34mm	-4						Pass/Fail
T7.10.1	Front wing chord	Min 15mm	-2						Pass/Fail
T7.10.2	Rear wing chord	Min 15mm	-2						Pass/Fail
T7.11.1	Front wing thickness	3.5mm Max: 9mm	-2						Pass/Fail
T7.11.2	Rear wing thickness	3.5mm Max: 9mm	-2						Pass/Fail
T7.12	Rear wing positioning behind centre line of rear axle	Visual Check	-1						Pass/Fail
T7.14	Rear wing construction material - 3D printed plastic only	Visual & Drawing Check	-4						Pass/Fail
ARTICLE T8 – WHEEL REGULATIONS									
T8.2	Combination of four unmodified REA standard wheels	Visual Check	-4						Pass/Fail
T8.8	Visibility in front view – permitted height of obstruction	Max 15mm	-4						Pass/Fail
T8.9.1	Visibility in front of front wheels	Min 1mm exclusion zone	-4						Pass/Fail
T8.9.2	Visibility behind front wheels	Min 15mm exclusion zone	-4						Pass/Fail
T8.9.3	Visibility in front of rear wheels	Check Tech Regs	-4						Pass/Fail
T8.9.4	Visibility behind rear wheels	Min 1mm exclusion zone	-4						Pass/Fail

LEGEND
 Eligibility Regulations/Possible Disqualification

 Critical Regulations - 0.1s Time Penalty

 Critical Regulations - 0.05s Time Penalty

 Critical Regulations - 0.02s/0.05s Time Penalty

CRITERIA 1 - SPECIFICATION SCORE CARD (3 OF 3)For clarification on individual regulations, refer to the **2024** Australian Technical Regulations.

Regulation	Regulation Overview	Min/Max Quick Guide	Penalty	Car A	Judge 1	Judge 2	Deduction	Remarks	Rectification
ARTICLE T9 – WHEEL SUPPORT REGULATIONS									
T9.3	Four unmodified REA axle grommets	Visual Check	-4						Pass/Fail
T9.4	2 standard REA axles or modified axles of same diameter	Visual Check/Min 3mm	-2						
T9.5	No added parts or modifications to wheel systems	Visual Check	-2						
ARTICLE T10 – TETHER LINE GUIDE REGULATIONS									
T10.1	2 guides firmly secured, front and rear underside of car	Visual Check	-10						Pass/Fail
T10.2	Longitudinal separation measured inside edges of guides	Min 120mm	-1						
T10.3	Inside diameter of guide (hole size)	Min 3mm	-2						
T10.4.1	Guides must be closed for racing	Visual Check	-4						
T10.4.2	No sharp edges	Visual Check	-4						
T10.4.3	Adequate strength & fixing	200g mass	-4						
ARTICLE T11 – POWER PLANT PROVISION RULES									
T11.1	Cylinder when fully inserted must interface with launch pod	Visual Check	-20						Pass/Fail
T11.2	CO2 cylinder chamber diameter	19mm	-1						
T11.3	Depth of chamber	Min 45mm Max 60mm	-1						
T11.4	Height of lowest point of chamber above track surface	22mm	-4						
T11.5	CO2 cylinder chamber completely surrounded by material	Min 3mm	-4						
T11.6	Paint & other materials not present in CO2 cylinder chamber	Visual Check	-1						

LEGEND ■ Eligibility Regulations/Possible Disqualification ■ Critical Regulations - 0.02s/0.05s Time Penalty ■ Critical Regulations - 0.05s Time Penalty

CRITERIA 2 - ENGINEERING: COMPUTER AIDED DESIGN SCORE CARD

JUDGING SUB CATEGORY	COMPUTER AIDED DESIGN	TEAM ID	
PRIMARY EVIDENCE	COMPLIANCE BOOKLET	TEAM NAME	
SECONDARY EVIDENCE	NIL	SCHOOL	
CRITERIA	2	COMPETITION CLASS	

	LOW	DEVELOPING	ADVANCED	SCORE
CRITERIA	0 1 0 1 2	2 3 3 4 5 6	4 5 7 8 9 10	/5 /10
2.1 Orthographic ¹	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.	/10
2.2 Rendering ¹	Poor quality	Different views. Some inconsistencies with final car.	Different views. Perfect match to final car including branding. Environment and lighting. High end photorealistic rendering technique	/10
PENALTIES (1 Pt each)			Computer Aided Design GRAND TOTAL	/70
T5.5 Virtual Cargo Identification - The virtual cargo location and compliance MUST be clearly identified via hatching, shading or block colour within the Engineering Drawings submitted as part of the Engineering Compliance Booklet			Minus Penalties	- /2
T7.2 Wing Identification – The surfaces defining both the front and rear wings MUST be identified clearly within the drawings submitted within the Engineering Compliance Booklet .			Computer Aided Design GRAND TOTAL	/70

¹ These criteria are judged by the CAD Judges in the lead up to an event and results entered on-line

CRITERIA 3 - ENGINEERING: MANUFACTURING SCORE CARD

JUDGING SUB CATEGORY	MANUFACTURING	TEAM ID	
PRIMARY EVIDENCE	EXAMINATION OF CAR A IN PARC FERME	TEAM NAME	
SECONDARY EVIDENCE	NIL	SCHOOL	
CRITERIA	3	COMPETITION CLASS	

	LOW	DEVELOPING	ADVANCED	SCORE
CRITERIA	0 1 2	3 4 5 6	7 8 9 10	/10
3.6 Quality of Finished Product - Geometry/Form¹	Reasonable form with some inconsistencies	Good overall form and assembly with attention to detail	Exceptional attention to detail across all aspects of form.	/10
3.7 Quality of Finished Product - Surface Finish¹	Reasonable finish with some inconsistencies	Good overall finish quality with attention to detail	Showcase finish quality. Exceptional attention to detail.	/10
			Manufacturing GRAND TOTAL	/20

² These criteria are judged by the Specifications Judges during the scrutineering process and results entered on-line

CRITERIA 4 - ENGINEERING: DESIGN PROCESS SCORE CARD

JUDGING SUB CATEGORY	ENGINEERING DESIGN PROCESS	TEAM ID
PRIMARY EVIDENCE	TEAM POSTER	TEAM NAME
SECONDARY EVIDENCE		SCHOOL
CRITERIA	4	COMPETITION CLASS

	LOW	DEVELOPING	ADVANCED	SCORE
CRITERIA	0 1 2	3 4 5 6	7 8 9 10	/10
4.2 Ideas	Single or basic concepts	Multiple concepts with links to research.	Several technically inspired ideas for different car features/functions	/10
4.4 Analysis	Little evidence of analysis	Analysis which is relevant and results documented	Quality analysis methodologies. Accurate results and data linked to design revisions. Advanced use of CFD and other design tools.	/10
4.6 Evaluation	No or limited evaluation	Evaluations at different stages	Excellent ongoing evaluations linked to improvement actions	/10
4.7 Overall Design Technical Merit	Basic design process with little technical merit	Developed design process with some technical merit	Original & clever developed design process with excellent technical merit	/10
			Design Process GRAND TOTAL	/40



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